TETRA TECH

August 12, 2013

Maryland Square Shopping Center, LLC

Mr. Robert G. Russell
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525 B Street, Suite 2200
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RE: **FINAL CORRECTIVE ACTION REPORT FOR GROUNDWATER**
MARYLAND SQUARE SHOPPING CENTER
3661 SOUTH MARYLAND PARKWAY
LAS VEGAS, NEVADA
FACILITY ID NO. H-000086

Dear Mr. Russell:

Enclosed please find one copy of the Final Corrective Action Report for Groundwater for the above referenced project as requested by the Nevada Division of Environmental Protection Bureau of Corrective Actions (BCA). This report is being provided to BCA in electronic Adobe Acrobat format on this date, August 12, 2013. Hard copies of the report will be forthcoming.

Should you have questions or require additional information, please do not hesitate to contact Robert Manriquez, Program Manager, at 619.321.6748, or myself at 619.525.7188. Thank you for your time and consideration in this matter.

Regards,

Steven N. Bradley, CEG, CEM
Certified Environmental Manager
CEM No. 1333, Exp. March 22, 2015

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Enclosure(s) Corrective Action Report for Groundwater

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FINAL CORRECTIVE ACTION REPORT FOR GROUNDWATER

MARYLAND SQUARE PCE SITE

Facility ID No. H-000086

3661 SOUTH MARYLAND PARKWAY

LAS VEGAS, NEVADA

SUBMITTED TO
NEVADA DIVISION OF ENVIRONMENTAL PROTECTION
BUREAU OF CORRECTIVE ACTIONS
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August 12, 2013

SIGNATURE PAGE

DRAFT CORRECTIVE ACTION REPORT FOR GROUNDWATER

Facility ID No. H-000086

Maryland Square PCE Site
3661 South Maryland Parkway
Las Vegas, Nevada

For the services provided and described to develop this document, the following language is from *Nevada Administrative Code* (NAC) 459:

I hereby certify that I am responsible for the services described in this document and for the preparation of this document. The services described in this document have been provided in a manner consistent with the current standards of the profession, and to the best of my knowledge comply with all applicable federal, state, and local statutes, regulations, and ordinances.



_____

Steven Bradley
Nevada Certified Environmental Manager
CEM No. 1333, Exp. March 22, 2015

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LIST OF ACRONYMS

µg/m^3	Micrograms per cubic meter
µg/L	Micrograms per liter
amsl	Above mean sea level
AS	Air sparging
ASTM	ASTM International
bgs	Below ground surface
CAO	Corrective action objective
CAR	Corrective action report
Carus	Carus Corporation
CFR	*Code of Federal Regulations*
cm/sec	Centimeters per second
CMT	Continuous multi-channel tubing
COC	Contaminant of concern
Converse	Converse Consultants
COPC	Contaminant of potential concern
CSM	Conceptual site model
DCE	Dichloroethene
DO	Dissolved oxygen
DPE	Dual-phase extraction
EPA	United States Environmental Protection Agency
ESA	Environmental site assessment
foc	Fraction of organic carbon
ft	Feet
ft^2	Square feet
ft/yr	Feet per year
g/cm^3	Grams per cubic centimeter
GES	Groundwater & Environmental Services, Inc.
g/kg	Grams per kilogram
g/L	Grams per liter
gpd	Gallons per day
gpm	Gallons per minute
GRA	General response action
GW	Groundwater
GW CAP	Corrective Action Plan for Groundwater
HHRA	Human health risk assessment
HI	Hazard Index (noncancer)
HSA	Hollow stem auger
IA/WW	Indoor Air and Well Water
IC	Institutional control

LIST OF ACRONYMS CONTINUED

ID	Identification
ISCO	In-situ chemical oxidation
J&E	Johnson and Ettinger
K	Hydraulic conductivity
K_z/K_r	Vertical to horizontal anisotropy ratio
lbs	Pounds
LTM	Long-term monitoring
MCL	Maximum contaminant level
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
mL	Milliliter
mm	Millimeter
MNA	Monitored natural attenuation
mS/cm	MicroSiemens per centimeter
NA	Not analyzed
NAC	*Nevada Administrative Code*
NAD 83	North American Datum of 1983
NAVD	North American Vertical Datum of 1988
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
ND	Not detected
NDEP	Nevada Division of Environmental Protection
NDWR	Nevada Division of Water Resources
NOD	Natural oxidant demand
NS	Not sampled
NTU	Nephelometric Turbidity Unit
ORP	Oxidation-reduction potential
PCE	Tetrachloroethene
PIP	Permanganate injection point
ppm	Parts per million
PRB	Permeable reactive barrier
psi	Pounds per square inch
PulseOx	Hydrogen peroxide/ozone injection
PVC	Polyvinyl chloride
RAGS	*Risk Assessment Guidance for Superfund*
ROI	Radius of influence
RSL	Regional Screening Level
S	Storage coefficient
SC	Specific conductance
scfm	Standard cubic feet per minute

LIST OF ACRONYMS CONTINUED

SLHHRA	Screening Level Human Health Risk Assessment
SSD	Subslab depressurization
SVE	Soil vapor extraction
T	Transmissivity
TCE	Trichloroethene
TDS	Total dissolved solids
Temp	Temperature
Tetra Tech	Tetra Tech EM Inc.
TOC	Total organic carbon
UIC	Underground injection control
URS	URS Corporation
VI	Vapor intrusion
VOA	Volatile organic analysis
VOC	Volatile organic compound
WRCC	Western Region Climate Center

CORRECTIVE ACTION REPORT

The Maryland Square Tetrachlorethene (PCE) Site (Site) is within an area of Las Vegas, Nevada, approximately 2 miles east of downtown Las Vegas. The Site contains a 6,000-foot-long plume of dissolved-phase PCE in the shallow groundwater (Figure 1). PCE-contaminated soil at the source area has been cleaned up, but not the PCE plume in groundwater. This Corrective Action Report (CAR) for Groundwater provides the results of the bench- and pilot-scale studies and additional characterization conducted to guide the selection and design of a remedy for the PCE-contaminated groundwater.

1.0 BACKGROUND

The area of Las Vegas that includes the former Maryland Square Shopping Center (the Property) was developed mainly in the 1960s and 1970s. This shopping center formerly housed a dry cleaning facility, which operated from 1969 to 2000. Historical discharge of PCE at this former dry cleaner was discovered during an environmental site assessment (ESA), and was reported in 2000 to the Nevada Division of Environmental Protection (NDEP) spill reporting hotline (NDEP 2012b). This section provides detailed information on site location and history, as well as a summary of the *Corrective Action Plan for Groundwater* (GW CAP) (Tetra Tech EM Inc. [Tetra Tech] 2011a).

1.1 Site Description

The former dry cleaners (Al Phillips the Cleaner) operated for more than 30 years at the Property, at 3661 S. Maryland Parkway. The former dry cleaner was on the west side of South Maryland Parkway, across the street from the Boulevard Mall (Figures 1 and 2). The exact date of the release (or releases) from the dry cleaners is unknown, although one 100-gallon spill was documented to have occurred in 1982.

Historical discharge of PCE at the former dry cleaners facility was discovered during a due diligence ESA (Converse 2000), and was reported on November 29, 2000, via the NDEP spill reporting hotline. In June 2005, the former shopping center, including the dry cleaners, was demolished.

A series of environmental investigations occurred on and off the Property from 2000 to present. Investigations on the Property determined the extent of PCE-contaminated soil. Investigations on and off the Property determined the extent of PCE-contaminated groundwater. Additional information on the history of the Site, as well as a list of previous investigations, appears in the GW CAP (Tetra Tech 2011a). In addition, the administrative record for the Site is available on-line at NDEP's website: http://ndep.nv.gov/pce/foia.htm. PCE-contaminated soil was removed from the Property in the summer of 2011.

The PCE plume in shallow groundwater extends downgradient of the former dry cleaners, beneath the Boulevard Mall, residential properties, a golf course, and past Eastern Avenue, which is approximately 6,000 feet (ft) downgradient (Figure 3).

1.2 Corrective Action Plan

The GW CAP (Tetra Tech 2011a) developed and evaluated potential remedies for cleaning up shallow groundwater contaminated with PCE. The primary purpose of the GW CAP was to establish a process, schedule, and criteria to evaluate and select a corrective action for cleanup of shallow groundwater.

Secondary purposes were to identify data gaps and propose actions needed to complete selection of a corrective action and facilitate design.

Preliminary corrective action objectives (CAO) and preliminary remediation standards were developed to evaluate corrective actions. As stated in the GW CAP, these preliminary CAOs and remediation standards would be refined and finalized after completion of the Screening Level Human Health Risk Assessment (SLHHRA). The preliminary methodology for the SLHHRA was summarized in the Indoor Air and Well Water (IA/WW) Work Plan (Tetra Tech 2011b), approved by NDEP on August 23, 2011. Preliminary CAOs defined in the GW CAP were:

1. Protect human health by reducing inhalation exposure to PCE and daughter products emanating from groundwater containing PCE concentrations above the remediation standard.

2. Remediate shallow groundwater where PCE concentrations exceed the remediation standard for groundwater.

In addition, the following objective was identified in the IA/WW Work Plan:

3. Take appropriate action to assure that the drinking water standards for PCE and its degradation products are not exceeded in domestic wells identified within the 5 micrograms per liter (µg/L) boundary of the plume.

The preliminary numerical remediation standard for PCE in shallow groundwater was 5.0 µg/L, the maximum contaminant level (MCL) promulgated under the Safe Drinking Water Act. The preliminary numerical remediation standard for PCE in indoor air is the concentration associated with a 10^{-6} carcinogenic risk as published in the United States Environmental Protection Agency's (EPA) Region IX Regional Screening Levels (RSL) for indoor air in a residential scenario. When the GW CAP was written, this concentration was 0.41 micrograms per cubic meter (µg/m^3), but has since changed to 9.4 µg/m^3. The concentration equivalent to a noncarcinogenic hazard index (HI) of 1 also changed from 276 to 42 micrograms per cubic meter (µg/m^3) (EPA 2012).

The GW CAP identified general response actions (GRA) using the preliminary CAOs and numerical remediation standards, and technologies under these GRAs were evaluated for implementability, effectiveness, and cost. Technologies found viable were subsequently assembled into Corrective Action Alternatives. These alternatives were then analyzed using the following eight National Oil and Hazardous Substances Pollution Contingency Plan (NCP) feasibility study evaluation criteria listed under 40 *Code of Federal Regulations* (CFR) 300.430 (e) (9): (1) overall protection of human health and the environment; (2) long-term effectiveness and permanence; (3) reduction in toxicity, mobility, and volume through treatment; (4) short-term effectiveness; (5) implementability; (6) cost; (7) state acceptance; and (8) community acceptance. The alternatives analyzed included:

- Alternative 1 – No Action
- Alternative 2A – In Situ Chemical Oxidation (ISCO) of Target Areas, Institutional Controls (IC), Subslab Depressurization (SSD) Systems, and Long-Term Monitoring (LTM)
- Alternative 2B – ISCO of the Entire Plume, ICs, SSD Systems, and LTM
- Alternative 3 – Permeable Reactive Barrier (PRB) Upgradient of the Residential Area, ICs, SSD Systems, and LTM
- Alternative 4 – Sparge Curtain Upgradient of the Residential Area, ICs, SSD Systems, and LTM

- Alternative 5 – Groundwater Extraction and Treatment, ICs, SSD Systems, and LTM
- Alternative 6 – In Situ Enhanced Bioremediation of Target Areas, ICs, SSD Systems, and LTM.

Alternative selection was deferred pending proof of performance of some of the proposed technologies; ISCO and air sparging were selected for pilot-scale testing (Appendix C of the GW CAP) as detailed in the next section. Pumping tests were to be conducted to better evaluate the feasibility of groundwater extraction and treatment as a corrective action. The GW CAP acknowledged that corrective action might require a multi-faceted approach because of the magnitude and extent of PCE contamination and aquifer heterogeneities. NDEP approved the GW CAP on September 8, 2011.

1.3 Proposed Aquifer Testing and Pilot Testing

Based on a review of the existing data, the GW CAP (Tetra Tech 2011a) concluded that additional data were needed for selection and design of the corrective action. Appendix C of the CAP, *A Work Plan for Bench and Pilot Tests*, outlined the proposed activities that included:

- Aquifer tests using constant rate pumping tests and step-drawdown pumping west of the Boulevard Mall, near MW-14, and in the parking lot east of Boulevard Mall.
- Vertical delineation to evaluate contaminant migration through the subsurface west of the Boulevard Mall, near MW-14, and in the parking lot east of Boulevard Mall.
- Bench-scale testing to measure natural oxidant demand (NOD) of soil at the Site.
- Pilot testing of air sparging (AS) with soil vapor extraction (SVE), ISCO using permanganate or persulfate, and ISCO using ozone and hydrogen peroxide.

1.4 Addenda and Deviations

Several addenda were prepared after submittal of the GW CAP as summarized in Table 1-1 below.

TABLE 1-1: Addenda and Deviations to the Corrective Action Plan for Groundwater

Date Submitted	Request/Change to Corrective Action Plan for Groundwater (GW CAP)	Date Approved by NDEP
8/25/2011	Tetra Tech proposed vertical delineation of contamination through continuous core borings and discrete depth groundwater sampling, per Nevada Division of Environmental Protection (NDEP) comments on the GW CAP.	9/8/2011
7/31/2012	Tetra Tech requested that the Air Sparging/Soil Vapor Extraction (AS/SVE) portion of the pilot test be dropped from the upcoming field work because of unfavorable subsurface conditions, consisting of a caliche layer below the water table that had been confirmed during vertical delineation work.	8/16/2012
8/20/2012	Tetra Tech proposed (1) installation of a deep nested well on the western mall parking lot, (2) installation of two deep nested wells on the eastern mall parking lot, and (3) installation of two deep wells in the Paradise Palms neighborhood.	8/21/2012
10/8/2012	Tetra Tech proposed (1) installation of a deep nested well on the western mall parking lot, (2) installation of two deep nested wells on the eastern mall parking lot, and (3) depending on results from sampling the first three wells, installation of one deep well in the Paradise Palms neighborhood.	10/9/2012

2.0 Field Activities and Results

The GW CAP outlined the field work to be performed, including additional characterization of the extent of PCE-contaminated groundwater, aquifer testing, and bench- and pilot-scale testing. This section summarizes the implementation of planned activities and documents any deviations from the plan.

2.1 Vertical Delineation

Prior to the work conducted for the GW CAP, the vertical extent of PCE-contaminated groundwater was unknown both near the source area and along the centerline of the plume. This information was needed to help select and design a remedy for groundwater, yet boreholes drilled for previous investigations generally had been limited to a depth of 30 to 40 ft below ground surface (bgs). Therefore, vertical delineation of PCE contamination in groundwater was conducted in the area near well MW-14, on the west side of the Boulevard Mall and immediately downgradient from the source area, and in the eastern parking lot of the Boulevard Mall. Both areas are along the centerline of the PCE plume.

Field work proceeded in three phases:

- Phase I (July 2012): Advancement of boreholes at four locations to depths of up to 60 ft bgs, with continuous core sampling to characterize lithology and to collect depth-discrete groundwater samples at 5-foot intervals from the water table to the total depth of the borehole.
- Phase II (January 2013): Advancement of boreholes at three locations to 100, 104, and 120 ft bgs, with continuous core sampling to characterize lithology and to collect depth-discrete groundwater samples at 10-foot intervals from the water table to the total depth of the borehole.
- Phase III (March 2013): Advancement of one borehole to a depth of 60 ft bgs to collect discrete groundwater samples at 50 and 60 ft bgs.

Phase I field work provided information on the vertical distribution of PCE and lithology throughout the saturated zone. This information allowed selection of appropriate target intervals for the upcoming pilot tests. However, significant concentrations of PCE (as much as 1,100 µg/L) were detected at 60 ft bgs, the total depth of drilling during Phase I. Therefore, additional vertical delineation was performed during Phase II. Groundwater and soil data collected during Phase II showed decreasing concentrations of PCE with increasing depth, down to nondetectable levels at about 80 ft bgs (Table 2-1-1). During Phase III, supplemental, depth-discrete grab samples of groundwater were collected during drilling for pilot test wells.

Table 2-1-1 summarizes information from the three phases of vertical delineation, and the following sections discuss sampling procedures and results.

TABLE 2-1-1: Analytical Data from Groundwater Samples from Vertical Delineation

BORING ID	MW-6D	MW-14I		B-4		MW-19D		PIP		MW-19I		MW-20D		CMT-1	
Phase	II	I		I		II		III		I		II		I	
Completion Date	1/21/13	7/27/12		7/18/12		1/15/13		3/6/13		7/19/12		1/11/13		7/24/12	
Depth to GW (ft bgs)	29	29		29.45		27		25		29		27		30	
Caliche (ft bgs)	18-20	18.5-20		33-35		30-31; 102-103		32-33		31-33		9-11.5; 24-26		31-32	
Depth (ft bgs)	[PCE] (µg/L)	Depth (ft bgs)	[PCE] (µg/L)	Depth (ft bgs)	[PCE] (µg/L)	Depth (ft bgs)	[PCE] (µg/L)	Depth (ft bgs)	[PCE] (µg/L)	Depth (ft bgs)	[PCE] (µg/L)	Depth (ft bgs)	[PCE] (µg/L)	Depth (ft bgs)	[PCE] (µg/L)
32	720	30	980	31	420	27[a]	810	--	--	33	*	27	*	32	170
--	--	35	900	36	500	36	840	--	--	36	920	37	*	35	280
41	1100	40	*	41	**	--	--	--	--	41	150	--	--	40	320
--	--	45	7600	44	430	46	700	--	--	46	*	--	--	45	350
51	180	50	650	49	360	--	--	--	--	49	63	--	--	50	370
--	--	55	1700	55	20	54	*	51	990	54	100	56	470	55	280
61	*			60	*	61	*	61	*	59	700	--	--	60	1100
65[a]	150					--	--					66	*		
71	17					71	*					--	--		
81	0.76					81[b]	ND					86	*		
91	ND					91	*					--	--		
101	ND					101	ND					101[c]	0.52/ND		
111	0.52														
121	ND														

Notes: Depth-discrete groundwater samples were collected during field activities in July 2012, January 2013, and March 2013.

Depth to GW Approximate depth of first groundwater encountered during drilling

* Not sampled due to insufficient recharge

** Sampler got unplugged

-- Interval not sampled

[a] Sample was collected with stainless steel bailer

[b] Based on soil sample result

[c] Primary and duplicate sample results

ft bgs Feet below ground surface

µg/L Micrograms per liter

ND Not detected

PCE Tetrachloroethene

[PCE] PCE concentration

PIP Potassium permanganate injection point

2.1.1 Continuous Soil Coring and Depth-Discrete Groundwater Sampling

Phase I (July 2012) – HSA Drilling

During Phase I field activities, a hollow stem auger (HSA) drilling rig was used to advance three boreholes within the parking lot east of Boulevard Mall (B-4, MW-19I, and CMT-1), and one west of the Boulevard Mall near well MW-14 (MW-14I). At each location, a split-spoon sampler was used to collect continuous soil core samples.

The split-spoon sampler was advanced into the undisturbed soil beneath the bottom of the casing or borehole using a weighted hammer and a drill rod. The hammer weight, hammer drop, and the number of blows required to advance the split-spoon sampler in 6-inch increments provided information on the density and consistency of the subsurface soil (see blow counts on boring logs for B-4 and MW-19I in Appendix A). After the split-spoon sampler had been driven to its intended depth, it was removed carefully to avoid loss of sample material. After the split-spoon sampler was removed from the casing, it was detached from the drill rod and opened to allow for visual examination and classification of recovered soil. For the first two boreholes, a 2-inch-diameter, 2-ft-long, steel, split-spoon sampler was used for continuous soil coring. However, to expedite drilling and sample collection, a 2-inch-diameter, 5-ft-long, steel, split-spoon sampler was used instead at the third and fourth boreholes (CMT-1 and MW-14I).

West of the Boulevard Mall, at the northwest corner of the west parking garage, where high concentrations of PCE have been measured in groundwater near well MW-14, care was taken to avoid potential cross-contamination while drilling. To minimize the risk of cross-contamination, a 12-inch steel casing was installed after drilling to a depth of 20 ft bgs (anticipated depth to groundwater). The drilling then resumed inside the temporary casing to the final depth of the borehole.

Groundwater samples were collected every 5 ft starting at the top of the saturated zone to the total depth of the borehole. Groundwater samples were collected using a Hydropunch II™ sampler. The sealed-screen sampler was advanced to the targeted sampling depth and the protective outer rod was retracted, exposing the screen to groundwater. The sampler was then left in place to allow groundwater to fill a sample chamber. Depending on the hydraulic conductivity of the lithology encountered at the targeted sampling depth, sample collection could take from 15 minutes to more than 1 hour. The sampler was then retrieved and the sample transferred into three 40-milliliter volatile organic analysis (VOA) vials for laboratory analysis. Drilling resumed and the borehole advanced to the next targeted sampling depth. The sampler and drive rod were decontaminated before being re-introduced into the borehole to collect another groundwater sample.

Groundwater samples from Phase I boreholes MW-14I, B-4, MW-19I, and CMT-1 were collected every 5 feet from 30 to 60 ft bgs (Table 2-1-1). However, the deepest groundwater sample from borehole MW-14I was collected at 55 ft bgs because the borehole was terminated at the top of clay layer; this was done to minimize the potential for PCE-contaminated water to migrate downward through this layer.

A total of 22 depth-discrete groundwater samples were collected from four boreholes during Phase I. Five samples could not be collected because the volume of water extracted was insufficient or the sampler malfunctioned. Analytical results (Table 2-1-1) indicate non-uniform distribution of dissolved PCE over depth, with the highest concentration of 7,600 µg/L PCE in monitoring wells at and near the location of the former dry cleaners. PCE concentrations in groundwater at the bottom of boreholes ranged from 700 to 1,700 µg/L. This suggested that PCE contamination could extend deeper than 60 ft bgs and led to Phase II of vertical delineation.

Phase II (January 2013) – Sonic Drilling

Using a sonic drill rig, two borings (MW-19D and MW-20D) were advanced to 100 and 104 ft bgs within the parking lot east of Boulevard Mall, and one boring (MW-6D) was advanced to 120 ft bgs west of the Boulevard Mall near well MW-14. Sonic drilling was chosen because of the anticipated depth of investigation and the need to retrieve continuous soil cores. In addition, telescoping sonic drill casing advancement allowed drilling through multiple water bearing units without risking cross-contamination.

The sonic drill head is a hydraulically activated unit that conveys high-frequency vibrations to a drill string to achieve cutting action at the bit face. The cutting action forces a continuous core of the formation up into the drill string. During this investigation, continuous cores were retrieved from each borehole as 10-ft-long sections. Occasionally, vibrations from sonic drilling produced cores that were very hot, especially when retrieved from dense or consolidated layers such as caliche. However, such heating was generally observed only at shallow depths in the unsaturated zone. Heating in the saturated zone was insignificant and not likely to have affected groundwater samples.

Soil core recovery rates were 80 to 100 percent, except for a few sections of boreholes MW-6D and MW-20D (see boring logs in Appendix A) where recovery was poor. This occurred when materials encountered became increasingly liquefied because the driller hammered in the temporary casing after several unsuccessful attempts.

Both SimulProbe® and Hydropunch II were used to collect depth-discrete groundwater samples. SimulProbe® is capable of concurrently sampling soil and groundwater. The SimulProbe was driven to a target depth, and the drive shoe was mechanically retracted from the soil sample container, exposing the screened fluid entry ports for groundwater sampling. Groundwater samples were collected by first pressurizing the water canister with nitrogen gas to prevent ambient groundwater from entering the tool as it was driven to sampling depth. Upon achievement of target depth, the pressure in the canister was released to allow groundwater to fill the canister through a one-way valve at the base of the canister.

Groundwater samples collected below 60 ft bgs were analyzed off site in the lab with quick turnaround because the results would determine whether drilling should continue. The plan was to advance the borehole and collect depth-discrete groundwater samples to a depth not to exceed 100 feet (in the Eastern Parking Lot area) or 200 feet (west of the Boulevard Mall area) or until PCE concentration measured was below 100 µg/L at three consecutive depths. SimulProbe was used to sample borehole MW-20D, and only two out of six attempts to collect groundwater samples were successful, despite waiting 1 hour for each sample to collect. Therefore, Hydropunch II was used to sample the next borehole, MW-19D. However, this did not prove much better, so the SimulProbe sampler was re-engaged to collect a soil sample if a groundwater sample could not be collected. In one case, when a groundwater sample could not be collected, a soil sample was collected at 81 ft bgs and sent to the lab to be analyzed for PCE.

Groundwater samples from Phase II boreholes MW-6D, MW-19D, and MW-20D were collected from 27 to 121 ft bgs (Table 2-1-1). A total of 16 depth-discrete groundwater samples were collected from three boreholes during this event; nine samples could not be collected because of extremely slow groundwater recovery from the formation. Analytical results (Table 2-1-1) indicate PCE in the upper 20 ft of the saturated zone at concentrations as high as 1,100 µg/L, but at decreasing concentrations below about 70 ft bgs, and absent or at very dilute concentrations below 81 ft bgs. Therefore, Phase II field activities appear to have been successful in delineating the vertical extent of PCE in the shallow groundwater.

Phase III (March 2013) – HSA Drilling

Additional depth-discrete groundwater samples were collected while pre-drilling the 60-ft-deep borehole to be used for injection of permanganate in the pilot test. The Hydropunch II sampler was used to collect depth-discrete groundwater samples from 51 and 61 ft bgs. However, after 2 hours, only the sample from 51 ft bgs had sufficient volume for analysis; thus no sample was collected from 61 ft bgs. PCE in groundwater at 51 ft bgs was detected at a concentration of 900 µg/L (Table 2-1-1).

2.1.2 Soil Sampling for Physical and Chemical Parameters

During Phase I and II field activities, soil samples were collected and analyzed for moisture content, bulk density, total porosity, hydraulic conductivity, grain size distribution, and total organic carbon (TOC) content. In addition, two composite samples were collected from two boreholes (MW-19I and CMT-1) within the parking lot east of the Boulevard Mall and analyzed for permanganate NOD, to calculate the amount of potassium permanganate needed to overcome the NOD.

Soil samples were collected from discrete depths in boreholes using a thin-walled tube sampler (Shelby tube). The Shelby tube was pushed to the desired depth and then rotated to collect an undisturbed soil sample. The retrieved 2-foot-long tube with soil sample was sealed with plastic caps and sent to PTS Laboratories, Inc., for soil analyses. The summary of laboratory results from five soil samples collected from boreholes at various depths in the saturated zone appears in Table 2-1-2. The details of analyses, including analytical methods, are provided in Attachment 4.

Soil samples were collected from approximately 38 to 81 ft bgs, and contained varying amounts of coarse and fine-grained soils (Table 2-1-2). Silt and clay content in samples ranged from approximately 22 to 72 percent, while sand and gravel content ranged from 28 to 78 percent. Moisture content in samples measured from 17 to 61 percent by weight. Dry bulk density ranged from 0.88 to 1.53 grams per cubic centimeter (g/cm^3), and total porosity was measured at 38-66 percent. Hydraulic conductivity values ranged from 0.01 to 0.35 ft per day, with the lower values representing fine-grained soils (silts, sandy silts), and the higher values representing sandy soils (fine sand, silty sand).

TOC content ranged from 270 to 750 milligrams per kilogram (mg/kg), which is relatively low, but not unexpected for soil samples in a desert environment with little history of vegetation. Expressed as fraction of organic carbon (foc), the average foc is less than 0.001, which indicates limited sorption of PCE to soil organic carbon.

Permanganate NOD sampling and analyses were part of bench-scale testing and are discussed in Section 2.3.

TABLE 2-1-2: Summary of Soil Properties

BORING ID	Depth (ft bgs)	Grain Size Description*	Gravel (%)	Sand (%)	Silt & Clay (%)	Moisture Content (% weight)	Dry Bulk Density (g/cm^3)	Total Porosity (%)	Hydraulic Conductivity (ft/day)	TOC (mg/kg)
MW-14I	52	Fine Sand/Clayey Silt Mixture	0	40.6	59.4	17.3	1.66	37.8	0.014	660
MW-6D	71	Sand, Silt, Gravel Mixture	29.40	36.96	33.65	44.8	1.08	58.8	0.013	270
	81	Silty Sand with Gravel	25.38	52.67	21.96	60.8	0.88	66.2	0.009	450
MW-19I	43.6	Sandy Silt	0	28.37	71.63	21.9	1.57	41.5	0.013	530
CMT-1	37.6	Silty Sand	2.69	60.58	36.73	20.5	1.52	43.5	0.350	750

Notes:

Data collected in July 2012 and January 2013.

* Grain size descriptions provided by PTS Laboratories were refined based on Unified Soil Classification System nomenclature for grain size composition.

ft bgs	Feet below ground surface
ft/day	Feet per day
(g/cm^3)	Grams per cubic centimeter
mg/kg	Milligrams per kilogram

2.1.3 Monitoring Well Installation

Three of the four Phase I investigative boreholes and all three Phase II investigative boreholes were converted to monitoring wells. Three wells were installed in Phase I (MW-14I, MW-19I, and CMT-1), and three triple-nested wells were installed in Phase II (MW-6D1/D2/D3, MW-19D1/D2/D3, and MW-20D1/D2/D3). Boring B-4 was abandoned in accordance with *Nevada Administrative Code* (NAC) 534, Underground Water and Wells.

Wells MW-14I and MW-19I were designed to function as pumping wells for aquifer tests (see Section 2.2). They were constructed of 4-inch-diameter schedule 40 polyvinyl chloride (PVC) casing with 0.010-inch slotted screens. The third well, CMT-1, was to be used as one of the observation wells for the aquifer test. It was constructed using the Seven-Channel continuous multi-channel tubing (CMT) system. The Seven-Channel CMT system, a 1.7-inch outer diameter polyethylene tube with seven screens, each 6 inches long, spaced 5 feet apart on centers, was installed into an 8-inch-diameter borehole. The tops of screens were positioned 30, 35, 40, 45, 50, 55, and 60 ft bgs. Each screen was accessed through one of seven ports at the top of the CMT riser.

Three triple-nested wells were installed on the Boulevard Mall Property during Phase II. Well MW-6D1/D2/D3 had a total depth of 110 feet, and wells MW-19D1/D2/D3, and MW-20D1/D2/D3 had total depths of approximately100 ft. The wells were designed to monitor shallow, intermediate, and deep groundwater, and for observation of the pilot tests.

All wells were developed using several cycles of surging, bailing, and pumping. Well construction details are summarized in Table 2-1-3. Appendix A provides well construction logs.

TABLE 2-1-3: Well Construction Details

Well Name	Construction Date	Northing* (ft)	Easting* (ft)	Top of Casing Elevation** ft	Well Casing Diameter inches	Total Depth of Well ft bgs	Total Depth of Borehole ft	Top of Screen ft bgs	Bottom of Screen ft bgs	Screen Length ft	Logged geology of screened interval
MW-06D1	1/21/2013	26746982.3	787975.8	1987.70	2	60	120	50	60	10	No recovery (Silty Clay w/gravel)
MW-06D2	1/21/2013	26746982.1	787975.9	1987.68	2	90	120	80	90	10	Silty Clay/Clayey Silt
MW-06D3	1/21/2013	26746982.5	787976.2	1987.73	2	110	120	100	110	10	Clayey Silt
MW-14I	7/27/2012	26747026.2	787981.9	1987.40	4	55	55.6	40	55	15	Silty Sand; Silt/Clay
MW-19I	7/23/2012	26746995.6	788955.1	1978.34	4	60	60	34	54	20	Silty Clay/Clayey Gravel; Silty Sand
MW-CMT1	7/25/2012	26747076.4	788956.4	1978.39	0.75	30.5	61	30	30.5	0.5	Silty Sand
CMT-1-35	7/25/2012	26747076.4	788956.4	1978.39	0.75	35.5	61	35	35.5	0.5	Lean Clay
CMT-1-40	7/25/2012	26747076.4	788956.4	1978.39	0.75	40.5	61	40	40.5	0.5	Clay
CMT-1-45	7/25/2012	26747076.4	788956.4	1978.39	0.75	45.5	61	45	45.5	0.5	Sandy, Gravelly Clay
CMT-1-50	7/25/2012	26747076.4	788956.4	1978.39	0.75	50.5	61	50	50.5	0.5	Gravelly Clay/Clay-Gravel mixture
CMT-1-55	7/25/2012	26747076.4	788956.4	1978.39	0.75	55.5	61	55	55.5	0.5	Sandy, Silty Clay
CMT-1-60	7/25/2012	26747076.4	788956.4	1978.39	0.75	60.5	61	60	60.5	0.5	Gravelly Clay
MW-19D1	1/15/2013	26746988.0	788928.9	1979.16	2	51	104	31	51	20	Gravel, interbedded with Clay
MW-19D2	1/15/2013	26746987.8	788929.0	1979.26	2	70	104	60	70	10	Silty to Sandy Clay; Silty Sand
MW-19D3	1/15/2013	26746987.8	788929.2	1979.26	2	102	104	92	102	10	Clayey Silt, Sandy Silt, Clay
MW-20D1	1/11/2013	26747067.6	788948.5	1978.61	2	45	100.5	25	45	20	Silty Sand, Poorly Graded Sand
MW-20D2	1/11/2013	26747067.7	788948.6	1978.68	2	65	100.5	55	65	10	Sandy Silt
MW-20D3	1/11/2013	26747067.6	788948.8	1978.59	2	100	100.5	90	100	10	Silty Sand

Notes:

* Northings and eastings are relative to the North American Datum of 1983 (NAD 83) Nevada State Plane East Zone 2701

** Elevation is relative to the North American Vertical Datum of 1988 (NAVD)

bgs Below ground surface

ft Feet

2.2 Aquifer Testing

The purpose of aquifer tests was to estimate the hydraulic properties such as hydraulic conductivity, transmissivity, and storage coefficient for geologic materials at the site, and also to provide additional information on site hydrogeology. The test setup, procedures, and interpretation of the results are detailed in Appendix B. This section briefly discusses the aquifer test procedures and summarizes test results. It also discusses the applicability of the aquifer test results for the interpretation of the pilot tests, as well as the implications for the groundwater remedy selection.

In July and August 2012, Tetra Tech conducted pumping tests west of the Boulevard Mall near well MW-14 and the parking lot east of Boulevard Mall The Boulevard Mall property lies immediately downgradient of the former Maryland Square Shopping Center, which housed the former dry cleaners.

2.2.1 Details of the Aquifer Testing

Test setup, procedures, and interpretation of results are detailed in Appendix B. This section briefly discusses the aquifer test procedures and analyzes the results.

Aquifer testing included a step-drawdown test and a constant-discharge test at each tested location. The step-drawdown tests determined the optimum pumping rates for the constant-discharge pumping tests that followed. The constant-discharge tests commenced after water levels had returned to static conditions.

Flow rates in the pumped wells were monitored throughout the test and maintained at the target rate by operating a flow control valve. Water levels in the pumped wells and the observation wells were measured both manually and automatically. Vented (gauged) pressure transducers were used for automated measurements. Water level recovery was monitored after pumping stopped. Water produced by the tests was treated and stored on the Boulevard Mall property in temporary fractionation tanks. The water was then sampled and analyzed for compliance with the permit prior to discharge into a storm sewer (see Appendix B).

MW-19I was used as the pumping well for the step-drawdown and constant-discharge tests in parking lot east of Boulevard Mall. MW-19 was an observation well for both tests, Wells MW-20 and CMT-1 were observation wells only for the constant-discharge test. Pressure transducers were used to measure water levels in observation wells MW-19 and MW-20. Additionally, water levels were measured manually in six of seven ports in well CMT-1. An obstruction prevented measurement in the deepest port. The cumulative drawdown at the end of the step test was approximately 10 ft in the pumping well, and 0.04 ft in the nearest observation well MW-19 (40 feet away). At the end of the 72-hour constant-discharge test, the drawdown was approximately 4 ft in the pumping well, and ranged from 0.03 to 0.04 ft in the three observation wells 40, 81, and 92 feet away.

MW-14I was used as the pumping well for the step-drawdown and constant-discharge tests west of the Boulevard Mall near well MW-14. MW-14 was an observation well for both tests, Wells MW-6 and MW-13 were used as observation wells only for the constant-discharge test. Water levels in all wells were measured using pressure transducers. The cumulative drawdown measured at the end of the step-drawdown test was approximately 10 ft in the pumping well and 0.07 ft in MW-14, the nearest observation well, located 40 feet away. At the end of the 77-hour constant-discharge test, the drawdown was approximately 13 ft in the pumping well, and ranged from 0.11 to 0.23 ft in the three observation wells located 231, 81, and 40 feet away.

Step-drawdown test data were used to determine the optimal pumping rate for the constant rate pumping tests and to calculate specific capacity and efficiency. Specific capacity expresses the well yield per unit of drawdown (Driscoll 1995). The estimated maximum specific capacity was 0.09 gallons per minute per foot of drawdown (gpm/ft) for MW-14I and 0.16 gpm/ft for MW-19I. The estimated well efficiency for each pumping well decreased from 74 to 60 percent when pumping rates increased from approximately 1 to 1.9 gpm. Both wells were expected to be most efficient when pumping at approximately 1 gpm. Therefore, a rate of 1 gpm was selected for the constant-discharge tests west of the Boulevard Mall near well MW-14 and the parking lot east of Boulevard Mall.

2.2.2 Analysis and Interpretation of Aquifer Test Data

The test data were interpreted using AQTESOLV version 4.5 (HydroSolve 2007), an aquifer test solution program. The water level input data did not require correction for barometric pressure fluctuations because vented pressure transducers were used. The AQTESOLV program calculated transmissivity (T) and storage coefficient (S) by comparing the observed time-drawdown data to theoretical standard curves (type curves) associated with known T and S. Hydraulic conductivity (K) was calculated by dividing T by the aquifer thickness (b).

As can be seen from the cross sections (see Figures 4, 5, 6, and 7), the lithology and hydrogeologic conditions near the pumping wells resemble a confined or leaky confined aquifer. Moreover, during drilling to install the pumping wells, groundwater was first encountered a few feet lower than the piezometric heads in the wells that were subsequently installed. This indicated that shallow groundwater may be under pressure at those locations, which would be consistent with a confined or leaky confined situation. Therefore, the Theis (1935)/ Hantush (1961) solution for a pumping/recovery test with a constant discharge rate in a confined aquifer with partial penetration was used for data analysis. Some data sets were also evaluated using the Hantush (1960) solution for a pumping/recovery test in a leaky confined aquifer without storage in adjacent aquitards. However, in the majority of cases, the Theis/Hantush solution for a confined aquifer better fit the field data.

Based on results of the step-drawdown and constant-discharge tests in the parking lot east of Boulevard Mall, the average transmissivity, storage coefficient, and hydraulic conductivity of the saturated zone are estimated at T= 64 ft^2/day, S = 0.0017, and K = 2.1 ft/day. Assuming a 30-ft thick saturated zone, the estimated hydraulic conductivity ranged from K = 1.1 to 3.4 ft/day, which is characteristic of silty sand and fine sand (Heath 1983, Domenico and Schwartz 1998). The average vertical to horizontal hydraulic conductivity anisotropy ratio (K_z/K_r) is estimated at approximately 0.005, indicating that the vertical permeability of the material is 200 times lower than its horizontal permeability. Despite the relatively weak response of the observation wells to pumping, the time-drawdown data from MW-19 and the recovery data for the pumping well increased confidence in the estimated parameters.

Based on results of the step-drawdown and constant-discharge tests west of the Boulevard Mall near well MW-14 , average T, S, and K of the saturated zone are estimated at T = 146 ft^2/day, S = 0.0009, and K = 4.2 ft/day. Assuming a 35-ft thick saturated zone, the estimated K ranged from 0.4 to 9.4 ft/day, which is characteristic of silty sand to medium clean sand (Heath 1983, Domenico and Schwartz 1998). The average K_z/K_r for the saturated water-bearing zone is estimated at approximately 0.013, indicating that the vertical permeability of the zone is nearly 100 times lower than its horizontal permeability.

2.2.3 Summary and Conclusions for the Aquifer Test Results

Conclusions from the step-drawdown and constant-discharge tests in the parking lot east of Boulevard Mall and west of the Boulevard Mall near well MW-14 are as follows:

1. The formation in which the pumping wells are screened produces relatively low well yields, as indicated by specific capacities ranging from 0.07 to 0.16 gpm per foot of drawdown. This means wells screened in the shallow water-bearing zone would produce water at very low flow rates, making them impractical for use in groundwater extraction for hydraulic control of PCE mass removal.

2. The average T ranges from 64 to 146 ft^2/day, and the average aquifer S ranges from 0.0009 to 0.0017. Therefore, wells screened in the shallow water-bearing zone would have excessive drawdowns even at low pumping rates, rendering them inefficient for groundwater extraction.

3. The average K of the shallow water-bearing zone ranges from 2.1 to 4.2 ft/day, corresponding to silty sand and sand, indicating moderate permeability. However, moderate permeability soils are likely present in the subsurface as thin disconnected lenses which would not support significant well yields.

These estimates of K are consistent with the results of slug tests conducted in a number of wells, including MW-13, MW-19, and MW-20, as summarized in Section 3.1.3.

Based on estimates of average K and observed hydraulic gradients, the horizontal groundwater seepage velocity at the Site is estimated to range from 40 to 100 ft/yr, with higher velocities associated with sand lenses of limited extent. Considering the low organic carbon content of tested soils (see Section 2.1.2), advective transport of PCE is expected to be only slightly retarded by sorption to soil. Therefore, within the test areas, the advective velocity of dissolved PCE is expected to range from 30 to 70 ft/yr. Section 3.2.2 further discusses groundwater seepage velocity and PCE transport.

2.3 Bench-Scale Testing

Representative soil samples from the proposed pilot test area were collected and tested for the 48-hour permanganate NOD. This information was necessary to calculate the permanganate dose for the pilot test. The representative samples were collected from saturated zone soil cores from the MW-19I and CMT-1 boreholes.

The first sample (TTEW201PNOD3059) was collected on July 19, 2012. It was a composite of material from 30 to 59 ft bgs at MW-19I. The sample was placed in three 8-ounce glass jars and refrigerated. The second sample (TTMW4001PNOD2955) was collected on July 23, 2012. It was a composite of material from 29 to 55 ft bgs at CMT-1. The sample was placed in four 8-ounce glass jars. Both samples were shipped to Carus Corporation's (Carus) customer service laboratory in LaSalle, Illinois, on July 23, 2013, for next day delivery.

Carus tested the samples in accordance with ASTM International (ASTM) D7262-07 Test Method A. Each sample was tested in triplicate. The soil was baked at 105°C for 24 hours, and then allowed to cool to room temperature. The soil was then blended and passed through a U.S. 10 sieve (2-millimeter [mm]). The reactors were loaded with 50 grams of soil and 100 milliliters (mL) of 20 grams per liter (g/L) potassium permanganate solution making up 40 grams per kilogram (g/kg) potassium permanganate by dry weight of soil. The reaction vessels were inverted once to mix the reagents. After 48 hours, the residual permanganate ion concentrations in the samples were measured and used to calculate the potassium permanganate demand on a dry weight basis.

The results were reported on August 1, 2012. The permanganate NOD of the first sample varied from 0.22 to 0.54 g/kg, and the permanganate NOD of the second sample varied from 0.37 to 0.52 g/kg. The

average permanganate NOD for both samples was reported at 0.4 g/kg. This is considered a low value, and soil with low NOD is conducive to remediation by chemical oxidation. The bench-scale test is detailed in Attachment 1.

2.4 Potassium Permanganate Injection Pilot Testing

Potassium permanganate pilot testing was conducted in the eastern parking lot of the Boulevard Mall, using wells MW-19, MW-19I, and MW-19D1 to monitor the test. Locations of these three wells in relation to the potassium permanganate injection point are shown on Figure 8. MW-19 is approximately 15 ft upgradient of the injection point and screened from19 to 34 ft bgs; MW-19D1 is approximately 10 ft crossgradient of the injection point and is screened from 31 to 51 ft bgs; MW-19I is approximately 25 ft downgradient of the injection point and is screened from 34 to 54 ft bgs.

Injection was conducted under a short-term underground injection control (UIC) general permit issued by NDEP's Bureau of Water Pollution Control on March 8, 2013, and revised on March 14, 2013 (Appendix E). In addition, a Temporary Hazardous Materials Storage Permit was obtained from the Clark County Fire Department (Appendix E).

2.4.1 Field Activities

Cascade Drilling provided drilling and injection services for the pilot test. Caliche in the subsurface would have prevented injection via direct-push drilling. Therefore, on March 6, 2013, the potassium permanganate injection point was pre-drilled with a 6-inch HSA to a depth of 62 ft bgs (see boring log in Appendix A). A fairly competent confining clay layer was found at approximately 60 ft bgs. The borehole was then backfilled with sand from approximately 62 to 20 ft bgs, followed by hydrated bentonite chips from approximately 20 ft bgs to the surface. The daily field reports are in Appendix C.

A 2 percent permanganate solution by weight was prepared by mixing 3,370 pounds of solid potassium permanganate (RemOx-S as supplied by Carus) with 20,000 gallons of water. A direct-push drill rig was used to inject the permanganate solution in a top-down approach. The potassium permanganate solution was injected into the shallow water bearing zone in 2-foot, discrete, vertical intervals starting at 20 ft bgs and ending at 60 ft bgs. Injection began on March 11, 2013, and ended on March 21, 2013. Approximately 1,020 gallons of the potassium permanganate solution was injected into each 2-foot interval. A summary of the injection data is in Table 2-4-1.

Bailers were used to collect groundwater samples from observation wells to detect potassium permanganate breakthrough. Potassium permanganate was observed in monitoring well MW-19D1 approximately 1 hour after the injection began. Potassium permanganate was observed in monitoring well MW-19 approximately 1.5 hours after injection began. Consistent with the proximity of MW-19D1 to the injection point, permanganate appeared more concentrated there, as evidenced by the dark purple color of groundwater. Permanganate was not seen in deeper screened intervals (MW-19D2 and MW-19D3) at this location, suggesting that the permanganate solution had travelled from the injection point somewhat horizontally. In monitoring well MW-19I, potassium permanganate was seen 1 week after injection began.

Injection pressure and flow rate were recorded as injection progressed. Injection data are summarized in Table 2-4-1 and detailed in Attachment 2. Injection pressure and flow rate were carefully controlled to limit the potential for hydraulic fracturing. Instantaneous flow rate and pressure were measured using an inline flow meter and a pressure gauge at the drill rig (see photograph 13 in Appendix D). Average flow rate was confirmed by measuring the time required to empty known volumes of permanganate storage

tanks. The UIC permit originally limited flow rate to 10 gpm, but this limit was raised to 20 gpm by permit modification because of the low injection pressures observed at the start of the pilot test (Appendix E).

After injection was complete, the borehole was grouted with a cement-bentonite slurry in accordance with Nevada regulations.

Two borings were advanced near the injection point to determine the uniformity of potassium permanganate migration through the formation (Figure 8). Both borings were advanced to a total depth of 60 ft bgs. Boring SB-01 was advanced 8 feet to the north of the injection point and boring SB-02 was advanced 6 feet to the east of the injection point. Appendix A presents the boring logs.

TABLE 2-4-1: Potassium Permanganate Injection Operating Parameters

Date	Zone	Interval	Potassium Permanganate Volume Injected (gallons)	Average Injection Rate (gpm)	Average Pressure (psi)	Notes
3/11/2013	Zone 1	20-22	450	3.8	0.0	At 1447, ISCO treatment began. Oxidant observed in crossgradient and upgradient monitoring wells within 1 and 1.5 hours, respectively. Continue ISCO of Zone 1 tomorrow.
3/12/2013	Zone 1	20-22	566	4.7	0.0	Finished injection in Zone 1. Groundwater sample collected from MW-19D1. To neutralize, the destruction of PCE samples were quenched with sodium thiosulfate.
3/12/2013	Zone 2	22-24	1020	5.4	1.9	Maximum injection rate of 8 gpm with pressure at the wellhead <5 psi. Groundwater sample collected from upgradient well MW-19.
3/12/2013	Zone 3	24-26	1050	7.2	5.5	psi readings of 10 and greater after 250 gallons, so rods were removed to clean the screen of the injection tool and then redeployed.
3/13/2013	Zone 4	26-28	1008	9.8	4.2	Peak pressure observed at 5.0 psi over 1 hr and 53 minutes of injection
3/13/2013	Zone 5	28-30	1000	10.0	<2	Peak pressure observed at 6.0 psi over 1 hr and 30 minutes of injection
3/13/2013	Zone 6	30-32	1050	7.6	13.7	Peak pressure observed at 28 psi over 2 hours and 45 minutes of injection.
3/13/2013	Zone 7	32-34	750	3.3	24	Peak pressure observed at 26 psi over 3 hours of injection. One raw product sample of permanganate solution was submitted to the lab. Continue ISCO of Zone 7 tomorrow.
3/14/2013	Zone 7	32-34	300	9.2	15	Peak pressure observed at 32 psi over 1 hour and 15 minutes of injection.
3/14/2013	Zone 8	34-36	1050	2.5	<30	Peak pressure observed at 40 psi over 6 hours of injection.
3/14/2013	Zone 9	36-38	250	2.5	<25	Peak pressure observed at 40 psi over 6 hours of injection.
3/15/2013	Zone 9	36-38	1050	7.2	30	Complete ISCO of Zone 9. Peak pressure observed at 30 psi over 6 hours of injection.
3/15/2013	Zone 10	38-40	1050	5.5	26.5	Peak pressure observed at 30 psi over 5 hours of injection.
3/18/2013	Zone 11	40-42	1050	5.7	7	Perform a "falling head" test to ensure proper equipment operation after weekend down time. Peak pressure observed was greater than 60 psi sustained for less than 2 minutes. Zone 11 was completed in 5.5 hours of injection.
3/18/2013	Zone 12	42-44	1050	10.0	13	Peak pressure observed 20 psi over 2 hours of injection. Oxidant was observed in downgradient well MW-19I at 1256 during injection into Zone 12.
3/18/2013	Zone 13	44-46	1050	8.3	16	Peak pressure observed at 21 psi over 2 hours of injection.
3/19/2013	Zone 14	46-48	1050	7.5	25	Peak pressure observed at 30 psi over 2 hours of injection.
3/19/2013	Zone 15	48-50	1050	8.6	25	Peak pressure observed at 32 psi over 2 hours of injection.

TABLE 2-4-1: Potassium Permanganate Injection Operating Parameters

Date	Zone	Interval	Potassium Permanganate Volume Injected (gallons)	Average Injection Rate (gpm)	Average Pressure (psi)	Notes
3/19/2013	Zone 16	50-52	1050	6.5	28	Peak pressure observed at 40 psi intermittently during the final 250 gallons. Zone 16 was completed in 2 hours. Collected groundwater samples from downgradient well MW-19I.
3/20/2013	Zone 17	52-54	1050	6.1	29	Peak pressure observed at 32 psi over 2 hours and 42 minutes of injection.
3/20/2013	Zone 18	54-56	1039	3.0	28.5	Peak pressure observed at 36 psi over 2 hours of injection.
3/20/2013	Zone 19	56-58	1050	5.8	28	Peak pressure observed at 35 psi over 2 hours and 30 minutes of injection. Collected groundwater recovery data from MW-19I and MW-19D3.
3/20/2013	Zone 20	58-60	1050	3.9	30	Peak pressure observed at 34 psi over 4 hours of injection. End permanganate injection.

Notes:

In-situ chemical oxidation using potassium permanganate reagent mixed to a 2% solution by weight

ISCO In-situ chemical oxidation

psi Pounds per square inch

gpm Gallons per minute

PCE Tetrachloroethene

2.4.2 Monitoring

Monitoring wells MW-19I, MW-19D1, and MW-19 were sampled before (March 8), during (March 12 and 19), and after (March 26, April 4, April 11, and May 2) injection. Groundwater was sampled using a low flow sampling method following NDEP guidance (NDEP 2007). The samples were analyzed for volatile organic compounds (VOC) via EPA Method 8260, for dissolved metals (field filtered) via EPA 3010A and 6020, for cations/anions via chromatography, and for potassium permanganate via colorimetry. Samples for VOC analysis collected during and after injection were quenched with sodium thiosulfate to prevent destruction of analytes after sample collection.

Analytical results are listed in Table 2-4-2, and are discussed below. Field parameters were measured more frequently and are presented in Table 2-4-3.

Wells MW-19D2 (screened from 60 to 70 ft bgs) and MW-19D3 (screened from 90 to102 ft bgs) were sampled before injection commenced. Permanganate was not likely to enter these wells because their screens lie within and below a competent clay layer, and below the maximum depth of injection (60 ft bgs). These wells were sampled, but the samples were not analyzed because there was no visible evidence of permanganate; field parameters measured are listed in Table 2-4-3.

After injection was complete, two investigative boreholes were advanced approximately 6 ft east (downgradient) and 9 ft north (crossgradient) of the injection point. The boreholes were advanced to assess the uniformity of potassium permanganate distribution around the injection point. Continuous cores were collected and logged for permanganate staining. The boreholes were subsequently grouted with a cement-bentonite slurry in accordance with Nevada regulations. Findings of the investigation are discussed below.

TABLE 2-4-2: Potassium Permanganate Injection Pilot Test Analytical Results

Well ID	Date	Volatile Organics by 8260B (µg/L)		Dissolved Metals (field filtered) by EPA 3010A and 6020			Cation/Anion Analysis by Chromatography		Colorimetry
		PCE (µg/L)	TCE (µg/L)	Arsenic (µg/L)	Chromium (µg/L)	Manganese (µg/L)	Chloride (mg/L)	Potassium (mg/L)	Potassium Permanganate (mg/L)
MW-19D1 (10 feet crossgradient)	3/8/2013	300	2.9	2.2	2.8	41	82	9.1	ND
	3/12/2013	9.4	ND	0.32	49	360000	120	390	2800
	3/27/2013	17	ND	1.2	35	30000	NA	NA	71
	4/4/2013	27	ND	1.8	9.4	1200	NA	NA	128
	4/11/2013	240	0.83	1.4	4.4	310	NA	NA	ND
	5/2/2013	99	0.54	2..1	1.9	11	NA	9.7	NA
MW-19 (15 feet upgradient)	3/8/2013	520	3.2	7.4	17	170	190	25	ND
	3/12/2013	390	ND	2	25	120000	170	86	450
	3/27/2013	14	ND	0.33	130	43000	NA	NA	200
	4/4/2013	110	ND	2	79	7100	NA	NA	2.155
	4/11/2013	220	ND	1.8	44	5400	NA	NA	32.1
	5/2/2013	810	2.2	2.7	9.7	460	NA	41	NA
MW-19I (25 feet downgradient)	3/8/2013	710	5.2	2.0	1.6	ND	160	13	ND
	3/19/2013	280	ND	1.7	14	2700	150	13	17
	3/26/2013	9.4	ND	0.93	44	27000	NA	NA	300
	4/4/2013	3.5	ND	3	170	4700	NA	NA	1130
	4/11/2013	1.7	ND	0.19	52	9400	NA	NA	231
	5/2/2013	0.61	ND	1.2	43	20000	NA	21	NA

Notes:

Shading indicates baseline sample collected before injection.

NA Not analyzed
ND Not detected
PCE Tetrachloroethene
TCE Trichloroethene
mg/L Milligrams per liter
µg/L Micrograms per liter

2.4.3 Results

This section discusses the results of the potassium permanganate pilot test. Analytical results are listed in Table 2-4-2, and field parameters are presented in Table 2-4-3. Figure 9 shows PCE response to the pilot test.

PCE Response

Decreased concentrations of PCE corresponded with visual detection of potassium permanganate in the three observation wells. Baseline concentrations of PCE ranged from 300 to 780 µg/L. In the crossgradient well MW-19D1, the PCE concentration decreased to 9.4 µg/L 1 day after the start of injection, and decreased concentrations of PCE were detected for at least a month after injection. In the upgradient well MW-19, PCE concentrations decreased immediately from the 520 µg/L baseline to 390 µg/l, Two weeks after injection, PCE concentration was 14 µg/L. In the downgradient well MW-19I, concentrations of PCE decreased 1 week after the start of injection and continued to decline for the remainder of the test; 7 weeks after initial injection, a PCE concentration of 0.6 µg/L was detected.

As potassium permanganate concentrations decreased, concentrations of PCE rebounded, possibly due to influx of contaminated groundwater and desorption from soil. MW-19 being upgradient of the injection point was the first to experience rebound. PCE concentration in this well started to increase just 3 weeks after injection commenced, and 4 weeks later, the concentration increased to 810 µg/L. In MW-19D1, PCE concentrations started increasing after a month; however, concentrations continued to be less than the baseline concentration in this well.

TCE Response

TCE concentrations followed a pattern of decrease and rebound similar to that of PCE, as seen in Table 2-4-2. Baseline concentrations of TCE were detected in all wells, and initial concentrations ranged from 2.9 to 5.2 µg/L. After injection, TCE was not detected in any of the observations wells. In the downgradient well, MW-19I, TCE was not detected for the duration of the test. In MW-19D1, TCE concentration rebounded slightly to 0.83 µg/L 1 month after injection; 7 weeks after initial injection, a TCE concentration of 0.53 µg/L was detected. In MW-19, 7 weeks after injection, a TCE concentration of 2.2 µg/L was detected.

Metals Response

Soils can contain metals that transform to more soluble species when oxidized. Potassium permanganate is likely to oxidize some metals, rendering them more soluble. Increases in metals concentrations resulting from injection of oxidant are expected to be localized and temporary. Arsenic concentrations did not change significantly. Dissolved chromium concentrations increased in all three observation wells after potassium permanganate injection, and subsequently decreased. Pre-treatment concentrations of chromium ranged from 2.8 to 17 µg/L. Concentrations of chromium in two of the samples exceeded the MCL for chromium of 100 µg/L. The highest concentration of chromium observed during testing was 170 µg/L in MW-19I on April 4, 2013. Seven weeks after the potassium permanganate injection, chromium concentrations had decreased in all observation wells, with concentrations ranging from 1.9 µg/L to 43 µg/L. Concentrations of chromium in MW-19I are expected to decrease further as potassium permanganate concentration decreases and chromium returns to a lower oxidation state.

Concentrations of manganese increased during testing because potassium permanganate contains manganese. Initial manganese concentrations ranged from non-detect to 170 µg/L. The highest manganese concentration observed was 360,000 µg/L in MW-19D1 on March 12, 2013. No MCL has been established for manganese; however, the secondary drinking water standard is 50 µg/L.

Table 2-4-3 : Potassium Permanganate Field Parameters

Well ID	Date/Time	Depth to Groundwater (feet)	pH	Specific Conductance (S/m)	Dissolved Oxygen (mg/L)	Temperature (mg/L)	Percent Salinity	Total Dissolved Solids (mg/L)	ORP (mV)	Percent CO2	PID	O2
Project Monitoring Wells Located on Maryland Square Property												
MW-19	3/08/2013 1800	26.19	--	--	--	--	--	--	--	--	--	--
MW-19	3/11/2013 1448	26.18	--	--	--	--	--	--	--	--	--	--
MW-19	3/11/2013 1549	25.92	6.35	0.338	7.5	24.6	--	2200	95	--	--	--
MW-19	3/12/2013 1215	25.69	7.05	0.337	9.1	24.3	0.17	2200	299	0.2	10	20.9
MW-19	3/12/2013 1330	30.5	--	--	--	--	--	--	--	0.7	19	17.7
MW-19	3/12/2013 1654	25.7	--	--	--	--	--	--	--	1.56	81	12.8
MW-19	3/13/2013 0900	25.41	6.33	0.338	8.6	22.9	0.18	2200	558	0.00	0.0	--
MW-19	3/13/2013 1147	25.26	6.32	0.351	8.9	24.4	0.18	2200	525	0.62	3.0	17.9
MW-19	3/13/2013 1409	25.62	--	--	--	--	--	--	--	--	--	--
MW-19	3/13/2013 1700	25.64	--	--	--	--	--	--	--	--	--	--
MW-19	3/14/2013 1025	25.76	5.99	0.372	9.2	23.7	0.2	2400	585	0.18	0.0	20.9
MW-19	3/14/2013 1545	25.34	5.98	0.493	9.4	26	0.24	3100	576	2.42	133	10.9
MW-19	3/15/2013 0914	25.56	6.15	9.99	1.4	23.6	4.4	99000	582	0.02	0.0	20.9
MW-19	3/15/2013 1415	--	--	9.99	2	24.5	4	99000	533	3.12	174	7.6
MW-19	3/18/2013 0915	25.71	6.61	9.99	1.2	22.9	4	99000	589	0.0	3.0	20.9
MW-19	3/18/2013 1328	25.27	6.98	9.99	1.4	23.6	4	99000	586	0.44	23	18.8
MW-19	3/18/2013 1642	25.03	6.88	9.99	1.4	24.1	4	99000	588	1.66	80	13.6
MW-19	3/19/2013 0830	25.10	--	--	--	--	--	--	--	--	--	--
MW-19	3/19/2013 1115	25.04	6.88	9.99	1.5	23.3	4	99000	562	0.02	2.0	20.9
MW-19	3/19/2013 1300	25.49	--	--	--	--	--	--	--	--	--	--
MW-19	3/20/2013 1205	25.34	6.89	9.99	1.3	24	4	99000	593	1.76	76	11.9
MW-19	3/20/2013 1548	25.26	6.84	9.99	1.3	23.9	4	99000	623	2.52	127	9.5
MW-19	3/21/2013 0946	25.61	6.78	9.99	1.2	22.8	4	99000	644	0.0	3.0	20.9
MW-19	3/27/2013 1027	26.22	6.69	0.45	6.8	24.3	0.24	2600	595	--	--	--
MW-19	4/04/2013 1220	26.28	6.65	3.489	3.41	24.79	--	--	--	--	--	--
MW-19	4/11/2013 1302	26.00	6.46	3267	77.6	25.56	--	--	585.6	--	--	--
MW-19	5/02/2013 1142	26.3	6.55	0.344	5.91	25.2	0.2	2200	604	--	--	--
MW-19D1	3/08/13 1225	23.38	6.92	0.161	8.2	22.9	0.07	1100	15	--	--	--
MW-19D1	3/11/13 1452	25.35	6.83	0.182	8.6	24.1	--	1200	475	--	--	--
MW-19D1	3/12/2013 1000	24.99	--	--	--	--	--	--	--	0	--	20.9
MW-19D1	3/12/2013 1655	25.03	--	--	--	--	--	--	--	0.02	1.00	20.9
MW-19D1	3/13/2013 0908	24.53	6.76	0.23	8.4	23.4	0.12	1500	545	0	--	20.90
MW-19D1	3/13/2013 1154	24.41	6.15	0.598	8.3	24.7	0.3	3400	558	0.06	0	--
MW-19D1	3/13/2013 1400	25.01	--	--	--	--	--	--	--	--	--	--
MW-19D1	3/13/2013 1701	24.92	--	--	--	--	--	--	--	--	--	--
MW-19D1	3/14/2013 1030	25.00	6.02	0.35	8.9	24.4	0.18	--	566	0.02	0	20.90
MW-19D1	3/14/2013 1556	24.59	6.13	0.496	9.1	24.8	0.27	2200	575	0.1	3	20.10
MW-19D1	3/15/2013 0925	24.91	5.56	9.99	1.6	23.2	4.0	3200	560	0.04	0	20.90
MW-19D1	3/15/2013 1407	--	7.08	0.587	9.4	24.6	0.34	99000	589	0.08	0	20.80
MW-19D1	3/18/2013 0910	25.03	6.69	0.179	8.1	23.3	0.09	4100	531	0.1	1	20.90
MW-19D1	3/18/2013 1323	24.44	7.05	9.99	1.4	24.4	4.0	1100	584	0.06	0	20.80
MW-19D1	3/18/2013 1631	24.51	7.07	9.99	1.3	24.1	4.0	99000	610	0.14	1	20.80
MW-19D1	3/19/2013 0830	24.64	--	--	--	--	4.0	99000	--	--	--	--
MW-19D1	3/19/2013 1110	24.61	7.27	9.99	1.5	23.8	--	99000	577	0.12	0	20.90
MW-19D1	3/19/2013 1300	24.81	--	--	--	--	--	--	--	--	--	--
MW-19D1	3/20/2013 1158	24.75	6.94	0.335	8.4	23.5	0.17	2100	585	0.1	0	20.90
MW-19D1	3/20/2013 1537	24.71	6.93	9.99	1.4	23.5	4.0	99000	619	0.1	0	20.90
MW-19D1	3/21/2013 0932	24.97	6.93	9.99	1.4	23.5	4.0	99000	634	0.12	0	20.90
MW-19D1	3/27/2013 1218	23.35	7.48	0.608	11.5	24.5	0.36	4200	521	--	--	--
MW-19D1	4/04/2013 1110	25.51	6.99	0.81	4.57	23.96	--	--	--	--	--	--
MW-19D1	4/11/2013 1500	23.10	7	1670	82.3	23.53	--	--	448.4	--	--	--
MW-19D1	5/1/2013 0942	--	--	--	--	--	--	--	--	--	--	--
MW-19D2	3/08/13 1215	25.61	6.95	0.226	3.7	22.8	0.12	1400	32	--	--	--
MW-19D2	3/11/13 1454	25.31	--	--	--	--	--	--	--	--	--	--
MW-19D2	3/11/13 1457	25.05	7.42	0.243	7.9	24.7	--	1600	292	--	--	--
MW-19D2	3/12/2013 1145	24.54	6.41	0.23	10.1	24.3	0.12	1500	282	0.06	0.01	20.9
MW-19D2	3/12/2013 1658	24.96	--	--	--	--	--	--	--	0.04	0.00	20.9
MW-19D2	3/13/2013 0915	--	7.05	0.227	8.9	22.5	1.2	1500	239	0.02	1.00	20.9
MW-19D2	3/13/2013 1202	24.37	6.36	0.242	8.7	24.6	0.12	1600	190	0.12	0.00	20.6
MW-19D2	3/13/2013 1402	25.07	--	--	--	--	--	--	--	0.04	--	--
MW-19D2	3/13/2013 1702	24.79	--	--	--	--	--	--	--	0.1	--	--
MW-19D2	3/14/2013 1040	24.83	6.48	0.348	7.3	23.7	0.28	3000.0	202	0.04	0.00	20.9
MW-19D2	3/14/2013 1600	24.38	6.1	0.243	7.3	25.1	0.12	1600	206	0.1	1.00	20.8
MW-19D2	3/15/2013 0930	24.71	6.12	9.99	1.2	23.1	4.0	99000	211	0.08	0.00	20.9
MW-19D2	3/15/2013 1400	--	7.22	0.237	5.8	24.1	0.12	1500	194	0.04	0.00	20.9
MW-19D2	3/18/2013 0900	24.44	6.78	0.311	3.4	23.5	0.17	2100	305	0.08	1	20.9
MW-19D2	3/18/2013 1315	24.64	7.17	2.2	3.6	24.6	1.97	20000	350	0.08	1	20.8
MW-19D2	3/18/2013 1622	23.25	7.29	6.22	2.9	24.8	4.0	99000	418	0.1	1	20.9
MW-19D2	3/19/2013 0830	24.55	7.33	1.59	3	24.2	0.85	9000.0	222	0.14	1	20.9
MW-19D2	3/19/2013 1105	23.16	--	--	--	--	--	--	--	--	--	--
MW-19D2	3/19/2013 1300	24.91	--	--	--	--	--	--	--	--	--	--
MW-19D2	3/20/2013 1152	24.31	7.24	0.421	3	24.6	0.4	6100	222	0.1	1	20.9
MW-19D2	3/20/2013 1530	24.32	7.08	9.99	4.7	25	4.0	99000	294	0.1	2	20.8
MW-19D2	3/21/2013 0926	25.02	7.28	0.564	2.4	22.9	0.3	3400	296	0.14	0	20.8
MW-19D2	4/11/2013 1302	--	--	--	--	--	--	--	--	--	--	--
MW-19D2	4/23/2013 0942	--	--	--	--	--	--	--	--	--	--	--
MW-19D2	5/2/2013 1052	26.04	6.92	0.119	10.33	24.6	0.1	800	446	--	--	--

Table 2-4-3: Potassium Permanganate Field Parameters

Well ID	Date/Time	Depth to Groundwater (feet)	pH	Specific Conductance (S/m)	Dissolved Oxygen (mg/L)	Temperature (mg/L)	Percent Salinity	Total Dissolved Solids (mg/L)	ORP (mV)	Percent CO2	PID	O2
Project Monitoring Wells Located on Maryland Square Property												
MW-19D3	3/08/13 1218	22.41	6.96	47.5	10.5	20.7	0.02	310	2.6	--	--	--
MW-19D3	3/11/13 1455	17.59	--	--	--	--	--	--	--	--	--	--
MW-19D3	3/11/13 1614	17.02	7.44	53.8	5.5	25.5	--	350	284	--	--	--
MW-19D3	3/12/2013 1150	17.64	7.52	53.2	8.1	24.1	0.02	340	185	0.04	0.00	20.9
MW-19D3	3/12/2013 1659	16.65	--	--	--	--	--	--	--	0.1	0.00	20.9
MW-19D3	3/13/2013 0920	17.09	7.16	49.7	7.4	24.00	0.02	320	229	0.4	0.00	20.9
MW-19D3	3/13/2013 1212	16.81	6.66	0.09	8.00	24.3	0.03	430	202	0.1	--	20.6
MW-19D3	3/13/2013 1405	16.98	--	--	--	--	--	--	--	--	--	--
MW-19D3	3/13/2013 1703	16.83	--	--	--	--	--	--	--	--	--	--
MW-19D3	3/14/2013 1100	16.86	6.81	0.206	8.80	23.6	0.14	1700	188	0.08	1.00	20.8
MW-19D3	3/14/2013 1610	16.89	6.56	0.09	8.20	24.6	0.04	3120	208	0.14	0.00	20.6
MW-19D3	3/15/2013 0941	16.78	6.41	0.296	8.30	24.6	0.13	1700	213	1.2	0.00	20.9
MW-19D3	3/15/2012 1400	--	7.27	56.9	8.30	25.6	0.02	370	252	0.08	0.00	20.9
MW-19D3	3/18/2013 0850	17.59	6.66	54.3	7.1	24.3	0.02	350	313	0.1	1	20.9
MW-19D3	3/18/2013 1308	17.06	7.3	68.9	7.5	25.1	0.03	460	361	0.14	0	20.9
MW-19D3	3/18/2013 1617	17.03	7.38	0.153	8.1	24.8	0.07	10000	448	0.06	0	20.9
MW-19D3	3/19/2013 0830	17.46	--	--	--	--	--	--	--	--	--	--
MW-19D3	3/19/2013 1100	17.43	7.36	0.349	7.9	24.6	0.17	2100	253	0.1	0	20.9
MW-19D3	3/19/2013 1300	17.65	--	--	--	--	--	--	--	--	--	--
MW-19D3	3/20/2013 1106	17.44	7.26	0.17	7.5	24.1	0.07	1000	260	0.08	0	20.9
MW-19D3	3/20/2013 1523	17.51	7.23	9.99	4.7	25	4.0	99000	294	0	0	20.9
MW-19D3	3/21/2013 0950	17.6	7.16	0.16	7.8	24.4	0.07	1000	304	0.12	0	20.90
MW-19D3	4/11/2013 1302	--	--	--	--	--	--	--	--	--	--	--
MW-19D3	4/23/2013 0942	--	--	--	--	--	--	--	--	--	--	--
MW-19D3	5/1/2013 0942	--	--	--	--	--	--	--	--	--	--	--
MW-19I	3/08/13 1325	25.57	6.53	0.31	5.1	23.3	0.17	2000	47	--	--	--
MW-19I	3/11/13 1457	25.05	--	--	--	--	--	--	--	--	--	--
MW-19I	3/11/13 1618	24.95	7.26	0.324	3.3	25.1	--	2100	279	--	--	--
MW-19I	3/12/2013 1154	24.88	7.03	0.312	4.00	23.4	0.16	2000.00	221	--	--	20.9
MW-19I	3/12/2013 1700	24.87	--	--	--	--	--	--	--	0.00	0.00	20.9
MW-19I	3/13/2013 0930	24.76	7.15	0.3	5.1	21.4	0.17	2000.00	224	0.02	1.00	20.9
MW-19I	3/13/2013 1225	24.65	6.72	0.478	6.3	24.7	0.27	3300	216	0.02	0.00	20.6
MW-19I	3/13/2013 1408	24.81	--	--	--	--	--	--	--	--	--	--
MW-19I	3/13/2013 1704	24.81	--	--	--	--	--	--	--	--	--	--
MW-19I	3/14/2013 1115	24.88	6.82	0.966	5.5	23.6	0.99	11000	204	0.04	1.00	20.6
MW-19I	3/14/2013 1615	24.82	6.61	0.463	6.3	24.4	0.26	3200	216	0.04	1.00	20.8
MW-19I	3/15/2013 0950	24.81	6.42	0.431	6.2	23.8	0.21	2600	216	0.04	1.00	20.9
MW-19I	3/15/2013 1351	--	7.04	0.33	6.3	25.2	0.17	2100	299	0.04	1.00	20.9
MW-19I	3/18/2013 0842	24.97	6.2	0.315	4.4	22.8	0.17	2000	414	0.06	0	20.9
MW-19I	3/18/2013 1256	24.8	7.08	0.335	5.9	24.1	0.18	2200	487	0.06	0	20.9
MW-19I	3/18/2013 1609	24.61	7.18	0.328	6.2	24.0	0.17	2200	499	0.04	2	20.9
MW-19I	3/19/2013 0840	24.94	7.38	0.365	5.6	24.7	0.18	2300	540	--	--	--
MW-19I	3/19/2013 1055	24.71	7.31	0.346	9.6	24.0	0.18	2300	479	0.32	17	20.9
MW-19I	3/19/2013 1300	24.83	--	--	--	--	--	--	--	--	--	--
MW-19I	3/20/2013 1100	24.84	6.73	9.99	1.8	24.4	4	99000	508	0.3	14	20.9
MW-19I	3/20/2013 1514	24.72	6.91	9.99	1.8	24.8	4	99000	524	0.22	12	20.9
MW-19I	3/21/2013 0908	24.91	6.46	9.99	4.8	24.4	4	99000	537	0.2	5	20.90
MW-19I	3/26/2013 1600	25.12	6.69	0.343	5.8	24.9	0.17	2200	543	--	--	--
MW-19I	4/4/2013 1010	25.22	6.35	3.646	3.79	23.94	--	--	--	--	--	--
MW-19I	4/11/2013 1620	25.47	7.15	31.23	71.2	25.58	--	--	617.2	--	--	--
MW-19I	4/23/2013 0942	--	--	--	--	--	--	--	--	--	--	--
MW-19I	5/2/2013 1005	25.8	6.59	0.331	4.82	24.1	0.2	2100	611	--	--	--

-- = Not measured
S/m2 = Siemens per square meter
g/l = Grams per liter
m/v = Millivolts
ORP = Oxygen reduction potential
PID = Photoionization detector
CO2 = Carbon dioxide
O2 = Oxygen

Seven weeks after the potassium permanganate injection, manganese concentrations approached the baseline in wells where potassium permanganate was no longer present. Concentrations of manganese in MW-19I were still high, indicating presence of potassium permanganate. As with wells MW-19 and MW-19D1, manganese concentration will decrease as the potassium permanganate is flushed out or reduced to manganese dioxide, which is insoluble.

Investigative Borings

Soil cores from the northern boring (SB-01) were stained with potassium permanganate from 25 to 35 ft bgs, and from 55 to 60 ft bgs. Soil cores from the eastern boring (SB-02) were stained with potassium permanganate from 26 to 40 ft bgs, and from 48 to 60 ft bgs. Staining was intermittent between 36 and 40 feet bgs. There was no staining in the predominantly fine-grained soil between 40 and 48 feet bgs. However, staining was observed in other fine-grained materials outside this interval, including caliche and saturated silty clays. Therefore, no relationship was apparent between the degree of staining and soil type. The method of injection and operational challenges, including injection tool clogging, likely influenced the effectiveness of potassium permanganate delivery into targeted vertical intervals. It may be inferred from the pattern of staining at these two locations that the injected solution was not uniformly distributed in the targeted zone. Consequently, diffusion would play an important role in vertical distribution of the oxidant.

2.4.4 Summary

ISCO with potassium permanganate successfully decreased PCE and TCE concentrations in the pilot test area. An injection radius of influence (ROI) of 11 ft was observed up to 60 ft bgs, with downgradient effect to at least 29 feet from the injection point. Given that potassium permanganate was detected 29 feet from the injection point just 8 days after injection started, the injection ROI is estimated at approximately 20 feet. Six weeks after completion of injection, PCE concentration remained below 1 µg/L in the downgradient well. PCE concentrations had rebounded in the crossgradient well but were still less than the original concentration, and PCE concentration had rebounded in the upgradient well. Chromium concentrations increased temporarily in the aquifer because of a change in oxidation state.

The potassium permanganate migrated significant distances horizontally through the formation. Some channeling of the potassium permanganate was observed, possibly because of the method of injection. Top-down injection in a pre-drilled hole filled with sand appeared successful although the sand may have allowed the injected solution to migrate outside the targeted vertical interval. Occasional injection tool clogging also impeded progress.

2.5 Hydrogen Peroxide/Ozone Injection Pilot Testing

Hydrogen peroxide/ozone injection (PulseOx) pilot testing was performed within the eastern parking lot of the Boulevard Mall using existing wells MW-20, MW-20D1, and MW-CMT1 as observation wells to monitor the test. Locations of these wells in relation to the newly installed injection well, OS-1, are shown on Figure 8. MW-20 is approximately 27 ft upgradient of the injection point and screened from19 to 35 ft bgs. MW-20D1 and MW-20D2 are approximately 8 ft crossgradient and downgradient of the injection point, and are screened from 31 to 51 ft bgs and 55 to 65 ft bgs, respectively; MW-CMT1 is approximately 18 ft downgradient of the injection well and has seven 0.5-foot screens starting at 30 ft bgs and continuing every 5 ft to 60 ft bgs.

An SVE well, SVE-1, was installed 3 ft from the injection well. Two vapor monitoring wells were installed approximately 45 ft upgradient and downgradient of the injection well to monitor soil gas.

Injection was conducted under a short-term UIC general permit issued by NDEP's Bureau of Water Pollution Control on March 8, 2013, and revised on March 14, 2013 (Appendix E). In addition, a Temporary Hazardous Materials Storage Permit and a Compressed Gas Storage Permit were obtained from the Clark County Fire Department (Appendix E).

2.5.1 Field Activities

Cascade Drilling provided drilling services for the pilot test. Installation of hydrogen peroxide/ozone injection well OS-1 began on March 26 and ended on March 28, 2013. Figure 10 shows typical well construction details. OS-1 consists of two pairs of injectors, with each pair targeting a specific transmissive zone. A pair of injectors consists of one hydrogen peroxide injector and one ozone injector separated by a layer of bentonite that is at least 2 ft thick. The two injector pairs are separated by a thicker layer of cement-bentonite grout. Each injector screen is embedded in sand. The shallow hydrogen peroxide injector screen was set at 27.5 to 30.5 ft bgs, and the shallow ozone injector screen was set at 36.5 to 33.5 ft bgs. The deep hydrogen peroxide injector screen was set at 47 to 51 ft bgs, and the deep ozone injector screen was set at 58 to 61 ft bgs.

The two vapor monitoring wells and one SVE well were installed on March 6 and 7, 2013, to 20 ft bgs, each with 5-ft-long screens. The SVE well was installed as a precaution so that it could be used to control fugitive ozone emissions if necessary. The daily field reports presented in Appendix C detail the installation of these wells.

Groundwater & Environmental Services, Inc. (GES) provided the PulseOx trailer and injection services. The PulseOx trailer was mobilized to the site on April 2, 2013. Figure 11 shows a schematic of the PulseOx system. The system operates by sequentially injecting hydrogen peroxide and a mixture of ozone, oxygen, and air. The ozone/air sparge phase helps distribute the hydrogen peroxide in the formation. Ozone destroys PCE and reacts with hydrogen peroxide to produce hydroxyl free radicals which also destroy PCE. Ozone was injected at mass flow rates of 16 and 25 pounds per day. Hydrogen peroxide was injected at 34 percent concentration by weight at an average mass flow rate of 96 pounds per day. Table 2-5-1 summarizes operational data, and the Figure 13 shows the PulseOx system operating cycles. Operation and maintenance logs are presented in Appendix C.

The system operated intermittently after startup on April 3, 2013, until adjustments were completed on April 4, 2013. From then on, the system operated continuously until May 1, 2013, except during maintenance, system alarms, and groundwater sampling events.

Ozone concentrations were monitored in ambient air within the fenced enclosure of the pilot test area, inside the PulseOx trailer, above and inside well vaults, and inside well casings. Ozone concentrations were measured using a handheld ozone monitor. If the ozone concentration above the well vaults or in ambient air exceeded 0.1 parts per million by volume, the system was shut off until the necessary repairs could be made. Well plugs with rubber seals were initially used to plug groundwater monitoring wells, vapor monitoring wells, and the SVE well. However, ozone degraded the rubber seals faster than expected despite the use of plastic liners to isolate the rubber component. The degraded rubber seals then allowed ozone to leak into the well vaults. Therefore, the original well plugs were all replaced with threaded PVC caps and one well plug with a Viton seal.

2.5.2 Monitoring

Wells MW-20D1, MW-20D2, MW-CMT1, and MW-20 were sampled before injection (March 26, 2013) and during injection (April 4, 10, 22, and May 1, 2013). Groundwater sampling procedures included a low flow sampling method consistent with NDEP methods (NDEP 2007). The samples were analyzed for VOCs via EPA Method 8260, for dissolved metals (filtered) via EPA Methods 3010A and 6020, and for cations/anions via ion chromatography. Total alkalinity was measured by titration. Well MW-20D3 (screened from 92 to 100 ft bgs) was sampled before injection commenced. Treatment was not likely to reach this well because the screens lie within and below a competent clay layer, and below the maximum depth of injection (60 ft bgs).

Soil gas summa canister samples were collected from SVE-1 and VM-2 before and during the test. Three well volumes were purged from the each well before the soil vapor sample was collected. The samples were analyzed for VOCs via EPA Method Modified TO-15.

Analytical results are presented in Tables 2-5-2 (groundwater) and 2-5-3 (soil gas), and are discussed below. Field parameters were monitored more frequently and are listed in Table 2-5-4.

TABLE 2-5-1: PulseOx System Operating Parameters				
General				
System startup and testing	4/3/2013			
System optimization complete	4/4/2013			
System shut down	5/2/2013			
System demobilization	5/8/2013			
Total system time after adjustment at startup	28	days		
Hydrogen peroxide injection hours	374.5	hours	15.6	days
Ozone sparging hours	438.5	hours	18.3	days
System uptime	18.3	days	65%	
System downtime	9.7	days	35%	
Hydrogen Peroxide Injection				
Concentration	34%			
Initial dose (Operating Cycle 1; April 4)	57	gallons per day		
Adjusted dose (Operating Cycle 2; April 5 to 19)	40	gallons per day		
Adjusted dose (Operating Cycle 3; April 20 to May 2)	16	gallons per day		
Total volume injected	550	gallons		
Mass of pure H_2O_2 injected	1,763	lbs		
Average pure H_2O_2 volumetric flow rate	30.1	gpd		
Average pure H_2O_2 mass flow rate	96.3	lbs/day		
Injection pressure				
Minimum	1	psi		
Maximum	12	psi		
Average	6.4	psi		
Ozone Injection				
Mass flow rate from April 4 - April 28	24	lbs/day		
Mass flow rate from April 29 - May 1	16	lbs/day		
Air injection pressure				
Minimum	28	psi		

TABLE 2-5-1: PulseOx System Operating Parameters (Continued)		
Maximum	49	psi
Average	37.8	psi
Air flow		
Minimum	1.9	scfm
Maximum	4.3	scfm
Average	2.8	scfm

Notes:

gpd	Gallons per day
H_2O_2	Hydrogen peroxide
lbs	Pounds
psi	Pounds per square inch
scfm	Standard cubic feet per minute

TABLE 2-5-2: PulseOx Groundwater Analytical Results Table

		Volatile Organics via 8260B (µg/L)		Cation/Anion Analysis via Chromatography	Metals (non-filtered) via EPA 3010A and 6020		Test Strip
Well ID	Date	PCE (µg/L)	TCE (µg/L)	Chloride (mg/L)	Arsenic (µg/L)	Chromium (µg/L)	Peroxide (ppm)
CMT-1-30 (27 feet downgradient)	3/25/2013	4.7	ND	200	4	ND	NA
	4/10/2013	0.86	ND	180	7.2	65	0-15
	4/23/2013	8.8	ND	180	4.6	180	0.3
	5/1/2013	1.2	ND	180	5.9	210	0.3
CMT-1-35 (27 feet downgradient)	3/25/2013	48	3.1	200	14	ND	NA
	4/10/2013	6.4	ND	180	6.9	ND	0-15
	4/23/2013	2.5	ND	170	2.6	5.7	0.1
	5/1/2013	2.3	ND	170	3.5	25	0.1
CMT-1-40 (27 feet downgradient)	3/25/2013	270	1.6	170	2.5	3.2	NA
	4/10/2013	94	0.7	160	2.5	6.6	0-15
	4/23/2013	150	1.2	160	2.4	20	0
	5/1/2013	96	ND	170	3.3	38	0.1
CMT-1-45 (27 feet downgradient)	3/25/2013	310	1.6	160	2.4	ND	NA
	4/10/2013	120	0.58	160	2.0	15	0-15
	4/23/2013	100	ND	160	1.8	41	0.1
	5/1/2013	78	ND	170	2.7	47	0.1
CMT-1-50 (27 feet downgradient)	3/25/2013	280	2.4	170	4.1	ND	NA
	4/10/2013	110	0.7	160	2.2	14	0-15
	4/23/2013	120	ND	160	2	38	0.2
	5/1/2013	79	ND	170	3.1	41	0.1
CMT-1-55 (27 feet downgradient)	3/25/2013	390	4.1	160	1.5	ND	NA
	4/10/2013	570	3.2	160	1.6	3.9	0-15
	4/23/2013	510	1.7	170	1.5	10	0.1
	5/1/2013	430	1.1	170	2.7	12	0.1
CMT-1-60 (27 feet downgradient)	3/25/2013	1200	9.5	150	1.8	ND	NA
	4/10/2013	1200	9.3	150	1.7	ND	0-15
	4/23/2013	1400	9.4	150	1.5	1.1	0
	5/1/2013	1200	6.8	160	2.7	2	0
MW-20D1 (8 feet crossgradient)	3/26/2013	69	2.8	190	14	21	NA
	4/11/2013	3.6	ND	110	33	130	0-15
	4/23/2013	5.5	ND	90	19	110	NA
	5/1/2013	3.7	ND	110	13	70	0.1
MW-20D2 (8 feet crossgradient)	3/26/2013	25	ND	11	2.7	3.4	NA
	4/11/2013	7.9	ND	73	3.2	50	0-15
	4/23/2013	8.0	ND	33	6.3	74	0.1
	5/1/2013	1.1	ND	22	1.7	27	0.2
MW-20D3 (8 feet crossgradient)	3/26/2013	0.66	ND	7.4	2.6	5.8	NA
	4/11/2013*	NS	NS	NS	NS	NS	NS
	4/23/2013	ND	ND	13	10	43	0.1
	5/1/2013	ND	ND	5.9	2.7	8.4	0.2
MW-20 (15 feet Upgradient)	3/26/2013	290	1.8	190	4.7	4.3	NA
	4/10/2013	480	1.7	200	5.6	9.7	0-15
	4/23/2013	850	2.3	200	6.1	8.8	0.1
	5/2/2013	470	1.4	200	4	2.7	0

Notes:

* MW-20D3 was not sampled due to high ambient air ozone levels

Shading indicates baseline sample collected before injection.

NA Not analyzed
ND Not detected
NS Not sampled
PCE Tetrachloroethene
ppm Parts per million
TCE Trichloroethene
mg/L Milligrams per Liter
µg/L Micrograms per liter

TABLE 2-5-3: PulseOx Soil Gas Analytical Results

COMPOUNDS	SAMPLE ID					
	VM-2-040213	SVE-1-040213	VM-2-040813	SVE-1-040813	VM-2-050113	SVE-1-050113
PCE (µg/m^3)	190,000	280,000	31,000	3,700	17,000	260
TCE (µg/m^3)	ND	530	ND	ND	ND	ND

Notes:

The sample collection date is included in the sample ID.

Shading indicates baseline sample collected before injection

ND Not detected
PCE Tetrachloroethene
TCE Trichloroethene
µg/m^3 Micrograms per cubic meter

2.5.3 Results

This section discusses results of the PulseOx pilot test. Analytical results are presented in Tables 2-5-2 and 2-5-3, and field parameters are presented in Table 2-5-4. Figure 12 shows PCE response to the pilot test.

PCE Response

Concentrations of PCE decreased within the test area in MW-20D1, MW-20D2, and MW-CMT1. Baseline concentrations of PCE ranged from 4.7 to 310 µg/L. In MW-20D1, the well closest to the PulseOx injection well, concentrations of PCE measured during testing ranged from 3.5 to 5.5 µg/L. In MW-20D2, screened from 55 to 65 ft bgs, concentrations of PCE measured during testing ranged from 1.1 to 8 µg/L. In MW-CMT1, decreases in concentration of PCE were observed within the screened intervals from 30 to 50 ft bgs; however, the decreases were not consistent across events or the various screened intervals.

During testing, no effect was observed in MW-20, MW-20D3, and the screened intervals of MW-CMT1 at 55 and 60 ft bgs. MW-20 is 27 ft upgradient of the injection point. MW-20D3 is screened from 90 to100 ft bgs, 29 feet below the deepest injector screen, and was therefore expected to be outside the treatment zone. Similarly, the two deepest screened intervals of MW-CMT1, at 55 and 60 ft bgs, showed no decrease in PCE concentration.

TCE Response

Decreases in TCE concentrations were similar to those found in PCE concentrations. TCE concentrations decreased in wells MW-20D1 and within the screened intervals of MW-CMT1 from 30 to 50 ft bgs.

Metals Response

Soils can contain metals that transform to more soluble species when oxidized. Increases in metals concentrations resulting from injection of oxidant are expected to be localized and temporary. Chromium concentrations increased in wells MW-20D1, MW-20D2, and within the screened intervals of MW-CMT1 from 30 to 55 ft bgs. Baseline concentrations of chromium ranged from non-detect to 21 µg/L. During treatment, chromium concentrations ranged from nondetect to 130 µg/L. Arsenic concentrations did not change noticeably.

Soil Gas Response

Concentrations of PCE in soil gas decreased during treatment. Initial soil gas concentrations in SVE-1 (3 ft from the injection well) and VM-2 (50 ft downgradient of the injection well) were 280,000 µg/m^3 and 190,000 µg/m^3, respectively. Concentrations of PCE in soil gas from these wells decreased between one and three orders of magnitude during the test.

2.5.4 Summary

ISCO with hydrogen peroxide and ozone successfully decreased concentrations of PCE in groundwater during the pilot test. PCE concentrations decreased in MW-20D1, MW-20D2, and MW-CMT1. An ROI of at least 15 ft is estimated at depths up to 50 ft bgs. An ROI of at least 8 ft is estimated at depths up to 60 ft bgs. Chromium was detected at elevated concentrations during treatment.

System operating parameters were not significantly altered during the test because of the short duration, and because optimization was not a testing objective. However, system operation could potentially be improved for more efficient PCE destruction.

Table 2-5-4: PulseOx Field Measurements

Well ID	Date/Time	Depth to Groundwater (feet)	pH	Specific Conductance (mS/cm)	Dissolved Oxygen (mg/L)	Temperature (mg/L)	Salinity (%)	Total Dissolved Solids (mg/L)	ORP (mV)	H2O2
MW-20	3/08/13 1325	25.57	--	--	--	--	--	--	--	--
MW-20	3/11/13 1457	25.05	--	--	--	--	--	--	--	--
MW-20	3/11/13 1618	24.95	--	--	--	--	--	--	--	--
MW-20	3/12/2013 1154	24.88	--	--	--	--	--	--	--	--
MW-20	3/12/2013 1700	24.87	--	--	--	--	--	--	--	--
MW-20	3/13/2013 0930	24.76	--	--	--	--	--	--	--	--
MW-20	3/13/2013 1225	24.65	--	--	--	--	--	--	--	--
MW-20	3/13/2013 1408	24.81	--	--	--	--	--	--	--	--
MW-20	3/13/2013 1704	24.81	--	--	--	--	--	--	--	--
MW-20	3/14/2013 1115	24.88	--	--	--	--	--	--	--	--
MW-20	3/14/2013 1615	24.82	--	--	--	--	--	--	--	--
MW-20	3/15/2013 0950	24.81	--	--	--	--	--	--	--	--
MW-20	3/19/2013 1300	25.60	--	--	--	--	--	--	--	--
MW-20	3/26/2013 1256	25.96	6.89	3.64	6.8	25.0	0.18	2300	27	--
MW-20	4/11/2013 1602	26.02	7.13	3307	106.8	23.91	1.78	--	66.5	0-15
MW-20	4/23/2013 0942	26.36	6.84	3234	8.6	23.36	--	2202	-4.2	0.1
MW-20	5/2/2013 0912	26.48	6.57	3.63	9.8	23.9	0.2	2300	143	0
MW-20D1	3/13/2013 1419	24.76	--	--	--	--	--	--	--	--
MW-20D1	3/19/2013 1300	24.77	--	--	--	--	--	--	--	--
MW-20D1	3/26/2013 1127	23.35	6.99	3.37	8.5	23.9	--	2200	-98	--
MW-20D1	4/11/2013 1059	23.72	7.17	2210	230.2	24.68	0.97	--	187.4	0-15
MW-20D1	4/23/2013 1037	25.62	7.22	1890	16.34	24.04	0.17	1245	-10.2	0.1-0.02
MW-20D1	5/1/2013 1557	25.73	7.13	2.19	19.98	26	0.1	1400	99	0.1
MW-20D2	3/13/2013 1418	24.14	--	--	--	--	--	--	--	--
MW-20D2	3/19/2013 1300	24.22	--	--	--	--	--	--	--	--
MW-20D2	3/26/2013 1045	24.79	7.13	562	4.1	22.5	0.02	360	61	--
MW-20D2	4/11/2013 1007	21.82	6.34	1528	340.1	23.83	--	--	816.4	0-15
MW-20D2	4/23/2013 1125	25.51	7.35	1237	24.81	24.62	0.58	753	-1.9	0.1
MW-20D2	5/1/2013 1635	25.53	7.41	835	19.99	26.1	0	540	182	0.2
MW-20D3	3/13/2013 1420	18.20	--	--	--	--	--	--	--	--
MW-20D3	3/19/2013 1300	18.24	--	--	--	--	--	--	--	--
MW-20D3	3/26/2013 0955	17.86	6.93	489	7.1	22.9	0.02	320	85	--
MW-20D3	4/11/2013 1500	--	--	--	--	--	--	--	--	--
MW-20D3	4/23/2013 1228	23.05	7.38	551	12.39	25.09	0.27	359	-15.6	0.1
MW-20D3	5/1/2013 1725	24.42	7.05	578	6.94	26	0	370	164	0.2
CMT-1	3/25/2013 1141	24.75	7.73	3.49	10.2	20.9	0.19	2200	178	--
CMT-1	4/10/2013 1032	23.96	7.75	2657	109.6	18.38	--	--	60.7	0-15
CMT-1	4/23/2013 1445	25.45	7.58	3240	6.87	28.26	1.58	1982	-39.9	0.3
CMT-1	5/1/2013 1014	29.51	7.79	3.24	9.22	24.00	0.2	2100	81	0.3
CMT-2	3/25/2013 1300	24.85	7.58	3.7	10.1	24.2	0.19	2400	30	--
CMT-2	4/10/2013 1129	22.75	7.57	3140	105.4	23.13	--	--	17.2	0-15
CMT-2	4/23/2013 1545	25.41	7.74	3300	6.58	29.20	1.58	1989	-44.5	0.1
CMT-2	5/1/2013 1124	25.55	7.62	2.95	9.1	26.5	0.2	2000	70	0.1
CMT-3	3/25/2013 1445	24.85	7.13	3.48	6.2	27.8	0.16	2200	-121	--
CMT-3	4/23/2013 1620	25.34	7.12	3118	6.14	29.32	1.51	1904	-19.9	0-15
CMT-3	4/10/2013 1215	24.05	7.41	2863	97	23.6	--	--	54	0.00
CMT-3	5/1/2013 1219	25.57	6.75	3.07	14.68	29.5	0.2	2000	127	0.1
CMT-4	3/25/2013 1552	24.82	7.02	3.13	5.8	23.4	0.16	2000	-181	--
CMT-4	4/10/2013 1255	21.34	7.38	2823	208.5	24.39	--	--	61.9	0-15
CMT-4	4/23/2013 1705	25.35	7.04	3050	16.94	28.19	1.47	1856	-0.6	0.1
CMT-4	5/1/2013 1259	25.54	6.84	3.06	19.99	29.3	0.2	2000	137	0.1
CMT-5	3/25/2013 1800	24.82	7.2	3.25	5.6	23.2	0.17	2100	-210	--
CMT-5	4/10/2013 1335	22.30	7.18	2901	210.9	24.65	--	--	66.90	0-15
CMT-5	4/23/2013 1745	25.42	7.02	2994	16.09	27.56	1.48	1860	-3.00	0.2
CMT-5	5/1/2013 1346	25.53	6.78	3.07	19.99	30.7	0.2	2000	144	0.1
CMT-6	3/25/2013 1915	24.82	7.2	2.97	6.8	22.3	0.16	1900	-250	--
CMT-6	4/10/2013 1416	25.47	7.14	2984	168.1	26.41	--	--	65.5	0-15
CMT-6	4/23/2013 1820	25.35	6.95	2941	12.22	26.86	1.49	1873	-11.8	0.1
CMT-6	5/1/2013 1436	25.55	6.64	3.08	19.34	29.9	0.2	2000	149	0.1
CMT-7	3/25/2013 2001	24.82	7.07	2.93	5.8	20.6	0.16	1900	-247	--
CMT-7	4/10/2013 1501	24.34	7.15	3013	119.9	26.38	--	--	63.1	0-15
CMT-7	4/23/2013 1854	25.37	6.92	2854	10.07	24.51	1.5	1876	-13.1	0
CMT-7	5/1/2013 1511	25.57	6.63	3.1	14.86	29.5	0.2	2000	149	0

-- = Not measured
S/m2 = Siemens per square meter
g/l = Grams per liter
m/v = Millivolts
ORP = Oxygen reduction potential
H2O2 = Hydrogen peroxide

3.0 UPDATED CONCEPTUAL SITE MODEL

A conceptual site model (CSM) describes the contaminant source, mechanism of transport, and exposure pathway at a contaminated site. A preliminary CSM was developed in the early stages of Maryland Square investigation, and has been periodically refined and updated as more information has been collected. The NDEP's website for the Maryland Square PCE Site provides a simplified figure showing the vapor intrusion process and how chemicals released in one place migrated in groundwater to affect homes more than 1,000 feet from the source area (http://ndep.nv.gov/pce/graphic/vi_process_csm_figure.pdf). This CSM figure, as well as previous reports describing details of site investigations are available on-line at NDEP's website (http://ndep.nv.gov/pce/maryland_reports.htm). Additional information collected for site geology, hydrogeology, and the vertical delineation of PCE in groundwater throughout the course of the investigations and pilot testing during summer 2012 and winter-spring 2013 are used here to further refine the CSM for the Maryland Square PCE Site.

3.1 Physical Characteristics of the Study Area

The Las Vegas Valley covers roughly 1,600 square miles in southern Nevada, with the eastern edge extending to approximately 5 miles west of Lake Mead and the Colorado River. The Valley is bounded by mountain ranges that reach a maximum elevation of almost 12,000 ft above mean sea level (amsl) to the west. Elevation of the Valley floor ranges from about 3,000 ft in the west to 1,500 ft amsl in the east (Zikmund 1996).

Precipitation on the Valley floor averages 4.16 inches per year, as reported by the Western Region Climate Center (WRCC 2010). Most precipitation occurs during the months of July and August and during the winter (Wild 1990). Potential evapotranspiration ranges from 1 to 19 inches per month from winter to summer months (Shevenell 1996). Mountains surrounding the basin may receive as much as 20 inches of precipitation per year, usually as snowfall. Surface water flows in the Valley are tributary to Lake Mead through Las Vegas Wash (Brothers and Katzer 1988).

3.1.1 Regional Hydrogeology

The Valley lies within the Basin and Range Province of the northern Mojave Desert, and is a structural basin filled with 3,000 to 15,000 ft of sediments (Langenheim and others 1998). Groundwater generally flows southeast from recharge areas in the Spring Mountains to the west and the Sheep Range to the north, toward the Las Vegas Wash and Lake Mead (Figure 14) (Leising 2004).

In the western portion of the basin, alluvial fan deposits consist of coarse-grained sand and gravel. In the lowland central and eastern portion of the basin, coarser grained sediments interfinger with finer grained lacustrine and playa deposits (Plume 1984, Leising 2004). Within the east central area of the Valley, which includes the Site, coarser-grained deposits interfinger with layers and lenses of sandy silt, silty sand, clayey sand, sandy clay, and caliche (Plume 1984, Leising 2004). Coarser-grained deposits generally serve as aquifers, whereas silts, clays, and caliche may act as confining layers (Zikmund 1996).

The hydrostratigraphic units of the Valley are presented here as defined by Leising (2004) and illustrated on Figures 14 and 15. The upper unit consisting of a heterogeneous package of sand, silt, and clay sediments within the central and eastern areas of the Valley is termed the Las Vegas Wash Aquitard. Based on well logs on file with Nevada Division of Water Resources (NDWR), this unit may be 100 ft thick in the area of the Site. The Maryland Square PCE plume lies within the Las Vegas Wash Aquitard, but has been studied mostly within the upper 30 to 50 ft across the Site, except at two areas west and east of Boulevard Mall where depth of investigation ranged from 60 to 120 ft bgs.

As shown on Figure 16, the Las Vegas Springs Aquifer underlies the Las Vegas Wash Aquitard and is subdivided into an upper unit (Las Vegas Creek Aquifer), a middle unit (Twin Lakes Aquitard), and a lower unit (La Madre Mountain Aquifer). The Las Vegas Creek Aquifer serves as the primary supply to domestic wells, and the La Madre Mountain Aquifer serves as the primary source for municipal supply wells. Based on well logs on file with NDWR, depths to upper and lower units of the Las Vegas Springs Aquifer within a few miles of the Site are an estimated 100 to 200 ft bgs for the Las Vegas Creek Aquifer, and 550 to at least 750 ft bgs for the La Madre Mountain Aquifer. The Duck Creek Aquifer underlies the Las Vegas Springs Aquifer.

Recharge to the shallow groundwater system (i.e., the Las Vegas Wash Aquitard) is attributed to: (1) upward vertical flow from the Las Vegas Springs Aquifer, (2) surface infiltration of runoff, and (3) over-irrigation (either agricultural or residential) (Bernholtz 1993). However, in some areas where water supply wells produce from the deeper aquifer, the vertical gradient has been reversed downward, and in some cases, shallow groundwater may be pumped and blended with groundwater from the deeper aquifer for irrigation and industrial uses (Zikmund 1996).

3.1.2 Site Geology

The geology of the Site consists of interbedded layers and lenses of sand, sandy silt, sandy clay, and silty clay, along with discontinuous zones of caliche and gravel scattered throughout. Lithologic data are available from borehole logs for 46 monitoring wells installed at the Site between 2000 and 2013. The borehole logs and well construction diagrams for all monitoring wells at the Site are in Appendix A.

Additional lithologic information was obtained from 29 soil borings drilled for characterization of source area soils (URS Corporation [URS] 2007b), and from borings installed for active soil-gas sampling within and adjacent to the residential neighborhood (URS 2007d). Depths of monitoring wells at the Site range from 20 to 110 ft, although most wells are completed at depths between 30 and 35 ft.

South-North cross sections west and east of Boulevard Mall (Figures 5 and 6) indicate that the unsaturated zone from 0 to approximately 20 ft bgs consists primarily of sands and silts, but may include soils that consist entirely of sandy clays and clays. The upper 40 ft of the saturated zone (approximately 20 to 60 feet bgs) consist of sands and silty sands, which tend to interbed with lower permeability clays and silts and include lenses of caliche. A unit of predominately fine-grained soil is present from approximately 60 to 90 ft bgs. Below 90 ft bgs is a unit of higher permeability soils (silty sands, sandy silts) with lenses of clay. West-East cross section (Figure 7) oriented parallel to the central line of the PCE plume further illustrates these main units. As indicated by water level measurements in shallow and deep monitoring wells, the bottom of the shallow groundwater system is approximately 60 ft bgs, while the unit below 90 ft bgs belongs to a deeper groundwater system.

East of the Boulevard Mall Property and farther along the plume centerline cross section (Figure 17), sediments along Algonquin Drive consist of gravelly sand and grade into silt with depth to the east (URS 2007d). Within the neighborhood, groundwater is hosted in predominantly silty and clayey layers, with the amount of clay increasing in the eastern portion (Figure 17). Lower permeability clays and silts (silty clay, sandy clay, clayey silt, and sandy silt) dominate the saturated zone of the shallow groundwater system across most of the Site; however, the upper few ft of this zone consists of sands and silty sands within the source area and extending eastward across the Boulevard Mall property, and into the western portion of the neighborhood. This mainly sandy zone may represent portions of a higher permeability paleochannel within the alluvial deposits.

Borehole logs for irrigation wells PW-1 (DWR #5675) and PW-2 (DWR #16296) at the Las Vegas National Golf Course are driller's logs (not geologist logs), and provide less lithological detail. The lithology in PW-1 is described as mainly clay/shale deposits (reddish color) with some sand and gravel "streaks" from 0 to 706 ft, and the main water-bearing gravel layer from 706 to 746 ft bgs. The well seal extends from the ground surface to 130 ft bgs, with a screened interval from about 500 to 746 ft bgs. The lithologic description for PW-2 notes a greater occurrence of caliche zones throughout much of the boring (total depth of 620 ft), but in particular above about 250 ft bgs. Red clay and sandstone are listed as the dominant lithologies on the driller's borelog, along with a screened interval from 220 to 620 ft bgs.

3.1.3 Hydraulic Properties of the Shallow Groundwater System

Depth to groundwater generally ranges between 9 to 28 ft bgs across the Site, but varies annually in each well. Based on water level data obtained in 2013, shallow groundwater flows east with a gradient that ranges from 0.014 to 0.017 ft/foot (Figure 18). Historical groundwater elevations indicate the water table has fluctuated by several feet over the monitoring period from 2000 to 2011, as illustrated on Figure 19. Data for wells adjacent to the golf course show seasonal fluctuations in water levels of approximately 6 ft (Figure 19). However, it is unclear whether these fluctuations represent drawdown or mounding or some degree of both from operation of the golf course irrigation wells.

As discussed in Section 2.2, based on results of pumping tests from two areas on the Boulevard Mall Property, the estimated T and aquifer S for shallow groundwater system range from 64 to 146 ft^2/day and 0.0009 to 0.0017, respectively. Average estimated K values range from 2.1 to 4.2 ft/day. These estimates correspond to previous slug test results (Converse Consultants [Converse] 2004).

Converse conducted slug tests in monitoring wells MW-2, MW-3, MW-13, MW-15, MW-16, MW-19, and MW-20 in 2004 to estimate K values representative of the Site. Calculated K values developed using the Bouwer-Rice Method (Bouwer and Rice 1976) ranged from 1.9 to 17 ft/day, whereas K values calculated using the Hvorslev Method (Hvorslev 1951) ranged from 0.8 to 6.4 ft/day.

As discussed in Section 2.1.2, measured porosity and bulk density in soil samples with varying amounts of coarse and fine-grained soils were 38 to 66 percent and 0.88 to 1.53 g/cm^3, respectively. Converse (2004) obtained similar results from two samples of sandy clay: 49 to 57 percent for porosity and 1.14 to 1.49 g/cm^3 for bulk density. In addition, URS (2007d) conducted bulk density and grain size analyses of soil samples collected from three borings (SVB-5 at depths of 5.5 and 10 ft bgs, SVB-9 at depths of 3 and 8 ft bgs, and SVB-13 at depths of 8.5 and 18.5 ft bgs). Grain size ranged from clayey silt to sandy gravel, and bulk density ranged from 1.6 to 1.91 g/cm^3.

Zikmund (1996) reported results from a study by Western Technologies (1991) to characterize basic hydraulic parameters of the shallow groundwater system in the Valley. Western Technologies tested 2- and 4-inch-diameter wells completed to depths of 25 to 30 ft bgs in downtown Las Vegas. The results of this study (summarized below) show hydraulic characteristics of the shallow groundwater system in the downtown area (near the intersection of U.S. 95 and Interstate 15), approximately 3 miles north-northwest from the former dry cleaners:

- Yield 0.15 to 8.5 gpm
- Average Transmissivity 64 ft^2/day
- Horizontal Hydraulic Conductivity 0.9 to 16 ft/day

Groundwater likely exhibits a range of flow velocities within the generally unconsolidated and heterogeneous geologic deposits that host the shallow groundwater at the Site. Higher rates of flow occur through the coarser grained layers (sands and gravels), and lower rates of flow occur through the finer grained layers (silty sands, silts, and clays). Data from two wells, USGS 43 and USGS 5 (Leising 2004), indicate that shallow groundwater northwest and southeast of the Site may best be characterized as a calcium-magnesium sulfate water, as discussed below in Section 3.14.

3.1.4 Geochemistry of the Shallow Groundwater System

Groundwater in the Las Vegas Wash Aquitard is generally brackish and non-potable. Water quality in the Las Vegas Wash Aquitard generally degrades in an easterly, downgradient direction with increasing concentrations of total dissolved solids (TDS), sulfate, and sodium. Salinity of shallow groundwater is the result of evapotranspiration, dissolution of saline minerals in soils and rocks, and infiltration of irrigation water (Zikmund 1996). Groundwater in the Las Vegas Wash Aquitard in the area of the Site is a calcium-magnesium-sulfate water with a lesser bicarbonate component (Leising 2004). Some parts of the flow system also exhibit elevated concentrations of boron and nitrate (Zikmund 1996). Due to irrigation with chlorinated water from the local water system, chloroform and trihalomethanes may also be present in the shallow groundwater (Leising 2004).

Groundwater samples collected from 12 wells were analyzed for concentrations of major anions (i.e., nitrate, sulfate, chloride, bicarbonate alkalinity), total iron, dissolved manganese, TOC, and dissolved oxygen (URS 2008a). Results are generally consistent with the regional geochemical characterization provided by Leising (2004). Sulfate is the dominant anion, with concentrations ranging from 1,500 to 3,700 milligrams per liter (mg/L) (URS 2008a), with lesser concentrations of bicarbonate and chloride. Nitrate generally ranges from 4.5 to 23.9 mg/L in the shallow groundwater (URS 2008a), and is attributed to the heavy use of fertilizers across the Valley (Leising 2004). TOC in shallow groundwater at the Site ranges from 1.2 to 6.0 mg/L, with one outlier of 24 mg/L having appeared among 49 samples in a data set (URS 2008a).

Field parameters (pH, temperature, specific conductance, turbidity, dissolved oxygen [DO], and oxidation-reduction potential [ORP]) are routinely measured during quarterly groundwater monitoring. TDS concentrations (TDS) range from 900 to 4,300 mg/L in monitoring wells installed across the Site. URS (2008a) reported detectable iron ranging from 1.2 to 38 mg/L and detectable manganese ranging from 0.0053 to 0.69 mg/L; however, turbidity is highly variable and can range from non-detectable to greater than 999 Nephelometric Turbidity Units (NTU) because of abundant silt and clay within the saturated zone. Elevated concentrations of metals reported during prior investigations likely reflect the amount of total suspended solids (i.e., sediment) in the sample. Turbidity measurements are also likely influenced by the effectiveness of well development. Relatively high concentrations of DO averaging 4.1 mg/L and

consistently high ORP measurements averaging 188 millivolts indicate oxidizing conditions not conducive to reductive dechlorination of PCE.

Reported ranges and selected summary statistics for the field parameters are listed in Table 3-1.

TABLE 3-1: Statistical Summary of Field Parameters

	pH	Temp (°C)	SC (mS/cm)	Turbidity (NTU)	DO (mg/L)	TDS (g/L)	ORP (mV)
Arithmetic Mean	6.66	24.5	4.03	153	4.11	2.5	188
Standard Deviation	0.47	1.95	4.33	211	2.08	0.51	166
Median	6.8	24.45	3.68	37	4.12	2.4	170
Minimum	4.67	18.8	1.32	0	0.54	0.9	-321
Maximum	7.41	32.5	69.4	999	9.84	4.3	634
Count (n)	217	240	240	166	225	200	223

Notes:

DO	Dissolved oxygen
g/L	Grams per liter
mg/L	Milligrams per liter
mS/cm	MicroSiemens per centimeter
mV	Millivolts
NTU	Nephelometric Turbidity Unit
ORP	Oxidation-reduction potential
SC	Specific conductance
TDS	Total dissolved solids
Temp	Temperature

Source: Nevada Division of Environmental Protection (NDEP). 2011. Draft Corrective Action Plan for Groundwater, Maryland Square Shopping Center. Letter and attachments to Mr. Irwin Kishner and Mr. Tim Swickard. April 26

3.2 Nature and Extent of Contamination in Shallow Groundwater

The Maryland Square PCE plume extends at least 6,000 ft eastward from the former Maryland Square Shopping Center that hosted the former dry cleaners, beneath the Boulevard Mall and a residential neighborhood, past the Las Vegas National Golf Course, and across S. Eastern Avenue (Figure 3) for at least another 1,500 feet (based on the 5 µg/L contour). For the first 2,000 feet from the source, the plume is about 500 feet wide. However, about midway through the residential neighborhood the PCE plume broadens along its northern edge to become about 1,000 feet wide at the western border of the golf course (Figure 3).

Delineation of the vertical extent of the plume was performed during implementation of Phases I and II of the work described in this CAR. As discussed in Section 2.1.1, based on vertical delineation results for two areas at the Boulevard Mall Property, PCE contamination is limited to the shallow groundwater system and is likely absent below 81 ft bgs.

3.2.1 History of Groundwater Investigations at the Site

The investigation of groundwater began in August 2000, with a limited Phase II Environmental Site Assessment at the former Maryland Square Shopping Center, where the former dry cleaners operated from 1969 to 2000 (Converse 2000). Following discovery of PCE in groundwater at the Property, an off-site investigation began to delineate the extent of the PCE plume, with installation of five wells downgradient of the property (Converse 2002). Since that time, additional wells have been installed across the site in a phased approach to further define the plume (see http://ndep.nv.gov/pce/graphic/2012_Map_Well_History.pdf). Quarterly scheduled monitoring and sampling of groundwater has been performed since May 2005. Currently, 46 monitoring wells are installed at the Site, and are part of the monitoring program (Figure 3). Eleven wells within the residential area of the plume are sampled quarterly. Eleven wells within the area of the former dry cleaners, the Boulevard Mall, and the southwestern residential area are sampled semi-annually. All wells in the program are sampled during the 4th quarter monitoring event, and water-level measurements are obtained quarterly.

Assuming the PCE releases began in 1969 at the former dry cleaners, and that the leading edge of the dissolved PCE plume traveled 6,000 feet in that time, the estimated average velocity of PCE migration is 140 ft/year. PCE was first reported in a sample collected from golf course irrigation well PW-1 at 8.1 µg/L in 1990. Therefore, the plume likely arrived at PW-1 after 18 to 20 years of migration.

3.2.2 Migration of the PCE Plume

The plume would have initially migrated from the source area preferentially through the fine sands and gravels because of their higher hydraulic conductivity. Assuming a gradient of 0.0155 ft/foot, an average hydraulic conductivity of 10 ft/day, and a porosity of 0.25 (effective porosity of sand), the average shallow groundwater flow velocity through this material is approximately 230 ft/year. If the PCE plume moved slower at 140 ft/year, it was apparently retarded by a factor of 1.6, which is expected when PCE is minimally degraded and migrates through an environment with low organic carbon content (supported by low TOC data):

$$v = \frac{K x t}{n} \left(\frac{dh}{dl} \right)$$

$$v\ (ft/yr) = \frac{10\ (ft/day) \times 365\ (days/yr)}{0.25} \times 0.0155\ (ft/ft)$$

$$v = 226.3\ ft/yr$$

$$R_f = \frac{velocity\ of\ water}{velocity\ of\ contaminant}$$

$$R_f = \frac{226}{140} = 1.6$$

where:

K = hydraulic conductivity (ft/day)
dh/dl = hydraulic gradient (ft/ft)
n = effective porosity
t = time (days)
R_f = retardation factor

Note that the estimated groundwater flow velocity represents flow through the most permeable zones averaged over the entire length of the plume. The groundwater flow velocity at any given point in the plume may vary and could be much lower in fine-grained soils such as those found at the Boulevard Mall property (see Section 2.2.3).

Analytical data for PCE daughter products indicate limited, if any, degradation of PCE at the Site. Low levels of TCE and *cis*-1,2-dichloroethene (DCE) have been detected in wells MW-2, MW-5, and MW-6 (concentrations of about 0.5% of the PCE concentration). This is roughly the percentage that TCE occurs as a trace contaminant in industrial grade PCE. The highest concentrations of daughter products have been detected in samples from MW-6 (maximum TCE concentration of 41 µg/L and maximum *cis*-1,2-DCE concentration of 23 µg/L). This indicates that natural attenuation of PCE through reductive dechlorination is not prevalent at the site.

3.2.3 Estimate of PCE Mass

Based on the PCE plume geometry shown on Figure 3, an average total porosity of 0.41, and an average saturated thickness of 35 feet, the volume of contaminated groundwater is estimated at 316 million gallons within the 100 µg/L contour, and 738 million gallons within the 5 µg/L contour. The estimated dissolved mass of PCE within the 100 µg/L contour is 1,216 pounds (lbs), and the estimated dissolved mass of PCE within the 5 µg/L contour is 1,401 lbs. Based on an average organic carbon content of 0.065 percent, and an organic carbon-water partition coefficient of 265 liters per kilogram, mass of PCE adsorbed to soil is estimated at 806 lbs within the 100 µg/L contour and 928 lbs within the 5 µg/L contour. The total dissolved and sorbed mass of PCE in the saturated zone is estimated at 2,022 lbs within the 100 µg/L contour and 2,329 lbs within the 5 µg/L contour. This equates to 150 gallons and 173 gallons of PCE respectively. The quantity of nonaqueous-phase PCE that may be smeared to soil in the saturated zone cannot be estimated.

4.0 SCREENING LEVEL HUMAN HEALTH RISK ASSESSMENT

The primary objective of the SLHHRA is to determine whether site contaminants pose a current or potential risk to human health in the absence of remediation. The SLHHRA helps to evaluate whether further remediation is necessary at the site. The complete SLHHRA is provided in Appendix F.

Tetra Tech conducted the SLHHRA at the Site consistent with EPA and state guidance. As described in *Risk Assessment Guidance for Superfund* (RAGS) (EPA 1989), the risk assessment is conducted in four basic steps: (1) data evaluation and identification of contaminants of potential concern (COPC), (2) exposure assessment, (3) toxicity assessment, and (4) risk and hazard characterization. In addition, the SLHHRA includes a discussion and evaluation of significant sources of uncertainties in the risk assessment process as applied at the Site.

The SLHHRA is based on the data from indoor air samples collected at houses in the Paradise Palms neighborhood. All detected chemicals in the indoor air samples were selected as COPCs. Thus, the COPCs evaluated in this SLHHRA are PCE, TCE, and vinyl chloride. All properties were evaluated and sorted into one of eight different groups depending on property location, availability of indoor air sample data, and analytical data from sampling (see Appendix F, Table 2).

4.1 Results of the Vapor Intrusion Risk Evaluation

The indoor air concentration in each house is based on a unique set of circumstances for each house, related subsurface conditions and building construction. Thus, each house with indoor air sampling results was evaluated as an exposure unit. Health risks posed by exposure to vapor intrusion (VI) were estimated quantitatively at 45 houses. Forty-two houses above the 100 µg/L groundwater PCE plume contour with detected sampling results and that do not have SSD systems were included in the quantitative assessment. Three houses with detected results and that are not within the 100 µg/L groundwater PCE plume contour were also evaluated quantitatively. Sampling was offered to any homeowner whose property lay partially or wholly within the 100 µg/L contour; however, thirty-three houses within the VI area of concern have not undergone any air sampling. These 33 properties are evaluated qualitatively.

4.1.1 Estimated Cancer Risks

None of the houses in the quantitative evaluation had an estimated potential incremental cancer risk exceeding the 1 in 10,000 (1E-04) action level. The estimated cancer risk range for the 42 houses without SSD systems within the 100 µg/L groundwater PCE plume contour and where PCE has been detected in indoor air is 4E-08 to 5E-06. The estimated cancer risk range for the 3 houses outside the 100 µg/L groundwater PCE plume contour where PCE has been detected in indoor air is 8E-07 to 2E-06. The highest estimated potential cancer risk was 5E-06. This estimated risk occurred at Broadbent identification (ID) 985. This house was not sampled by Tetra Tech in 2012 (ID 1626). The measured indoor air concentration of PCE at this house was 43 µg/m^3, which exceeds the interim action level of 32 µg/m^3 established by NDEP. This house is eligible to have a SSD system installed; however, the homeowner refused the installation. Table 4-1 presents cancer risk estimates for the 45 houses included in the quantitative risk assessment.As shown on Table 4-1, 22 houses had estimated potential incremental cancer risk within the risk management range of 1 in one million (1E-06) to 1E-04). Of the 22 homes, nine had risks equivalent to the low end of the risk management range at 1E-06.

The houses with estimated risks within the risk management range are primarily on Seneca Lane or Maricopa Way. Two of the houses in the risk range are on Ottawa Drive, and two are on Cherokee Lane. One of the houses is at the eastern edge of the VI area of concern on Ottawa Circle. Two of the houses outside the 100 µg/L groundwater PCE contour had estimated cancer risks within the risk management range.

Twenty-three houses included in the quantitative assessment had estimated potential cancer risks of less than 1E-06. These houses are considered to have negligible cancer risk from VI to indoor air.

4.1.2 Estimated Noncancer Hazards

No houses had an estimated noncancer hazard greater than the action level of 1. One house had an estimated noncancer hazard equal to 1. The estimated noncancer hazard range for the 42 houses without SSD systems within the 100 µg/L groundwater PCE plume contour where PCE has been detected in indoor air is 0.03 to 1. The estimated noncancer hazard range for the 3 houses outside the 100 µg/L groundwater PCE plume contour where PCE has been detected in indoor air is 0.2 to 0.5. This estimated noncancer hazard occurred at Broadbent ID 985. This house was not sampled by Tetra Tech in 2012 (ID 1626). The measured indoor air concentration of PCE at this house was 43 µg/m^3, which exceeds the interim action level of 32 µg/m^3 established by NDEP. This house is eligible to have a SSD system installed; however, the homeowner refused the installation. Table 4-1 presents noncancer hazard estimates for the 45 houses included in the quantitative risk assessment.

All of the other houses in the VI area of concern have an estimated noncancer hazard less than 1, and are thus below a level of concern for non-cancer hazards from VI to indoor air.

4.1.3 Qualitative Assessment of Houses without Indoor Air Sample Results

Thirty-three parcels within the VI area of concern have been offered indoor air sampling, but to date, have not been sampled. Empirical data from indoor air in the houses located above the groundwater PCE plume have PCE concentrations ranging from nondetect to 110 µg/m^3 and TCE concentrations ranging from nondetect to 9.4 µg/m^3. Assuming the highest detected concentrations would have been found in the houses not having undergone indoor air sampling, the estimated potential incremental cancer risk would be 3E-05, and the estimated non-cancer hazard would be 7 (Table 4-1). This estimated potential cancer risk is within the cancer risk range of 1E-06 to 1E-04, while the estimated non-cancer hazard exceeds the HI=1 threshold.

The uncertainty level associated with assigning indoor air concentrations from three houses to other houses is very high. Use of these indoor air concentrations assumes that the subsurface conditions and building properties that resulted in the indoor air concentrations observed in the sampled houses applies to the houses that have not been sampled. In addition, samples collected from other houses in the area have confirmed that the distribution of PCE concentrations in indoor air does not correlate to the distribution of PCE concentrations in groundwater. Indoor air concentrations above a level of concern are possible in any of the houses above the plume because of the possibility of preferential vapor pathways such as utility conduits, or individual building properties such poor foundation condition or ventilation properties of the house. Indoor air sampling is necessary to quantitatively assess the risk at any individual property above the plume.

4.1.4 Maximally Exposed Individual

The maximum concentration of PCE in indoor air measured in the residential area is 110 µg/m^3. Several homes located above the PCE plume have not had indoor samples collected. Assuming that 110 µg/m^3 PCE is the highest indoor air concentration, this value can be used as the exposure point concentration to calculate the cancer risk and non-cancer hazard for the maximally exposed individual. At a PCE concentration of 110 µg/m^3, the estimated incremental cancer risk from PCE in indoor air is 1E-05. This estimated cancer risk is within the EPA's target cancer risk range of 1E-4 to 1E-6. The calculated non-cancer hazard from a PCE concentration of 110 µg/m^3 in indoor air is HI=3. This calculated non-cancer hazard exceeds the target non-cancer hazard of HI=1. (It should be noted that the home with this PCE concentration in indoor air had a SSD system installed and therefore its residents are not being exposed at this level. After installation and modifications to the SSD system, PCE concentrations were not detected in indoor air.)

4.2 Uncertainty Assessment

The risks and hazards calculated as part of the Site SLHHRA are subject to various degrees of uncertainty from a variety of sources associated with all the major phases of the human health risk assessment (HHRA) process. The uncertainty assessment identifies and discusses the nature of the uncertainty associated with the most significant sources of site-specific uncertainty.

It should be noted that human health implications related to PCE, or any other type of contaminant exposure, are not entirely based on the concentration and time period of exposure, but individual differences among the exposed population also play a role in the human health response. Individual traits including, but not limited to, differences in age, sex, diet, health status, family history of disease, and personal lifestyle choices can impact individual sensitivity to exposure and the severity of response.

Virtually every step in the HHRA process requires numerous assumptions, all of which contribute to uncertainty in the risk evaluation. In the absence of empirical or site-specific data, assumptions are developed based on best estimates of data quality, exposure parameters, and dose-response relationships. Overall, conservative measures were used to address the uncertainties in the SLHHRA; thus, the SLHHRA is expected to overestimate actual risks to receptors in the VI area of concern.

4.3 Summary and Conclusions of the SLHHRA

None of the houses included in the quantitative evaluation had an estimated potential cancer risk exceeding the 1E-04 action level. Twenty-two of the 45 houses evaluated had estimated potential cancer risk within the risk management range (1E-06 to 1E-04); however, none the estimated risks exceeded 5E-06, and nine houses were equivalent to the low end of the range at 1E-06. Twenty-three houses had estimated potential cancer risks of less than 1E-06. These houses are considered to have negligible cancer risk from VI to indoor air.

None of the houses included in the quantitative evaluation had an estimated noncancer hazard greater than the action level of 1. One house had an HI equal to 1. All of the other houses in the VI area of concern have an estimated noncancer hazard less than 1, and thus are below a level of concern for non-cancer hazards from VI to indoor air.

One house had an estimated cancer hazard equal to 5E-06 and a noncancer hazard equal to 1. This estimated cancer risk and noncancer hazard occurred at Broadbent ID 985. This house was not sampled

by Tetra Tech in 2012 (ID 1626). The measured indoor air concentration for PCE at this house was 43 µg/m^3, which exceeds the interim action level of 32 µg/m^3 established by NDEP. This house is eligible to have an SSD system installed; however, the homeowner refused the installation. Installation of an SSD system would reduce the potential cancer risk and noncancer hazard estimated for this house below a level of concern.

Indoor air sampling data are not available for 33 parcels wholly or partially within the 100 µg/L contour groundwater PCE contour. Assuming the highest detected concentrations would have been found in these houses, the estimated cancer risk would be 3E-05, which is within the cancer risk range of 1E-06 to 1E-04, while the estimated non-cancer hazard of 7 would exceed the HI=1 threshold. The uncertainty level associated with assigning indoor air concentrations from three houses to other houses is very high. Indoor air sampling is necessary to quantitatively assess the risk at any individual property above the plume.

The largest sources of uncertainty in the risk assessment are (1) use of a single sample result for estimating risk and (2) lack of sampling data regarding potential temporal variations in the PCE concentrations in indoor air in the houses.

Table 4-1: Estimated Cancer Risk and Noncancer Hazard by Residence.
Maryland Square PCE Site

Group	COPC	Broadbent 2007-2008		Tetra Tech 2012		Maximum Concentration ($\mu g/m^3$)	Cancer RSL ($\mu g/m^3$)	Non-Cancer RSL ($\mu g/m^3$)	Estimated Cancer Risk	Estimated Noncancer Hazard
		Random ID	COPC Concentration ($\mu g/m^3$)	Random ID	COPC Concentration ($\mu g/m^3$)					
4	PCE	192	7.6	--	--	7.6	9.4	42	8.1E-07	0.2
	TCE		ND		--	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		--	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**8E-07**	**0.2**
4	PCE	421	19	--	--	19	9.4	42	2.0E-06	0.5
	TCE		ND		--	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		--	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**2E-06**	**0.5**
4	PCE	910	20	--	--	20	9.4	42	2.1E-06	0.5
	TCE		ND		--	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		--	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**2E-06**	**0.5**
5	PCE	027	ND	2498	1.2	1.2	9.4	42	1.3E-07	0.03
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**1E-07**	**0.03**
5	PCE	042	15	1501	7	15	9.4	42	1.6E-06	0.4
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**2E-06**	**0.4**
5	PCE	086	ND	3787	1.9	1.9	9.4	42	2.0E-07	0.05
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**2E-07**	**0.05**
5	PCE	196	10	2301	2.6	10	9.4	42	1.1E-06	0.2
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**1E-06**	**0.2**
5	PCE	233	ND	4263	0.36	0.36	9.4	42	3.8E-08	0.009
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**4E-08**	**0.009**
5	PCE	253	8.3	3029	8.3	8.3	9.4	42	8.8E-07	0.2
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**9E-07**	**0.2**
5	PCE	281	ND	2838	0.63	0.63	9.4	42	6.7E-08	0.02
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**7E-08**	**0.02**

Table 4-1: Estimated Cancer Risk and Noncancer Hazard by Residence.
Maryland Square PCE Site

Group	COPC	Broadbent 2007-2008		Tetra Tech 2012		Maximum Concentration ($\mu g/m^3$)	Cancer RSL ($\mu g/m^3$)	Non-Cancer RSL ($\mu g/m^3$)	Estimated Cancer Risk	Estimated Noncancer Hazard
		Random ID	COPC Concentration ($\mu g/m^3$)	Random ID	COPC Concentration ($\mu g/m^3$)					
5	PCE	287	ND	1028	0.44	0.44	9.4	42	4.7E-08	0.01
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
								Cumulative Cancer Risk/Noncancer Hazard	**5E-08**	**0.01**
5	PCE	293	24	4691	29	29	9.4	42	3.1E-06	0.7
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
								Cumulative Cancer Risk/Noncancer Hazard	**3E-06**	**0.7**
5	PCE	382	7.7	2759	5	7.7	9.4	42	8.2E-07	0.2
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
								Cumulative Cancer Risk/Noncancer Hazard	**8E-07**	**0.2**
5	PCE	418	ND	1106	3.7	3.7	9.4	42	3.9E-07	0.09
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
								Cumulative Cancer Risk/Noncancer Hazard	**4E-07**	**0.09**
5	PCE	426	ND	4721	5.9	5.9	9.4	42	6.3E-07	0.1
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
								Cumulative Cancer Risk/Noncancer Hazard	**6E-07**	**0.1**
5	PCE	511	9.3	3987	5.3	9.3	9.4	42	9.9E-07	0.2
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
								Cumulative Cancer Risk/Noncancer Hazard	**1E-06**	**0.2**
5	PCE	624	9.6	2681	2.4	9.6	9.4	42	1.0E-06	0.2
	TCE		ND		0.44	0.44	0.43	2.1	1.0E-06	0.2
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
								Cumulative Cancer Risk/Noncancer Hazard	**2E-06**	**0.4**
5	PCE	671	ND	4523	1.7	1.7	9.4	42	1.8E-07	0.04
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
								Cumulative Cancer Risk/Noncancer Hazard	**2E-07**	**0.04**
5	PCE	749	ND	4728	2.1	2.1	9.4	42	2.2E-07	0.05
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
								Cumulative Cancer Risk/Noncancer Hazard	**2E-07**	**0.05**
5	PCE	764	18	4638	ND	18	9.4	42	1.9E-06	0.4
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
								Cumulative Cancer Risk/Noncancer Hazard	**2E-06**	**0.4**

Table 4-1: Estimated Cancer Risk and Noncancer Hazard by Residence.
Maryland Square PCE Site

Group	COPC	Broadbent 2007-2008		Tetra Tech 2012		Maximum Concentration ($\mu g/m^3$)	Cancer RSL ($\mu g/m^3$)	Non-Cancer RSL ($\mu g/m^3$)	Estimated Cancer Risk	Estimated Noncancer Hazard
		Random ID	COPC Concentration ($\mu g/m^3$)	Random ID	COPC Concentration ($\mu g/m^3$)					
5	PCE	923	6.6	1553	7	7	9.4	42	7.4E-07	0.2
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**7E-07**	**0.2**
5	PCE	972	8.2	3253	2.5	8.2	9.4	42	8.7E-07	0.2
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**9E-07**	**0.2**
5	PCE	990	ND	3313	11	11	9.4	42	1.2E-06	0.3
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		0.075	0.075	0.16	100	4.7E-07	0.0008
Cumulative Cancer Risk/Noncancer Hazard									**2E-06**	**0.3**
6	PCE	045	23	2167	--	23	9.4	42	2.4E-06	0.5
	TCE		ND		--	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		--	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**2E-06**	**0.5**
6	PCE	049	11	3757	--	11	9.4	42	1.2E-06	0.3
	TCE		ND		--	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		--	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**1E-06**	**0.3**
6	PCE	075	9.2	3934	--	9.2	9.4	42	9.8E-07	0.2
	TCE		ND		--	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		--	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**1E-06**	**0.2**
6	PCE	414	26	1602	--	26	9.4	42	2.8E-06	0.6
	TCE		ND		--	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		--	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**3E-06**	**0.6**
6	PCE	428	8.3	2736	--	8.3	9.4	42	8.8E-07	0.2
	TCE		ND		--	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		--	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**9E-07**	**0.2**
6	PCE	516	19	1452	--	19	9.4	42	2.0E-06	0.5
	TCE		ND		--	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		--	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**2E-06**	**0.5**
6	PCE	598	12	3695	--	12	9.4	42	1.3E-06	0.3
	TCE		ND		--	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		--	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**1E-06**	**0.3**

Table 4-1: Estimated Cancer Risk and Noncancer Hazard by Residence.
Maryland Square PCE Site

Group	COPC	Broadbent 2007-2008		Tetra Tech 2012		Maximum Concentration ($\mu g/m^3$)	Cancer RSL ($\mu g/m^3$)	Non-Cancer RSL ($\mu g/m^3$)	Estimated Cancer Risk	Estimated Noncancer Hazard
		Random ID	COPC Concentration ($\mu g/m^3$)	Random ID	COPC Concentration ($\mu g/m^3$)					
6	PCE	636	5.6	4947	--	5.6	9.4	42	6.0E-07	0.1
	TCE		ND		--	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		--	ND	0.16	100	--	--
								Cumulative Cancer Risk/Noncancer Hazard	**6E-07**	**0.1**
6	PCE	700	12	1425	--	12	9.4	42	1.3E-06	0.3
	TCE		ND		--	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		--	ND	0.16	100	--	--
								Cumulative Cancer Risk/Noncancer Hazard	**1E-06**	**0.3**
6	PCE	773	6.3	4851	--	6.3	9.4	42	6.7E-07	0.2
	TCE		ND		--	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		--	ND	0.16	100	--	--
								Cumulative Cancer Risk/Noncancer Hazard	**7E-07**	**0.2**
6	PCE	913	27	1211	--	27	9.4	42	2.9E-06	0.6
	TCE		ND		--	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		--	ND	0.16	100	--	--
								Cumulative Cancer Risk/Noncancer Hazard	**3E-06**	**0.6**
6	PCE	933	11	1174	--	11	9.4	42	1.2E-06	0.3
	TCE		ND		--	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		--	ND	0.16	100	--	--
								Cumulative Cancer Risk/Noncancer Hazard	**1E-06**	**0.3**
6	PCE	942	7.3	4764	--	7.3	9.4	42	7.8E-07	0.2
	TCE		ND		--	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		--	ND	0.16	100	--	--
								Cumulative Cancer Risk/Noncancer Hazard	**8E-07**	**0.2**
6	PCE	985	43	1626	--	43	9.4	42	4.6E-06	1
	TCE		ND		--	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		--	ND	0.16	100	--	--
								Cumulative Cancer Risk/Noncancer Hazard	**5E-06**	**1**
7	PCE	--	--	1278	13	13	9.4	42	1.4E-06	0.3
	TCE		--		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		--		ND	ND	0.16	100	--	--
								Cumulative Cancer Risk/Noncancer Hazard	**1E-06**	**0.3**
7	PCE	--	--	2093	4.1	4.1	9.4	42	4.4E-07	0.1
	TCE		--		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		--		ND	ND	0.16	100	--	--
								Cumulative Cancer Risk/Noncancer Hazard	**4E-07**	**0.1**
7	PCE	--	--	3330	3.4	3.4	9.4	42	3.6E-07	0.08
	TCE		--		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		--		ND	ND	0.16	100	--	--
								Cumulative Cancer Risk/Noncancer Hazard	**4E-07**	**0.08**

Table 4-1: Estimated Cancer Risk and Noncancer Hazard by Residence.
Maryland Square PCE Site

Group	COPC	Broadbent 2007-2008		Tetra Tech 2012		Maximum Concentration ($\mu g/m^3$)	Cancer RSL ($\mu g/m^3$)	Non-Cancer RSL ($\mu g/m^3$)	Estimated Cancer Risk	Estimated Noncancer Hazard
		Random ID	COPC Concentration ($\mu g/m^3$)	Random ID	COPC Concentration ($\mu g/m^3$)					
7	PCE	--	--	3770	5.9	5.9	9.4	42	6.3E-07	0.1
	TCE		--		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		--		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**6E-07**	**0.1**
7	PCE	--	--	3939	5.7	5.7	9.4	42	6.1E-07	0.1
	TCE		--		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		--		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**6E-07**	**0.1**
7	PCE	--	--	4129	2.4	2.4	9.4	42	2.6E-07	0.06
	TCE		--		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		--		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**3E-07**	**0.06**
7	PCE	--	--	4774	11	11	9.4	42	1.2E-06	0.3
	TCE		--		0.31	0.31	0.43	2.1	7.2E-07	0.1
	Vinyl Chloride		--		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**2E-06**	**0.4**
7	PCE	--	--	4878	14	14	9.4	42	1.5E-06	0.3
	TCE		--		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		--		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**1E-06**	**0.3**
8 *	PCE	754	110	1567	49	110	9.4	42	1.2E-05	2.6
	TCE	609	9.4	2681	0.44	9.4	0.43	2.1	2.2E-05	4.5
	Vinyl Chloride	--	--	3313	0.075	0.075	0.16	100	4.7E-07	0.0008
Cumulative Cancer Risk/Noncancer Hazard									**3E-05**	**7**

Notes:
* Group 8 houses do not have indoor air sample results. The risk calculations are based on the highest concentrations observed in all indoor air sample results and is applicable to all Group 8 houses.
$\mu g/m^3$ - microgram per cubic meter
-- - not sampled
ID - identification
ND -- not detected
PCE - Tetrachloroethene
TCE - Trichloroethene

5.0 CORRECTIVE ACTION OBJECTIVES AND REMEDIATION GOALS

The preliminary CAOs and numerical remediation goals were established in the GW CAP to address site-specific COPCs, affected media, and potential exposure pathways, and to guide evaluation of potential corrective actions. These preliminary CAOs and remediation goals have been refined and updated based on (1) data obtained since the GW CAP and the IA/WW Work Plan were written; (2) results of the SLHHRA; and (3) NDEP direction. The following sections present the proposed CAOs and remediation goals for the Site. CAOs and numerical remediation goals become final when the corrective action is selected in the Record of Decision for the Site; however, numerical remediation goals can be modified in the future based on changes to calculated risk values, water quality regulations, or empirical data.

5.1 Corrective Action Objectives

The following CAOs, developed in the GW CAP, address potential risks to human health and the environment, and are consistent with NAC 445A.22725:

- Protect human health by reducing inhalation exposure to PCE and daughter products emanating from groundwater containing PCE concentrations above the remediation goals.
- Remediate shallow groundwater where PCE concentrations exceed the remediation goal for groundwater to protect indoor air.

Groundwater at the site is not a source of drinking water due to poor water quality; however, groundwater is considered "waters of the state," and regulations require "no degradation" of waters of the state. State records show that domestic water supply wells exist east of Eastern Avenue, more than 6,300 feet from the source area, and some of these wells are screened as shallow as 30 ft bgs (NDEP 2012a). Details on identified domestic water supply wells are included in the UIC permit (Appendix E). The GW CAP, in conjunction with the IA/WW Work Plan, determined that domestic wells within the described plume boundaries should be identified. Therefore, an additional CAO applies:

- Execute appropriate action to ensure PCE does not exceed water quality standard as defined in NAC 445A22735 in domestic water supply wells.

5.2 Remediation Goals for Groundwater and Indoor Air to Protect Against Vapor Intrusion

PCE is the primary contaminant of concern (COC) at the Site. Two daughter products of PCE, TCE and vinyl chloride, have also been detected in a few indoor air samples collected from houses within the residential area. The PCE daughter product *cis*-1,2-DCE has not been detected in indoor air, but has been detected at low levels in some groundwater samples. However, because no toxicity values have been established for *cis*-1,2-DCE, a remediation goal cannot be calculated. Volatilization of contaminants from the groundwater and subsequent transport of these vapors into indoor spaces represent a potentially complete exposure pathway via inhalation of contaminated indoor air.

As detailed in the GW CAP, development of numerical remediation goals is based on calculation of risk-based concentrations. The preliminary methodology for development of the remediation goals was summarized in the IA/WW Work Plan, approved by NDEP on August 23, 2011 (Tetra Tech 2011b).

An increased incidence of cancer less than 1 in one million (1E-06) and a noncancer HI less than 1 are considered protective for long-term exposure to contaminants. These values are also considered the

point-of-departure dictating corrective action, and are the RSLs. Calculation of risk-based concentrations in groundwater protective of indoor air concentrations at a target cancer risk of 1E-06 and noncancer HI of 1 is necessary to establish the remediation goals for groundwater at the Site.

An indoor air remediation goal for PCE of 9.4 µg/m^3 is based on 1E-06 carcinogenic risk, and equates to a noncancer HI of 0.22. The indoor air remediation goal applies to properties between the eastern boundary of the Boulevard Mall and Eastern Avenue.

Remediation goals for groundwater COCs to protect residential indoor air are listed in Table 5-1, and Figure 20 shows the points of compliance and the eastern boundary of the Boulevard Mall. The primary remediation goals for groundwater at the Site are based on potential for VI into houses above the plume of contaminated groundwater. Thus, risk-based groundwater concentrations protective of indoor air concentrations were calculated. The EPA version of the Johnson and Ettinger (J&E) Model (1991) can estimate risk-based concentrations of COCs in groundwater based on user-defined target cancer risks and non-cancer hazard quotients of those contaminants. The EPA version of the J&E model (GW-ADV-Feb04, Version 3.1 [EPA 2004]) was used to calculate remediation goals for the shallow groundwater underlying the residential area east of the Boulevard Mall and west of Eastern Avenue. Inputs to the J&E Model include chemical properties of the contaminant, properties of saturated and unsaturated soils, and functional properties of the building. Current EPA chemical-specific properties and toxicity values (EPA 2012) for the COPCs were used in the model. Site-specific parameters (e.g., soil type, average depth to groundwater, average groundwater temperature) were used if available; otherwise, conservative default parameters were used. Information from the soil boring for monitoring well MW-18 (Figure 1) was used as the basis for site-specific soil type, average depth to groundwater, and average groundwater temperature. This well was selected because, historically, it has shown the highest PCE concentrations in groundwater underlying the residential area, as well as the shallowest depth to groundwater in the residential area. Further discussion of the model assumptions, inputs, and uncertainty and sensitivity appears in Appendix G.

In any given modeled scenario, the J&E model predicts conservative groundwater concentrations that will protect indoor air. However, because of the heterogeneity in subsurface soils, none of the modeled scenarios may accurately represent existing conditions. Therefore a PCE concentration of 100 µg/L was selected as the preliminary remediation goal for groundwater. This preliminary remediation goal is based on the NDEP's experience at other sites in Nevada and is expected to reduce PCE concentrations in indoor air below 9.4 µg/m^3. If after 5 years of remediation the indoor air remediation goal has been attained while the preliminary groundwater remediation goal of 100 µg/L has not yet been attained, the NDEP will consider remediation complete or relaxing the preliminary remediation goal for groundwater based on empirical data.

TABLE 5-1: Remediation Goals to Protect Residential Indoor Air

Chemical	Remediation Goal for Groundwater based on Vapor Intrusion Pathway East of Boulevard Mall to Eastern Avenue (µg/L)[1]	Remediation Goal for Indoor Air (µg/m^3)[2]
PCE	100[3]	9.4
TCE	23	--
Vinyl chloride	5.0	--

Notes:

1 The point of compliance for the remediation goal for groundwater is the eastern edge of the Boulevard Mall property.

2 Applicable only to residential area between the Boulevard Mall and Eastern Avenue

3 If after 5 years of remediation the indoor air remediation goal has been attained while the preliminary groundwater remediation goal of 100 µg/L has not yet been attained, the NDEP will consider remediation complete or relaxing the preliminary remediation goal for groundwater based on empirical data.

µg/L Micrograms per liter
µg/m^3 Micrograms per cubic meter
PCE Tetrachloroethene
TCE Trichloroethene

5.3 Remediation Goals for Groundwater To Protect Downgradient Domestic Wells

State records show that domestic wells may exist east of Eastern Avenue. There is potential for some domestic wells to be in hydraulic communication with contaminated shallow groundwater. MW-38 is the only monitoring well east of Eastern Avenue and there is uncertainty in the boundary of the PCE plume in this area. There are plans to install additional groundwater monitoring wells in the area by August 31, 2013, and groundwater monitoring will continue to track changes in plume nature and extent. Thus, to protect against future ingestion of PCE-contaminated groundwater, the MCL of 5.0 µg/L was established as the remediation goal for domestic wells east of Eastern Avenue in accordance with NAC 445A.22735. This remediation goal is considered protective for long-term exposure to PCE in drinking water. In addition, the MCLs for TCE and vinyl chloride are included as remediation goals. MCLs are enforceable standards and were included as the remediation goals for TCE and vinyl chloride because risk-based goals for TCE and vinyl chloride are lower than their MCLs and considered unattainable due to the limitations of best available technologies. Table 5-2 presents the remediation goals for groundwater considered protective of domestic water supply wells, and Figure 20 shows the area where these remediation goals are applicable, east of Eastern Avenue.

TABLE 5-2: Remediation Goals to Protect Domestic Wells

Chemical	Remediation Goal for Groundwater based on Domestic Use of Groundwater East of Eastern Avenue (µg/L)
PCE	5
TCE	5
Vinyl Chloride	2

Notes:

Apply to domestic water supply wells east of Eastern Avenue

µg/L Micrograms per liter
PCE Tetrachloroethene
TCE Trichloroethene

6.0 EVALUATION OF CORRECTIVE ACTION ALTERNATIVES

This section summarizes recommendations from the GW CAP (Tetra Tech 2011a) and the process that led to selection of the preferred corrective action alternative.

The GW CAP (Tetra Tech 2011a) evaluated corrective action alternatives for overall protection of human health according to criteria of long-term and short-term effectiveness; reduction in toxicity, mobility, and volume through treatment; implementability; and cost. The outcome of the analysis was uncertain, and the GW CAP recommended additional vertical delineation of groundwater contamination, aquifer testing, bench-scale testing, and pilot testing before selection of a corrective action alternative. Groundwater extraction, ISCO using permanganate, ISCO using ozone and hydrogen peroxide, and AS were selected for pilot testing. The GW CAP further recommended that if these technologies would prove insufficient or problematic during field testing, corrective actions integrating remedial effects of extraction and treatment should be further evaluated. The GW CAP summarized the advantages and disadvantages of each technology as well as questions to be answered with the aquifer and pilot testing (Table 8.2 of the GW CAP; this table has been updated and can be found in Table 6-1).

Groundwater extraction (pump and treat) was evaluated for site-wide use through aquifer pumping tests conducted in July 2012. Overall low pumping rates were observed. The pumping rate on the eastern side of Boulevard Mall was 1 gpm, and little drawdown was observed in observation wells. Testing on the western side of the Boulevard Mall could have sustained a slightly higher pumping rate of 1.5 to 2 gpm. Wells screened in the shallow water-bearing zone would produce water at very low flow rates making them impractical for use in groundwater extraction. Given the low pumping rates and the associated small capture zones, groundwater extraction for hydraulic control or PCE mass removal would be challenging within the Boulevard Mall property. Therefore, groundwater extraction is not a recommended corrective action, but may be considered together with other technologies as a contingent corrective action if the recommended corrective action fails. The feasibility of groundwater extraction outside the Mall property was not evaluated and may be considered at a later date, if necessary.

The AS pilot test was eliminated after subsurface investigations within the pilot testing area revealed layers of caliche and other fine-grained soils below the lowest observed water table. Caliche layers and clayey lenses are undesirable for AS with SVE. Caliche and clayey lenses limit vertical distribution of air through the aquifer, reducing remedial effectiveness. The low-permeability layers also hinder recovery of sparged air containing stripped contaminants. A variant of AS/SVE, consisting of AS with dual-phase extraction (DPE) was evaluated for use at the source area and the western side of Boulevard Mall. The lithology in these areas was considered more favorable to AS, and DPE could draw down groundwater below the caliche layer and allow recovery of sparged air. However, pumping tests suggested inadequate recovery rates and narrow cones of depression, rendering AS with DPE infeasible.

Pilot testing results show that both ISCO using permanganate and ISCO using ozone and hydrogen peroxide achieve significant destruction of PCE in groundwater. Both technologies could be used at this site and are therefore retained for development of the recommended corrective action.

TABLE 6-1: Summary of Technology Data Needs and Findings

Technology	Current Data	Data Acquired and Technology Evaluation
In Situ Chemical Oxidation	• Tetrachloroethene (PCE) concentrations in groundwater (concentrations are within the treatment range of in situ chemical oxidation). *In situ chemical oxidation proved effective at reducing PCE concentrations at the pilot test site.* • Metals concentrations in soil and groundwater (concentrations are low enough that metals mobility should not be an issue, but additional testing required). *Chromium concentrations in groundwater increased during the testing period but decreased after testing was complete.* • Lithologic logging, soil type, and groundwater velocity (current boreholes in target area, however, more contiguous vertical delineation is needed). *The bottom of PCE contamination was found at approximately 60 feet (ft) below ground surface (bgs). A competent clay layer was also found at approximately 60 to 65 ft bgs. On the Boulevard Mall property treatment should focus from the top of the water table to 60 to 65 ft bgs.*	• Aquifer pump tests. *Pumping rates observed during the pump tests were low; however injection rates, pressure and radius of influence (ROI) were favorable as measured during the In-situ chemical oxidation (ISCO) pilot testing.* • Vertical delineation of lithology and PCE distribution in target areas. *Vertical delineation provided the distribution of contaminants from the top of the water table to the approximately 60 feet bgs. Injection can be tailored based on depth and contaminant concentration.* • Bench scale testing including natural oxidant demand (NOD), dosing requirements, optimal activator, and metals mobility testing. *Results of the bench scale test indicated fairly low NOD, which is favorable to ISCO treatment. Significant mobilization of metals was not observed during bench scale testing.* • Geotechnical testing to determine porosity, grain size distribution, soil type. *Results can be found in Table 2.1.2. Based on the ROI and decreases in PCE concentrations, ISCO conducted in areas with these soil types will be effective.* • Pilot testing for effectiveness, ROI, preferential pathways, injection method. *ISCO with potassium permanganate and hydrogen peroxide and ozone successfully treated PCE during the pilot test. A ROI of 25 ft was observed up to 60 ft bgs during potassium permanganate injection. A ROI of 8 to 15 ft was observed during the hydrogen peroxide/ozone injection (PulseOx).* • *Delivery difficulties, contaminant rebound and incomplete treatment may be problems associated with ISCO. Delivery difficulties and incomplete treatment were not observed during pilot testing. Rebound was observed but was most likely because untreated contaminated groundwater upgradient of the pilot test area flowed into the pilot test area.*
Air Sparging (AS)	• PCE concentrations in groundwater (concentrations are within the treatment range of sparging). *The pilot test was not conducted due to subsurface conditions.* • Lithologic logging (current boreholes in target area, however, more contiguous vertical delineation is needed). *Given the*	• Aquifer pump tests. *AS with dual-phase extraction (DPE) was evaluated for use at the source area and the western side of Boulevard Mall. However, pumping tests suggested inadequate recovery rates and drawdown, rendering AS with DPE infeasible.* • Vertical delineation of lithology and PCE distribution in target areas.

Technology	Current Data	Data Acquired and Technology Evaluation
	lithology (a competent layer of caliche below the water table) AS was not a viable treatment option.	*Given the lithology (a competent layer of caliche below the water table) AS was not a viable treatment option.* • Geotechnical testing to determine porosity, grain size distribution, and soil type. *The pilot test was not conducted due to subsurface conditions* . • Pilot testing for effectiveness, ROI, air permeability, flow rates, and vapor capture. *The pilot test was not conducted due to subsurface conditions.*
Extraction and Treatment,	• PCE concentrations in groundwater (concentrations are within the treatment range of chemical reduction). *Not evaluated.* • Total dissolved solids data (elevated concentrations may make system operation challenging). *Not evaluated.* • Lithologic logging (current boreholes in target area, however, more contiguous vertical delineation is needed). *The bottom of PCE contamination was found at approximately 60 ft bgs. A competent clay layer was also found at approximately 60 to 65 ft bgs.*	• Aquifer pump tests. *Wells screened in the shallow water-bearing zone would produce water at very low flow rates making them impractical for use in groundwater extraction.* • Vertical delineation of lithology and PCE distribution in target areas. *Moderate permeability soils are likely present in the subsurface as thin disconnected lenses which would not support significant well yields.* • Geotechnical testing to determine porosity, grain size distribution, and soil type. *Results can be found in Table 2.1.2. Based on the low pumping rates, groundwater extraction conducted in areas with these soil types will not be effective* • Pilot testing for ROI and treatability of groundwater. *Given the low pumping rates and small radii of influence, groundwater extraction for hydraulic control or PCE mass removal would be challenging within the Boulevard Mall property.* • *Insufficient hydraulic containment or groundwater capture, long treatment timeframes and contaminant rebound may be problems associated with extraction and treatment. Low pumping rates and small radii of influence observed during pilot testing suggest long treatment timeframes and challenges with groundwater capture. Contaminant rebound was not evaluated.*

Notes:

Originally Table 8.2 of the Corrective Action Plan for Groundwater (Tetra Tech 2011a).

Updated text based on data collected during the aquifer and pilot tests is italicized.

7.0 RECOMMENDED CORRECTIVE ACTION

ISCO is recommended for treatment of PCE in groundwater. ISCO will be implemented using one or more of the following chemicals: (1) sodium or potassium permanganate, or (2) ozone with or without hydrogen peroxide. During implementation of the corrective action, indoor air monitoring will continue on an annual basis and SSD systems will continue to be installed in homes with indoor air concentrations above the interim action level of 32 µg/m^3.

ISCO will target accessible areas where PCE concentrations in groundwater exceed the remediation goal for protection of indoor air. The general remedial approach is to deplete the source resulting in the cleanup of shallow groundwater within the residential area east of Boulevard Mall to the extent practicable. Shallow groundwater is defined as groundwater within the shallow water bearing zone overlying the clay formation encountered at 60 to 65 ft bgs. The point of compliance is defined as the eastern edge of the Boulevard Mall property. The point of compliance is shown on Figure 20.

The PCE source will be depleted by:

- Implementing ISCO within the source area west of Maryland Parkway, with the zone of oxidation extending below Maryland Parkway.
- Implementing ISCO within accessible portions of the Boulevard Mall property west of the Mall building, with the zone of oxidation extending below the Mall building.

Source depletion will have been achieved when potential is lacking for discharge of COCs at the point of compliance at concentrations above remediation goals.

Shallow groundwater within the residential area east of the Boulevard Mall will be remediated by:

- Implementing ISCO on the Boulevard Mall property east of the Mall building to cut off the PCE plume at the property boundary.

Domestic water supply wells east of Eastern Avenue will be protected by:

- Identifying domestic water supply wells contaminated with PCE.
- Abandoning contaminated wells or providing point of entry treatment.

7.1 Safety Measures

Oxidants would be stored and handled in accordance with Clark County regulations. Secondary containment would be provided for all chemicals. If solid oxidant is brought to the site, the oxidant would be stored and handled in a manner that minimizes dust generation. Liquid oxidant injection would be designed to minimize potential for surfacing, and if surfacing occurs, the surfaced liquid would be cleaned up promptly.

If ISCO involves ozone injection:

- Continuous ambient ozone monitors would be used to ensure compliance with Nevada ambient air quality standards. The ozone injection system would automatically shut down if the ozone

ambient air quality standard is exceeded. The number and location of ozone monitors would be determined in consultation with NDEP.

- Sentinel vapor monitoring wells screened in the vadose zone may be installed between ozone injection wells and living spaces. Need for such wells depends on locations of injection wells and their proximities to living spaces. Therefore, details of ozone monitoring in soil vapor would be determined in consultation with NDEP.

- If ozone in soil vapor is a threat to indoor air quality, system operation would be modified or SVE would be implemented. Off-gas from SVE would be treated in accordance with Nevada regulations.

- Sparging without ozone for longer than 24 hours would require SVE and off-gas treatment.

7.2 Performance Monitoring

Performance monitoring will seek to optimize corrective action and will depend on the means and methods of corrective action. Therefore, the number and locations of monitoring wells, monitoring frequency, and monitoring parameters will be detailed during remedial design. Monitoring parameters will include COCs, anions, geochemical field parameters, and dissolved oxidant concentrations.

7.3 Compliance Monitoring

The purpose of compliance monitoring will be to evaluate progress toward attainment of remediation goals at the point of compliance. Four monitoring wells will be installed along the eastern edge of the Boulevard Mall parking lot to monitor PCE concentrations and determine corrective action effectiveness (conceptual locations are shown on Figure 20). These compliance wells will be monitored quarterly during remediation.

In addition, the following wells will be monitored within the residential area east of Boulevard Mall: MW-18, MW-19, MW-23, MW-25, MW-26, MW-27, MW-32, MW-36, MW-38, and MW-39. Any monitoring well within the residential area at which a COC is detected (in the future) above its remediation goal will also be monitored. A residential monitoring well which is no longer useful will be removed from the program upon NDEP approval. After corrective action starts, residential monitoring wells will be monitored quarterly for 2 years, semi-annually for 2 years, and annually thereafter. Monitoring frequency at a well will not be decreased if concentration of a COC trends upward in that well. Similarly, if concentration of a COC trends upward during annual or semi-annual monitoring, monitoring frequency will be doubled.

Monitoring parameters will include COCs, dissolved metals, anions, geochemical field parameters, and any constituents required by the UIC or other permits. Metals are included because manganese may be introduced if ISCO involves permanganate injection, and naturally occurring metals (such as chromium) may temporarily become more soluble during ISCO. Because these temporary effects will naturally reverse after ISCO stops, metals will require no action other than monitoring. Metals monitoring will also comply with the conditions of the UIC permit to be obtained for ISCO. If permanganate-based ISCO is used, dissolved sodium or potassium permanganate may also be monitored.

Indoor air will be monitored as approved by the NDEP under the existing program, and the properties to be monitored will be determined in consultation with the NDEP.

7.4 Domestic Water Supply Wells

There are wells east of Eastern Avenue being used for domestic water supply. However, additional, undocumented domestic water supply wells may exist. The documented domestic water supply wells appear to be located outside the estimated boundary of the 5 µg/L PCE plume (Appendix E). The locations of undocumented wells are unknown. After the 5 µg/L PCE plume has been fully delineated, domestic water supply wells within the plume will be identified in accordance with the IA/WW Work Plan (Tetra Tech 2011b). These wells will be sampled, if possible, and the samples will be analyzed for COCs. If any COC is detected above its remediation goal, a mitigation plan will be developed. In the absence of a better alternative, wells contaminated with PCE above 5 µg/L will be abandoned if permitted by the well owners.

7.5 Monitored Natural Attenuation

Monitored natural attenuation (MNA) is not an anticipated component of this corrective action. However, MNA will be evaluated as an alternative if progress with ISCO becomes asymptotic and accelerating progress through other means is deemed impractical. If MNA is found feasible, the corrective action would transition to MNA after approval by the NDEP.

7.6 Confirmation of Cleanup

Quarterly monitoring will resume when cleanup must be confirmed. Cleanup will have been achieved when COC concentrations in groundwater remain below their remediation goals for four consecutive monitoring events after ISCO stops. Assumedly, ISCO will stop when ozone injection stops, or when the concentration of sodium or potassium permanganate in compliance wells has been below 1 mg/L for 1 quarter. Because ozone lasts only a few hours in the dissolved phase, COC destruction would stop almost as soon as ozone injection stops. Permanganate, on the other hand, can persist for several months, but 1 year after its concentration declines below 1 mg/L (as sodium or potassium permanganate), COC destruction, if any, would be insignificant.

Annual monitoring of indoor air will continue during confirmation of cleanup. SSD systems will be shut down and concentrations of PCE measured in indoor air before or during confirmation of cleanup. If PCE concentrations in indoor air at a property are below 9.4 µg/m^3 for two consecutive monitoring events, the SSD system will be removed for the property. If all measured concentrations of PCE are below 9.4 µg/m^3 for two consecutive monitoring events, indoor air monitoring will cease.

7.7 Deep Groundwater Protection

A video survey of irrigation well PW-1 at the Las Vegas National Golf Club revealed damage to the well casing. In its present condition, this well may act as a conduit for contamination of deep groundwater. Therefore, the well owner will be required to repair this well, or plug and abandon it in accordance with Based upon the observed coniditon of the well, it does not comply with the requirements of NAC 534.427, and is subject to the determination by the NDWR requiring repair or abandonment of the well..

7.8 Interim Protection of Indoor Air

SSD systems are operating in 14 homes, and will soon be installed in 3 more homes within the residential area. SSD systems minimize soil VI and the consequent migration of COCs into indoor air. Homes located above the groundwater plume with concentrations of PCE greater than 100 µg/L will continue to

be offered indoor air monitoring annually. New SSD systems will be offered to homes when indoor air monitoring results are above the interim action level of 32 µg/m^3. A SSD system will operate until the remediation goal for indoor air has been attained within that home, or changes to the home or site conditions render the SSD system unnecessary. Maintenance of the SSD systems will be provided until they are no longer required.

7.9 Access and Permitting

Implementing the recommended corrective action will require access to private properties, including the Boulevard Mall, the former dry cleaners, residences, businesses, and the Ruby S Thompson Elementary School. An access agreement will be necessary for any work performed on the Boulevard Mall property. Similarly, other businesses, homeowners, and commercial property owners may also require access agreements.

A UIC permit will be obtained from NDEP Bureau of Water Pollution Control before injection of any chemicals into groundwater. Permitting conditions are likely to include monitoring for dissolved metals to ensure that ISCO does not impair groundwater quality. The intent of such monitoring would be to demonstrate that increases in concentrations of dissolved metals are both localized and temporary. Compliance with this anticipated permitting condition is discussed in Section 7.3.

Construction permits and hazardous materials storage permits will be obtained from Clark County before conducting any of these permitted activities.

7.10 Corrective Action Evaluation

After 5 years of corrective action implementation, the remediation goals and correct action effectiveness will be evaluated.

- If the remediation goal for indoor air has been met while the preliminary groundwater remediation goal of 100 µg/L has not yet been achieved, NDEP will consider remediation complete or relax the preliminary remediation goal for groundwater based on empirical data.

- If the preliminary remediation goal for groundwater of 100 µg/L is met at the compliance point but the remediation goal for indoor air is not met in individual homes, active groundwater remediation will cease and SSD systems will therefore be installed in homes where concentrations of PCE in indoor air are greater than 9.4 µg/m^3 based on annual indoor air monitoring results.

If after 5 years of corrective action implementation the preliminary remediation goal for groundwater is being met at the point of compliance during the majority of monitoring events, the corrective action will be considered effective. Section 7.6 details monitoring that must be completed for confirmation of cleanup and groundwater remediation cessation. If ISCO has not achieved the preliminary remediation goal for groundwater at the point of compliance after 5 years, the following will be evaluated:

- changes to ISCO implementation including implementation of ISCO within accessible portions of the residential area east of the Boulevard Mall, and

- additional corrective action alternatives, including groundwater extraction, will be evaluated.

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N
W E
S

0 500 1,000 Feet

Approximate Scale in Feet

MARYLAND SQUARE SHOPPING CENTER
3661 South Maryland Parkway
Las Vegas, Nevada

FIGURE 1
Site Overview Map

TETRA TECH

Path: S:\EMI Shared\Projects Directory\Private Sector - Other Offices\Maryland Square\2013\Figure 1.mxd



Source: Clark County Assessors Web Site

Scale: 0Feet 200 Feet

N

MARYLAND SQUARE SHOPPING CENTER
3661 South Maryland Parkway
Las Vegas, NV

Figure 2
Al Philips the Cleaner
Former Facility Location

TETRA TECH

Modified from URS 2007

115.135° W
115.13° W
115.125° W
115.12° W
115.115° W
36.125° N
36.12° N

S MARYLAND PARKWAY
SOUTH EASTERN AVENUE
E TWAIN AVENUE
E KATIE AVENUE
FLAMINGO WASH

Boulevard Mall
Ruby S. Thompson Elementary School
Golf Course
William E. Orr Middle School
Orr Park

CMT-1 DEPTH (feet bgs)	PCE
30	4.7
35	48
40	270
45	310
50	280
55	390
60	1,200

WELL	PCE
MW-20D1	69
MW-20D2	25
MW-20D3	0.66

WELL	PCE
MW-6D1	ND
MW-6D2	ND
MW-6D3	ND

WELL	PCE
MW-19D1	300
MW-19D2	170
MW-19D3	0.50

MW-7 10
MW-17 190
MW-1 260
MW-12 0.65
MW-34 550
MW-35 340
MW-8 1.5
MW-9 6.6
MW-14 1,900
MW-15 2.7
MW-14I 7,200
MW-13 1,300
MW-6 2,600
MW-2 580
MW-3 12
MW-5 530
MW-4 NS
MW-10 ND
MW-21 8.4
MW-20 290
MW-19 520
MW-18 1,200
MW-19I 710
MW-16 ND
MW-11 ND
MW-22 ND
MW-39 280
MW-23 960
MW-24 1.3
MW-33 ND
MW-36 160
MW-32 720
MW-25 660
MW-26 740
MW-27 450
PW-1
PW-2
MW-30 62
MW-31 61
MW-37 34
MW-38 7.3
MW-28 0.50
MW-29 ND

Legend

- Monitoring Well Location
- Pumping Well Location
- Monitoring Well Location (Abandoned)
- 710 PCE Concentration in µg/L (March 2013)
- µg/L Micrograms Per Liter
- bgs Below Ground Surface
- ND Not Detected
- NS Not Sampled
- PCE Tetrachloroethylene
- Flamingo Wash
- PCE Remediation Goal for Protection of Indoor Air = 100µg/L
- PCE Remediation Goal for Protection of Domestic Water Supply Wells = 5µg/L
- 3000µg/L Contour
- 2000µg/L Contour
- 1000µg/L Contour
- 500µg/L Contour
- 100µg/L Contour
- 5µg/L Contour (Dashed Where Inferred)

N
W E
S

0 250 500 Feet
Approximate Scale in Feet

MARYLAND SQUARE PCE SITE
3661 South Maryland Parkway
Las Vegas, Nevada

FIGURE 3
PCE CONCENTRATION MAP

TETRA TECH

Path: S:\EMI Shared\Projects Directory\Private Sector - Other Offices\Maryland Square\2013\Figure 3 PCE.mxd

115.135° W | 115.13° W | 115.125° W | 115.12° W | 115.115° W

36.125° N

36.12° N

S MARYLAND PARKWAY

SOUTH EASTERN AVENUE

E TWAIN AVENUE

E KATIE AVENUE

FLAMINGO WASH

Boulevard Mall

Ruby S. Thompson Elementary School

Golf Course

William E. Orr Middle School

Orr Park

MW-6D1/D2/D3
MW-7
MW-14
MW-17
MW-1
MW-35
MW-12
MW-14I
MW-13
MW-34
MW-6
MW-5
MW-2
MW-8
MW-4
MW-3
MW-9
MW-10
MW-19D1/D2/D3
MW-15
MW-21
MW-20
MW-20D1/D2/D3
B-4
MW-19
MW-19I
MW-18
MW-23
CMT-1
MW-16
MW-11
MW-22
MW-39
MW-33
MW-36
MW-32
MW-25
MW-26
MW-24
MW-28
MW-27
PW-1
MW-30
MW-31
MW-37
MW-38
PW-2
MW-29

A
A'
B
B'
C
C'

Legend

- Monitoring Well Location
- Pumping Well Location
- Monitoring Well Location (Abandoned)
- Soil Boring Location
- A — A' Cross Section Location

N
W E
S

0 250 500 Feet

Approximate Scale in Feet

MARYLAND SQUARE PCE SITE
3661 South Maryland Parkway
Las Vegas, Nevada

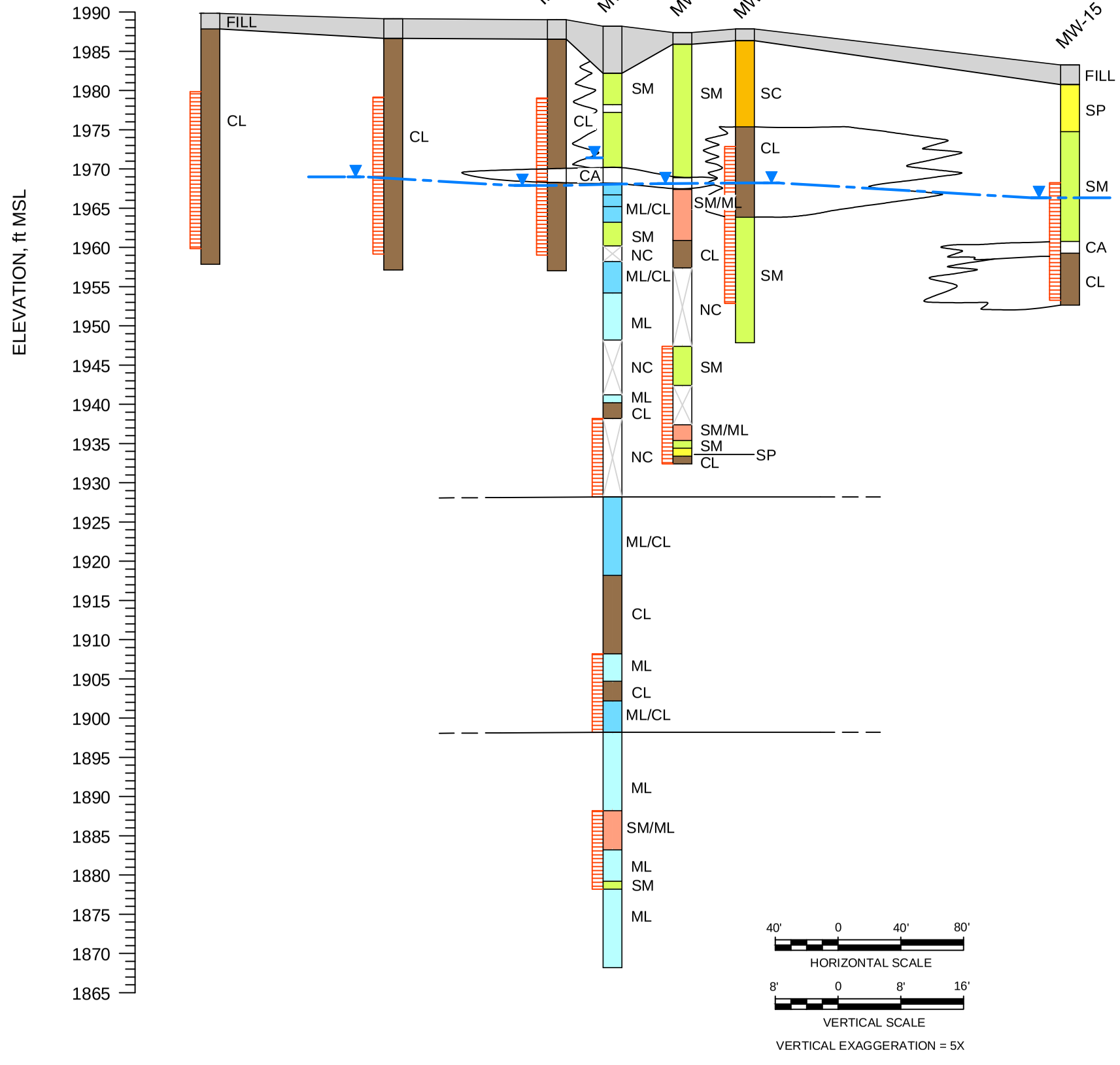
FIGURE 4
CROSS SECTION LOCATIONS

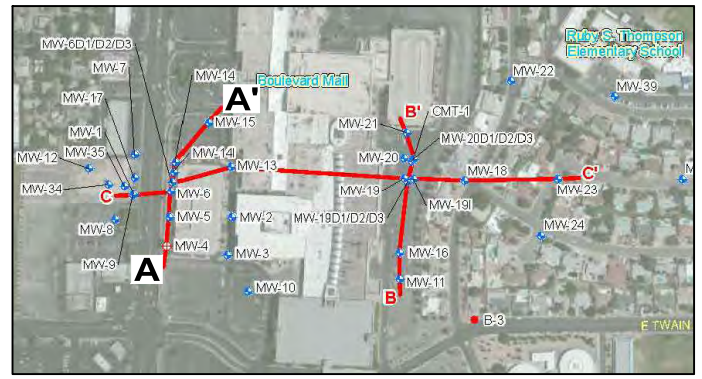
TETRA TECH

Path: S:\EMI Shared\Projects Directory\Private Sector - Other Offices\Maryland Square\2013\Figure_4_XsecLoc.mxd

SOUTH

NORTH





LEGEND

FILL	FILL UNDER ASPHALT
SC	CLAYEY SAND
SM	SILTY SAND
SP	POORLY GRADED SAND, SAND WITH GRAVEL
SM/ML	SILTY SAND / SANDY SILT
ML	CLAYEY SILT, SANDY SILT
CL	CLAY, SILTY CLAY, SANDY CLAY
ML/CL	SILT, CLAYEY SILT, SILT/CLAY MIXTURES
CA	CALICHE
NC	NO RECOVERY
	LITHOLOGICAL CONTACT, DASHED WHERE UNCERTAIN
	APPROXIMATE GROUNDWATER ELEVATION
	SCREEN INTERVAL
FT MSL	FEET ABOVE MEAN SEA LEVEL

MARYLAND SQUARE PCE SITE
3661 South Maryland Parkway
Las Vegas, Nevada

FIGURE 5
CROSS-SECTION A-A'

TETRA TECH

\\emis016fp1\cad\Clients\Maryland Square, Las Vegas NV\Well Details\ Figure x X-Sections.dwg 06/13/2013 deborah.ford DN

SOUTH B

NORTH B'

MW-11 MW-16 B-4 MW-19D1/D2/D3 MW-20D1/D2/D3 CMT-1 MW-21

1985 1980 1975 1970 1965 1960 1955 1950 1945 1940 1935 1930 1925 1920 1915 1910 1905 1900 1895 1890 1885 1880 1875

FILL SP/GM SP SP CL SC GM SC CA CL

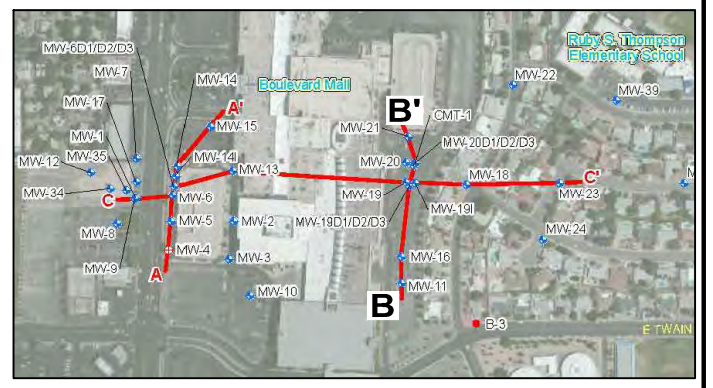
SM SM/ML ML ML/CL SM ML GC CA GC ML/CL ML/GC CL CL/ML GC CL

FILL SP SM CA SP/SM SP SM SP/SM CA SW/GP GC/CL SM CA SM CL SM CL ML/CL SM GC CL/GC ML/CL CL/GC ML

FILL SC CL SC CL

SM ML GM CL GC/CL CL SM CL ML/SM ML CA CL

ML/SM SM ML/SM ML ML/CL ML SM/ML CL SM



LEGEND

FILL	FILL UNDER ASPHALT
SC	CLAYEY SAND
SM	SILTY SAND
SP	POORLY GRADED SAND, SAND WITH GRAVEL
SM/ML	SILTY SAND / SANDY SILT
ML	CLAYEY SILT, SANDY SILT
CL	CLAY, SILTY CLAY, SANDY CLAY
ML/CL	SILT, CLAYEY SILT, SILT/CLAY MIXTURES
GC	CLAYEY GRAVEL/ GRAVELLY CLAY
GM	GRAVEL, GRAVEL-SAND-SILT MIXTURE
CA	CALICHE
NC	NO RECOVERY
	APPROXIMATE GROUNDWATER ELEVATION
	SCREEN INTERVAL
FT MSL	FEET ABOVE MEAN SEA LEVEL

60' 0 30' 60'
HORIZONTAL SCALE

6' 0 6' 12'
VERTICAL SCALE

VERTICAL EXAGGERATION = 5X

MARYLAND SQUARE PCE SITE
3661 South Maryland Parkway
Las Vegas, Nevada

FIGURE 6
CROSS-SECTIONS B-B'

TETRA TECH

\\emis016fp1\cad\Clients\Maryland Square, Las Vegas NV\Well Details\ Figure x X-Sections.dwg 06/13/2013 deborah.ford DN

WEST

C

C'

EAST

ELEVATION, ft MSL

1990 1985 1980 1975 1970 1965 1960 1955 1950 1945 1940 1935 1930 1925 1920 1915 1910 1905 1900 1895 1890 1885 1880 1875 1870 1865

MW-9 MW-6 MW-6D1/D2/D3 MW-13 MW-19 MW-19D1/D2/D3 MW-19I MW-18 MW-23

FILL SP CA SP CA SP CA ML CL

SM NC SM CA ML/CL SM NC ML/CL ML NC ML CL NC ML/CL CL ML CL ML/CL ML SM/ML ML SM ML

CA ML CL SC CL

FILL SC SM CA GM CL GM CL GC GC/CL CL

FILL SM SM/SP SM/ML ML ML/CL CL GC/CL CA CL/GC GC/CL CL/GC CL ML GC/CL ML/SM CL/ML ML SM ML/SM ML/CL CL/ML ML ML/SM CA CL

ML ML

SM ML



LEGEND

FILL	FILL UNDER ASPHALT
SC	CLAYEY SAND
SM	SILTY SAND
SP	POORLY GRADED SAND, SAND WITH GRAVEL
SM/ML	SILTY SAND / SANDY SILT
ML	CLAYEY SILT, SANDY SILT
CL	CLAY, SILTY CLAY, SANDY CLAY
ML/CL	SILT, CLAYEY SILT, SILT/CLAY MIXTURES
GC	CLAYEY GRAVEL/ GRAVELLY CLAY
GM	GRAVEL, GRAVEL-SAND -SILT MIXTURE
CA	CALICHE
NC	NO RECOVEREY
	LITHOLOGICAL CONTACT, DASHED WHERE UNCERTAIN
	APPROXIMATE GROUNDWATER ELEVATION
	SCREEN INTERVAL
FT MSL	FEET ABOVE MEAN SEA LEVEL

60' 0 60' 120'
HORIZONTAL SCALE

15' 0 7.5' 15'
VERTICAL SCALE

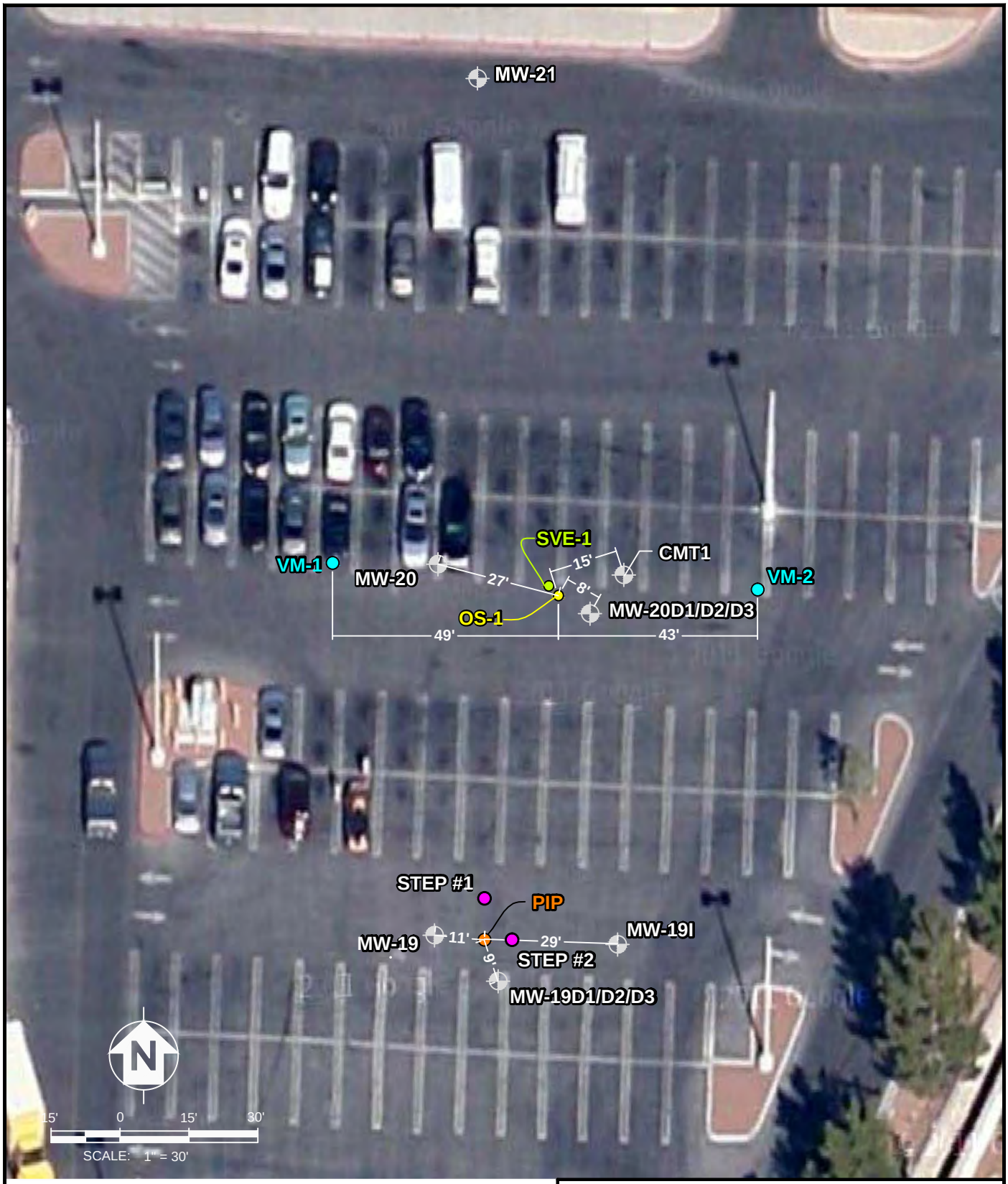
VERTICAL EXAGGERATION = 8X

MARYLAND SQUARE PCE SITE
3661 South Maryland Parkway
Las Vegas, Nevada

FIGURE 7
CROSS-SECTION C-C'

TETRA TECH

C:\Users\Public\Documents\Work\Maryland Square\ Figure x X-Sections.dwg 08/02/2013 deborah.ford DN



LEGEND

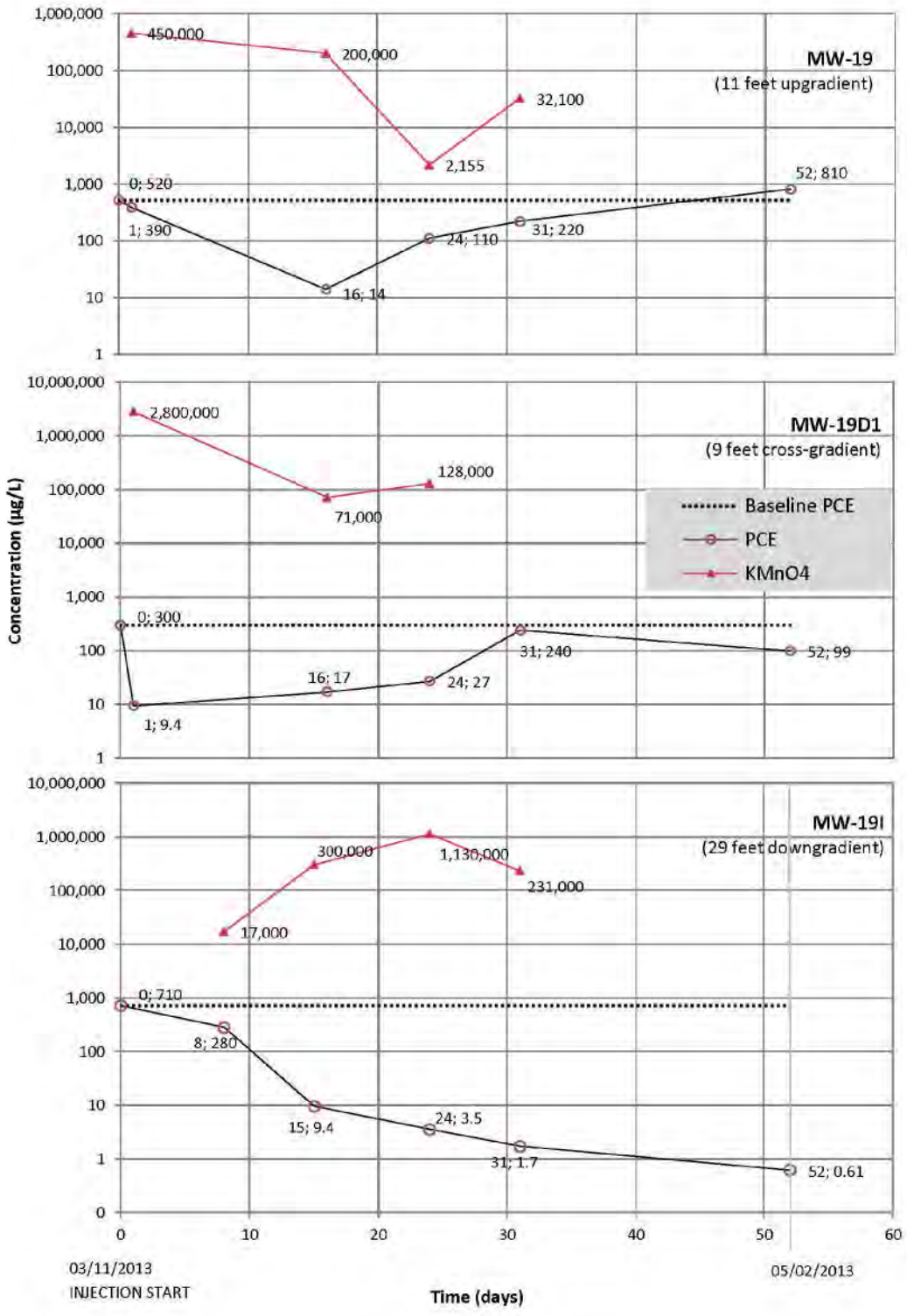
MW-19	⊕	GROUNDWATER MONITORING WELL
OS-1	○	OZONE-PEROXIDE SPARGE WELL
SVE -1	○	SOIL VAPOR EXTRACTION WELL
VM-1	○	VAPOR MONITORING WELL
PIP	○	PERMANGANATE INJECTION POINT
STEP #1	○	STEP OUT BORING

MARYLAND SQUARE PCE SITE
3661 South Maryland Parkway
Las Vegas, Nevada

FIGURE 8
PILOT TEST WELL LOCATIONS

TETRA TECH

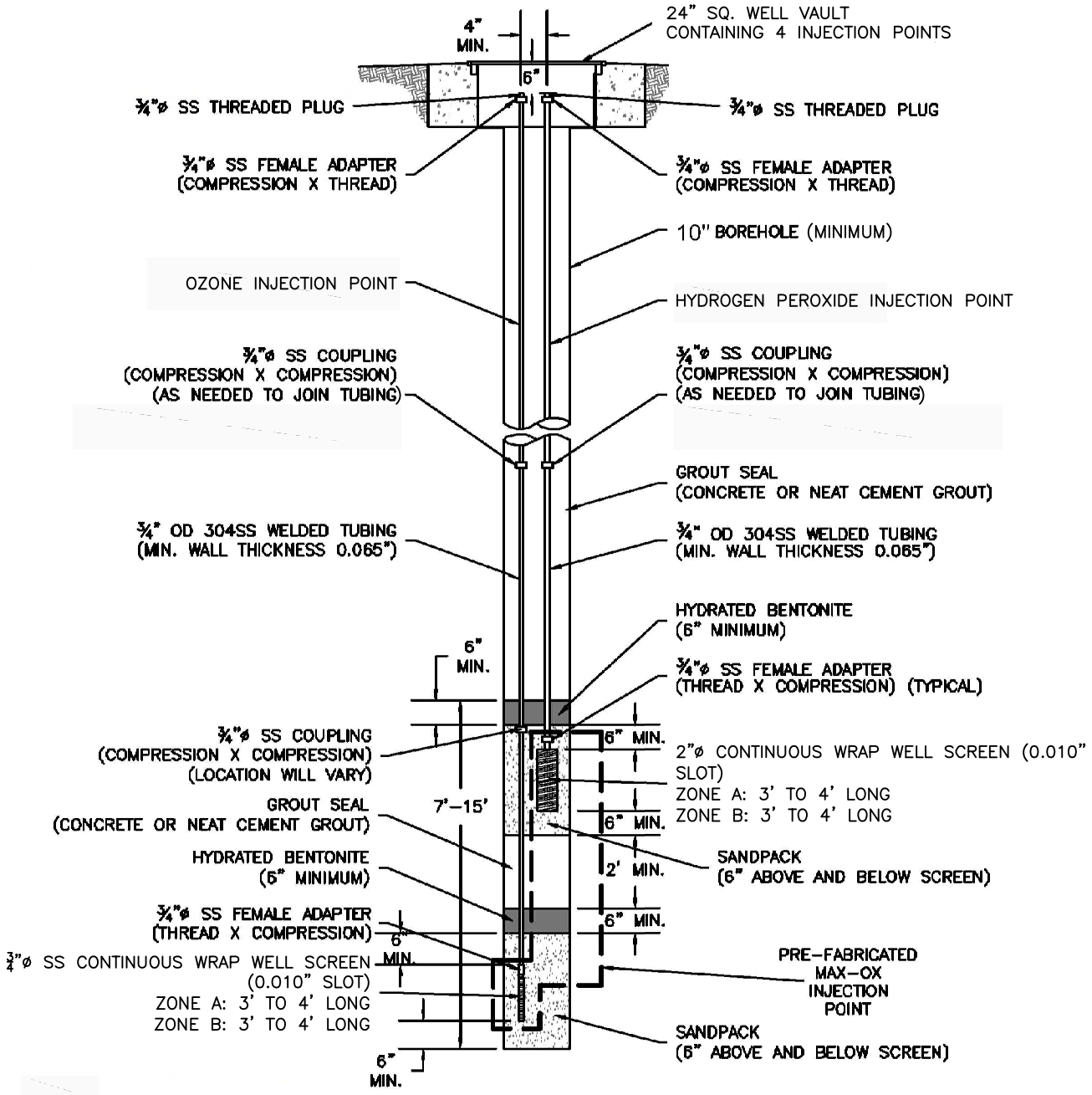
R:\Clients\Maryland Square, Las Vegas NV\Well Details\ Figure 8 Proposed Wells R2.dwg 06/12/2013 deborah.ford DN



MARYLAND SQUARE SHOPPING CENTER
3661 South Maryland Parkway
Las Vegas, Nevada

FIGURE 9
PCE CONCENTRATIONS DURING POTASSIUM PERMANGANATE PILOT TESTING

TETRA TECH



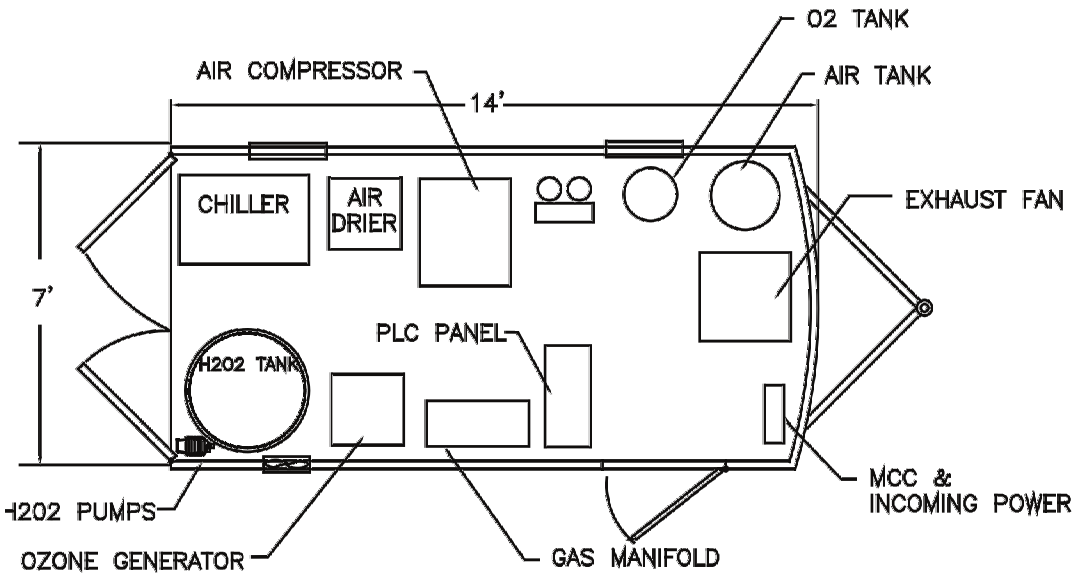
NOTE:
1. SECOND MAX–OX INJECTION PAIR NOT SHOWN.

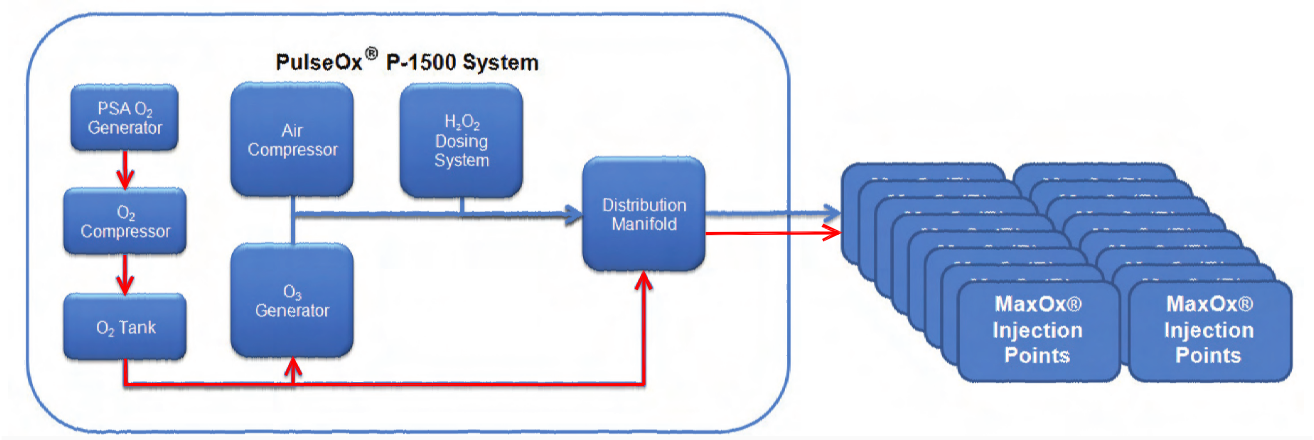
MARYLAND SQUARE SHOPPING CENTER
3661 South Maryland Parkway
Las Vegas, Nevada

FIGURE 10
PULSEOX INJECTION WELL DETAIL

TETRA TECH

Source: Modified from Hypeair Nested Point (SS/SS) (Typical);
Groundwater & Environmental Services, Inc. 2010, Used by Permission.





PulseOx®
P-1500

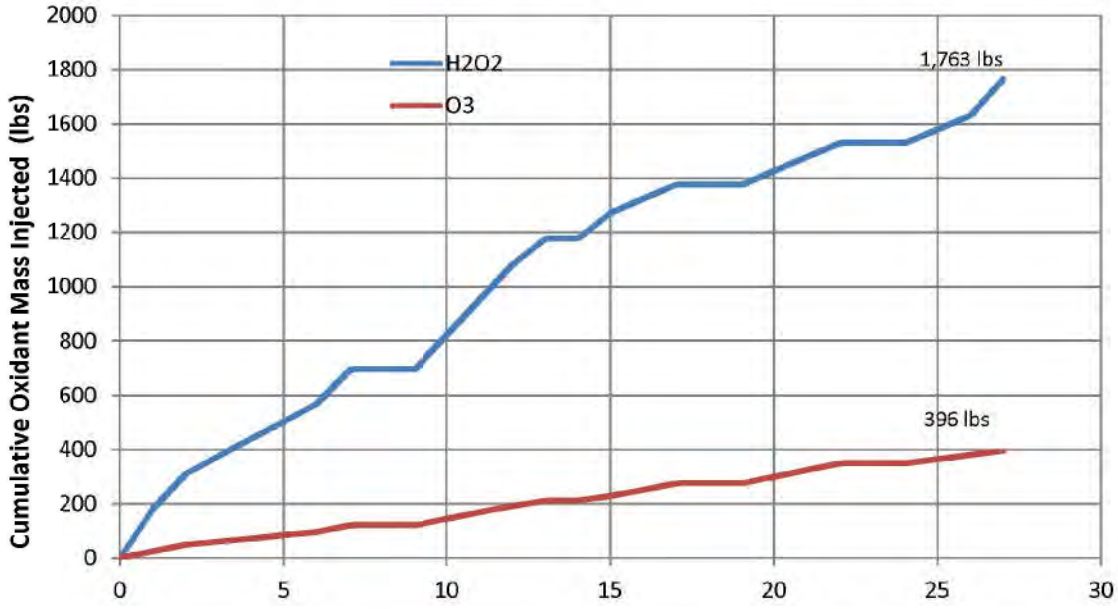
PulseOx© process is a patented chemical oxidation process owned by ATPwater, Inc., Patent #7,264,419.
Specifications subject to change without notice.

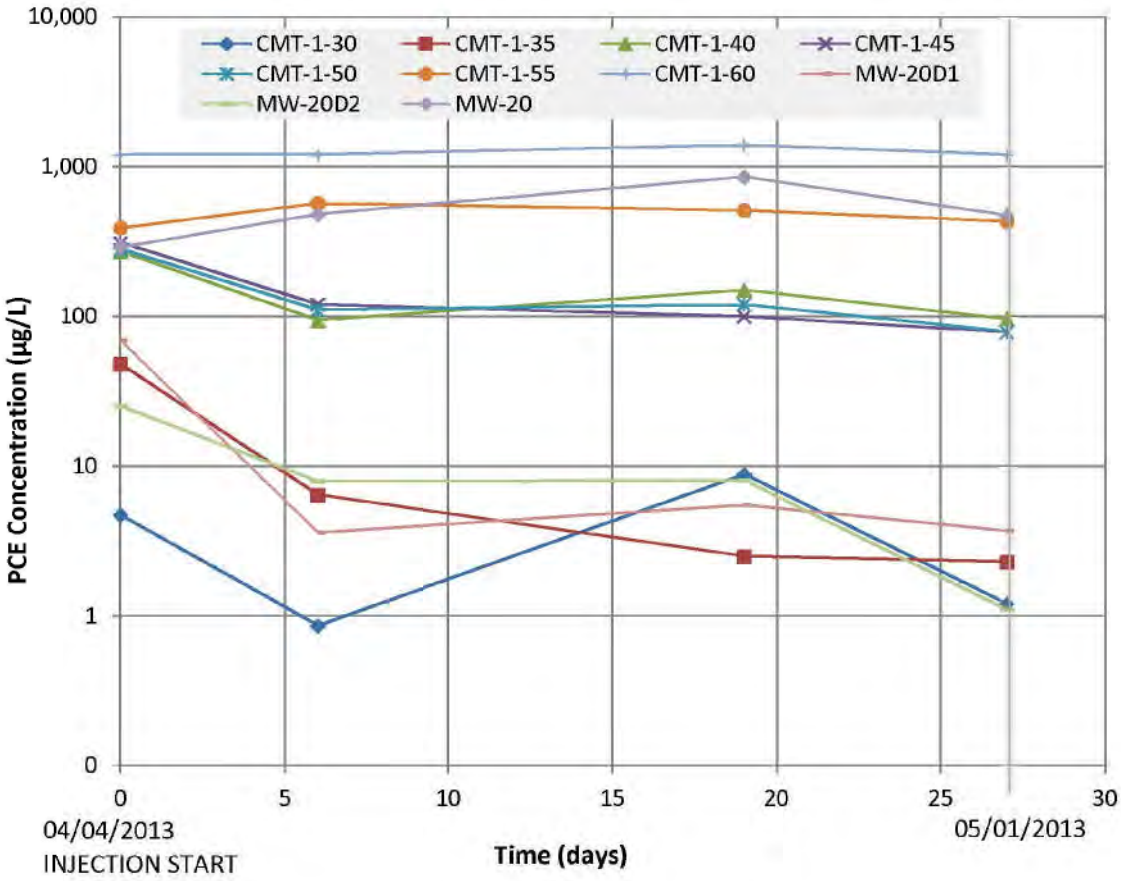
MARYLAND SQUARE SHOPPING CENTER
3661 South Maryland Parkway
Las Vegas, Nevada

FIGURE 11
PULSEOX SYSTEM SCHEMATIC

TETRA TECH

Source: Modified from APT Water

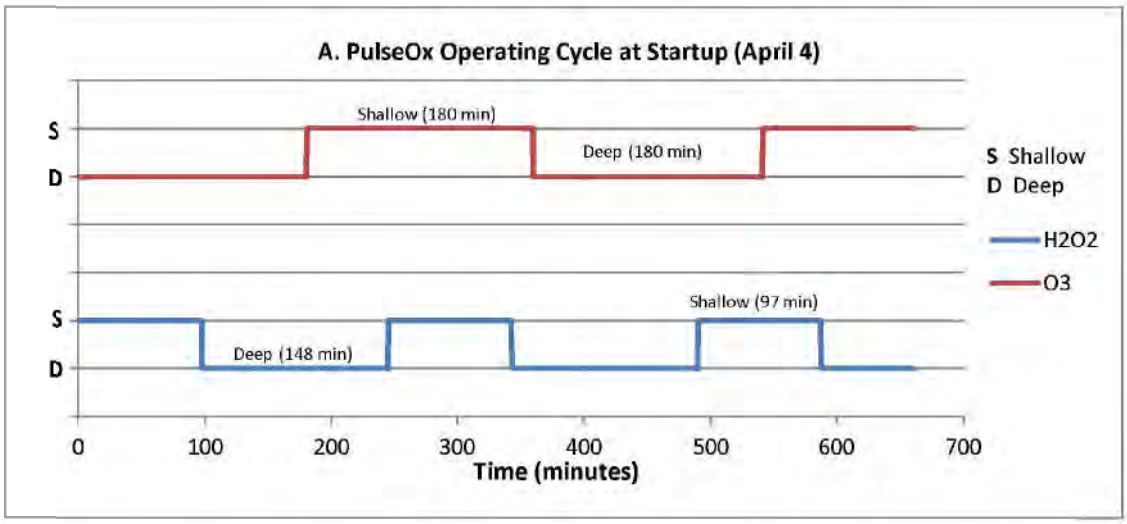


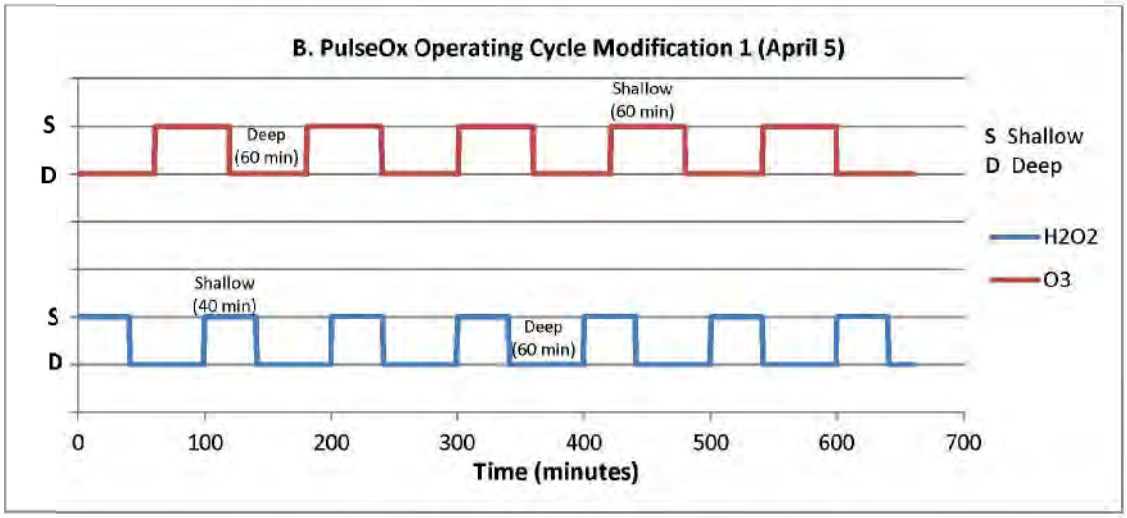


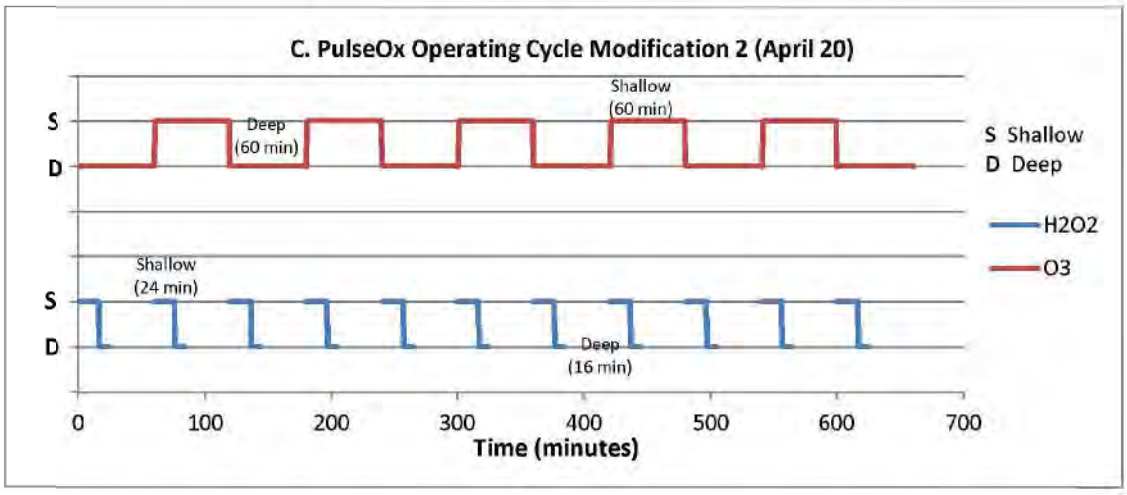
MARYLAND SQUARE SHOPPING CENTER
3661 South Maryland Parkway
Las Vegas, Nevada

FIGURE 12
PCE CONCENTRATIONS DURING PULSEOX PILOT TESTING

TETRA TECH



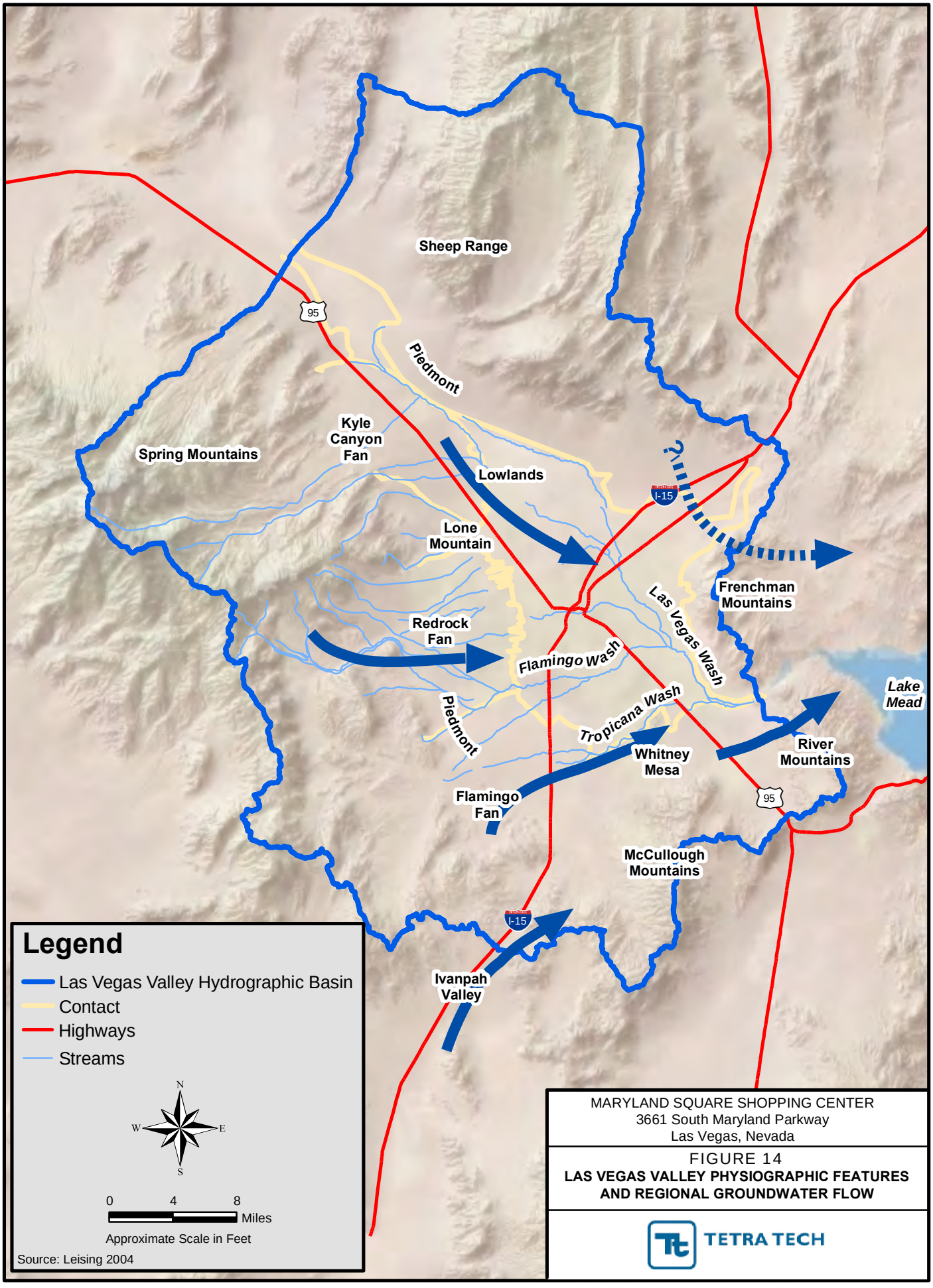


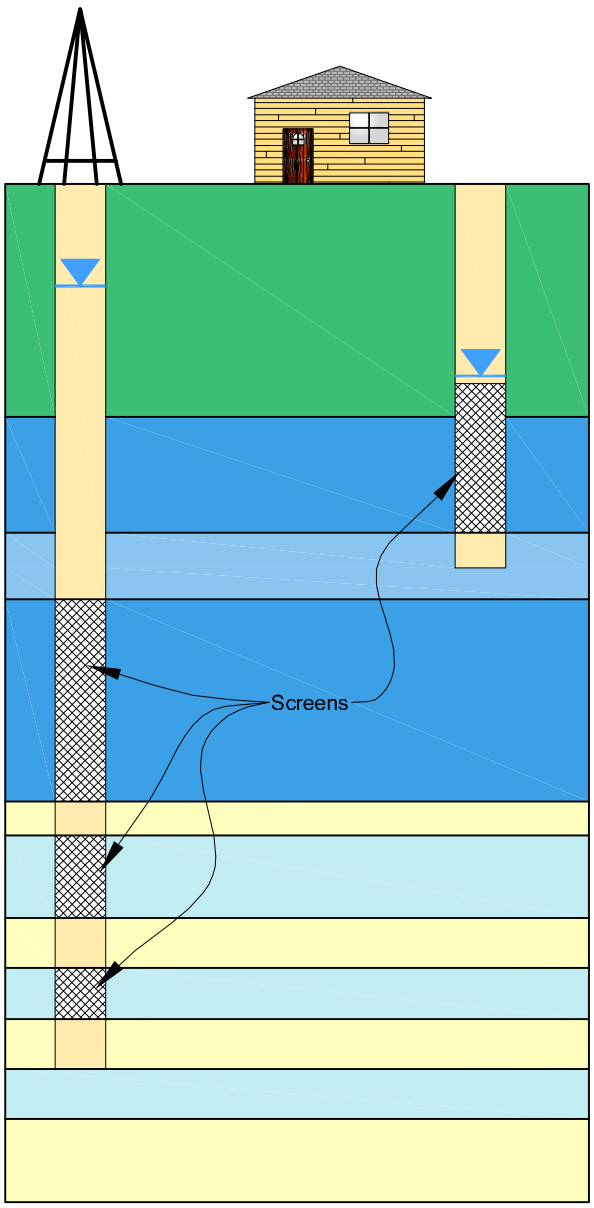


MARYLAND SQUARE SHOPPING CENTER
3661 South Maryland Parkway
Las Vegas, Nevada

FIGURE 13
PULSEOX OPERATING CYCLES

TETRA TECH


Sheep Range
95
Piedmont
Kyle Canyon Fan
Spring Mountains
Lowlands
I-15
Lone Mountain
Frenchman Mountains
Las Vegas Wash
Redrock Fan
Flamingo Wash
Lake Mead
Piedmont
Tropicana Wash
Whitney Mesa
River Mountains
Flamingo Fan
95
McCullough Mountains
I-15
Ivanpah Valley
Legend
Las Vegas Valley Hydrographic Basin
Contact
Highways
Streams
N
W
E
S
0
4
8
Miles
Approximate Scale in Feet
Source: Leising 2004
MARYLAND SQUARE SHOPPING CENTER
3661 South Maryland Parkway
Las Vegas, Nevada
FIGURE 14
LAS VEGAS VALLEY PHYSIOGRAPHIC FEATURES AND REGIONAL GROUNDWATER FLOW
TETRA TECH



Mostly Aquitards
Tapped Rarely in its lower portions by domestic wells

Las Vegas Wash Aquitard

~90 - 450 feet below surface

Las Vegas Creek Aquifer
Primary supply for domestic wells

Twin Lakes Aquitard

Las Vegas Springs Aquifer

Las Madre Mountain Aquifer
Principal sourse for municipal wells

~630 - 950 feet below surface

Undivided Aquifers and Aquitards
Upper portions utilized by some municipal wells

Duck Creek Aquifer

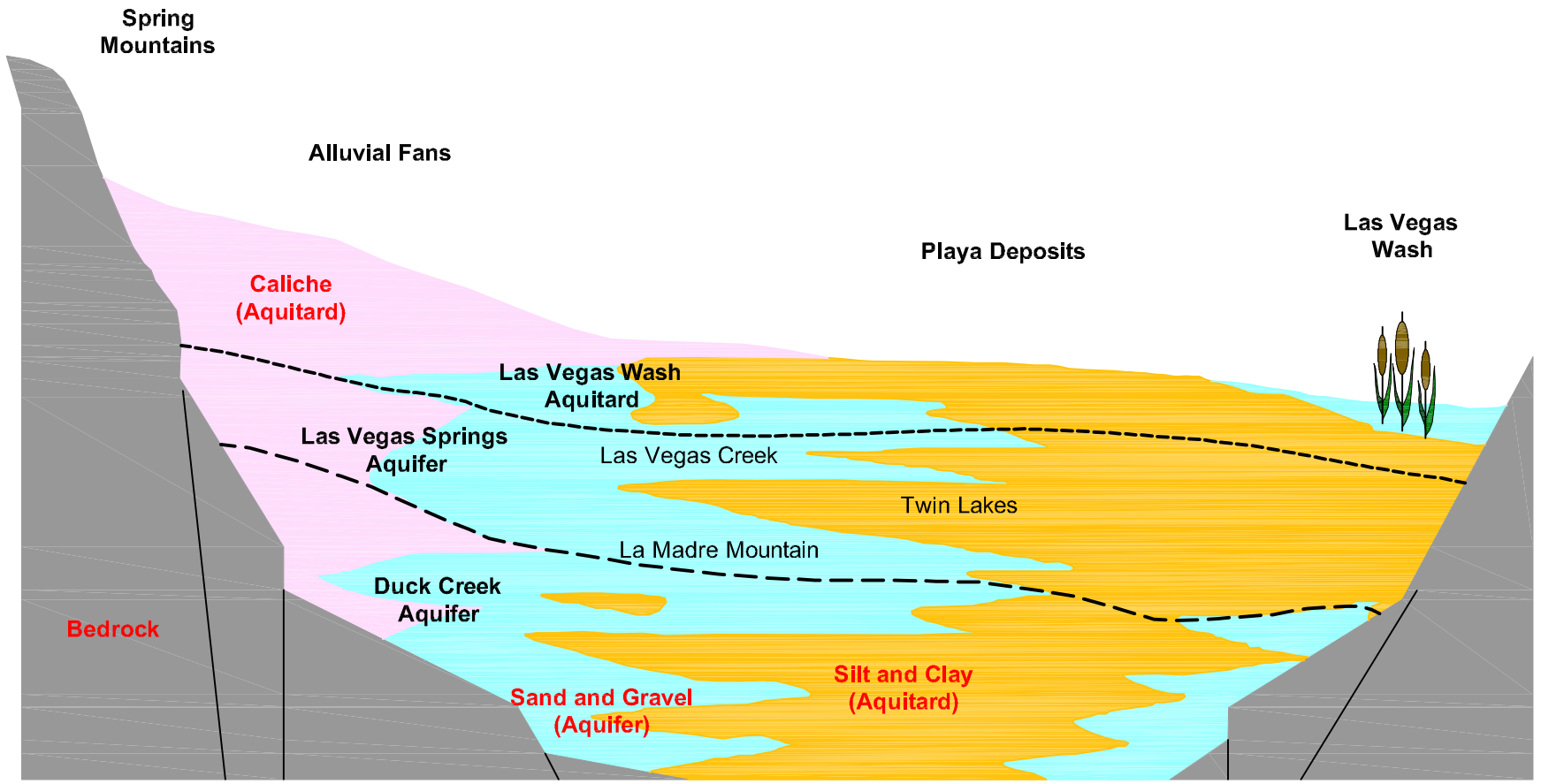
Not to Scale

MARYLAND SQUARE SHOPPING CENTER
3661 South Maryland Parkway
Las Vegas, Nevada

FIGURE 15
HYDROGEOLOGIC UNITS OF THE LAS VEGAS VALLEY

TETRA TECH

Source: Modified from Leising 2004



Not to Scale

MARYLAND SQUARE SHOPPING CENTER
3661 South Maryland Parkway
Las Vegas, Nevada

FIGURE 16
GENERALIZED CROSS SECTION OF THE LAS VEGAS VALLEY

TETRA TECH

Source: Leising 2004

115.14° W
115.135° W
115.13° W
115.125° W
115.12° W
36.125° N
36.12° N

S MARYLAND PARKWAY
E TWAIN AVENUE
E KATIE AVENUE
FLAMINGO WASH
Boulevard Mall
Ruby S. Thompson Elementary School
Golf Course
William E. Orr Middle School
Orr Park

1975
1970
1965
1960
1955
1950
1945
1940
1935
1930
1925
1920

MW-15 1966.96
MW-17 1971.24
MW-7 1972.03
MW-12 1979.99
MW-9 1972.12
MW-14 1968.89
MW-13 1965.43
MW-6 1968.54
MW-1 1971.91
MW-8 1973.81
MW-5 1970.48
MW-2 1964.78
MW-4
MW-3 1963.94
MW-10 1962.02
BM
MW-21 1953.86
MW-20 1953.36
MW-19 1953.51
MW-18 1950.43
MW-16 1953.12
MW-11
MW-22 1948.17
MW-23 1945.99
MW-24 1946.67
MW-25 1941.76
MW-26 1934.65
MW-33 1933.56
MW-32 1934.61
MW-27 1931.24
MW-28 1930.86
MW-31 1922.23
MW-30 1924.71
MW-29 1918.73
PW-1
PW-2
PW-3

Legend

- Monitoring Well Location
- Pumping Well Location
- Groundwater Elevation Contour (5 ft Intervals)
- Direction of Groundwater Flow
- 1971.91 Groundwater Elevation (ft amsl)
- NM Not Measured
- ft amsl Feet Above Mean Sea Level

Elevations measured February 28th - March 2nd of 2011.

N
W E
S

0 250 500 Feet

Approximate Scale in Feet

MARYLAND SQUARE SHOPPING CENTER
3661 South Maryland Parkway
Las Vegas, Nevada

FIGURE 17
GROUNDWATER POTENTIOMETRIC MAP WITH CONTOURS

TETRA TECH

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115.135° W
115.13° W
115.125° W
115.12° W
115.115° W
36.125° N
36.12° N

S MARYLAND PARKWAY
SOUTH EASTERN AVENUE
E TWAIN AVENUE
E KATIE AVENUE
FLAMINGO WASH
Boulevard Mall
Ruby S. Thompson Elementary School
William E. Orr Middle School
Orr Park
Golf Course

MW-6D1/D2/D3 1972.43 1973.78 1974.68
MW-7 1971.31
MW-17 1971.10
MW-1 1971.66
MW-12 1979.19
MW-34 1974.82
MW-35 1971.38
MW-8 1971.06
MW-9 1971.69
MW-14 1968.21
MW-15 1966.33
MW-14I NM
MW-13 1964.78
MW-6 1967.89
MW-2 1964.24
MW-3 1963.44
MW-5 1969.00
MW-10 1961.92
MW-4
MW-21 1954.22
CMT-1 1953.87
MW-20D1/D2/D3 1953.85 1954.54 1960.39
MW-20 1954.38
MW-19 1954.05
MW-19I 1952.77
MW-19D1/D2/D3 1955.78 1953.65 1956.85
MW-16 1953.67
MW-11 1954.06
B-3 1949.98
B-1 1959.26
B-2 1950.11
B-4 1953.19
MW-22 1948.92
MW-39 1943.35
MW-18 1950.84
MW-23 1946.50
MW-24 1947.20
MW-25 1940.54
MW-26 1936.64
MW-33 1933.73
MW-36 1936.27
MW-32 1934.47
PW-1
MW-27 1928.82
MW-28 1930.57
PW-2
MW-37 1911.15
MW-31 1921.39
MW-30 1923.21
MW-29 1919.05
MW-38 1893.90

1970
1965
1960
1955
1950
1945
1940
1935
1930
1925
1920
1915
1910
1905
1900
1895

Legend

- Monitoring Well Location
- Pumping Well Location
- Monitoring Well Location (Abandoned)
- Soil Boring Location (Ninyo & Moore)
- 1950.11 Groundwater Elevation
- Groundwater Elevation Contour (Dashed Where Inferred)

N
W E
S

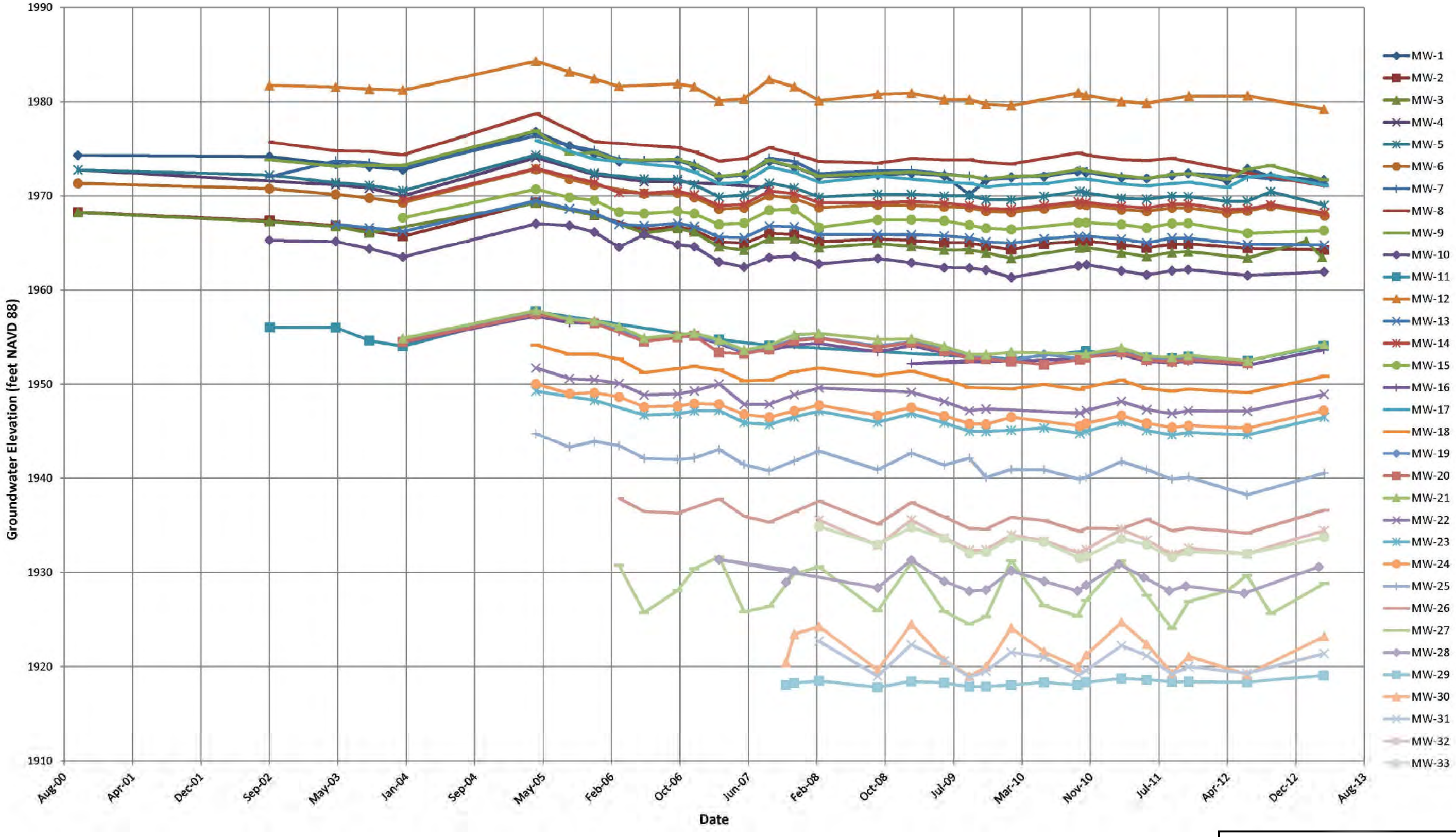
0 250 500 Feet
Approximate Scale in Feet

MARYLAND SQUARE PCE SITE
3661 South Maryland Parkway
Las Vegas, Nevada

FIGURE 18
SHALLOW GROUNDWATER ELEVATIONS
MARCH 2013

TETRA TECH

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MARYLAND SQUARE SHOPPING CENTER
3661 South Maryland Parkway
Las Vegas, Nevada

FIGURE 19
GROUNDWATER ELEVATION OVER TIME

TETRA TECH

Source: Modified from URS 2008

115.135° W
115.13° W
115.125° W
115.12° W
115.115° W
36.125° N
36.12° N
S MARYLAND PARKWAY
SOUTH EASTERN AVENUE
E TWAIN AVENUE
E KATIE AVENUE
FLAMINGO WASH
Point of Compliance
Boulevard Mall
Ruby S. Thompson Elementary School
Golf Course
William E. Orr Middle School
Orr Park
MW-1
MW-2
MW-3
MW-4
MW-5
MW-6
MW-7
MW-8
MW-9
MW-10
MW-11
MW-12
MW-13
MW-14
MW-14I
MW-15
MW-16
MW-17
MW-18
MW-19
MW-19I
MW-20
MW-21
MW-22
MW-23
MW-24
MW-25
MW-26
MW-27
MW-28
MW-29
MW-30
MW-31
MW-32
MW-33
MW-34
MW-35
MW-36
MW-37
MW-38
MW-39
PW-1
PW-2

Legend

- Monitoring Well Location
- Pumping Well Location
- Monitoring Well Location (Abandoned)
- Conceptual Location of Compliance Well
- μg/L Micrograms Per Liter
- PCE Tetrachloroethylene
- Flamingo Wash
- 100 μg/L PCE Contour
- 5 μg/L PCE Contour (Dashed Where Inferred)
- Area for Protection of Indoor Air
- Area for Protection of Domestic Water Supply Wells
- Groundwater Treatment Area
- PCE Remediation Goal for Protection of Indoor Air = 100 μg/L
- PCE Remediation Goal for Protection of Domestic Water Supply Wells = 5 μg/L

N
W E
S

0 250 500 Feet

Approximate Scale in Feet

MARYLAND SQUARE PCE SITE
3661 South Maryland Parkway
Las Vegas, Nevada

FIGURE 20
COMPLIANCE AREAS

TETRA TECH

Path: S:\EMI Shared\Projects Directory\Private Sector - Other Offices\Maryland Square\2013\Figure_20_Complaince Areas.mxd

APPENDIX A

Boring and Well Construction Logs

TETRA TECH

BORING LOG
MW-19I

Project:	Maryland Square Shopping Center	Borehole Depth:	59-60 feet bgs.	Sampling Method: Split spoon
Location:	3661 S. Maryland Parkway	Borehole Diameter:	10 inches	Page 1 of 3
Project No.:	103P172824.01	Reviewed By: Becki Dano		Northing (feet): TBA
Logged By:	Vladimir Prilepin			Easting (feet): TBA
Date Boring Started:	7/19/2012	Drilling Contractor: Cascade Drilling L.P.		Ground Surface Elevation (feet MSL): TBA
Date Boring Completed:	7/23/2012	Drilling Method: HSA		Top of Casing Elevation (feet MSL): TBA

Depth (feet bgs)	Recovery (percent)	Blow Counts	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description	OVA (ppm, BZ = breathing zone)
0			10:10				0.5' asphalt	
					SM		0-5 feet bgs. Cleared with air vacumn tool (silty sand w/gravel)	
1								
2								
3								
4								
5		4			SM		5-7 feet bgs. SILTY SAND with gravel, very pale brown 10YR 7/3, loose, dry; gravels up to 2"	0.0
6		8						
		21						
7	70%	2						
		8			SM/SP		7-9 feet bgs. SILTY SAND to fine SAND, very pale brown 10YR 7/3, fine, poorly graded, loose dry to ~8', becomes dense with gypsum(?) crystals up to 1.5" long, 0.2" wide, color lightens to 10YR 8/3	0.0
8		10						
		10						
9	90%	11						
		5			SM/ML		9-11 feet bgs. Fine SAND /SILT mixture, very pale brown, dry, medium desnity when pressed, occasional gravel, crumbles.	0.0
10		8						
		11						
11	95%	4						
		5			ML		11-13 feet bgs. SILT to CLAYEY SILT, very pale brown, 10YR 7/3, medium dense (crumbles when pressed), clay content increases with depth to ~15%, 85% silt; becomes brown at ~12 feet - 7.5YR 3/4	
12		8						
		10						
13	100%	12						
		9					13-15 feet bgs. CLAYEY SILT, brown 7.5YR 5/4, medium dense (crumbled), dry, clay content increases with depth to ~30	0.0
14		12						
		13						
15	100%	14						
		13					15-17 feet bgs. Same as above.	0.0
16		8						
		13						
17	100%	15						
		6					17-19 feet bgs. Same as above with gravelly to silty clay	0.0
18		13						
		15						
19	100%	16						
		5			ML/CL		19-21 feet bgs. SILTY CLAY/CLAYEY SILT, strong brown, 7.5YR 5/6, medium dense to soft (easily crumbles), dry, 60-50% silt,	
20	100%	5						

TETRA TECH

BORING LOG
MW-19I

Project: Maryland Square Shopping Center	Borehole Depth: 59-60 feet bgs.	Sampling Method: Split spoon	Page 2 of 3
Location: 3661 S. Maryland Parkway	Borehole Diameter: 10 inches		
Project No.: 103P172824.01	Reviewed By: Becki Dano	Northing (feet): TBA	
Logged By: Vladimir Prilepin		Easting (feet): TBA	
Date Boring Started: 7/19/2012	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA	
Date Boring Completed: 7/23/2012	Drilling Method: HSA	Top of Casing Elevation (feet MSL): TBA	

Depth (feet bgs)	Recovery (percent)	Blow Counts	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description	OVA (ppm, BZ = breathing zone)
20		7					40-60% clay	
	100%	7						
21		3			CL		21-23 feet bgs. SILTY CLAY, srong brown 2.5YR 5/4, medium stiff to soft, dry, secondary mineralization traces	0.0
		7						
22		8						
	100%	7						
23		3					23-25 feet bgs. SILTY CLAY with gravels, to gravelly clay, brown, soft, gravels up to 1" in size, angular	
		5						
24		4						
	100%	6						
25		3					25-27 feet bgs. GRAVELLY CLAY. Amount of gravels increases to 30%	
		6						
26		4						
	100%	5						
27		2			CL		27-29 feet bgs. SANDY to SILTY CLAY, light brown 7.5YR 6/4, soft, low to medium plasticity, ~70% clay, fine to very fine sand 10-15%, silt 10-15%, moist	
		2						
28		4						
	100%	25		▼				
29		4			GC/CL		29-31 feet bgs. GRAVEL/CLAY mixture, brown, saturated, gravels up to 1", subangular to rounded, 60% gravel, 30% clay, 10% silt/sand.	
		7						
30		14					Driller tried to push through sampler but in caliche	
	70%	24						
31					CA		31-33 feet bgs. CALICHE (couldn't collect a core sample), pushed GW sampler 33-34 feet.	
32								
	0%							
33							Attempted to collect groundwater sample - no water	
34		3			CL/GC		34-36 feet bgs. SILTY CLAY/CLAYEY GRAVEL mixture, saturated between 34' & 35', gravels to 1.5" to coarse sand, moist 35'-36'. Up to 50% gravel, ~50% fine, gravels rounder	
		18						
35		8						
		7						
36	80%							
				GW			TT-EW2-01-GW-36 (water is muddy)	
37								
		nr			GC/CL		37-39 feet bgs. Similar to above, saturated ~36-38, grading to SILTY CLAY at ~38 feet, plastic, soft, 70% clay	
38								
	75%							
39		0			CL/GC		39-40 feet bgs. GRAVEL/CLAY mixture, saturated	
	80%	2						
40								

TETRA TECH

BORING LOG
MW-19I

Project: Maryland Square Shopping Center	Borehole Depth: 59-60 feet bgs.	Sampling Method: Split spoon	Page 3 of 3
Location: 3661 S. Maryland Parkway	Borehole Diameter: 10 inches		
Project No.: 103P172824.01	Reviewed By: Becki Dano	Northing (feet): TBA	
Logged By: Vladimir Prilepin		Easting (feet): TBA	
Date Boring Started: 7/19/2012	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA	
Date Boring Completed: 7/23/2012	Drilling Method: HSA	Top of Casing Elevation (feet MSL): TBA	

Depth (feet bgs)	Recovery (percent)	Blow Counts	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description	OVA (ppm, BZ = breathing zone)
40								
		2			CL		40-41 feet bgs. CLAY, brown, soft, plastic, with occasional gravels, sticky, moist	
41	80%	3						
			13:55	GW	ML		TT-EW2-02-GW-41	
42								
				SS			TT-EW2-01-SS-42 Collected soil samle for physical parameters [with Shelby tube (2'), between 42-44 feet] - SANDY, CLAYEY SILT	
43								
44								
		2			GC/CL		44-46 feet bgs. GRAVEL/GRAVELLY CLAY mixture, saturated 44-45 feet; grading to SILTY CLAY, CLAYEY SILT, SANDY SILT, amount of sand increases with depth	
45		5						
		13			ML/SM			
46	70%	11						
							46-47 feet bgs. Attempted to collect water sample, no water in sampler after waiting ~10 min.; will increase waiting time	
47								
		6			CL/ML		47-49 feet bgs. SILTY/SANDY CLAY grading to CLAYEY SILT, strong brown, 7.5YR 4/6; saturated between 47-47.5' (water from above?), sand, very fine at 15%, some gravels, from 48-49' CLAYEY SILT, soft, medium plasticicity, dry to moist	
48		11						
		8						
49	80%	8						
				GW			TT-EW2-O3-GW-49	
50								
		27			ML		50-52.5 feet bgs. CLAYEY SILT to SANDY SILT with gravels, brown, saturated at the top, gravels angular to subangular.	
51		50/4						
		"						
52	60%	"						
		13						
53		17			SM		52.5-54 feet bgs. SILTY SAND with gravel, strong brown 7.5YR 5/6; soft, some plasticity, very fine sand ~70%, 20% silt, 10% clay	
		16						
54	80%	13						
				GW			TT-EW2-O4-GW-54	
55								
		4			ML/SM		55-57 feet bgs. CLAYEY SILT to SILTY SAND, strong brown, amount of fines decreases with depth; amount of fine sand increases with depth; 15-70% fine sand, 45-15% silt, 10-5% clay; moist	
56		6						
		9						
57	90%	8						
		4			ML/CL		57-59 feet bgs. GRAVELLY and CLAYEY SILT grading to SILTY CLAY with depth, brown 7.5YR 5/4, gravel is rounded to subangular; 0.25-1'; silt 60-30%, clay 30-50%, gravel ~10-30%	
58		6						
		5						
59	90%	15						
			16:40	GW			TT-EW2-05-GW-59 between 59-60 feet bgs	
							T.D. 60 feet bgs	
60								

TETRA TECH

BORING LOG
MW-19D

Project:	Maryland Square Shopping Center	Borehole Depth: 104 feet bgs.	Sampling Method: Continuous Core
Location:	3661 S. Maryland Parkway	Borehole Diameter: 10 inches	
Project No.:	103P172828.01	Reviewed By: Geoff Richards, PG	Northing (feet): TBA
Logged By:	Vladimir Prilepin, PG		Easting (feet): TBA
Date Boring Started:	1/12/2013	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA
Date Boring Completed:	1/14/2013	Drilling Method: Sonic	Top of Casing Elevation (feet MSL): TBA

Depth (feet bgs)	Drive Interval (% recovery)	Soil PID/FID (ppm)	Time	Sample Matrix	USCS	Graphic Log	Interval and Lithologic Description
0			7:45				0.3 feet Asphalt
1							0.5 feet bgs. Cleared with air vac tool.
2							
3							
4							
5					SM		5 - 16 feet bgs. SILTY SAND, whitish to very pale brown, 10YR 8/2, loose to compacted, very fine, poorly graded, silt ~30 - 40%, dry.
6							
7							
8							
9							
10	**100%**						Chunks of asphalt encountered at ~10-11 feet bgs.
11							
12							
13							
14							
15	**100%**						
16					ML		16 - 20 feet bgs. SANDY and CLAYEY SILT with very fine gravels, light yellowish brown, 10YR 6/4, compacted (crumbles with fingers), clay content increases with depth to 30 - 40%; dry.
17							
18							
19							
20	**100%**						

TETRA TECH

BORING LOG
MW-19D

Project:	Maryland Square Shopping Center	Borehole Depth: 104 feet bgs.	Sampling Method: Continuous Core
Location:	3661 S. Maryland Parkway	Borehole Diameter: 10 inches	
Project No.:	103P172828.01	Reviewed By: Geoff Richards, PG	Northing (feet): TBA
Logged By:	Vladimir Prilepin, PG		Easting (feet): TBA
Date Boring Started:	1/12/2013	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA
Date Boring Completed:	1/14/2013	Drilling Method: Sonic	Top of Casing Elevation (feet MSL): TBA

Depth (feet bgs)	Drive Interval (% recovery)	Soil PID/FID (ppm)	Time	Sample Matrix	USCS	Graphic Log	Interval and Lithologic Description
20					SC		20 - 29.5 feet bgs. CLAYEY SAND with some gravels and occasional cobbles; dark yellowish brown, 10YR 4/4; clay content increases at ~24 feet bgs (from 15-30% to 45%); gravels and cobbles 2" to 5" in size at 24-26 feet bgs, wet ~26 feet; a stringer of poorly graded sand (SP) 6" thick at 28.5-29 feet.
21							
22							
23							
24							
25	**100%**						
26							
27					GW		TTMW19D01GW27 at 9:30 on 1/12/13 (sample collected directly from the borehole with bailer)
28							
29							
30	**100%**				CA.		29.5 to 30.5 feet bgs. CALICHE layer.
31					GM		30.5 to 37.5 feet bgs. GRAVEL and GRAVEL-SAND-SILT mixture, light gray to very pale brown, 10YR 7/2-7/3; 75-90% GRAVEL, well graded, subrounded to rounded, 0.2-2" in size; 25-10% medium to coarse grained sand, ~5% silt, unconsolidated, saturated especially between 30-32 feet, then wet.
32							
33							
34							
35	**100%**						
36					GW		TTMW19D02GW36 12:25 on 1/12/13 (sample collected w/SimulProbe)
37							
38					CL		37.5 to 39.5 feet bgs. CLAY, brown, 7.5YR 4/4, medium stiff, plastic, secondary mineralization (some small 0.2" whitish nodules and irregularly shaped rocks 2"); dry to moist.
39							39.5 to 41.5 feet bgs. SILTY GRAVEL, light gray to very pale brown, saturated at 40 feet; up to 70% well graded gravel, 30% fines.
40	**90%**				GM		

TETRA TECH

BORING LOG
MW-19D

Project:	Maryland Square Shopping Center	Borehole Depth: 104 feet bgs.	Sampling Method: Continuous Core
Location:	3661 S. Maryland Parkway	Borehole Diameter: 10 inches	
Project No.:	103P172828.01	Reviewed By: Geoff Richards, PG	Northing (feet): TBA
Logged By:	Vladimir Prilepin, PG		Easting (feet): TBA
Date Boring Started:	1/12/2013	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA
Date Boring Completed:	1/14/2013	Drilling Method: Sonic	Top of Casing Elevation (feet MSL): TBA

Depth (feet bgs)	Drive Interval (% recovery)	Soil PID/FID (ppm)	Time	Sample Matrix	USCS	Graphic Log	Interval and Lithologic Description
40					GM		
41							
42					CL		41.5 to 45 feet bgs. CLAY, brown, 7.5YR 4/4, medium soft, plastic, sticky, some gravels (mudstone), gravel content increases with depth to 10%.
43							
44							
45	100%				GC		45 to 53 feet bgs. CLAYEY GRAVEL, brown, 10YR 5/3, 85-90% well graded gravel and some coarse sand, gravel 0.2 - 3" in size, unconsolidated to compacted; saturated.
46				GW			TTMW19D03GW46 at 14:15 on 1/13/13 (sample collected w/Hydropunch II)
47							
48							
49							
50							
51							
52	85%						
53					GC/CL		53 to 56 feet bgs. CLAYEY GRAVEL/GRAVELLY CLAY mixture, brown, 7.5YR 5/4, gravels 0.2-2" up to 55%, clay is sticky, soft, wet to saturated.
54							
55	100%						
56					CL		56 to 60 feet bgs. SANDY CLAY with gravel, light brown, 7.5YR 6/3, with zones of whitish secondary mineralization and chunks of mudstone/caliche, very fine sand up to 15%, gravel 5-10%; clay in up to 75%, soft, plastic, sticky, wet.
57							
58							
59							
60	100%						

TETRA TECH

BORING LOG
MW-19D

Project:	Maryland Square Shopping Center	Borehole Depth: 104 feet bgs.	Sampling Method: Continuous Core
Location:	3661 S. Maryland Parkway	Borehole Diameter: 10 inches	
Project No.:	103P172828.01	Reviewed By: Geoff Richards, PG	Northing (feet): TBA
Logged By:	Vladimir Prilepin, PG		Easting (feet): TBA
Date Boring Started:	1/12/2013	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA
Date Boring Completed:	1/14/2013	Drilling Method: Sonic	Top of Casing Elevation (feet MSL): TBA

Depth (feet bgs)	Drive Interval (% recovery)	Soil PID/FID (ppm)	Time	Sample Matrix	USCS	Graphic Log	Interval and Lithologic Description
60							60 to 69.5 feet bgs. LEAN SILTY CLAY, brown, 7.5YR 5/4, medium soft, plastic, with occasional nodules of calcite mineralization.
61					CL		
62							
63							
64							
65	100%						65 to 69.5 feet bgs. Becomes more sandy, mottled because of extensive zones of calcite mineralization with chunks of irregularly shaped caliche-like rocks, light brown, 7.5YR 6/3, amount of silt and very fine sand increases with depth to ~15%, wet (this part appears relatively more permeable than above).
66							
67							
68							
69							69.5 - 70 feet bgs. SILTY SAND, brown, 7.5YR 5/4, very fine to fine, medium dense, poorly graded, silt 15-40%; wet.
70	100%				SM		70 to 75 feet bgs. SILTY to SANDY CLAY, brown, 7.5YR 5/4, medium stiff to soft, medium plasticity, occasional nodules of secondary mineralization, moist to wet (more moisture is visible around calcite/caliche chunks), sticky, cohesive; fine to very fine sand content increases to 15-20% at ~74-75 feet bgs.
71							
72					CL		
73							
74							
75	100%						75 to 80 feet bgs. CLAY, brown, 2.5YR 5/4, with zones of secondary mineralization, medium stiff, plastic, about 0.5 feet compacted/cemented (calcite) zone of hard clay that crumbles with fingers; dry, caliche-like layer at 77.5-78 feet.
76					CL		
77							
78							
79							
80	100%						

TETRA TECH

BORING LOG
MW-19D

Project:	Maryland Square Shopping Center	Borehole Depth: 104 feet bgs.	Sampling Method: Continuous Core
Location:	3661 S. Maryland Parkway	Borehole Diameter: 10 inches	
Project No.:	103P172828.01	Reviewed By: Geoff Richards, PG	Northing (feet): TBA
Logged By:	Vladimir Prilepin, PG		Easting (feet): TBA
Date Boring Started:	1/12/2013	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA
Date Boring Completed:	1/14/2013	Drilling Method: Sonic	Top of Casing Elevation (feet MSL): TBA

Depth (feet bgs)	Drive Interval (% recovery)	Soil PID/FID (ppm)	Time	Sample Matrix	USCS	Graphic Log	Interval and Lithologic Description
80					CL		80 to 84 feet bgs. Same as above, fewer zones of secondary mineralization, mottled, relatively more saturated, soft, low to medium plasticity; grading to silty clay at 84 feet and down; saturated. TTMW19D01SS81 at 14:20 on 1/13/2013
81				SS			
82							
83							
84					CL		84 to 86 feet bgs. SILTY CLAY, brown, 7.5YR 5/4, soft to medium stiff, low to medium plasticity; zones of secondary mineralization, chunks of mudstones.
85	100%						
86					CL/ML		86 to 90 feet bgs. SANDY CLAY/SANDY SILT, pale brown, 10YR 6/3, medium stiff, slight plasticity, occasional zones of calcite mineralization, iron staining.
87							
88							
89							
90	100%				ML		90 to 92 feet bgs. SANDY SILT, brown, 7.5YR 5/4, soft, very fine to fine sand up to 30-40%, moist to wet. Zones of calcite mineralization (whitish gray).
91							
92					ML		92 to 94 feet bgs. CLAYEY SILT, brown, 7.5YR 5/4, very fine sand, <10%, clay 30-40%, silt >60%, sticky, medium plasticity, nodules of secondary mineralization; moist.
93							
94					CL		94 to 99 feet bgs. CLAY, strong brown, 7.5YR 4/6, medium stiff to stiff, color changes to brown 7.5YR 5/3 because of 0.5-1' zone of calcite mineralization (96-98'); plastic, fine sand and silt content increases with depth to 10%.
95	100%						
96							
97							
98							
99					ML/SM		99 to 100 feet bgs. SANDY to CLAYEY SILT/SILTY SAND mixture, brown, soft, fine to very fine sand 15-45%, clay 0-15%, silt up to 55%; wet.
100	100%						

TETRA TECH

BORING LOG
MW-19D

Project:	Maryland Square Shopping Center	Borehole Depth: 104 feet bgs.	Sampling Method: Continuous Core
Location:	3661 S. Maryland Parkway	Borehole Diameter: 10 inches	
Project No.:	103P172828.01	Reviewed By: Geoff Richards, PG	Northing (feet): TBA
Logged By:	Vladimir Prilepin, PG		Easting (feet): TBA
Date Boring Started:	1/12/2013	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA
Date Boring Completed:	1/14/2013	Drilling Method: Sonic	Top of Casing Elevation (feet MSL): TBA

Depth (feet bgs)	Drive Interval (% recovery)	Soil PID/FID (ppm)	Time	Sample Matrix	USCS	Graphic Log	Interval and Lithologic Description
---- 100 ----					ML		100 to 102 feet bgs. SANDY/CLAYEY SILT, brown, soft, slight plasticity; wet to moist (with secondary mineralization nodules).
---- 101 ----				GW			TTMW19D09GW101 10:45 1/14/2013
---- 102 ----					CA.		102 to 103 feet bgs. CALICHE layer, light gray to white, hard rock.
---- 103 ----					CL		103 to 104 feet bgs. SILTY CLAY, brown, soft, plastic, sticky, with zones of secondary mineralization; moist.
---- 104 ----	**100%**						**T.D. 104 feet bgs**

TETRA TECH

BORING LOG
MW-20D

Project:	Maryland Square Shopping Center	Borehole Depth: 100 feet bgs.	Sampling Method: Continuous core
Location:	3661 S. Maryland Parkway	Borehole Diameter: 10 - 8 inches	
Project No.:	103P172828.01	Reviewed By: Geoff Richards, PG	Northing (feet): TBA
Logged By:	Vladimir Prilepin, PG		Easting (feet): TBA
Date Boring Started:	1/8/2013	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA
Date Boring Completed:	1/10/2013	Drilling Method: Sonic	Top of Casing Elevation (feet MSL): TBA

Depth (feet bgs)	Drive Interval (% recovery)	Soil PID/FID (ppm)	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description
0							0.3 feet Asphalt
1					SM		0-5 feet bgs. Cleared with air vac tool (silty sand with gravels)
2							
3							
4							
5			14:15		SP		5-9 feet bgs. SAND, yellowish brown 10YR 5/4, poorly graded, fine to very fine, loose, dry
6							
7							
8							
9					CA.		9-11.5 feet bgs. CALICHE, pinkish white (comes out very warm, pulverized to powder; some gravels and cobbles)
10	80%						
11							
12					SP		11.5-22 feet bgs. SAND, light yellowish brown 10YR 6/4, poorly graded, fine, loose, dry
13							
14							
15	100%						
16							
17							
18							
19							
20	100%						

TETRA TECH

BORING LOG
MW-20D

Project:	Maryland Square Shopping Center	Borehole Depth: 100 feet bgs.	Sampling Method: Continuous core
Location:	3661 S. Maryland Parkway	Borehole Diameter: 10 - 8 inches	
Project No.:	103P172828.01	Reviewed By: Geoff Richards, PG	Northing (feet): TBA
Logged By:	Vladimir Prilepin, PG		Easting (feet): TBA
Date Boring Started:	1/8/2013	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA
Date Boring Completed:	1/10/2013	Drilling Method: Sonic	Top of Casing Elevation (feet MSL): TBA

Depth (feet bgs)	Drive Interval (% recovery)	Soil PID/FID (ppm)	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description
20					SP		Becomes moist at 21 feet bgs; w/some gravels, subangular to subrounded 0.3-1" in size
21							
22					SM		22-24 feet bgs. SILTY SAND with gravels, pale brown, 10YR 6/3, medium to fine grained; saturated between 23-24 (likely a perched zone atop of the caliche-like layer); silt ~15%; amount of gravels and their size increases w/depth (up to 2")
23							
24					CA.		24-26 feet bgs. CALICHE-like layer, light gray in color, 10YR 7/1, clayey matrix w/gravels up to 50%, calcite cementation, a cobble of 7" encountered and smaller cobbles & gravels, moist to dry
25	100%						
26					GC/CL		26-30 feet bgs. GRAVELLY CLAY to GRAVEL/CLAY mixture, light yellowish brown, 10 YR 6/4, clay medium hard to hard, dry, gravels up to 50%; subangular to subrounded, 1" and more in size
27							
28							
29			1/8/13				
30	100%		15:00				
			1/9/13		SM		30-37' bgs. SILTY SAND w/gravel, yellowish brown, 10 YR 5/4, very fine to fine, poorly graded, silt ~15%, gravel >20%, up to 3" in size, but usually 0.5", subrounded; hard to judge on moisture [cores came out steaming hot].
31			10:05				
32							
33							
34							
35	100%						
36							
37					SP		37-39' bgs. POORLY GRADED SAND, dark yellowish brown, 10 YR 4/6, fine to very fine [could be saturated but water likely evaporated].
38							
39					SM		39-43' bgs. SILTY SAND, yellowish to brown, 10YR 5/4, soft (slushy) and saturated between 40-41 feet.
40	100%						

TETRA TECH

BORING LOG
MW-20D

Project:	Maryland Square Shopping Center	Borehole Depth: 100 feet bgs.	Sampling Method: Continuous core
Location:	3661 S. Maryland Parkway	Borehole Diameter: 10 - 8 inches	
Project No.:	103P172828.01	Reviewed By: Geoff Richards, PG	Northing (feet): TBA
Logged By:	Vladimir Prilepin, PG		Easting (feet): TBA
Date Boring Started:	1/8/2013	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA
Date Boring Completed:	1/10/2013	Drilling Method: Sonic	Top of Casing Elevation (feet MSL): TBA

Depth (feet bgs)	Drive Interval (% recovery)	Soil PID/FID (ppm)	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description
40					SM		Silt content decreases from 30% to 15% at ~42 feet bgs; occasional gravels at 43 feet bgs.
41							
42							
43					CL		43-47 feet bgs. GRAVELLY CLAY, yellowish brown, 10YR 5/4, medium soft, plastic, becomes medium stiff; gravel conent increases from 20 to 40% at 45-46 feet.
44							
45	100%						
46							
47					CL		47-50' bgs. LEAN CLAY, dark yellowish brown, 10YR 4/4, medium to high plasticity, medium soft, grading to silty clay with gravels at 49 feet, yellowish brown 10YR 5/4, medium soft, plastic, with traces of secondary mineralization (calcite).
48							
49							
50	100%				ML		50-65 feet bgs. Poor recovery, description is based on small amount of materials retreived from core barrel: SANDY SILT, brown, 7.5YR 5/4, soft wet to saturated, very fine sand 15-30%, some clay, silt ~70%, occasional gravels 0.1 - 0.25" in size.
51							
52							
53							
54							
55	10%						
56				GW			TTMW20D03GW56 at 8:00 am 1-10-13
57							
58							
59							
60	5%						

TETRA TECH

BORING LOG
MW-20D

Project:	Maryland Square Shopping Center	Borehole Depth: 100 feet bgs.	Sampling Method: Continuous core
Location:	3661 S. Maryland Parkway	Borehole Diameter: 10 - 8 inches	
Project No.:	103P172828.01	Reviewed By: Geoff Richards, PG	Northing (feet): TBA
Logged By:	Vladimir Prilepin, PG		Easting (feet): TBA
Date Boring Started:	1/8/2013	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA
Date Boring Completed:	1/10/2013	Drilling Method: Sonic	Top of Casing Elevation (feet MSL): TBA

Depth (feet bgs)	Drive Interval (% recovery)	Soil PID/FID (ppm)	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description
60							
61							
62							
63							
64							
65	5%				CL		65-66 feet bgs. SILTY CLAY, pale brown 10YR 6/3, soft to very soft, sticky, with gravels 0.5-2" in size.
66					CL		66-67 feet bgs. LEAN CLAY, light gray 10YR 7/2, low plasticity, 100% clay; becomes stiff to hard at 66.5 feet, non-plastic, crumbles w/fingers, very dry.
67							
68							
69							
70	100%						70-72 feet bgs. Becomes soft and plastic, color changes to brown, 10YR 5/3, some subangular gravels 0.2-2" in size.
71							
72							72-76 feet bgs. Color changes to pale brown, 10YR 6/3; with traces and zones of secondary mineralization.
73							
74							
75	80%						
76					CL		76 - 81' bgs. CLAY, light brownish gray 10YR 6/2, stiff, plastic; becomes hard and whitish because of secondary mineralization at 78-79 feet, grades to sand/silt mixture starting at 81 feet.
77							
78							
79							
80	100%						

TETRA TECH

BORING LOG
MW-20D

Project:	Maryland Square Shopping Center	Borehole Depth: 100 feet bgs.	Sampling Method: Continuous core
Location:	3661 S. Maryland Parkway	Borehole Diameter: 10 - 8 inches	
Project No.:	103P172828.01	Reviewed By: Geoff Richards, PG	Northing (feet): TBA
Logged By:	Vladimir Prilepin, PG		Easting (feet): TBA
Date Boring Started:	1/8/2013	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA
Date Boring Completed:	1/10/2013	Drilling Method: Sonic	Top of Casing Elevation (feet MSL): TBA

Depth (feet bgs)	Drive Interval (% recovery)	Soil PID/FID (ppm)	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description
80					CL		
81					ML/SM		81 - 82' bgs. SAND/SILT mixture, light brownish gray 10YR 6/2, very fine sand ~50%, 50% silt; wet.
82					SM		82 - 82.5 feet bgs. SILTY SAND, 15% silt, 85% very fine sand.
83					ML/SM		82.5 - 84 feet bgs. SAND/SILT mixture, same color as above. ~50% very fine sand, 50% silt, slight plasticity.
84					ML		84 - 85 feet bgs. SANDY SILT, yellowish brown, 10YR 5/4, some plasticity, ~70% silt; grading to clayey silt w/depth; clay content increases to 30%.
85	100%				ML/CL		85 - 86' bgs. CLAYEY SILT/CLAY mixture, brown 10YR 5/3, low plasticity, stiff.
86					ML		86 - 87 feet bgs. CLAYEY SILT, pale brown, 10YR 6/3, stiff, low plasticity, moist to dry.
87					ML		87 - 89 feet bgs. GRAVELLY SILT, pale brown with whitish secondary mineralization, gravels up to 30-40%, pea size to 1", some may be from mineralization, very fine sand ~5%.
89					SM/ML		89 - 90 feet bgs. FINE SAND/SILT mixture, pale brown with whitish secondary mineralization and some gravels.
90	100%				CL		90 - 95.5 feet bgs. SILTY CLAY to CLAY, pale brown to dark yellowish brown, 10YR 4/4, stiff, plasticity increases with depth, secondary mineralization stringers (whitish) with pea size minerals.
95	100%				SM		95.5 - 100 feet bgs. SILTY SAND, brown, 10YR 5/3, very fine, poorly graded, semi-soft, becomes more compacted with depth, wet/moist.
99			1/10/13				
100	100%		15:55				
				GW			TTMW20D06GW101 and -101D at 8:00 on 1/11/13

T.D. 100 feet bgs

TETRA TECH

BORING LOG
MW-20D

Project:	Maryland Square Shopping Center	Borehole Depth: 100 feet bgs.	Sampling Method: Continuous core
Location:	3661 S. Maryland Parkway	Borehole Diameter: 10 - 8 inches	
Project No.:	103P172828.01	Reviewed By: Geoff Richards, PG	Northing (feet): TBA
Logged By:	Vladimir Prilepin, PG		Easting (feet): TBA
Date Boring Started:	1/8/2013	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA
Date Boring Completed:	1/10/2013	Drilling Method: Sonic	Top of Casing Elevation (feet MSL): TBA

Depth (feet bgs)	Recovery (percent)	Soil PID/FID (ppm)	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description
0							0.3 feet Asphalt
0					SM		0-5 feet bgs. Cleared with air vac tool (silty sand with gravels)
5			14:15		SP		5-9 feet bgs. SAND, yellowish brown 10YR 5/4, poorly graded, fine to very fine, loose, dry
9	80%				CA.		9-11.5 feet bgs. CALICHE, pinkish white (comes out very warm, pulverized to powder; some gravels and cobbles)
11.5	100%				SP		11.5-22 feet bgs. SAND, light yellowish brown 10YR 6/4, poorly graded, fine, loose, dry
20	100%						

TETRA TECH

BORING LOG
MW-20D

Project:	Maryland Square Shopping Center	Borehole Depth: 100 feet bgs.	Sampling Method: Continuous core
Location:	3661 S. Maryland Parkway	Borehole Diameter: 10 - 8 inches	
Project No.:	103P172828.01	Reviewed By: Geoff Richards, PG	Northing (feet): TBA
Logged By:	Vladimir Prilepin, PG		Easting (feet): TBA
Date Boring Started:	1/8/2013	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA
Date Boring Completed:	1/10/2013	Drilling Method: Sonic	Top of Casing Elevation (feet MSL): TBA

Depth (feet bgs)	Recovery (percent)	Soil PID/FID (ppm)	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description

TETRA TECH

BORING LOG
MW-20D

Project:	Maryland Square Shopping Center	Borehole Depth: 100 feet bgs.	Sampling Method: Continuous core
Location:	3661 S. Maryland Parkway	Borehole Diameter: 10 - 8 inches	
Project No.:	103P172828.01	Reviewed By: Geoff Richards, PG	Northing (feet): TBA
Logged By:	Vladimir Prilepin, PG		Easting (feet): TBA
Date Boring Started:	1/8/2013	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA
Date Boring Completed:	1/10/2013	Drilling Method: Sonic	Top of Casing Elevation (feet MSL): TBA

Depth (feet bgs)	Recovery (percent)	Soil PID/FID (ppm)	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description
20					SP		Becomes moist at 21 feet bgs; w/some gravels, subangular to subrounded 0.3-1" in size
21							
22					SM		22-24 feet bgs. SILTY SAND with gravels, pale brown, 10YR 6/3, medium to fine grained; saturated between 23-24 (likely a perched zone atop of the caliche-like layer); silt ~15%; amount of gravels and their size increases w/depth (up to 2")
23							
24					CA.		24-26 feet bgs. CALICHE-like layer, light gray in color, 10YR 7/1, clayey matrix w/gravels up to 50%, calcite cementation, a cobble of 7" encountered and smaller cobbles & gravels, moist to dry
25	100%						
26					GC/CL		26-30 feet bgs. GRAVELLY CLAY to GRAVEL/CLAY mixture, light yellowish brown, 10 YR 6/4, clay medium hard to hard, dry, gravels up to 50%; subangular to subrounded, 1" and more in size
27							
28							
29			1/8/13				
30	100%		15:00				
			1/9/13		SM/SP		30-37' bgs. SILTY SAND w/gravel, yellowish brown, 10 YR 5/4, very fine to fine, poorly graded, silt ~15%, gravel >20%, up to 3" in size, but usually 0.5", subrounded; hard to judge on moisture [cores came out steaming hot].
31			10:05				
32							
33							
34							
35	100%						
36							
37					SP		37-39' bgs. POORLY GRADED SAND, dark yellowish brown, 10 YR 4/6, fine to very fine [could be saturated but water likely evaporated].
38							
39					SM		39-43' bgs. SILTY SAND, yellowish to brown, 10YR 5/4, soft (slushy) and saturated between 40-41 feet.
40	100%						

TETRA TECH

BORING LOG
MW-20D

Project:	Maryland Square Shopping Center	Borehole Depth: 100 feet bgs.	Sampling Method: Continuous core
Location:	3661 S. Maryland Parkway	Borehole Diameter: 10 - 8 inches	
Project No.:	103P172828.01	Reviewed By: Geoff Richards, PG	Northing (feet): TBA
Logged By:	Vladimir Prilepin, PG		Easting (feet): TBA
Date Boring Started:	1/8/2013	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA
Date Boring Completed:	1/10/2013	Drilling Method: Sonic	Top of Casing Elevation (feet MSL): TBA

Depth (feet bgs)	Recovery (percent)	Soil PID/FID (ppm)	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description

TETRA TECH

BORING LOG
MW-20D

Project:	Maryland Square Shopping Center	Borehole Depth: 100 feet bgs.	Sampling Method: Continuous core
Location:	3661 S. Maryland Parkway	Borehole Diameter: 10 - 8 inches	
Project No.:	103P172828.01	Reviewed By: Geoff Richards, PG	Northing (feet): TBA
Logged By:	Vladimir Prilepin, PG		Easting (feet): TBA
Date Boring Started:	1/8/2013	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA
Date Boring Completed:	1/10/2013	Drilling Method: Sonic	Top of Casing Elevation (feet MSL): TBA

Depth (feet bgs)	Recovery (percent)	Soil PID/FID (ppm)	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description
40					SM		Amount of silt decreases from 30% to 15% at ~42 feet bgs; occasional gravels at 43 feet bgs.
41							
42							
43					CL		43-47 feet bgs. GRAVELLY CLAY, yellowish brown, 10YR 5/4, medium soft, plastic, becomes medium stiff and amount of gravels increaseS from 20 to 40% at 45-46 feet.
44							
45	100%						
46							
47					CL		47-50' bgs. LEAN CLAY, dark yellowish brown, 10YR 4/4, medium to high plasticity, medium soft, grading to silty clay with gravels at 49 feet, yellowish brown 10YR 5/4, medium soft, plastic, with traces of secondary mineralization (calcite).
48							
49							
50	100%						
51					ML		50-65 feet bgs. Poor recovery, description is based on small amount of materials retreived from core barrel: SANDY SILT, brown, 7.5YR 5/4, soft wet to saturated, very fine sand 15-30%, some clay, silt ~70%, occasional gravels 0.1 - 0.25" in size.
52							
53							
54							
55	10%						
56				GW			TTMW20D03GW56 at 8:00 am 1-10-13
57							
58							
59							
60	5%						

TETRA TECH

BORING LOG
MW-20D

Project:	Maryland Square Shopping Center	Borehole Depth: 100 feet bgs.	Sampling Method: Continuous core
Location:	3661 S. Maryland Parkway	Borehole Diameter: 10 - 8 inches	
Project No.:	103P172828.01	Reviewed By: Geoff Richards, PG	Northing (feet): TBA
Logged By:	Vladimir Prilepin, PG		Easting (feet): TBA
Date Boring Started:	1/8/2013	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA
Date Boring Completed:	1/10/2013	Drilling Method: Sonic	Top of Casing Elevation (feet MSL): TBA

Depth (feet bgs)	Recovery (percent)	Soil PID/FID (ppm)	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description

TETRA TECH

BORING LOG
MW-20D

Project:	Maryland Square Shopping Center	Borehole Depth: 100 feet bgs.	Sampling Method: Continuous core
Location:	3661 S. Maryland Parkway	Borehole Diameter: 10 - 8 inches	
Project No.:	103P172828.01	Reviewed By: Geoff Richards, PG	Northing (feet): TBA
Logged By:	Vladimir Prilepin, PG		Easting (feet): TBA
Date Boring Started:	1/8/2013	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA
Date Boring Completed:	1/10/2013	Drilling Method: Sonic	Top of Casing Elevation (feet MSL): TBA

Depth (feet bgs)	Recovery (percent)	Soil PID/FID (ppm)	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description
60							
61							
62							
63							
64							
65	5%				CL		65-66 feet bgs. SILTY CLAY, pale brown 10YR 6/3, soft to very soft, sticky, with gravels 0.5-2" in size.
66					CL		66-67 feet bgs. LEAN CLAY, light gray 10YR 7/2, low plasticity, 100% clay; becomes stiff to hard at 66.5 feet, non-plastic, crumbles w/fingers, very dry.
67							
68							
69							
70	100%						Becomes soft and plastic, color changes to brown, 10YR 5/3, some subangular gravels 0.2-2" in size.
71							
72							Becomes pale brown, 10YR 6/3; with traces and zones of secondary mineralization.
73							
74							
75	80%						
76					CL		76 - 81' bgs. CLAY, light brownish gray 10YR 6/2, stiff, plastic; becomes hard and whitish because of secondary mineralization at 78-79 feet, grades to sand/silt mixture starting at 81 feet.
77							
78							
79							
80	100%						

TETRA TECH

BORING LOG
MW-20D

Project:	Maryland Square Shopping Center	Borehole Depth: 100 feet bgs.	Sampling Method: Continuous core
Location:	3661 S. Maryland Parkway	Borehole Diameter: 10 - 8 inches	
Project No.:	103P172828.01	Reviewed By: Geoff Richards, PG	Northing (feet): TBA
Logged By:	Vladimir Prilepin, PG		Easting (feet): TBA
Date Boring Started:	1/8/2013	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA
Date Boring Completed:	1/10/2013	Drilling Method: Sonic	Top of Casing Elevation (feet MSL): TBA

Depth (feet bgs)	Recovery (percent)	Soil PID/FID (ppm)	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description

TETRA TECH

BORING LOG
MW-20D

Project:	Maryland Square Shopping Center	Borehole Depth: 100 feet bgs.	Sampling Method: Continuous core
Location:	3661 S. Maryland Parkway	Borehole Diameter: 10 - 8 inches	
Project No.:	103P172828.01	Reviewed By: Geoff Richards, PG	Northing (feet): TBA
Logged By:	Vladimir Prilepin, PG		Easting (feet): TBA
Date Boring Started:	1/8/2013	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA
Date Boring Completed:	1/10/2013	Drilling Method: Sonic	Top of Casing Elevation (feet MSL): TBA

Depth (feet bgs)	Recovery (percent)	Soil PID/FID (ppm)	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description
80					CL		
81					ML/SM		81 - 82' bgs. SAND/SILT mixture, light brownish gray 10YR 6/2, very fine sand ~50%, 50% silt; wet.
82					SM		82 - 82.5 feet bgs. SILTY SAND, 15% silt, 85% very fine sand.
83					ML/SM		82.5 - 84 feet bgs. SAND/SILT mixture, same color as above. ~50% very fine sand, 50% silt, slight plasticity.
84					ML		84 - 85 feet bgs. SANDY SILT, yellowish brown, 10YR 5/4, some plasticity, ~70% silt; grading to clayey silt w/depth; clay content increases to 30%.
85	100%				ML/CL		85 - 86' bgs. CLAYEY SILT/CLAY mixture, brown 10YR 5/3, low plasticity, stiff.
86					ML		86 - 87 feet bgs. CLAYEY SILT, pale brown, 10YR 6/3, stiff, low plasticity, moist to dry.
87					ML		87 - 89 feet bgs. GRAVELLY SILT, pale brown with whitish secondary mineralization, gravels up to 30-40%, pea size to 1", some may be from mineralization, very fine sand ~5%.
89					SM/ML		89 - 90 feet bgs. FINE SAND/SILT mixture, pale brown with whitish secondary mineralization and some gravels.
90	100%				CL		90 - 95.5 feet bgs. SILTY CLAY to CLAY, pale brown to dark yellowish brown, 10YR 4/4, stiff, plasticity increases with depth, secondary mineralization stringers (whitish) with pea size minerals.
95	100%				SM		95.5 - 100 feet bgs. SILTY SAND, brown, 10YR 5/3, very fine, poorly graded, semi-soft, becomes more compacted with depth, wet/moist.
99			1/10/13				
100	100%		15:55				

TETRA TECH

BORING LOG
MW-20D

Project:	Maryland Square Shopping Center	Borehole Depth: 100 feet bgs.	Sampling Method: Continuous core
Location:	3661 S. Maryland Parkway	Borehole Diameter: 10 - 8 inches	
Project No.:	103P172828.01	Reviewed By: Geoff Richards, PG	Northing (feet): TBA
Logged By:	Vladimir Prilepin, PG		Easting (feet): TBA
Date Boring Started:	1/8/2013	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA
Date Boring Completed:	1/10/2013	Drilling Method: Sonic	Top of Casing Elevation (feet MSL): TBA

Depth (feet bgs)	Recovery (percent)	Soil PID/FID (ppm)	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description
[illegible]				GW			TTMW20D06GW101 and -101D at 8:00 on 1/11/13
							T.D. 100 feet bgs

TETRA TECH

BORING LOG
MW-CMT1

Project:	Maryland Square Shopping Center	Borehole Depth:	61 feet bgs.	Sampling Method: Split spoon	Page 1 of 3
Location:	3661 S. Maryland Parkway	Borehole Diameter:	8 inches		
Project No.:	103P172824.01	Reviewed By: Becki Dano		Northing (feet): TBA	
Logged By:	Vladimir Prilepin			Easting (feet): TBA	
Date Boring Started:	7/23/2012	Drilling Contractor: Cascade Drilling L.P.		Ground Surface Elevation (feet MSL): TBA	
Date Boring Completed:	7/25/2012	Drilling Method: HSA		Top of Casing Elevation (feet MSL): TBA	

Depth (feet bgs)	Recovery (percent)	Blow Counts	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description	OVA (ppm, BZ = breathing zone)
0			14.45				0.5 feet Asphalt	
							0-5 feet bgs. Cleared with air vac tool (silty sand with pea gravel)	
1								
2								
3								
4								
5					SP/SM		5-9 feet bgs. SILTY SAND, very pale brown 10YR 8/2, 70% very fine sand, 30% silt; amount of silt increses between 8-9' bgs; sand is poorly graded, loose, dry, compacted 8-9' bgs	0.0
6								
7								
8								
9					SP		9-10 feet bgs. Poorly graded SAND, color changes to light yellowish brown 10YR 6/4; very fine to fine, >95% sand, <5% silt; loose to slightly compacted, dry	0.0
10	10%							
					SP/SM		10-15 feet bgs. Same as above, grading to SILTY SAND at ~ 14 feet bgs; with occasional gravels, sabangular to subrounded, 0.5-0.75" in size.	0.0
11								
12								
13								
14								
15	40%							
					SP		15-20 feet gps. SAND (aeolean or dune sand), poorly graded, fine to very fine, light yellowish brown 10YR 6/4, dry, loose	0.0
16								
17								
18								
19								
20	40%							

TETRA TECH

BORING LOG
MW-CMT1

Project:	Maryland Square Shopping Center	Borehole Depth:	61 feet bgs.	Sampling Method: Split spoon	Page 2 of 3
Location:	3661 S. Maryland Parkway	Borehole Diameter:	8 inches		
Project No.:	103P172824.01	Reviewed By: Becki Dano		Northing (feet): TBA	
Logged By:	Vladimir Prilepin			Easting (feet): TBA	
Date Boring Started:	7/23/2012	Drilling Contractor: Cascade Drilling L.P.		Ground Surface Elevation (feet MSL): TBA	
Date Boring Completed:	7/25/2012	Drilling Method: HSA		Top of Casing Elevation (feet MSL): TBA	

Depth (feet bgs)	Recovery (percent)	Blow Counts	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description	OVA (ppm, BZ = breathing zone)
20					SP/SM		20-25 feet bgs. Same as above; grading to SILTY SAND at ~23 feet	
21								
22								
23							23-25 feet bgs. SILTY SAND, very pale brown, 10YR 7/3, amount of silt increases to 30-35% with depth; fines plastic (~10%)	
24								
25	60%				SW/GP		25-30 feet bgs. Same as above, grading to GRAVEL/SAND mixture, strong brown 7.5YR 5/6 to multi-colored because of gravels (subrounded to rounded, 0.5-1.5" in size), damp at 28-29 feet bgs, sand is coarse to fine, well graded	
26								
27							TT-MW-40-01-PNOD - Collected composite sample from 29-55 feet bgs	
28								
29								
30	40%			▼	SM		30-31 feet bgs. SILTY SAND, strong brown 7.5YR 5/6, grading to compacted, hard sandstone/siltstone that crumbles along horizontal places but thin plates are rigid and hard to break with fingers	0.0
31					CA.		31-32 feet bgs - CALICHE.	
32	100%		15:50	GW			TT-MW-40-01-GW-32 (from 32-33 feet bgs)	
33					SM		33-34 feet bgs. SILTY SAND, 70-80% fine sand, 20% silt, grading to SANDY LEAN CLAY, brown 7.5YR 5/4, medium plasticity, semisoft, damp (34-35 feet bgs), clay 85%, fine sand 15%	
34					CL			
35	100%			GW			TT-MW-40-02-GW-35 from 35-36 feet bgs	
36							35-40 feet bgs. Lean CLAY, brown as above, amount of fine sand decreasing with depth to 0; clay soft to medium stiff, damp, plastic, very sticky.	
37				SS			TT-MW-40-01-SS-36 - collected undisturbed soil sample (Shelby tube) from 36-38 feet bgs - SILTY SAND	
38					SM			
39					CL		Lean CLAY (as above)	
40	100%							

TETRA TECH

BORING LOG
MW-CMT1

Project: Maryland Square Shopping Center	Borehole Depth: 61 feet bgs.	Sampling Method: Split spoon	Page 3 of 3
Location: 3661 S. Maryland Parkway	Borehole Diameter: 8 inches		
Project No.: 103P172824.01	Reviewed By: Becki Dano	Northing (feet): TBA	
Logged By: Vladimir Prilepin		Easting (feet): TBA	
Date Boring Started: 7/23/2012	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA	
Date Boring Completed: 7/25/2012	Drilling Method: HSA	Top of Casing Elevation (feet MSL): TBA	

Depth (feet bgs)	Recovery (percent)	Blow Counts	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description	OVA (ppm, BZ = breathing zone)
40			8:05	GW	CL		TT-MW-40-03-GW-40 40-45 feet bgs. Lean CLAY, yellowish brown 10YR 5/4, soft, plastic at ~42 feet (where saturated) becomes medium stiff, gravelly between 44.5-45 feet bgs, gravels subangular to subrounded, 0.5-1", 15% gravel, 85% clay	
41								
42								
43								
44								
45	60%		8:45	GW			TT-MW-40-04-GW-45	0.0
46							45-46 feet bgs. SANDY, GRAVELLY CLAY, yellowish brown 10YR 5/4; 15-30% fine sand & gravels (up to 0.25"), 85-70% clay	
					ML/CL			
47							46-47 feet bgs. SANDY SILT grading to SILTY CLAY, strong brown 7.5YR 4/6; moist, clay is plastic, medium stiff. A stringer of fine silty sand (4") at ~47 feet, saturated 70% sand - 30% fines	
					SM			
48					GC/CL			
49							47-50 feet bgs. Fine sand, SILT, CLAY, GRAVEL mixture, yellowish brown 10YR 5/4, 30% fine sand, 35% silt & clay, 35% gravels (0.5-1", subangular), moist to wet, amount of gravels increases with depth	
50	100%		9:30	GW			TT-MW40-05-GW-50 (for 50-51 feet bgs)	
51							50-53 feet bgs. GRAVELLY CLAY/CLAY-GRAVEL mixture, very pale brown 10YR 7/3, 30-40% gravels, light to dark colored, subangular to rounded, 0.2-1" in size; clay 70-60%, low plasticity, damp to moist (saturated at the top of the core)	0.0
52								
53					ML/CL		53-54.5 feet bgs. SANDY SILT with gravel, yellowish brown, ~15% very fine sand, 10% gravel, 75% silt, grades to SILTY CLAY, plastic, moist to wet	
54								
55	100%		10:05	GW	CL/GC		TT-MW40-06-GW-55 for 55-56 feet bgs	0.7ppm
56							55-59 feet bgs. SANDY/SILTY CLAY, grading to GRAVELLY CLAY/CLAYEY GRAVEL mixture at 57 feet, strong brown 7.5YR 5/6, with lighter colored secondary mineralization; stiff, plastic, sticky, gravels subangular to subrounded 0.2-1", gravel content increases with depth from 5 to 50%; wet, saturated at depth	
57								
58								
59					CL/GC		59-60 feet bgs. Same as above but clay content increases to 60-70%	
60	100%		11:15	GW			TT-MW40-07-GW-60 (for 60-61 feet bgs)	

T.D. 61 feet bgs

TETRA TECH

BORING LOG
MW-6D

Project: Maryland Square Shopping Center		Borehole Depth: 104 feet bgs.	Sampling Method: Continuous Core
Location: 3661 S. Maryland Parkway		Borehole Diameter: 10 inches	
Project No.: 103P172828.01		Reviewed By: Vladimir Prilepin, PG	Northing (feet): TBA
Logged By: Geoff Richards, PG			Easting (feet): TBA
Date Boring Started: 1/16/2013		Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA
Date Boring Completed: 1/21/2013		Drilling Method: Sonic	Top of Casing Elevation (feet MSL): TBA

Depth (feet bgs)	Drive Interval (% recovery)	Soil PID/FID (ppm)	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description
0			7:45				0.3 feet Asphalt
1							0.5 feet bgs. Cleared with air vac tool.
2							
3							
4							
5					Fill		5 - 6 feet bgs. FILL: compacted gravel and silt with very fine sand; white; moist; contains rebar and other metal debris
6					SM		6 - 10 feet bgs. SILTY SAND, white 7.5YR8/1; very fine, poorly graded; very dense,dry; zones of brown laminated silt; hard to drill; reaction to HCl; calcite cementation *Soil may have been compacted as part of engineering for building
7							
8							
9							
10	**100%**						No recovery
11					SM		6 - 10 feet bgs. Same as above with increasing silt content; color change to grayish brown.
12							
13							
14							
15							
16							
17							
18					CA.		18 - 20 feet bgs. CALICHE; grayish white; crumbles to very fine silt/sand; dry.
19							*6 to 20 appears to be increasing degree of caliche/calcite cementation with increasing depth.
20	**90%**						

TETRA TECH

BORING LOG
MW-6D

Project:	Maryland Square Shopping Center	Borehole Depth: 104 feet bgs.	Sampling Method: Continuous Core
Location:	3661 S. Maryland Parkway	Borehole Diameter: 10 inches	
Project No.:	103P172828.01	Reviewed By: Vladimir Prilepin, PG	Northing (feet): TBA
Logged By:	Geoff Richards, PG		Easting (feet): TBA
Date Boring Started:	1/16/2013	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA
Date Boring Completed:	1/21/2013	Drilling Method: Sonic	Top of Casing Elevation (feet MSL): TBA

Depth (feet bgs)	Drive Interval (% recovery)	Soil PID/FID (ppm)	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description
20					ML		20 - 21.5 feet bgs. CLAYEY SILT, gray and brown, mottled; slightly plastic; iron oxide staining; calcite cementation; silt 85 to 90%, clay 10 to 15%; medium stiff to stiff; moderately cemented; moist.
21							
22					(CA.)		21.5 - 23 feet bgs. SANDY SILT with caliche-like cementation; light gray; dense, reaction to HCl; iron oxides; non-plastic; dry.
23					ML/CL		23 - 25 feet bgs. SILT/CLAY mixture; brown 7.5YR 5/4; some sub-rounded gravel; iron oxides; plastic; very stiff; moist.
24							
25					SM		25 - 28 feet bgs. SILTY SAND, brown 5 YR 4/4; loose; poorly graded; very fine sand 65 to 85%, silt 35 to 15%; w/iron oxide staining; wet
26							
27							
28							Cobbles and gravels, irregularly shaped; likely related to caliche zone - just above the lost section.
29	▼						
30	**80%**				ML/CL		30 - 34 feet bgs. SILT/CLAY mixture, light brown 7.5YR 6/4; with some fine/coarse sand, angular caliche gravel; soft, plastic; saturated.
31							Attempt to collect water sample (45 min) at 31 ft bgs with HP-II sampler - No Water
32			1320	GW			Attempt to collect water sample (1.0 hrs) at 32 ft bgs. with HP-II sampler. **TTMW6D02GW32 -** Sample Collected
33							
34					ML		34 - 40 feet bgs. CLAYEY SILT; light brown 7.5YR 6/3; stiff; low to non-plastic; gravel and coarse sand sized clastics in fine grained matrix; slight to moderate reaction to HCl; calcite cementation; dry with depth; zones of very fine-grained pale gray calcite mineralization; iron oxide staining; moist.
35							
36							
37							
38							
39							
40	**100%**						

TETRA TECH

BORING LOG
MW-6D

Project: Maryland Square Shopping Center		Borehole Depth: 104 feet bgs.	Sampling Method: Continuous Core
Location: 3661 S. Maryland Parkway		Borehole Diameter: 10 inches	
Project No.: 103P172828.01		Reviewed By: Vladimir Prilepin, PG	Northing (feet): TBA
Logged By: Geoff Richards, PG			Easting (feet): TBA
Date Boring Started: 1/16/2013		Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA
Date Boring Completed: 1/21/2013		Drilling Method: Sonic	Top of Casing Elevation (feet MSL): TBA

Depth (feet bgs)	Drive Interval (% recovery)	Soil PID/FID (ppm)	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description
40							Lost soil core. Appears to be saturated, GRAVELLY, CLAYEY SILT; very
41			825	GW			Attempt to collect water sample (overnight) at 41 ft bgs. with HP-II sampler. **TTMW6D03G41** - Sample Collected
42							
43							
44							
45							
46							
47					ML		47 - 48 feet bgs. CLAYEY SILT with gravel, pale brown 10YR 6/3; veryfine sand 5%, angular clastic gravel 25%, clay 30%, silt 40% (clay distributed in lenses); soft, sticky, saturated.
48					CL		
49		0.0					48 - 50 feet bgs. Silty Clay with Gravel and trace v. fine Sand; moist; pale brown 10YR 6/5; med. Dense, med stiff; gravel is SAA, plastic; soil is sticky
50	**30%**						
51			1040	GW			50 - 60 feet bgs. No recovery. Saturated. Attempt to collect water sample (1.0 hrs) at 51 feet bgs with HP-II sampler. **TTMW6D04G51** - Sample Collected
52							
53							
54							
55							
56							
57							
58							
59							
60	**0%**						

TETRA TECH

BORING LOG
MW-6D

Project:	Maryland Square Shopping Center	Borehole Depth: 104 feet bgs.	Sampling Method: Continuous Core
Location:	3661 S. Maryland Parkway	Borehole Diameter: 10 inches	
Project No.:	103P172828.01	Reviewed By: Vladimir Prilepin, PG	Northing (feet): TBA
Logged By:	Geoff Richards, PG		Easting (feet): TBA
Date Boring Started:	1/16/2013	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA
Date Boring Completed:	1/21/2013	Drilling Method: Sonic	Top of Casing Elevation (feet MSL): TBA

Depth (feet bgs)	Drive Interval (% recovery)	Soil PID/FID (ppm)	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description
60		0.0			ML/CL		60 - 65 feet bgs. GRAVELLY SILT/CLAY mixture; brown; plastic; medium stiff; clay 45%, silty 35%, gravel 15%, very fine sand 5%; mixture of calcite nodules and clastics of 0.2 mm to 3 mm and angular to subrounded; reaction to HCl: wet
61							
62							Attempt to collect water sample (1.5 hrs) at 61 ft bgs. with HP-II sampler - No
63							63 to 63.7 feet bgs. Becomes very loose and soft, appears to contain more water.
64							
65			1520	GW			Attempt to collect water sample from open boring cased to 60 feet bgs with a bailer. **TTMW6D06GW65 -** Sample Collected
		0.0			ML/CL		65 - 68 feet bgs. Same as above.
66							
67							
68							68 - 70 feet bgs. Same as above but with significant increase in calcification. Calcite nodules and clastics up to 3 in.; highly reactive to HCl; stiff; plastic where clay outside of zones of secondary mineralization; iron oxides; damp to dry.
69							
70	**100%**		820	GW/SS	CL		Attempt to collect water sample (overnight) at 71 feet bgs with SimulProbe. Both groundwater (**TTMW6D07G71)** and soil **(TTMW6D01SS71) s**amples collected.
71							70 - 80 feet bgs. No recovery (8" casing installed from 60 to 80 feet bgs). SILTY CLAY - per soil cuttings.
72							
73							
74							
75							
76							
77							
78							
79							
80	**0%**						

TETRA TECH

BORING LOG
MW-6D

Project:	Maryland Square Shopping Center	Borehole Depth: 104 feet bgs.	Sampling Method: Continuous Core
Location:	3661 S. Maryland Parkway	Borehole Diameter: 10 inches	
Project No.:	103P172828.01	Reviewed By: Vladimir Prilepin, PG	Northing (feet): TBA
Logged By:	Geoff Richards, PG		Easting (feet): TBA
Date Boring Started:	1/16/2013	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA
Date Boring Completed:	1/21/2013	Drilling Method: Sonic	Top of Casing Elevation (feet MSL): TBA

Depth (feet bgs)	Drive Interval (% recovery)	Soil PID/FID (ppm)	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description
80			1325	GW/SS	ML		80 - 83.5 feet bgs. CLAYEY SILT with calcite nodules; pale brown 10YR 6/3; non-plastic; soft; very loose; highly reactive to HCL; calcite nodules 0.5-2mm; saturated to wet at 82 ft, damp to dry above.
81		0.0					Attempt to collect water sample (2 hrs) at 81 feet bgs with SimulProbe. Both groundwater **(TTMW6D08G81)** and soil **(TTMW6D02SS81)** samples collected.
82							
83							
84		0.0			CL		83.5 - 86 feet bgs. SILTY CLAY; pale brown 10 YR 6/3; plastic (outside of mineralization zones); silt 5-20%, clay 80-95%; some coarse gravel to cobble size calcite nodules; medium stiff; large degree of secondary mineralization; dry.
85							
86		0.0			ML/CL		86 - 89 feet bgs. CLAYEY SILT/SILTY CLAY, brown 7.5YR 6/4; non-plastic; silt 50%, clay 50%; highly reactive to HCl; stiff; some manganese mottling; secondary mineralization may account for 30 to 40% of section.
87							
88		0.0					89 - 90 feet bgs. Same as above, some increase in clay content; coarse gravel sized calcite nodules; at 90 feet bgs a caliche like secondary mineralization.
89							
90	**100%**		1625	GW/SS	ML		Attempt to collect water sample (2 hrs) at 91 feet bgs with SimulProbe. Both groundwater **(TTMW6D09G91)** and soil **(TTMW6D03SS91)** samples collected.
91							90 - 100 feet bgs. Poor recovery (2 feet recovered from unknown depth). CLAYEY SILT with high degree of secondary calcite mineralization; non-plastic with lenses of plastic clays (10%) of recovered core; soft; sticky; saturated to wet.
92							
93							
94							
95							
96							
97							
98							
99							
100	**20%**						

TETRA TECH

BORING LOG
MW-6D

Project: Maryland Square Shopping Center		Borehole Depth: 104 feet bgs.	Sampling Method: Continuous Core
Location: 3661 S. Maryland Parkway		Borehole Diameter: 10 inches	
Project No.: 103P172828.01		Reviewed By: Vladimir Prilepin, PG	Northing (feet): TBA
Logged By: Geoff Richards, PG			Easting (feet): TBA
Date Boring Started: 1/16/2013		Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA
Date Boring Completed: 1/21/2013		Drilling Method: Sonic	Top of Casing Elevation (feet MSL): TBA

Depth (feet bgs)	Drive Interval (% recovery)	Soil PID/FID (ppm)	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description
100			835	GW/SS	SM/ML		Attempt to collect water sample (overnight) at 101 feet bgs with SimulProbe. Both groundwater **(TTMW6D10G101)** and soil **(TTMW6D04SS101)** samples collected.
101							100 - 102 feet bgs. Same as above.
102							102 - 105 feet bgs. SILTY SAND/SANDY SILT mixture; pale brown 7.5YR6/3; very fine sand 50%, silt 40%, clay 5%; some gravel size calcite nodules; non-plastic; soft; sticky; wet to saturated.
103							
104							
105					ML		105 - 109 feet bgs. SANDY SILT; pale brown 7.5YR 6/3; high degree of mineralization, highly reactive to HCL; non-plastic; soft; sticky; coarse sand sized calcite nodules and zones of white very fine calcite lenses; saturated.
106		0.0					
107							
108							
109		0.0			SM		109 - 110 feet bgs. SILTY SAND; brown 7.5YR5/4; sand 60%, silt 10%, calcite mineralization ~30%; medium dense; where cemented by calcite - dry
110	**100%**		1135	GW/SS	ML		Attempt to collect water sample (2.0 hrs) at 111 ft bgs with SimulProbe. Both groundwater **(TTMW6D11GW111)** and soil **(TTMW6D05SS111)** samples collected.
111		0.0					110 - 113 feet bgs. CLAYEY SILT, brown 10YR5/6; high degree of secondary mineralization; reaction w/HCL; moderate plasticity; medium stiff; clay 5-15%, sand 5-10%, silt 75-90%; saturated.
112							
113					ML		113 - 115 feet bgs. CLAYEY SILT; strong brown 7.5YR4/6; highly mineralized with calcite; stiff, slightly plastic, not sticky; wet to damp.
114							
115		0.0			ML		115 - 118 feet bgs. SANDY SILT, strong brown 7.5YR4/6; lenses of sand 15% and silt 85%; stiff; dry to damp except in the sand lenses; sand is veryfine grained, loose, saturated; reactive to HCL but very few calcite nodules.
116							
117							
118							118 - 120 feet bgs. Same as above; becomes highly reactive to HCL; zones of calcite mineralization.
119		0.0					
120	100%		1530	GW/SS			Attempt to collect water sample (2.0 hrs) at 121 feet bgs with SimulProbe. Both groundwater **(TTMW6D12GW121**) and soil **(TTMW6D06SS121)** samples collected.

TD = 120 feet bgs.

TETRA TECH

BORING LOG
OS-1

Project:	Maryland Square Shopping Center	Borehole Depth: 70 feet bgs.	Sampling Method: Split Spoon sampler
Location:	3661 S. Maryland Parkway	Borehole Diameter: 8 nches	
Project No.:	103P172828.01	Reviewed By: Vladimir Prilepin, PG	Northing (feet): TBA
Logged By:	Geoff Richards, PG		Easting (feet): TBA
Date Boring Started:	3/5/2013	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA
Date Boring Completed:	3/27/2013	Drilling Method: Hollow Stem Auger	Top of Casing Elevation (feet MSL): NA

Depth (feet bgs)	Drive Interval (% recovery)	Blow Count	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description
0			1420				0.3 feet Asphalt
1							5 feet bgs. Cleared with air vac tool.
2							
3							
4							
5			1455				
6					Fill		8 - 20 feet bgs. SAND/SILT mixture, light brown; some angular gravel; dry.I21
7					SM		
8							
9							
10	**0%**						
11					SM		
12							
13							
14							
15							
16							
17							
18							
19							
20	**0%**						

TETRA TECH

BORING LOG
OS-1

Project: Maryland Square Shopping Center		Borehole Depth: 70 feet bgs.	Sampling Method: Split Spoon sampler
Location: 3661 S. Maryland Parkway		Borehole Diameter: 8 nches	
Project No.: 103P172828.01		Reviewed By: Vladimir Prilepin, PG	Northing (feet): TBA
Logged By: Geoff Richards, PG			Easting (feet): TBA
Date Boring Started: 3/5/2013		Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA
Date Boring Completed: 3/27/2013		Drilling Method: Hollow Stem Auger	Top of Casing Elevation (feet MSL): NA

Depth (feet bgs)	Drive Interval (% recovery)	Blow Count	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description
20		3					20 - 23 feet bgs. SILTY SAND, light brown; v. fine sand, soft; Mn oxide streaks; some white mottling of calcite; dry to moist.
21		1			SM		
		3					
22	100%	2					
		2					
23		1					
		3			SM		23 - 26 feet bgs. SILT/SAND mixture with coarse sand and gravel; non-plastic; loose; clastic gravel is angular to subrounded (0.5 to 2 cm); gravel is a mix of sandstone and crystalline cobbles; dry.
24	100%	4					
		4					
25		7		▼			
		4					
26	80%	9					
		4			GM		26 -28 feet bgs. GRAVEL SAND mixture; non-plastic; loose; well graded; 30% fine sand the rest is a mix of coarse sand and gravel; saturated.
27		8					
		10					
28	60%	12					
		6					28 -30 feet bgs. CALICHE GRAVEL SAND mixture; buff to white; med. stiff; non-plastic; calcite cemented; few clastics; gravel is calcite; saturated.
29		16			CA		
		3					
30	45%	3					
		8			ML		30 - 31 feet bgs. SILT, reddish brown; dense; hard; non-plastic; calcite cemented; saturated.
31		3					
		6			SP		31 -32.5 feet bgs. SAND, light brown; soft; non-plastic; v. fine grading into coarse sand and gravel; loose; with clastics; 2 inch calcite nodule; saturated.
32	50%	6	1320				
		7					
		14					32.5 - 34 feet bgs. SILTY SAND, brown; v. fine sand; non-plastic; 20% angular clastic gravel (1mm); soft; trace manganese oxides; saturated.
33		13			SM		
	100%	8					
34		3					
		15					
35		11					
		12					
36	100%	2					36 - 38.5 feet bgs. SILTY CLAY, brown; dense; stiff; plastic; calcite mottling; dry.
		6			CL		
37		6					
		7					
38	100%	5					
		7					38.5 - 39.5 feet bgs. SILTY SAND, brown, v. fine sand; dense; stiff; non-plastic; includes a 2 inch clay interval; wet.
39		16			SM		
	80%	4					
40							

TETRA TECH

BORING LOG
OS-1

Project:	Maryland Square Shopping Center	Borehole Depth: 70 feet bgs.	Sampling Method: Split Spoon sampler
Location:	3661 S. Maryland Parkway	Borehole Diameter: 8 nches	
Project No.:	103P172828.01	Reviewed By: Vladimir Prilepin, PG	Northing (feet): TBA
Logged By:	Geoff Richards, PG		Easting (feet): TBA
Date Boring Started:	3/5/2013	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA
Date Boring Completed:	3/27/2013	Drilling Method: Hollow Stem Auger	Top of Casing Elevation (feet MSL): NA

Depth (feet bgs)	Drive Interval (% recovery)	Blow Count	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description
40		5					39.5 - 45 feet bgs. SANDY SILTY CLAY, brown; dense; stiff; calcite mottling; dry.
		12					
41		28	825		CL		
	95%	15					
42		0					
		3					
43		3					
	100%	5					
44		3					
		3					
45		6			SM		45 - 46 feet bgs. SILTY SAND, v. fine sand; non-plastic; iron oxide staining; two 1 inch intervals of clastic gravel; calcite mottling and nodules; saturated.
	100%	7					
46		0			CL		46 - 48 feet bgs. SANDY SILTY CLAY, brown, dense; plastic; thin intervals of fine sand; calcite nodules; wet
		2					
47		3					48 - 50 feet bgs. SAND; well graded coarse sand and gravel; loose; clastics; saturated
	95%	4					
48		0			GM		
		0.0					
49		8					
	100%	18					
50		2			CL		50 - 51 feet bgs. SAND SILTY CLAY, brown; med dense; plastic; no gravel; trace calcite; wet.
		2	1040				
51		5			SC		51 - 52 feet bgs. CLAYEY SANDY SILT with gravel, light brown; med dense; slightly plastic; calicite nodules and clastics.
	100%	7					
52		11			SM		52 - 53 feet bgs. SILTY SAND, lt brown; soft; loose; non-plastic; trace calcite; saturated.
		16					
53		9			CL		53 - 54 feet bgs. SILTY CLAY; reddish brown; dense; stiff; plastic; no gravel; iron oxides; no calicite but reactive; moist.
	100%	10					
54		2			SC/ML/CL		54 - 55 feet bgs. CLAYEY SILTY SAND, lt brown; loose; slightly plastic; some angular clastics; saturated.
		5					
55		3			SC/ML/CL		55 - 56 feet bgs. SANDY CLAYEY SILT, brown; med. Dense; plstic; well sorted; 5% calcite nodules; moist.
	100%	5					
56		9			SC/ML/CL		56 - 58 feet bgs. CLAYEY SILTY SAND, lt brown; sticky; soft; plastic; 30% calcite nodules; mottled white mineralization; saturated.
		4					
57		4					
	100%	4					
58		2			SM		58 - 59 feet bgs. SILTY SAND, lt brown; loose; non-plastic; calcite nodules and cememtation; becomes plastic; saturated.
		7					
59		9			ML		59 - 60 feet bgs. SILT, tan/white; dense; stiff; entirely calcified but no nodules; moist.
	100%	8					
60							

TETRA TECH

BORING LOG
OS-1

Project:	Maryland Square Shopping Center	Borehole Depth: 70 feet bgs.	Sampling Method: Split Spoon sampler
Location:	3661 S. Maryland Parkway	Borehole Diameter: 8 nches	
Project No.:	103P172828.01	Reviewed By: Vladimir Prilepin, PG	Northing (feet): TBA
Logged By:	Geoff Richards, PG		Easting (feet): TBA
Date Boring Started:	3/5/2013	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA
Date Boring Completed:	3/27/2013	Drilling Method: Hollow Stem Auger	Top of Casing Elevation (feet MSL): NA

Depth (feet bgs)	Drive Interval (% recovery)	Blow Count	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description
---- 60 ----		3.0					60 - 62 feet bgs. Same as above.
		5			ML		
---- 61 ----		9					
		7					
---- 62 ----	**50%**	27					62 - 70 feet bgs. SILT/CLAY, tan to light brown; dense; slightly plastic; calcite nodules; and mottling; moist to wet.
		47					
---- 63 ----		50/5					
	100%						
---- 64 ----		7					
		9					
---- 65 ----		12.0			CL		
	70%	4					
---- 66 ----		2					
		3					
---- 67 ----		4					
	100%	5					
---- 68 ----		4					
		7					
---- 69 ----		11					
	100%	16					
---- 70 ----							
							TD = 70 feet bgs.

TETRA TECH

BORING LOG
SB-1

Project:	Maryland Square Shopping Center	Borehole Depth: 60 feet bgs.	Sampling Method: Split Spoon sampler
Location:	3661 S. Maryland Parkway	Borehole Diameter: 8 nches	
Project No.:	103P172829.01	Reviewed By:	Northing (feet): 26747006
Logged By:	Geoff Richards, PG		Easting (feet): 788926
Date Boring Started:	3/25/2013	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): 1979.94
Date Boring Completed:	3/25/2013	Drilling Method: Hollow Stem Auger	Top of Casing Elevation (feet MSL): NA

Depth (feet bgs)	Drive Interval (% recovery)	Blow Count	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description
0			1420				0.3 feet Asphalt
1							5 feet bgs. Cleared with air vac tool.
2							
3							
4							
5			1455				
6					Fill		8 - 20 feet bgs. SAND/SILT mixture, tan to light brown; soft; some subrounded gravel; dry.
7					SM		
8							
9							
10	**0%**						
11							
12							
13							
14							
15							
16							
17							
18							
19							
20	**0%**						

TETRA TECH

BORING LOG
SB-1

Project:	Maryland Square Shopping Center	Borehole Depth: 60 feet bgs.	Sampling Method: Split Spoon sampler
Location:	3661 S. Maryland Parkway	Borehole Diameter: 8 nches	
Project No.:	103P172829.01	Reviewed By:	Northing (feet): 26747006
Logged By:	Geoff Richards, PG		Easting (feet): 788926
Date Boring Started:	3/25/2013	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): 1979.94
Date Boring Completed:	3/25/2013	Drilling Method: Hollow Stem Auger	Top of Casing Elevation (feet MSL): NA

Depth (feet bgs)	Drive Interval (% recovery)	Blow Count	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description
20		7	940		SM/ML		20 - 28 feet bgs. SILT/SAND mixture, light brown; v. fine sand; some angular clastics; moist.
21		12					
		15					
22	100%	10					
		6					
23		5					
		11					
24	100%	8					
		7					
25		50/5					
26	50%						
		6					
27		5					
		6	1004	▼			
28	75%	6					
		0			SM		28 - 30 feet bgs. SILTY SAND, v. fine grained; soft; non-plastic; saturated.
29		0					
		0					
30	25%	1					
		7					30 - 36 feet bgs. SILT/SAND mixture; with few gravel and trace clay. Clay 10%, gravel 5%; v. fine sand; med. Dense, med stiff; slightly plastic; angular crystalline gravel; saturated.
31		8			SM/ML		
		11					
32	25%	5	1320				
		28					
33		56					
		14					
34	40%	0					
		3					
35		2					
		2					
36	50%	2					
		0					36 - 42.5 feet bgs. CLAYEY SAND; v. fine sand; non-plastic; med. Dense; no gravel; well sorted; moist.
37		0			SM		
		0	1048				
38	100%	0					
		0					
39		0					
		2					
40	100%	2					

TETRA TECH

BORING LOG
SB-1

Project:	Maryland Square Shopping Center	Borehole Depth: 60 feet bgs.	Sampling Method: Split Spoon sampler
Location:	3661 S. Maryland Parkway	Borehole Diameter: 8 nches	
Project No.:	103P172829.01	Reviewed By:	Northing (feet): 26747006
Logged By:	Geoff Richards, PG		Easting (feet): 788926
Date Boring Started:	3/25/2013	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): 1979.94
Date Boring Completed:	3/25/2013	Drilling Method: Hollow Stem Auger	Top of Casing Elevation (feet MSL): NA

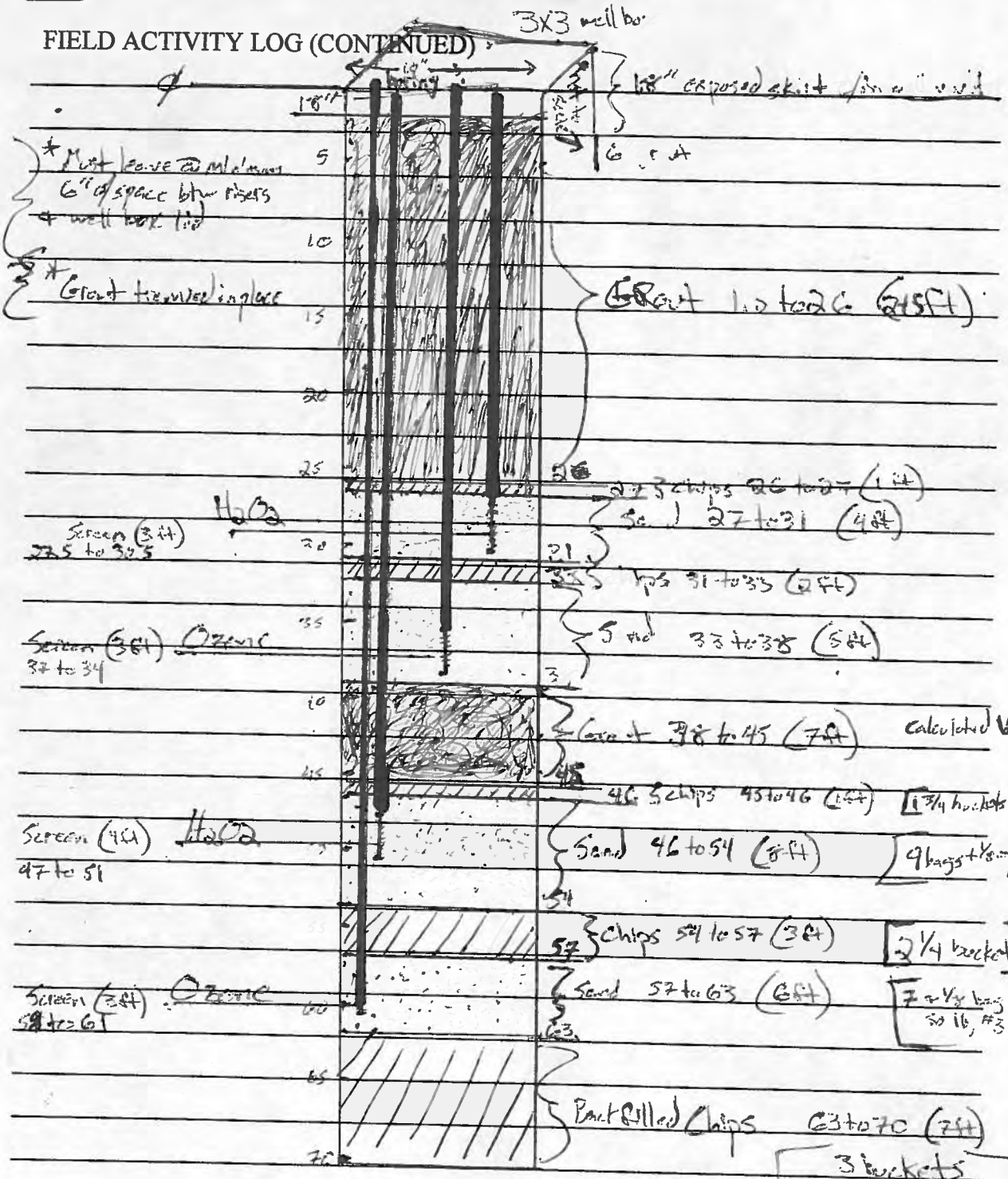
Depth (feet bgs)	Drive Interval (% recovery)	Blow Count	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description
40							
		8					
41		2					
		2	825				
42	**100%**	2					
		1					
		1					42.5 - 48 feet bgs. CLAY; dark brown; med. Dense; plastic; calcite nodules; moist, saturation increases with depth.
43		1					
		1					
44	**100%**	1					
		0					
		0			CL		
45		1					
		1	1110				
46	**100%**	1					
		1					
47		2					
		1					
48	**100%**	2					
		14					
		3.0					
49		2					
		0					
50	**5%**	0	1123	SB-01 50			50 -56 feet bgs. CLAYEY SAND, dark brown with white mottling; v. fine sand; slightly plastic; med. Stiff, dense; clastics at 54 feet (rounded, black); moist.
		0					
51		2		SB-01 51	SM		
		3	1145				
52	**100%**	2		SB -01 52			
		2		SB -01 52			
53		4		SB -01 53			
		4					
54	**100%**	4		SB-01 54			
		2					
55		2					
		4					
56	**75%**	8					56 - 60 feet bgs. SILTY SAND, v. fine sand; non-plastic; .med dense; lots of calcite nodules; no gravel; moist
		4			SM		
57		3					
		3					
58	**20%**	5					
		3					
59		2					
		2	1200				
60	**80%**						**TD = 60 feet bgs.**

3/27/13

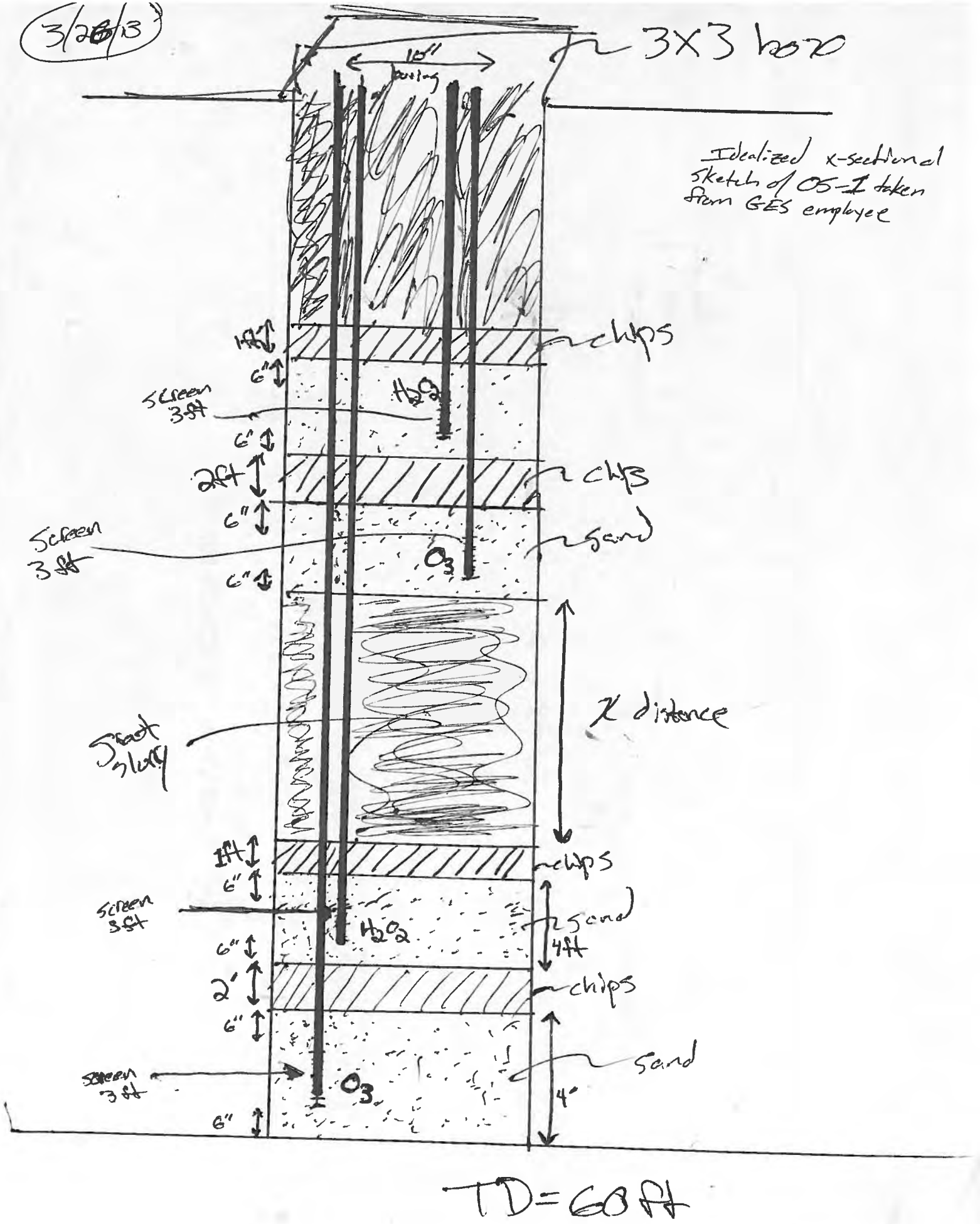
TETRA TECH EM INC.

OS-1

FIELD ACTIVITY LOG (CONTINUED)



(3/26/13)


3X3 box
10'
boring
Idealized x-sectional sketch of OS-I taken from GES employee
1ft
6"
chips
screen 3ft
H_2O_2
6"
2ft
chips
6"
Screen 3ft
sand
O_3
6"
X distance
Soil/dirt
1ft
6"
chips
screen 3ft
sand
4ft
H_2O_2
6"
2'
chips
6"
sand
screen 3ft
O_3
4'
6"
TD=60ft

3/26/13

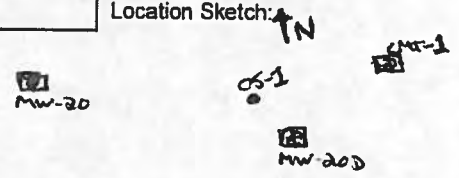
Sheet 1 of 3

DO: 103P172828
Bldg./Site: MSSC Pilot Study
Project Name: Adv. Tech. Vert. Delineation

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

Boring Number: OS-1	Date Started: 3/5/13
Drilling Method: (*Circle one*) HSA Continuous Core/Direct Push/Hand Auger	Date Completed:
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: GR
Outer Diameter of Boring: 8 inches	Drilling Subcontractor: Cascade
Inner Diameter of Well Casing:	Driller:
Depth to Water (ft./bgs.)	Location Sketch:



Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	V.B. utility type, dia. / Blow count (per 6 inches)	Description	USCS soil symbol	Well construction	OVM (ppm)
3/5/13 1450	0					0 to 1 Air knife 0 to 0.25 - Asphalt 0.25 to 1 - Fill; gravel ballast 1 to 5 - silty sand & gravel			
1455	5								
3/26/13 1230	6		5 feet auger	Not collected	N/A	8 - silt/sand mixture; light brown; some gravel; dry (soft)	SM/SP		
	12					13 - sand/silt; brown; angular gravel; dry *some grinding on the bit - must have just hit a gravel			
	20					20 - Sand/silt brown, ≤ 5% clastic gravel, dry			

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CS-1

Sheet 2 of 3

5/26/13

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

DO: 0039172829

Bldg./Site: MSSC

Project Name: Pilot Study

Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	V.B. utility type, dia. / Blow count (per 6 inches)	Description	USCS soil symbol	Well construction	OVM (ppm)
						- Note: entire soil column is highly reactive to HCl			
1310	20				2/1/3/2	20 to 22 → silty Sand; light brown; v. fine sand; Mn oxide streaks some white mottling of calcite mineralization; dry to moist	SM		
	22		100%			photo → 1 taken of core			
					2/1/3/4	22 to 24 → 22 to 23 → SAA 23 to 24 → silt/sand mixture (coarse Clastic gravel is angular to subrounded; soft; non-plastic; dry (0.8cm max)	SM		
	24		100%			photo taken			
			80%		4/3/4/3	24 to 26 → SAA → gravel is mix of ~5% crystalline cobbles; a 1" interval of just silty sand & no gravel (25 to 25.1) → saturated below ~24.8 ft photos (x2) 1 of section 2 of meter table			
	26								
			60%		4/5/10/12	26 to 28 → 26 to 26.2 → SAA 26.2 to 28 → Gravel sand mix; 70% fine sand that rest is mix of coarse sand & gravel; loose; non-plastic well graded; saturated * photo taken			
	28		45%		6/10/3/3	28 to 30 → sand/gravel mix; wet; white; med stiff; non plastic; calcite cemented, few clastics; most gravel is calcite; saturated photo taken			
	30				3/3/6/6	30 to 32 → 30 to 30.5 → Gravel/sand mix; all clastics; loose, angular, (<1 cm) med to coarse sand; high energy stream channel; saturated			
			50%			30.5 to 31.2 → silt; reddish brown; dense, hard, non plastic; calcite cemented			
	32					31.2 to 32 → sand; light brown; soft; non-plastic; v. fine; no gravel			
			100%		7/14/13/8	32 to 32.2 → v sand/coarse sand + gravel; loose; clastics * photo high energy channel → 2" calcite nodule			
	34					32.2 to 34 → silty sand; light brown; no gravel; soft; trace Mn oxides; saturated			
			100%		2/5/8/12	34 to 34.7 → clayey silt/fine sand mix; reddish brown; <5% clastics (1mm) dense; plastic * photo saturated			
	36					34.7 to 36 → silty/sandy gravel; brown; v. fine sand; ~20% clastics (1mm) angular loose; non-plastic; saturated * photo			
			40%		2/6/4/7	1st 6" gravel sand mix might be clay; 36 to 38 → silty/clay; brown; dense, stiff; plastic; calcite mottling dry * photo taken			
	38								
			80%		5/4/16/4	38 to 38.6 → SAA ~calcite nodules; saturated			
	40					38.6 to 39.6 → silty sand; brown; v. fine; dense, stiff; non-plastic; 6" clay interval @ bottom of core then SAA → clastic (5mm to 1cm) rounded <5% photo (x2) wet			
			95%		5/12/20/8	40 to 40.5 → sandy clayey silt; dark brown; dense, stiff; plastic, trace calcite mottling, dry 40.5 to 41.5 → silty sand; brown; v. fine, moderately loose; trace fine calcite mottling; saturated			
	42					photo taken last 4" → silty clay; brown; dense; moist			
			100%		6/3/3/5	42 to 42.3 → silty sand; brown; v. fine; loose; saturated			
						42.3 to 44 → sandy silty/clay; dense, stiff; plastic; calcite mottling (trace); dry * photo taken			
	44				3/3/6/7	44 to 45 → SAA; increase in moisture & sand content			
			100%			45 to 46 → silty sand; brown; Fe* oxides; v. fine sand; two 1" intervals of clastic gravel non-plastic mostly some zones of clay & plasticity; med dense calcite mottling nodules; saturated photo taken (x2) core & gravel intervals			
1444	46								
			95%		8/2/3/4	46 to 47 → sandy silty clay; brown; dense, thin intervals of fine sand & few clastics, plastic; ~5% calcite nodules; wet 47 to 49 → well graded coarse sand & gravel; loose, non-plastic; clastics; saturated * last 3 inches silty clay - dry			
	48					photo (x2) core a angled core			
			100%		20/5/14/9	48 to 49.2 → SAA; dry			
	50					49.2 to 50 → Sand; brown; ~10-20% silt, 5% med sand; <5% coarse sand; loose;			
			(100%)		2/3/5/7	photo → (x2) Fe oxides; saturated 50 to 51 → sandy silt clay; brown; med dense, plastic, no gravel; trace calcite increasing with depth; wet			
1515	52					51 to 52 → clayey sandy silt & gravely; light brown; med dense; slightly plastic; * photo taken 3" long zone of calcite mottling & nodules & clastics clastics are subrounded (5mm)			

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3/26/13

OS-1

Sheet 3 of 3

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

DO: 1C3P172829

Bldg./Site: MSSC

Project Name: Pilot Study

Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	V.E. utility type, dia. / Blow count (per 6 inches)	Description	USCS soil symbol	Well construction	OVM (ppm)
						- entire soil column highly reactive to HCl - ☒ symbol for SPT			
3/26/13	52				11/16/9/10	52 to 54 → 52 to 53.3 → silty fine Sand; lt brown; soft, loose; non-plastic; trace calcite mottling; saturated → last 6" are well graded clastics-rich; clastics are sub-round (2mm); sulfide staining (yellow)			
1535	54		100%		2/5/3/5	53 to 54 → silty clay; reddish brown; dense; stiff; plastic; no gravel; FE nodules; no calcite 54 to 56 → reactive; moist *photos (x2) 4" angular clastics (1.5cm) + calcite mottling (caliche)			
	56		100%		9/4/4/4	56 to 58 → Sandy clayey silt; brown; med. dense; plastic; well sorted; <5% calcite nodules (2"); moist *; water taken clayey (silty sand; lt brown; slicky; soft; plastic; 30% calcite nodules; mottled white calcite matrix (cohesion); saturated *photo taken			
	58		100%		2/7/9/8	58 to 60 → 58 to 59 → silty Sand; lt brown; loose; non-plastic; calcite nodules (1") T calcite cementation; becomes more plastic (T in silty clay) last 4"; saturated 59 to 60 → silty; tan white; dense; stiff; entirely calcified but no nodules; moist 2 photo (x2)			
	60		50%		3/5/6/7	60 to 62 → SAA; increase in calcite nodules (1cm); moist to dry photo taken			
	62		100%		27/47/50/5	62 to 64 → silt/clay; dense; slightly plastic to plastic (banded); moist to wet *photo (x2)			
	64		70%		7/9/12/4	64 to 66 → SAA *photo taken			
3/26/13 1300 3/27/13 0800	66		100%		2/3/4/5	66 to 68 → SAA; calcite nodules *photo taken			
	68		100%		4/7/11/16	68 to 70 → 68 to 68.5 → SAA 68.5 to 70 → clayey/silt; tan to light brown; 2 whitemottling; <5% calcite nodules + angular clastics (clastics in 0.5" bands) (1 to 1.5cm) brittle (68 to 70) seem to have pore space filled w/ water/saturated *photo (x2) core + close up of soil			
0830	70					TD = 70ft 0830 on 3/27/13			

P+P

Sheet 1 of 3

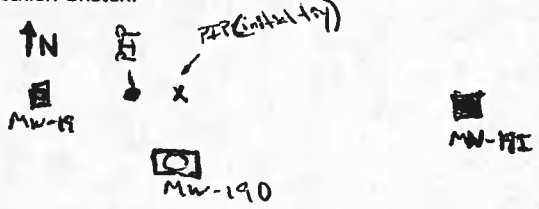
TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

DO: 103P172838
Bldg./Site: MSSC
Project Name: ~~Additional Well Pullback~~ Pilot Study

Boring Number: PIP	Date Started: 3/5/13
Drilling Method: (*Circle one*) HSA ~~Continuous Core/Direct Push/Hand Auger~~	Date Completed:
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: GR
Outer Diameter of Boring: 8"	Drilling Subcontractor: Cascade
Inner Diameter of Well Casing: 2"	Driller: Dennis Mitchell
Depth to Water (ft./bgs.)	Location Sketch:

- Logged from cuttings behind HSA
- PID readings taken from drum



Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	V.B. utility type, dia. / Blow count (per 6 inches)	Description	USCS soil symbol	Well construction	OVM (ppm)
3/5/13 1030	0	NA	NA			0 to 5' cleared by Air knife 0 to 0.25 - asphalt 0.25 to 1 - gravel ballast fill 1 to 5 - silty sand & gravel			
1550	5								
3/6/13 0900	5					Logged from cuttings			
	15					sand/silt mixture; light brown; some subangular gravel; slightly moist			
	17					change in color to brown; increasing clay content & decreasing sand; moist			0.0
	20								

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PIP

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

DO: MSSC
Bldg./Site: 103P172828
Project Name: P. Lot Study

Boring Number: PIP	Date Started: 3/5/13
Drilling Method: (Circle one) HSA Continuous Core/Direct Push/Hand Auger	Date Completed:
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: GR
Outer Diameter of Boring: 8"	Drilling Subcontractor: Cascade
Inner Diameter of Well Casing:	Driller: Dennis Mitchell
Depth to Water (ft./bgs.)	Location Sketch:

Logged from cuttings

Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	V.E. utility type, dia. / Blow count (per 6 inches)	Description	USCS soil symbol	Well construction	OVM (ppm)
	20					22 ft bgs. – Sandy Clayey Silt; strong brown; no gravel; wet			0.0
	25					25 ft bgs – Silty Clay with some sand; strong brown; plastic; soft; wet 26 ft bgs – Silty Sand; light brown; non-plastic; no gravel; very fine sand wet to saturated, photo taken of boring			0.0
0920	30					30 ft bgs Silty Sand w gravel; brown; non-plastic; angular gravel; very fine sand; wet to saturated			0.0
0925						33 ft bgs. Drilling got hard; grinding			
0931	35					35 ft bgs. Clayey Sand; brown; v. fine sand; slightly plastic; soft grey mottling; from secondary calcite mineralization; few angular gravels (<2 mm); wet to saturated			0.0
0935	40								

PIP

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

DO: MSSC
Bldg./Site: 10372172528
Project Name: PIP Study

Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.B. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
0935	40					40 ft bgs. Silty Sand; brown; v. fine to med sand; loose; soft; non-plastic; no gravel; saturated - photo taken			0.0
0937	45					45 ft bgs. SAA photo taken			0.0
0942 1330	50					50 ft bgs - SAA - photo taken Attempt to collect GW sample using HP-II from 50 to 51 ft bgs. Note: could not drive sampler the full 2 ft. hard subsurface @ 51. TT PIP01GW51 t = 1340 waited 4 hrs			
	55								
1409	60					60 ft bgs. Silty Sand, brown; v. fine to med sand; loose, soft; non-plastic; angular gravel that appears to be calcite and not clastics (0.1 - 0.5 mm); grey mottling; saturated Drive HP-II from 60 to 61. Attempt to collect water using HP-II after sitting overnight. TT PIP02GW61 t =			
						TD = 60 ft - 3 1/2 Drums IDW solid generated composite soil sample collected PIP030613 t = 1410			

SB-01 (step out)

3/25/13

Sheet 1 of 3

DO: 1037172429
Bldg./Site: MSSC
Project Name: Pilot Study

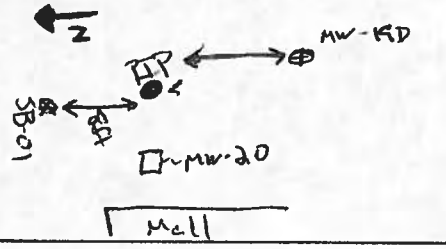
TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

Boring Number: SB-01 (step out)	Date Started: 3/25/13
Drilling Method: (*Circle one*) HSA Continuous Core/Direct Push/Hand Auger	Date Completed: 3/25/13
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: GR
Outer Diameter of Boring: 8" boring	Drilling Subcontractor: ~~Direct Push~~ Cascade
Inner Diameter of Well Casing: NA	Driller: Dennis Mitchell
Depth to Water (ft./bgs.)	Location Sketch:

- Step out confirmatory borings
- AK to 4ft bgs
- HSA to 20 ft
- Split spoon to 60 ft

SS = 1 3/8 ID 2OD
Driven 18 inches by 140lb hammer
Dpop = 30 inches



Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	V.E. utility type, dia. / Blow count (per 6 inches)	Description	USCS soil symbol	Well construction	OVM (ppm)
0800	0					0 to 4 ft → AK 0 to 0.5 - asphalt 0.5 to 1 - fill + ballast 1 to 4 - silty sand & gravel; fragments of asphalt	FM		
0900	4	5 stages	NA		2	4 to 9.5 - asphalt			
	6								
	8					8 ft sand/silt mixture, tan light brown, ~~subrounded~~ angular clasts; soft	SP/SM	NA	
	10								
	12					12 ft SAA			
	14								
	16								
	18								
	20					20 ft SAA	SP/SM		

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(3/21/13)

SB-01 (stepout)

Sheet 2 of 3

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

DO: 1CTP170029
Bldg./Site: MSSC
Project Name: Pilot Study

Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.B. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
0940	20		100%		7/2/6/8	20 to 22 ft → Sand/silt mixture; light brown; v. fine sand; some angular clastics, moist - * photo taken - no evident	SM		
	22				9/6/11/8	22 to 24 ft → SAA, moist photo taken - no evident	SM		
	24		100%		7/5/3	24 to 26 ft → SAA; moist to wet; no clastics photo taken → 1st evidence of solution/product - light pinkish purple color *24.4 ft is 1st observed in soil profile	SM		
	26		50%		4/5/6/6	26 to 28 ft → SAA; saturated wet photo taken → bright purple	SM		
1004	28		75%		0/0/0/1	28 to 30 → silty Sand; very fine grained; soft; non plastic; saturated photo taken - saturated bright purple	SM		
	30		25%		*weight pushed it down 7/8/12/18	30 to 32 → silt/sand mixture - few gravel + trace clay; clay ±1%; gravel ±5%; v. fine sand; med dense, slightly plastic; angular crystalline gravel; saturated photo taken → bright purple - some flowing purple sand	SM		
	32		25%		35/50/19	32 to 34 → SAA; saturated; last 0.5 ft more angular crystalline gravel (1 to 5 cm)	SM		
	34		40%			2 photos taken (1 close) - bright purple; saturated			
	36		50%	Not collected	3/2/2/2	34 to 36 → SAA; few rounded clastics (0.1 mm) photos (2) 1 close up → deep purple to 35 ft. last 6" recovered brown ± no product	SM		
	38		100%		4/6/6/6	36 to 38 → clayey Sand; v. fine sand non-plastic; med dense; no gravel; well sorted moisture content way down; moist not saturated photo → x-section shows no contact ± product; brown	SC		
1048	40		100%		4/6/2/2	38 to 40 → SAA	SC		
	42		100%		8/2/2/2	photo → x-section shows no contact ± product; brown 40 to 42 → SAA; lenses of caliche/secondary mineralization ranging from fine grained to 8cm angular concretions photo → no product in x-section; brown ± white mottling	SC		
	44		100%		1/1/1/1	42 to 44 → SAA to 42.5 42.5 to 44 → clay; few gravels, med dense; plastic, moist; dark brown 2 photos - x-section no product - close up of few clayey sand to clay	SC / CH		
	46		100%		0/0/1/1	44 to 46 SAA ± increase in calcite concretions + saturation photo → no product - brown	CH		
1110	48		100%		1/2/1/2	46 to 48 → 0.5 ft of sandy clay @ the top. clay; stiff; plastic; dark brown; ±5% calcite concretion all around 47 ft; well sorted; moist photo → no product in x-section; dark brown	CH		
	50		5%		14/3/2	48 to 50 → silty clay; saturated	CL		
1123	52			50 ft 51 ft 52 ft	0/0/2/3	photo → hard to tell if product was in contact here; so little recovered + saturation could have washed product in/during drilling Sat 52 → clayey sand; dark brown ± white mottling; slightly plastic; med stiff; v. fine sand photo → K2 - no product in x-section, 2nd pic is of sand in SS @ 52 ft	SC	NA	

SB-01 (step out)

5/25/13

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

DO: ~~MSSC~~ 1039/172829

Bldg./Site: MSSC

Project Name: P. Lot Study

SB-01 (step out) 54' ∈ = 1145

Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	V.B. utility type, dia. / Blow count (per 6 inches)	Description	USCS soil symbol	Well construction	OVM (ppm)
1145	52			52 ft 53 ft 54 ft	2/2/4/4	52 to 54 → Sand ± some clay; brown + light tan; v fine sand; dense; non-plastic clastics @ 54ft (rounded), black) photo → no product photo → 1/ contact @ 53.8 ft (from tan to reddish brown)	SC		
	54		100%		4/3/2/4	54 to 56 → silty clayey Sand; brown ± white mottling; v. fine sand; no plastic; moist few angular calcite rock les; few zones of round clastics	SC		
	56		75%			photo → stringer of product in gravel zones (3 photos)			
			20%		5/4/3/3	56 to 58 → silty Sand; v fine sand; med dense, non plastic; moist	SC		
	58			2 soil collected		photos → last 4 inches has product → limited recovery → no evidence above			
			40%		5/3/2/2	58 to 60 → silty Sand; lots of calcite mineralization; no clastics though med dense; non-plastic	SC		
	60					photo → product in most of core, last 3 inches, no product			
	62					TD = 60			
						1200			
						6 soil samples collected) - 50, 51, 52, 53, 54 ft		NA	

SB-02 (stepout) 3/25 & 3/26 Sheet 1 of 3

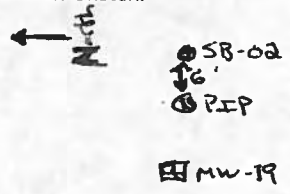
TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

DO: 103P17280G
Bldg./Site: MSSC
Project Name: Pilot Study

Boring Number: SB-02	Date Started: 3/25/13
Drilling Method: (*Circle one*) HSA Continuous Core/Direct Push/Hand Auger	Date Completed: 3/26/13
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: GR
Outer Diameter of Boring: 8 inch	Drilling Subcontractor: Cascade
Inner Diameter of Well Casing: NA	Driller: Dennis Mitchell
Depth to Water (ft./bgs.)	Location Sketch:

- AK clearance to 5ft
- HSA to 20ft
- SS continuous to 60ft
- Confirmatory boring for KMnO4 Injection
- 6 ft downgradient of PIP



HSA = HSA ⊠ = SPT or SS

Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	V.B. utility type, dia. / Blow count (per 6 inches)	Description	USCS soil symbol	Well construction	OVM (ppm)
3/25/13 1333	0		NA			0 to 5 → AirKnife 0 to 0.5 – asphalt 0.5 to 1 → ballast 1 to 5 → silty sand & gravel; fragments of old asphalt	SM		
3/25/13 1500	6		5 ft Augers	Not collected	NA	5 to 20 → HSA. logged from cuttings Sand	SP	NA	
	10					10 ft → ~~silt/sand mixture; brown~~ Sand; light brown; v. fine	SP		
	15					15ft → silt/sand mixture; brown; v. fine sand; few gravel <5%	SM		
	20					20ft → SAA	SM		

15
1
330 27
30

3/25 & 3/26/13

SB-02

Sheet 2 of 3

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

DO: 103717J629
Bldg./Site: 477SC
Project Name: Pilot Study

Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	V.B. utility type, dia. / Blow count (per 6 inches)	Description	USCS soil symbol	Well construction	OVM (ppm)
						37.5' t=0825 - soil smpl 39' t=0840 - soil smpl 42' t=0845 - soil smpl			
3/25/13 1515	20				3/4/5/5	20 to 22 → silty sand, wet; brown + white mottling; v. fine sand; secondary mineralization (2 to 4mm angular nodules) med stiff; non-plastic; well sorted; dry photo → no product in soil	SM		
	22		90%						
			80%		3/3/4/3	22 to 24 - SAA; larger calcite zones; trace Mn oxidation (black staining) photo → no product	SM		
	24								
			70%	35' t=1530	5/6/10/9	24 to 26 → SAA, saturated; high degree of Mn oxide staining 26 to deep purple → full saturation ≈ 25' bgs - sample collected these (4 sleeves) photo → (x2) core entirely pink/purple → photo 2 of 3 from light pink to purple	SM		
	26								
			75%		5/10/12/5	26 to 28 → silty sand; silt content dropping; ≈80% v. fine sand, <5% calcite nodules; gravel; soft; saturated	SP		
	28					photo → product in soil core; deep purple; saturated			
			50%		5/7/9/9	28 to 30 → Sand + gravel; v. fine sand; plastics (sub rounded; 1 to 3 mm) soft, non-plastic; saturated)			
	30					photo → (x2) product in core; close up of clastic (high energy deposit/channel) layer	SW		
			75%		3/4/50/1	30 to 32 → 30 to 31 → coarse, med sand, angular to subrounded; clastics 31 to 32 → silty clay and v. fine sand; med dense, slightly plastic; little to no gravel; saturated stream channel deposit; saturated	SW		
3/25 1545 3/26 1555 0750	32								
			0%		50/0	photo → product in core; (2 photos) 1 of stream channel deposit 32 to 34 → no recovery * tungsten through to next interval	SC		
	34					photo → movie			
			98%		15/9/22/30	34 to 36 → 34 to 35 → Sand + gravel; fine to coarse sand; soft, non-plastic, sat then 6" of dense, slightly plastic clayey sand + no gravel then gravel + sand again photo → (x3) product in moist core → 4" of clay/clay were it is absent, crystalline			
	36				14/40/32/28	36 to 38 → coarse/med sand; angular to subrounded; plastic channel deposit saturated; loose; uncemented; grades to much larger crystalline clasts at bottom			
			100%	37.5 t=0835		photo → (x4) product in top 7". absent below * photo showing things above			
	38				16/10/13/21	38 to 40 → 38 to 39.5 → fine to med sand; loose; moist → clay + calcite cemented med to coarse sand |2"| fissile |5"| v. sandy silt/clay |gravel; gravel is subround crystalline			
			90%	39 t=0840		photo → (x5) (2 to 3 cm) med stiff; non-plastic bathtubes; product in top + bottom 4"			
	40				4/3/3/6	40 to 42 → 40 to 40.6 → SAA 40.6 to 42 → sand/ light brown; soft; plastic; stained; admixed with clay; calcite nodules + gelatinous mineralization throughout photo → (x2) product in first 7" of core			
			100%	t=0845 #42					
	42				5/3/5/10	42 to 44 → 42 to 42.5 sandy silt; v. fine sand; soft; slightly plastic, brown calcite min (42.5 to 44 → silty clay; med dense; strong brown; plastic; calcite mineralization throughout + dry photo → no product			
			100%			calcite gravel the last 2 inches			
	44				10/11/14/10	44 to 46 → SAA - silty clay + clayey silt; strong brown; calcite min throughout but not the nodules; med dense; stiff; plastic; dry photo → no product			
			100%						
	46				5/5/5/6	46 to 48 → SAA + increase in calcite nodules. + clearly in saturated zone but cores are only damp			
			100%	45' t=0920		photo → no product			
	48				5/3/7/9	48 to 50 → clayey silt; brown; med dense; slightly plastic; calcite cemented + calcite nodules; ~~wet~~ saturated photo → (x2) small amount of product in upper 4"			
	50				0/3/12/2	50 to 52 → 50 to 51.6 → SAA clayey silt; brown; calcite cem.; wet + (photo → (x4) saturated purple top 3" + pink stain 4" in bottom 4")			
	52					51.6 to 52 → silt; tan + white; dense; stiff; non-plastic; calcite cemented; rock flour			

3/25 & 3/26/13

Sheet 3 of 3

SB-02

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

DO: 1037172824
Bldg./Site: M55C
Project Name: Pilot Study

Boring Number:	Date Started:
Drilling Method: ~~(Circle one)~~ HSA Continuous Core/Direct Push/Hand Auger	Date Completed:
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By:
Outer Diameter of Boring:	Drilling Subcontractor:
Inner Diameter of Well Casing:	Driller:
Depth to Water (ft./bgs.)	Location Sketch:

54' @ t = 0950
57' @ t = 1008

Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	V.B. utility type, dia. / Blow count (per 6 inches)	Description	USCS soil symbol	Well construction	OVM (ppm)
0946	52	80%	67%	54	5/50/3	52 to 54 → sand/silt & calcite gravel; laminated; mod dense, non-plastic			
	54					2bsb → (x2) product thru entire core; close up of differential staining			
		50%	50%		3/5/4/7	54 to 56 → 54 to 54.5 - SAH; 54.5 to 56 → sand/silt w/ laminated gravel rubrounded (2-3cm) clusters; calcite cementation; sat - mix & gravel; soft non-plastic			
	56					2bsb → (x2) product through (cut at 1" flexible tubing) over remaining core			
		75%	75%	57'	2/03/13/7	56 to 58 → SAH; sand/silt mix & clastic gravel; channel deposit saturated; calcite cemented throughout, few nodules; non-plastic			
	58					2bsb → (x2) product through core; close up of staining only around calcite nodule			
		100%	100%		0/3/6/5	58 to 60 → 58 to 58.25 → SAH; 58.25 to 60 → silt; brown & white mottling; mod dense; slightly plastic; tough; calcite nodules; calcite cement; moist.			
1008	60					2bsb → (x3) product in first 3" pic of whole core, 10% product area, 2 of calcite laminae s/o product		4 2	

TD = 60 ft

t = 1008

SVE-1

7/7/13

TETRATECH EM INC

MONITORING WELL COMPLETION RECORD

DRILLING INFORMATION

DRILLING BEGAN:
DATE 3/5/13 TIME 0800
WELL INSTALLATION BEGAN:
DATE 7/7/13 TIME 1000
WELL COMPLETION FINISHED:
DATE 7/7/13 TIME 1600
DRILLING CO. Cascade
DRILLER Dennis Mitchell
LICENSE
DRILL RIG CME-75
DRILLING METHOD:
☒ HOLLOW STEM AUGER
☐ AIR ROTARY
☐
DIAMETER OF AUGERS:
ID ____ OD 8 inch

BENTONITE SEAL

AMOUNT CALCULATED
AMOUNT USED 1½ bags
☐ PELLETS, SIZE
☒ CHIPS, SIZE 3/8"
☐
PRODUCT Wyoming Sodium Bentonite
MFG. BY Baroid Halliburton
METHOD INSTALLED:
☒ POURED ☐ TREMIE
AMOUNT OF WATER USED 5 gal

FILTER PACK

AMOUNT CALCULATED
AMOUNT USED 9 bags
☒ SAND, SIZE #3
☐ FORMATION COLLAPSE:
FROM NA TO NA
PRODUCT
MFG. BY CEMEX
METHOD INSTALLED:
☒ POURED ☐ TREMIE

SURVEY INFORMATION

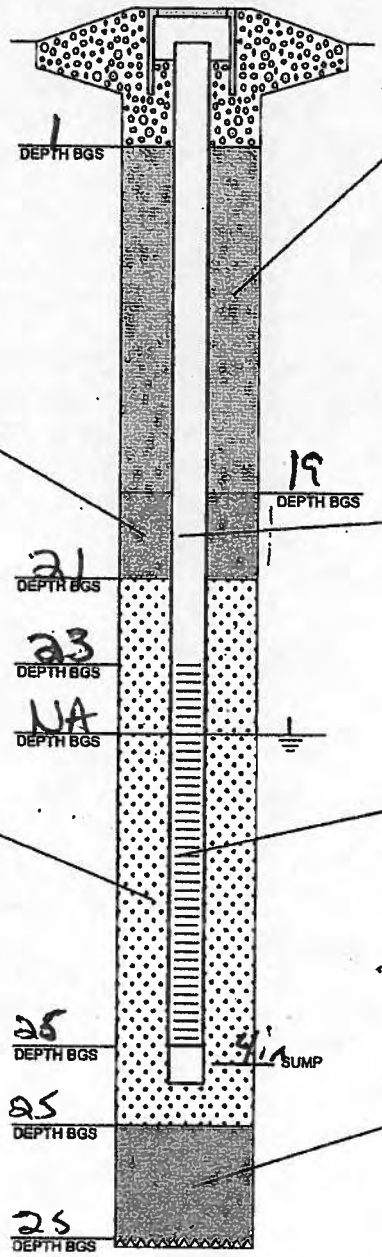
TOC ELEVATION
GROUND ELEVATION
NORTHING CORD.
EASTING CORD.
DATE SURVEYED
SURVEY CO.

CENTRALIZERS USED?

☐ YES ☒ NO;
CENTRALIZER DEPTHS: ____, ____

SURFACE COMPLETION

☒ FLUSH MOUNT
☐ ABOVE GROUND W/BUMPER POST
☐ CONCRETE ☐ ASPHALT



MONITORING WELL

MONITORING WELL NO. SVE-1
PROJECT 103717.0828
SITE MSSC
BOREHOLE NO. SVE-1
WELL PERMIT NO.
TOC TO BOTTOM OF WELL

ANNULAR SEAL

AMOUNT CALCULATED
AMOUNT USED
☒ GROUT FORMULA
PORTLAND CEMENT 1.5 bags (94 lb per bag)
BENTONITE 3 bags
WATER 60 gallons (gal)
☐ PREPARED MIX
PRODUCT
MFG. BY
METHOD INSTALLED:
☒ POURED ☐ TREMIE
mixed in Hydrovac

CASING

☒ SCHEDULE 40 PVC
☐
PRODUCT
MFG. BY
CASING DIAMETER:
ID 2" OD
LENGTH OF CASING 23 ft

WELL SCREEN

☒ SCHEDULE 40 PVC
☐
PRODUCT
MFG. BY
CASING DIAMETER:
ID 2" OD
SLOT SIZE 0.01 in
LENGTH OF SCREEN 2 ft

BOREHOLE BACKFILL

AMOUNT CALCULATED
AMOUNT USED
☐ BENTONITE CHIPS, SIZE
☐ BENTONITE PELLETS, SIZE
☐ SLURRY
☐ FORMATION COLLAPSE
PRODUCT
MFG. BY
METHOD INSTALLED:
☐ POURED ☐ TREMIE

SVE-1

Sheet 1 of 2

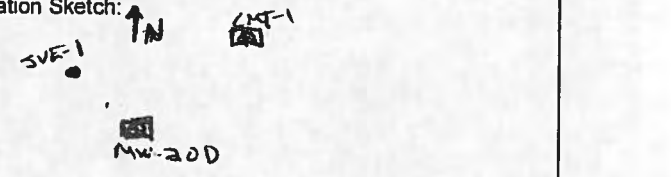
TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

DO: 103P172828
Bldg./Site: MSSC Pilot Study
Project Name: ~~Additional Vert Wells~~

Boring Number: SVE-1	Date Started: 3/5/13
Drilling Method: (*Circle one*) HSA Continuous Core/Direct Push/Hand Auger	Date Completed:
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: GR
Outer Diameter of Boring: 8 inches	Drilling Subcontractor: Cascade
Inner Diameter of Well Casing:	Driller: Dennis Mitchell
Depth to Water (ft./bgs.)	Location Sketch:

- logged from cuttings
- PID reading from drums



Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	V.B. utility type, dia. / Blow count (per 6 inches)	Description	USCS soil symbol	Well construction	OVM (ppm)
3/5/13 1330	0					0 to 5 Air knife			
	1					0 to 0.25 - Asphalt			
	2					0.25 to 1 - Fill - gravel ballast			
	3					1 to 5 - silty sand to gravel			
	4								
1416	5								
3/7/13 1000	6					5 ft bgs = silty sand to gravel; light brown; v. fine grained; gravel is angular to subround (0.1 - 2mm) clastics/coquina (i.e not rounded) gravel ≈ 20%			
	7								
	8								0.0
	9								
1007	10					10 ft bgs - SAA			
	11								
	12								0.0
	13								
	14								
1010	15					15 ft bgs. - SAA slightly darker brown & few gravel (5%)			0.0
1016	20					20 ft bgs. SAA photo taken @ 20 ft			0.0

(7/7/13)

SVE-1

Sheet 2 of 2

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

DO: 103P172825
Bldg./Site: M55C
Project Name: P1 LA Study

Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	V.B. utility type, dia. / Blow count (per 6 inches)	Description	USCS soil symbol	Well construction	OVM (ppm)
	20					20 ft bgs-SAA; Sand/silt mixture; light brown; soft; base; non plastic few gravel (0.1 to 2 mm) angular; Dry (Photo @ 20ft) ~2 mm			0.0
1423	25					25 ft bgs. SAA Photo taken @ 25ft			0.0
						TD=25 ft bgs			
						Drums			
						* Note: 2 of the drums used were ½ full. So cuttings are a mix of Airknife soil + SVE-2			
						1 DW-solid = 3 Drums			

VM-1

TETRATECH EM INC

MONITORING WELL COMPLETION RECORD

DRILLING INFORMATION

DRILLING BEGAN:
DATE 3/5/13 TIME 0900
WELL INSTALLATION BEGAN:
DATE 3/6/13 TIME 1035
WELL COMPLETION FINISHED:
DATE 3/6/13 TIME _____
DRILLING CO. Cascade
DRILLER Dennis Mitchell
LICENSE _____
DRILL RIG CME-85 HSA
DRILLING METHOD:
☒ HOLLOW STEM AUGER
☐ AIR ROTARY
☐ _____
DIAMETER OF AUGERS:
ID _____ OD 8 in

BENTONITE SEAL

AMOUNT CALCULATED _____
AMOUNT USED _____
☐ PELLETS, SIZE _____
☒ CHIPS, SIZE 3/8 in
☐ _____
PRODUCT Sodium Bentonite
MFG. BY Halliburton
METHOD INSTALLED:
☒ POURED ☐ TREMIE
AMOUNT OF WATER USED _____

FILTER PACK

AMOUNT CALCULATED _____
AMOUNT USED 4 bags (50 lbs per)
☒ SAND, SIZE #3
☐ FORMATION COLLAPSE:
FROM _____ TO _____
PRODUCT Monterey Sand
MFG. BY CEMEX
METHOD INSTALLED:
☒ POURED ☐ TREMIE

SURVEY INFORMATION

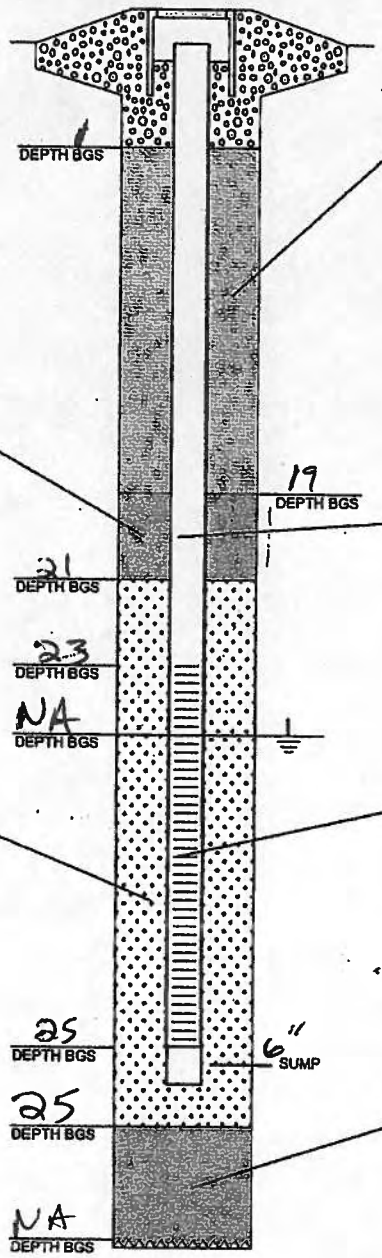
TOC ELEVATION _____
GROUND ELEVATION _____
NORTHING CORD. _____
EASTING CORD. _____
DATE SURVEYED _____
SURVEY CO. _____

CENTRALIZERS USED?

☐ YES ☒ NO;
CENTRALIZER DEPTHS: _____

SURFACE COMPLETION

☒ FLUSH MOUNT
☐ ABOVE GROUND W/BUMPER POST
☐ CONCRETE ☒ ASPHALT



MONITORING WELL

MONITORING WELL NO. _____
PROJECT _____
SITE _____
BOREHOLE NO. _____
WELL PERMIT NO. _____
TOC TO BOTTOM OF WELL _____

ANNULAR SEAL

AMOUNT CALCULATED _____
AMOUNT USED _____
☐ GROUT FORMULA
PORTLAND CEMENT _____
BENTONITE _____
WATER _____
☐ PREPARED MIX
PRODUCT _____
MFG. BY _____
METHOD INSTALLED:
☐ POURED ☐ TREMIE

CASING

☒ SCHEDULE 40 PVC
☐ _____
PRODUCT S.
MFG. BY _____
CASING DIAMETER:
ID _____ OD 2 in
LENGTH OF CASING 23 ft

WELL SCREEN

☒ SCHEDULE 40 PVC
☐ _____
PRODUCT _____
MFG. BY _____
CASING DIAMETER:
ID _____ OD 2 in
SLOT SIZE 0.01 inches
LENGTH OF SCREEN 2 ft

BOREHOLE BACKFILL

AMOUNT CALCULATED _____
AMOUNT USED _____
☐ BENTONITE CHIPS, SIZE _____
☐ BENTONITE PELLETS, SIZE _____
☐ SLURRY _____
☐ FORMATION COLLAPSE _____
PRODUCT _____
MFG. BY _____
METHOD INSTALLED:
☐ POURED ☐ TREMIE

10 surface

VM-1

Sheet 1 of 2

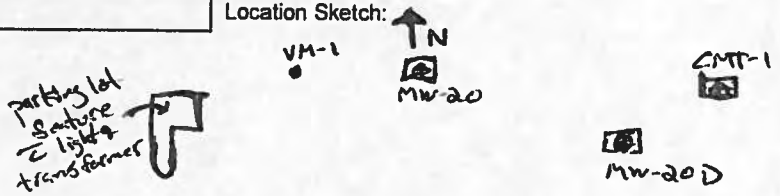
TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

DO: 1037172828
Bldg./Site: MSSC
Project Name: Plot Study

Boring Number: VM-1	Date Started: 3/5/13
Drilling Method: (*Circle one*) HSA Continuous Core/Direct Push/Hand Auger	Date Completed: 3/6/13
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: GP
Outer Diameter of Boring: 8 inches	Drilling Subcontractor: Cascade
Inner Diameter of Well Casing: 2 inches	Driller: Dennis
Depth to Water (ft./bgs.) not encountered	Location Sketch:

- logged from cuttings
- PID measurements from Drum



Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	V.B. utility type, dia. / Blow count (per 6 inches)	Description	USCS soil symbol	Well construction	OVM (ppm)
3/5/13 1320	0					~~0 to 5~~ Cascade Air Knife			
	1					0 to 0.25 - Asphalt			
	2					0.25 to 1 - Fill; gravel base			
	3					1 to 5 - silty sand with gravel			
	4								
1338	5								
3/6/13	6					5 ft bgs; sandy silt, light brown; angular to sub rounded gravel (2 mm to 6 mm); ~~dry~~ loose; soft; dry			0.6
	7								
	9								
1025	10					10' SAH - drilling hard; grinding & large gravels (up to 6")			
	11								
	12								
	13								
	14					14' SAH - photo taken of sand/silt mixture with lots of gravel			
1030	15					15' sand; tan; very fine sand; soft, loose; ~10-20% is coarse sand sized angular gravel; dry; the gravel are clastics & not mineralization - photo taken			0.0
1032	20								

S:\AECRU\Hunters Point Shipyard\DO 0019 (PLOB X027)\WE2-Plans\Draft SAP\for Angela\appendices\Appendix C\04 Soil Boring and Well Installation Log.doc

VM-1

Sheet 2 of 2

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

DO: MSSC

Bldg./Site: 103P172828

Project Name: Pilot Study

Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.B. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
1032	20					20 ft bgs Sand, SAA = color change to slightly darker brown/tan - photo taken			0.0
1035	25					25 ft bgs - SAA - photo taken			0.0
						* TD = 25 ft bgs			
						* 1 + 1/4 drums generated @ to 25 ft labeled VM-1			

VM-2

3/6/13

TETRATECH EM INC

MONITORING WELL COMPLETION RECORD

DRILLING INFORMATION

DRILLING BEGAN:
DATE 3/5/13 TIME 0800
WELL INSTALLATION BEGAN:
DATE 3/6/13 TIME 1300
WELL COMPLETION FINISHED:
DATE _____ TIME _____
DRILLING CO. Cascade
DRILLER Dennis
LICENSE
DRILL RIG CME-85
DRILLING METHOD:
☒ HOLLOW STEM AUGER
☐ AIR ROTARY
☐
DIAMETER OF AUGERS:
ID _____ OD 8"

BENTONITE SEAL

AMOUNT CALCULATED
AMOUNT USED 2 bags
☐ PELLETS, SIZE
☒ CHIPS, SIZE 3/8 inch
☐
PRODUCT Wyoming Sodium Bentonite
MFG. BY Halliburton 50lb/per
METHOD INSTALLED:
☒ POURED ☐ TREMIE
AMOUNT OF WATER USED 5 gallons

FILTER PACK

AMOUNT CALCULATED
AMOUNT USED 3 bags
☒ SAND, SIZE #3
☐ FORMATION COLLAPSE:
FROM N/A TO
PRODUCT Monterey
MFG. BY CEMEX 50lb per
METHOD INSTALLED:
☒ POURED ☐ TREMIE

SURVEY INFORMATION

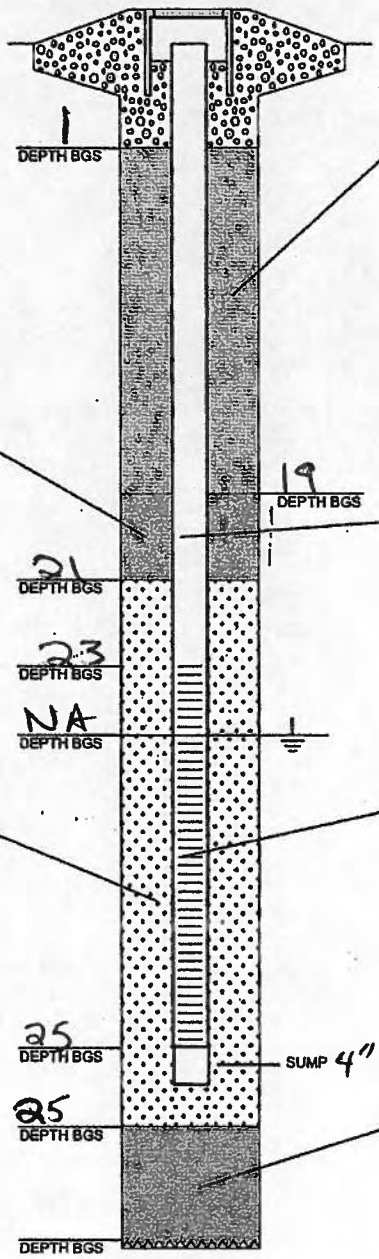
TOC ELEVATION
GROUND ELEVATION
NORTHING CORD.
EASTING CORD.
DATE SURVEYED
SURVEY CO.

CENTRALIZERS USED?

☐ YES ☒ NO;
CENTRALIZER DEPTHS: NA

SURFACE COMPLETION

☒ FLUSH MOUNT
☐ ABOVE GROUND W/BUMPER POST
☐ CONCRETE ☒ ASPHALT



MONITORING WELL

MONITORING WELL NO. VM-2
PROJECT MSSC
SITE 10381728228
BOREHOLE NO. VM-2
WELL PERMIT NO.
TOC TO BOTTOM OF WELL

ANNULAR SEAL

AMOUNT CALCULATED
AMOUNT USED
☒ GROUT FORMULA
PORTLAND CEMENT
BENTONITE
WATER
☐ PREPARED MIX
PRODUCT
MFG. BY
METHOD INSTALLED:
☐ POURED ☐ TREMIE

CASING

☒ SCHEDULE 40 PVC
☐
PRODUCT
MFG. BY
CASING DIAMETER:
ID _____ OD 2 in
LENGTH OF CASING 23 ft

WELL SCREEN

☒ SCHEDULE 40 PVC
☐
PRODUCT
MFG. BY
CASING DIAMETER:
ID _____ OD 2inch
SLOT SIZE 0.01
LENGTH OF SCREEN 2 ft

BOREHOLE BACKFILL

AMOUNT CALCULATED
AMOUNT USED
☐ BENTONITE CHIPS, SIZE
☐ BENTONITE PELLETS, SIZE
☐ SLURRY
☐ FORMATION COLLAPSE
PRODUCT
MFG. BY
METHOD INSTALLED:
☐ POURED ☐ TREMIE

VM-2

Sheet 1 of 2

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

DO: 1037172824
Bldg./Site: MSSC
Project Name: Pilot Study

Boring Number: VM-2	Date Started: 3/5/13
Drilling Method: (*Circle one*) HSA Continuous Core/Direct Push/Hand Auger	Date Completed:
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: GR
Outer Diameter of Boring: 8 inches	Drilling Subcontractor: Cascade
Inner Diameter of Well Casing: 2 inches	Driller: Dennis Mitchell
Depth to Water (ft./bgs.)	Location Sketch: ↑N

Logged from cuttings
PID measurements taken from drums



Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	V.B. utility type, dia. / Blow count (per 6 inches)	Description	USCS soil symbol	Well construction	OVM (ppm)
3/5/13 1502	0					etosl Cleared using Air Knife 0 to 0.25 - Asphalt 0.25 to 1 - Fill w/gravel ballast 1 to 5 - silty sand & gravel			
1520	5								
1445						5ft Sand + gravel mixture; tan/light brown; large angular gravel (6") loose; soft; fill; dry			0.0
1230	6								
	7								
	9					- photo of the bothcuttings @ top of boring @ contact soils			
1245	10					10ft - Sand; light brown; loose; soft; very fine sand; angular to subrounded gravel (0.5 mm to 1 mm); dry			0.0
	11								
	13								
1246	14					SAA photo taken			
	15								0.0
						17ft - Sand; light brown; very fine grained; loose; soft; dry; ± 15% subrounded gravel that seems to be chastles & rock Secondary mineralization photo taken			
1250	20								

VM-2

Sheet 2 of 2

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

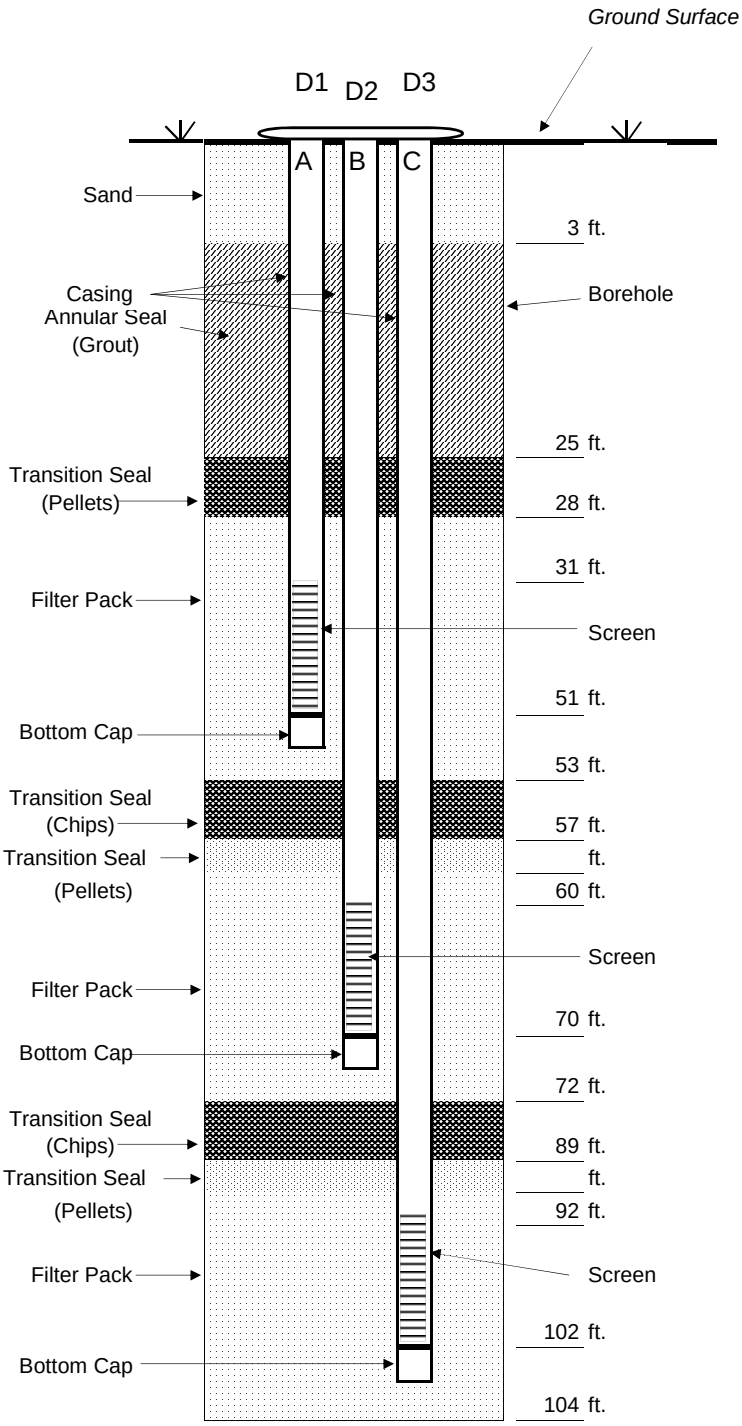
DO: MSSC
Bldg./Site: 103P172828
Project Name: P1&2 Study

Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.B. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
	20					"SAA -			
						contact			
						22 ft - clayey sand; light reddish brown; soft; slightly plastic; angular gravel (<0.2mm to 2mm) that is calcite, wet			0.0
3/6/13 1252	25					25-SAA - photo taken			
						TD=25			
						2 1/5 Drums IDW soil generated @ to 25 ft			

WELL CONSTRUCTION LOG

Tetra Tech
1230 Columbia Street, Suite 1000
San Diego, CA 92101
Telephone: (619) 525-7188
Telefax (619) 525-7186

WELL NUMBER:	MW-19D
WELL TYPE:	Monitoring Well
SURFACE ELEV (ft MSL):	TBA
CASING ELEV (ft MSL):	TBA



DRILLING SUMMARY

DATE COMPLETED:	1/15/2013
DRILLING COMPANY:	Cascade Drilling, LLP
DRILLING RIG TYPE:	Sonic
TOTAL DEPTH DRILLED:	feet bgs

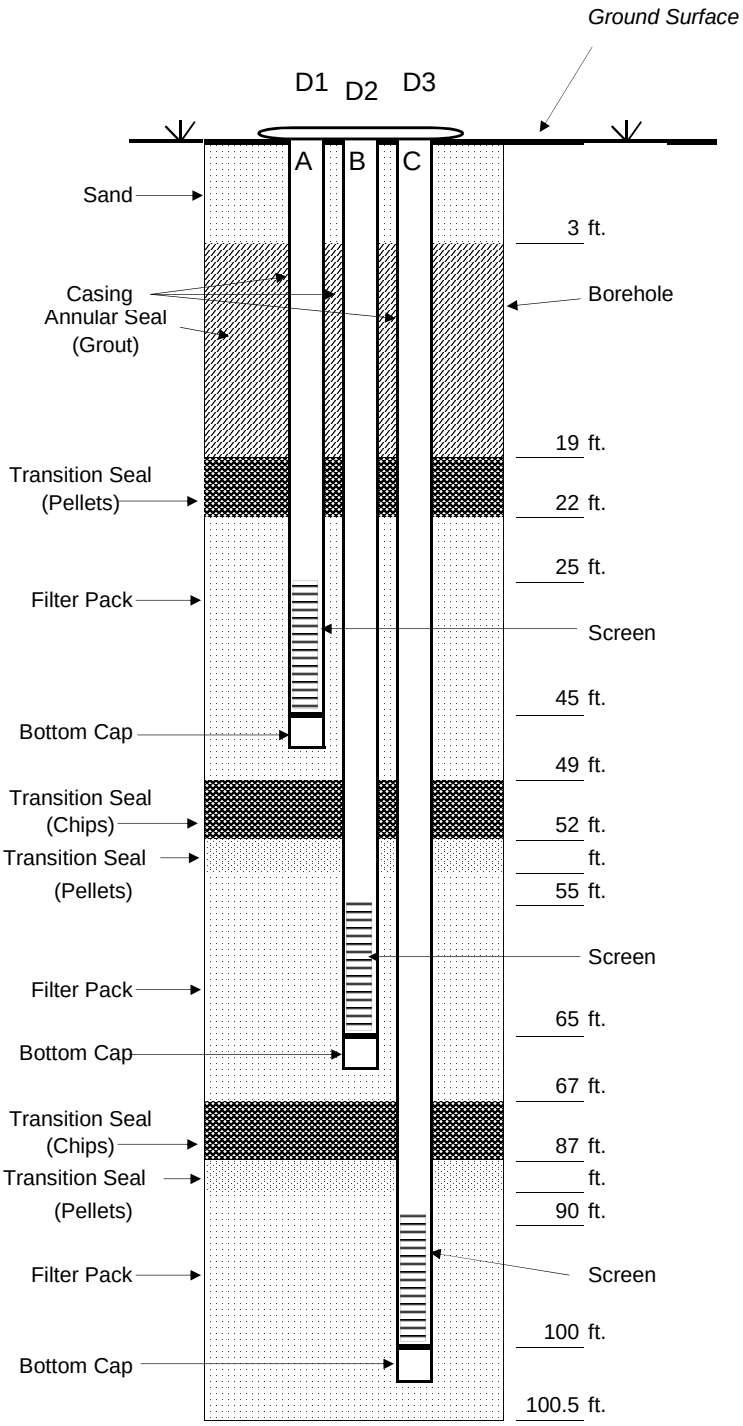
CONSTRUCTION DETAILS

	0-50' bgs	50-100' bgs
BOREHOLE DIAMETER:	10 inches	8
TOTAL WELL DEPTH:	51/ 70 / 102 feet	
BLANK CASING TYPE:	Sch. 80 PVC	
BLANK CASING DIAMETER:	2 inches	
TOTAL BLANK CASING LENGTH:	31 / 60 / 92 feet	
SCREEN TYPE:	Slotted Sch. 80 PVC	
SCREEN SLOT SIZE:	0.02 inches	
SCREEN LENGTH:	20 / 10 / 10 feet	
SUMP LENGTH:	NA	
PROTECTIVE CASING STICKUP:	N/A feet	
GROUT MATERIAL:	Portland cement, bentonite, water	
SEAL MATERIAL	Puregold medium chips	
FILTER MATERIAL:	Cemex Monterey Sand #3	
COMMENTS:		

WELL CONSTRUCTION LOG

Tetra Tech
1230 Columbia Street, Suite 1000
San Diego, CA 92101
Telephone: (619) 525-7188
Telefax (619) 525-7186

WELL NUMBER: MW-20D
WELL TYPE: Monitoring Well
SURFACE ELEV (ft MSL): TBA
CASING ELEV (ft MSL): TBA



DRILLING SUMMARY

DATE COMPLETED: 1/11/2013

DRILLING COMPANY: Cascade Drilling, LLP

DRILLING RIG TYPE: Sonic

TOTAL DEPTH DRILLED: feet bgs

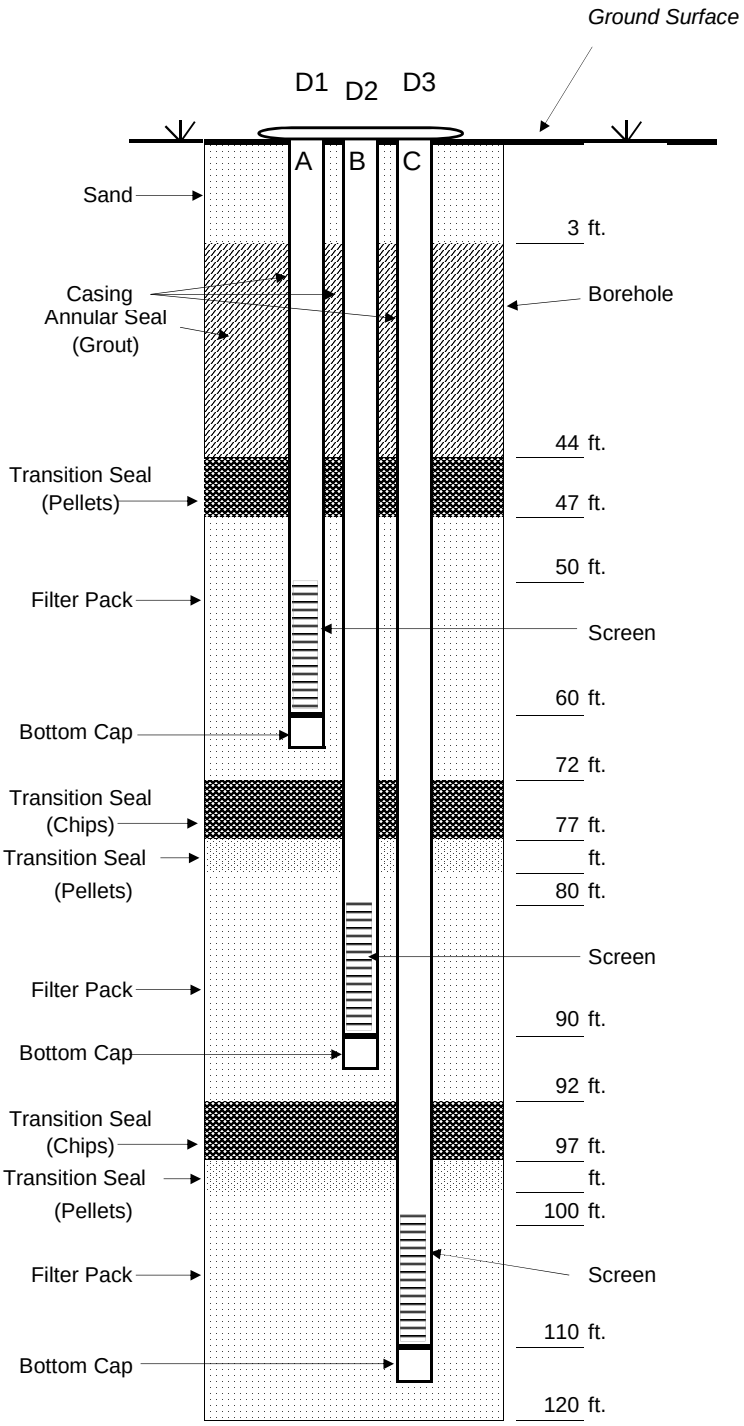
CONSTRUCTION DETAILS

	0-50' bgs	50-100' bgs
BOREHOLE DIAMETER:	10 inches	8
TOTAL WELL DEPTH:	45/ 65 / 100 feet	
BLANK CASING TYPE:	Sch. 80 PVC	
BLANK CASING DIAMETER:	2 inches	
TOTAL BLANK CASING LENGTH:	25 / 55 / 90 feet	
SCREEN TYPE:	Slotted Sch. 80 PVC	
SCREEN SLOT SIZE:	0.02 inches	
SCREEN LENGTH:	20 / 10 / 10 feet	
SUMP LENGTH:	NA	
PROTECTIVE CASING STICKUP:	N/A feet	
GROUT MATERIAL:	Portland cement, bentonite, water	
SEAL MATERIAL	Puregold medium chips	
FILTER MATERIAL:	Cemex Monterey Sand #3	
COMMENTS:		

WELL CONSTRUCTION LOG

Tetra Tech
1230 Columbia Street, Suite 1000
San Diego, CA 92101
Telephone: (619) 525-7188
Telefax (619) 525-7186

WELL NUMBER: MW-6D
WELL TYPE: Monitoring Well
SURFACE ELEV (ft MSL): TBA
CASING ELEV (ft MSL): TBA



DRILLING SUMMARY

DATE COMPLETED: 1/21/2013

DRILLING COMPANY: Cascade Drilling, LLP

DRILLING RIG TYPE: Sonic

TOTAL DEPTH DRILLED: feet bgs

CONSTRUCTION DETAILS

	0-60' bgs	60-110' bgs
BOREHOLE DIAMETER:	10 inches	8
TOTAL WELL DEPTH:	60/ 90 / 110 feet	
BLANK CASING TYPE:	Sch. 80 PVC	
BLANK CASING DIAMETER:	2 inches	
TOTAL BLANK CASING LENGTH:	50 / 80 / 100 feet	
SCREEN TYPE:	Slotted Sch. 80 PVC	
SCREEN SLOT SIZE:	0.02 inches	
SCREEN LENGTH:	10 / 10 / 10 feet	
SUMP LENGTH:	NA	
PROTECTIVE CASING STICKUP:	N/A feet	
GROUT MATERIAL:	Portland cement, bentonite, water	
SEAL MATERIAL	Puregold medium chips	
FILTER MATERIAL:	Cemex Monterey Sand #3	
COMMENTS:		

APPENDIX B

Aquifer Testing Report

AQUIFER TESTING REPORT

MARYLAND SQUARE TETRACHLOROETHENE (PCE) SITE

3661 SOUTH MARYLAND PARKWAY
LAS VEGAS, NEVADA

SUBMITTED TO
NEVADA DIVISION OF ENVIRONMENTAL PROTECTION
BUREAU OF CORRECTIVE ACTIONS
901 SOUTH STEWART STREET, SUITE 4001
CARSON CITY, NEVADA 89701-5249

PREPARED FOR
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PREPARED BY

TETRA TECH

1230 Columbia Street, Suite 1000
San Diego, CA 92101

May 22, 2013

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1.0 INTRODUCTION

Tetra Tech EM Inc. (Tetra Tech) conducted aquifer testing at the Maryland Square Tetrachloroethene (PCE) Site (the Site) located approximately 2 miles east of downtown Las Vegas, Nevada (Figure 1). Purposes of aquifer testing were to estimate the hydraulic properties (e.g., hydraulic conductivity, transmissivity, and storage coefficient) of geologic materials at the site, and to obtain additional information on site hydrogeology.

1.1 SITE DESCRIPTION AND BACKGROUND

The Site contains a dissolved PCE plume that extends east (downgradient) from the location of the former dry cleaners (Al Philips the Cleaner), in the former Maryland Square Shopping Center (the Property) at 3661 South Maryland Parkway. The former dry cleaners operated in the former Maryland Square Shopping Center from 1969 to 2000. The former dry cleaners is on the west side of South Maryland Parkway, approximately 400 feet (ft) north of Twain Avenue, across the street from The Boulevard Mall (Figure 1). The exact date of the release (or releases) from the dry cleaners is unknown, although one 100-gallon spill was documented to have happened in 1982.

The historical discharge of PCE at the former dry cleaners facility was discovered during a due diligence environmental site assessment (Nevada Division of Environmental Protection [NDEP] 2012), and was reported on November 29, 2000, via the NDEP spill reporting hotline. In June 2005, the former shopping center, including the dry cleaning facility, was demolished.

A series of environmental investigations occurred on and off the Property from 2000 to present. Investigations on the Property determined the extent of PCE-contaminated soil. Investigations on and off the Property determined the extent of PCE-contaminated groundwater. Additional information on the history of the Site, as well as a list of previous investigations, appears in the GW CAP (Tetra Tech 2011a). In addition, the administrative record for the Site is available on-line at NDEP's website: http://ndep.nv.gov/pce/foia.htm. PCE-contaminated soil was removed from the Property in the summer of 2011.

This PCE plume in shallow groundwater extends downgradient of the former dry cleaning facility, beneath the Boulevard Mall, residential properties, and a golf course, past Eastern Avenue, which is approximately 6,000 ft downgradient. The western third of the plume is shown on Figure 1.

1.2 PHYSICAL SETTING AND SITE HYDROGEOLOGY

The Site is in the east-central portion of the Las Vegas Valley. Precipitation on the Valley floor averages 4.16 inches per year as reported by the Western Region Climate Center (WRCC 2010). Most precipitation occurs during the months of July and August

and during the winter (Wild 1990). Potential evapotranspiration ranges from 1 to 19 inches per month from winter to summer months (Shevenell 1996).

The Las Vegas Valley is a structural basin within the Basin and Range Province of the northern Mojave Desert (Langenheim and others 1998). The Valley is filled with 3,000 to 15,000 feet of sediments and, in the east central valley area, coarser-grained deposits interfinger with layers and lenses of sandy silt, silty sand, clayey sand, sandy clay, and caliche (Plume 1989, Leising 2004). Coarser grained deposits generally serve as aquifers, whereas the silts, clays, and caliche generally act as confining layers (Zikmund 1996). The upper unit of heterogeneous sand, silt, and clay sediments is termed the Las Vegas Wash Aquitard. Based on well logs on file with Nevada Department of Water Resources (NDWR), this unit may be 100 feet thick in the area of the Site. The shallow groundwater system that has been investigated to define the distribution of the PCE within the Site is within the upper 30 to 60 feet of the Las Vegas Wash Aquitard.

The geology of the Site consists of interbedded layers and lenses of sand, sandy silt, sandy clay, and silty clay, along with scattered, discontinuous layers and lenses of caliche, silty sand, and gravelly sand. Lithologic data are available for borehole logs from 46 monitoring wells installed at the Site between 2000 and 2013. Additional lithologic information was obtained from 29 soil borings drilled for characterization of source area soils (URS 2007a), and from borings installed for active soil-gas sampling in and adjacent to the residential neighborhood (URS 2007b). In July 2012 and January-March, 2013 Tetra Tech completed deeper borings west and east of the Boulevard Mall (see Section 2.1.1 of the main text) that provided lithological information for depths previously not investigated. In addition, generalized driller's logs (746 and 620 feet deep) are available for irrigation wells PW-1 (DWR #5675) and PW-2 (DWR #16296) at the Las Vegas National Golf Course. Depths of monitoring wells at the Site range between 20 and 110 ft, although most wells are completed at depths between 30 and 35 feet.

South-North cross sections constructed for two areas of investigation west and east of the Boulevard Mall (included as Figures 5 and 6 in the main report) indicate that approximately 20 ft of unsaturated materials are composed primarily of sands and silts. However, some portions of the unsaturated zone may consist entirely of sandy clays and clays. The upper 40 ft of the saturated zone consist of sands and silty sands, which tend to interbed with lower permeability clays and silts, and include lenses of caliche. A confining unit of predominantly fine-grained materials is present from approximately 60 to 90 ft bgs. Below 90 ft bgs is a unit of relatively more permeable materials (silty sands, sandy silts) with lenses of clay. West-East cross section (included as Figure 7 the main report), oriented parallel to the central line of the PCE plume in groundwater, further illustrates these main units. As indicated by water level measurements in shallow and deep monitoring wells, the bottom of the shallow groundwater system is approximately 60-65 ft bgs, while the unit below 90 ft bgs belongs to a deeper groundwater system.

As shown on the geologic cross sections for the upper 60 feet bgs in two areas west and east of the Boulevard Mall (see Figures 2 and 3), lower permeability materials (silty clay, sandy clay, clayey silt, and sandy silt) dominate the saturated zone of the shallow groundwater system. However, 5- to 20-foot-thick lenses of silty sand or poorly graded sand are present beneath the water table or underlie the clayey units. Both cross sections indicate that lenses of clay and caliche may act as semi-confining or confining layers for the shallow groundwater system as corroborated by measurements of groundwater elevations. First groundwater encountered during drilling of wells MW-14I and MW-19I was at 2 or more feet lower than the static water level. Therefore, at some locations of the Site, shallow groundwater system may act as a semi-confined (leaky) or confined aquifer. Boring logs for wells shown on the cross sections are provided in Attachment 1.

Depth to groundwater generally ranges from 9 to 28 feet below ground surface (bgs) across the Site. Based on water level data, shallow groundwater flows east with a gradient that ranges from 0.014 to 0.017 ft/foot. Historical groundwater elevations indicate the water table fluctuates seasonally. Since May 2005 (following one of the wettest seasons), groundwater levels have declined by about 4-5 feet through 2012.

Groundwater in the Las Vegas Wash Aquitard is generally brackish and considered non-potable, with total dissolved solids (TDS) ranging from 900 to 4,300 milligrams per liter (mg/L) in monitoring wells installed across the Site (Tetra Tech 2011). Water quality in the Las Vegas Wash Aquitard generally degrades in an easterly, downgradient direction, with increasing concentrations of TDS, sulfate, and sodium. The elevated salinity results from evapotranspiration, dissolution of saline minerals in soils and rocks, and infiltration of irrigation water (Zikmund 1996). Groundwater in the Las Vegas Wash Aquitard within the area of the Site is a calcium-magnesium-sulfate water with a lesser bicarbonate component (Leising 2004).

The remaining sections of this document discuss the pumping test methods (Section 2.0) and summarize results of the aquifer tests and interpretation (Section 3.0). Section 4.0 presents conclusions and offers recommendations.

2.0 METHODS

Tetra Tech conducted pumping tests downgradient of the MSSC within two investigation areas on the Boulevard Mall property: (1) east of the Boulevard Mall (Eastern Parking Lot Area) and (2) west of the Boulevard Mall (MW-14 Area). Step-drawdown and constant discharge tests took place within the Eastern Parking Lot Area from July 31 through August 4, 2012, and within the MW-14 Area from August 6 through 12, 2012. The test procedures are discussed in subsequent sections; additional details are accessible in the field notes provided as Attachment 2.

The test procedures included setup and calibration of the equipment, and water level measurements in the pumped and observation wells. Discharge water was treated for volatile organic compounds (including PCE) and TDS, and was collected in an on-site holding tank prior to disposal. Approval to discharge the treated water under the De

Minimis Discharge Program by the NDEP Bureau of Water Pollution Control was granted on October 1, 2013 (Attachment 3).

The following sections summarize the test setup and equipment used during aquifer testing, as well as procedures for each type of test that was performed.

2.1 AQUIFER TEST SETUP

The aquifer test equipment setup is illustrated on Figure 4. The same test setup was used at each investigation area.

Testing equipment included an electric submersible pump (Grundfos 5 SQ-90, 3-inch diameter) set into the pumping well at the top of the well screen to maximize available drawdown. A discharge hose was connected to a filter bag assembly that would remove any suspended solids. In front of the filter bag assembly, a valve and a flow meter were installed in line to control the discharge rate and to measure instantaneous and total flow from the well.

Pumped water was treated after passing through a system of 5-micron filter bags, a coconut-shell activated carbon vessel (to remove PCE), and an ion-exchange vessel (to remove TDS), and was then piped to a 18,000-gallon on-site holding tank. The carbon vessel contained 1000 pounds of virgin coconut carbon. Treatment and water storage areas were bermed for secondary containment of potential spills (see Figure 4).

To monitor water levels during tests, a pressure transducer, a Level TROLL 700 (with a cable vented to the atmosphere), was installed in the pumping well slightly above the pump to accommodate the maximum drawdown anticipated for the well. The same type of pressure transducers were installed in the nearby observation wells.

Because vented transducers were used, a separate transducer was not installed to monitor barometric pressure changes throughout the duration of the tests. Planned pumping was expected to generate drawdowns in observation wells that would significantly exceed level fluctuations resulting from atmospheric pressure changes.

The transducers/dataloggers were programmed by setting the level reference to zero, and continuously recording three parameters (pressure, temperature, and water level) at a logging rate of one reading per second. Static water levels in wells were measured before the test start.

2.2 STEP DRAWDOWN TEST

A step-drawdown or step-rate test was conducted to establish the optimum pumping rate for the long-term constant discharge pumping test. The step-drawdown test within each investigation area consisted of pumping from the extraction well at successively

increasing flow rates. Because of time constraints in the field, a 30-minute duration of pumping was selected for each step of the test.

Flow rates were monitored throughout the duration of each step of the test and adjusted to maintain the target step rate by adjusting a flow valve. Water levels in the pumped well and the nearest observation well were recorded using pressure transducers, and were also measured manually as a check. Water level recovery was monitored and recorded following the last step of the test; the level was allowed to completely recover to static prior to starting the constant discharge test. Treated discharge water from the tests was stored in the on-site holding tank.

2.2.1 Eastern Parking Lot Area

Well MW-19I was used as a pumped well for the step-drawdown test within the Eastern Parking Lot Area of the Boulevard Mall. Well MW-19 was used as an observation well during the test. Both wells were equipped with pressure transducers. Locations of wells in plan view and cross section are shown on Figures 1 and 3.

2.2.2 MW-14 Area

Well MW-14I was used as a pumped well for the step-drawdown test within the area west of the Boulevard Mall. Well MW-14 was used as an observation well during the test. Both wells were equipped with pressure transducers. Locations of wells in plan view and cross section are shown on Figures 1 and 2.

2.2.3 Test Results

Results of the step tests in each investigation area indicated that the pumping rate for the constant discharge test should be about 1 gallon per minute (gpm). In addition, data from the step tests could be used for preliminary estimation of the aquifer hydraulic parameters. Results of the step test interpretations are discussed in Section 3.1.

2.3 Constant Discharge Pumping Test

The constant discharge aquifer tests took place within each investigation area after completion of step-drawdown tests and return of water levels to static. Based on results of the step test, pumping rates of 1 gpm were selected for the constant discharge tests. Section 3.1 provides additional details regarding the procedure of selecting rates.

Flow rates in the pumped wells were monitored throughout the duration of the test and adjusted to maintain the target rate by adjusting a flow valve. Water levels in the pumped well and the observation wells were recorded using pressure transducers, and were also measured manually—frequently during the first few hours after initiation of the tests and every hour to 2 hours throughout the pumping period. Water level recovery was monitored and recorded after turning the pump off. Treated discharge water from the tests was stored in the on-site holding tank.

2.3.1 Eastern Parking Lot Area

The constant discharge test setup within the Eastern Parking Lot Area of the Boulevard Mall included pumped well MW-19I and three observation wells: MW-19, MW-20, and MW-CMT1 located 40 to 90 feet from the pumped well (see Figures 1 and 3).

All wells except MW-CMT1 were equipped with pressure transducers. The transducers/data-loggers were programmed to record changes in water levels from the beginning of pumping, so the recorded water level reflected the drawdown. A logging rate for water levels was set at one reading per second.

Well MW-CMT1 is a continuous multi-channel tubing well, for which transducers were not available. A slim water level sounder was used to collect water level measurements in this well. Static water levels were measured in all four wells before the test start.

2.3.2 MW-14 Area

The constant discharge test setup within the area west of the Boulevard Mall included pumped well MW-14I and three observation wells: MW-14, MW-6, and MW-13 located 40 to 231 feet from the pumped well (see Figures 1 and 2).

Wells MW-14, MW-6, and MW-13 were equipped with pressure transducers. The transducers/dataloggers were programmed to record changes in water levels from the beginning of pumping, so the recorded water level reflected the drawdown. Based on the 72-hour test within the Eastern Parking Lot Area, a logging rate for water levels at one reading per second resulted in the datalogger memory overflow issues. Therefore, a logarithmic sampling interval was used for wells during the 77-hour constant discharge test within the MW-14 area. Initial data were collected at 0.01-minute intervals. Intervals were increased towards the end of pumping period to a maximum of 4 hours. Static water levels were measured in all four wells before the start of the test.

2.3.3 Test Results

Results of the constant discharge tests within each investigation area were used for estimation of the aquifer hydraulic parameters. Results of the test interpretations are discussed in Section 3.3. The estimated parameters are defined and briefly discussed below.

Transmissivity (T) of an aquifer is a measure of how much water can be transmitted horizontally to a pumping well. Transmissivity is directly proportional to the thickness of an aquifer (b) and is calculated as $T = K\,b$, where K is hydraulic conductivity. The dimensions of transmissivity are area per time.

The storage coefficient characterizes ability of an aquifer to store water. The storage coefficient (S) of an aquifer represents a volume of water released from an aquifer per 1 foot surface area per 1 foot change in head. The potential range of the S value

depends on whether the aquifer is confined or unconfined. In a confined aquifer setting, the load on top of an aquifer is supported by the solid rock skeleton and the hydraulic pressure exerted by water (the hydraulic pressure acts as a support mechanism). Water derived from storage of a confined aquifer is due to: (1) expansion of water as the aquifer is depressurized (pumped) and (2) compression of the aquifer. Because of these variables, the storage coefficient of most confined aquifers ranges from 0.00001 to 0.001. Conversely, in an unconfined aquifer setting, the predominant source of water is from gravity drainage, while expansion of water and compaction of the rock skeleton is negligible. Thus, in an unconfined aquifer, the storage coefficient is approximately equal to a value of specific yield and ranges from 0.1 to about 0.3.

3.0 AQUIFER TEST RESULTS

This section discusses how the pumping test data were analyzed and interpreted, and presents results of interpretation for each of the investigation areas.

Data obtained from the pumping tests were used to calculate the transmissivity and storage coefficient of the shallow water-bearing zone beneath the site. In addition, specific capacity values and well efficiency were estimated for pumped wells MW-14I and MW-19I within each investigation area.

A summary of field information for the step-drawdown and constant discharge tests is provided in Table 1. Table 2 summarizes results of the step drawdown tests interpretation. Table 3 provides details on the pumping and observation wells used in the pumping tests, including maximum drawdown observed in wells. Input parameters for the AQTESOLV program are summarized in Table 4. Table 5 lists estimates of transmissivity and storage coefficient obtained on a well by well basis from the step test and pumping tests. In addition, Table 5 also provides estimates of hydraulic conductivity of the materials in which the test wells are screened.

3.1 STEP TEST DATA INTERPRETATION

Step test data were used to determine the optimal pumping rate for the constant rate pumping tests and calculate well specific capacity and efficiency. Step drawdown data were plotted in the field (see Figures C1 and C3 in Attachment 4) to determine the optimal pumping rate for the constant rate pumping test.

These data allowed estimating a specific capacity for each pumped well, although the drawdowns were not sufficiently stabilized at the end of each step for well MW-14I. Specific capacity expresses the well yield per unit of drawdown (Driscoll 1995). Thus, specific capacity for each pumped well was determined by dividing the step-specific pumping rate by the respective drawdown. The highest estimated specific capacities for wells MW-19I and MW-14I correspond to lowest pumping rates, and are 0.16 and 0.09 gpm per foot of drawdown, respectively (see Table 2). The estimated values of specific capacity appeared low for both wells and suggested selecting a lower pumping rate for the subsequent constant discharge pumping test.

The drawdown versus time plots further were used to evaluate the well efficiency of the pumping well during the step drawdown test based on the method developed by Jacob (1964) and Bierschenk (1974). For wells with turbulent flow, Jacob (1964) suggested that the drawdown in a well might be more accurately expressed as the sum of a first-order (laminar) component and a second-order (turbulent) component, as follows:

$$s = BQ + CQ^2$$

where:

s = Drawdown (L)

Q = Pumping rate (L^3/T)

BQ = Formation loss (laminar term, reflects the head loss resulting from aquifer permeability)

CQ^2 = Well loss (the turbulent term, reflects the head loss attributable to hydraulic resistance of well screen or, in other words, to well inefficiency).

This equation can be expressed in linear form:

$$\frac{s}{Q} = B + CQ$$

and it can be solved graphically by plotting s/Q against Q to produce a straight line, where B is the intersect on the y-axis and C the slope of the line (Brassington 2007). It is then possible to calculate well efficiency at each pumping step using the following equation:

$$\text{Well Efficiency} = \frac{BQ}{BQ+CQ^2} \times 100$$

Well efficiency of each pumped well decreased from 74 to 60 percent when pumping rates increased from approximately 1 to 1.4 or 1.9 gpm, respectively (Table 2). Both wells appeared most efficient when pumping at approximately 1 gpm. Based on this information, a rate of 1 gpm was selected for constant discharge test within each investigation area.

3.2 CONSTANT DISCHARGE TEST DATA INTERPRETATION

This section summarizes the drawdown response characteristics and casing storage effects observed during constant discharge tests within each investigation area. Time-drawdown plots for both the pumped and observation wells for each test are included in Attachment 3. The test data were interpreted using AQTESOLV version 4.5 (HydroSolve, Inc. 2007), an aquifer test solution program. The AQTESOLV printouts of

the pumping test interpretation results are provided in Attachment 5. The estimated hydraulic parameters are summarized in Table 5.

3.2.1 Casing Storage Effects

Because pumping was conducted at a low flow rates, the casing storage of the pumped well could affect interpretation of test results. To determine the time when casing storage effects become negligible, the following formula was used (Schafer 1978, as cited in Driscoll 1995):

$$t_c = 0.6\ (d_c^2 - d_p^2)/Q/s$$

where:

t_c = critical time when casing storage effect becomes negligible

d_c = inside diameter of well casing (inches)

d_p = ouside diameter of pump column pipe (inches)

Q/s = specific capacity of the well in gpm/foot at time t_c

The equation above requires that the drawdown s at time t_c be known, as two unknowns are in the equation. However, t_c can be calculated iteratively by choosing initial s from the time-drawdown curve and repeating calculations until the calculated t_c does not change (Driscoll 1995).

For well MW-19I, d_c = 4 inches, d_p = 3 inches, and Q = 0.94 gpm throughout 72-hour pumping. Based on these inputs, the time when casing storage effect in well MW-19I becomes negligible is estimated at 14.5 minutes since start of pumping. For well MW 14I, pumped at 1 gpm for 77 hours, the casing storage effect was estimated to become negligible after 32 minutes since start of pumping. Accordingly, the type curves were fitted to the portion of the time-drawdown data when well storage effects became insignificant.

3.2.2 Eastern Parking Lot Area

The constant discharge pumping test within the Eastern Parking Lot Area included 72 hours of continuous pumping at a rate of 0.94 gpm, which resulted in a maximum drawdown in the pumped well of 3.9 feet (see Table 1). However, all observation wells responded to pumping only with small drawdowns of approximately 0.03 – 0.04 foot (see Table 3). After the pump was turned off, the water levels in both the pumped well and observation wells continued to be monitored for several hours until complete recovery. During the pumping test, more than 4,000 gallons of water was extracted and treated.

The drawdown in well MW-19I at the end of 72-hour pumping period measured only 3.9 feet. Both well development and step test indicated well MW-19I to be poorly producing. As can be seen on cross section (Figure 3), the available drawdown is

limited to approximately 10 feet. Pumping at 1.4 gpm at the last 30-minute step resulted in drawdown of 10.2 feet (see Table 1). By selecting a pumping rate of 0.94 gpm for the 72-hour constant discharge test, it was expected that water level would not be drawn below the top of the well screen.

However, pumping of MW-19I during the step test may have resulted in some additional well development, which likely improved its overall efficiency. Based on a weak response of the observation wells MW-19 and MW-20, the selected long-term pumping rate appears too low to stress the aquifer sufficiently in the allotted time for the test. Therefore, data from the observation wells obtained during the constant discharge test were used with caution for determining the hydraulic parameters. As a supplement, the time-drawdown data from MW-19 obtained from the step test, as well as recovery data for the pumped well, were used to assist in increasing confidence in the estimated parameters.

3.2.3 MW-14 Area

After pumping of MW-14I at an average rate of 1 gpm for 77 hours, all the observation wells at the area showed a good response to pumping with drawdowns of 0.11 to 0.23 foot (see Table 3). After the pump was turned off, water levels in both the pumped well and observation wells continued to be monitored for several hours until complete recovery. During the pumping test, more than 4,600 gallons of water was extracted and treated.

Time-drawdown data obtained from all observation wells within the NW-14 Area were more confidently interpreted than were well data from the Eastern Parking Lot Area. The following section provides details on pumping test data interpretation.

3.3 Selection of Analytical Models for Data Interpretation

The test data were interpreted using AQTESOLV version 4.5 (HydroSolve 2007), an aquifer test solution program. The AQTESOLV program used for test data interpretation allows matching the observed time-drawdown data to theoretical standard curves (type curves). Based on the matched curves, the program calculates transmissivity (T) and storage coefficient (S). Hydraulic conductivity (K) is calculated by dividing the transmissivity value by the aquifer thickness value (b).

As supported by the cross sections constructed for both investigation areas (see Figures 2 and 3) and discussed in Section 1.2, the site lithology and hydrogeology conditions are interpreted to correspond to a confined or leaky confined aquifer. Therefore, the Theis (1935)/Hantush (1961) solution for a pumping/recovery test with a constant discharge rate in a confined aquifer with partial penetration was selected as the appropriate method for data analysis. Some data sets were also evaluated by Hantush (1960) solution for a pumping/recovery test in a leaky confined aquifer without storage in adjacent aquitards. However, in majority of cases, Theis/Hantush solution for a confined aquifer was a better fit to the field data.

Numeric values for T and S were first automatically calculated by the software program from the match of the drawdown curves for observation wells to the standard curves (see Attachment 5). However, final interpretations for both test areas were derived using visual curve-fitting to data and accounting for casing storage effects exhibited by the extraction wells.

The analysis methods assume radial flow to the pumping well in a homogeneous, isotropic, confined unit. The Hantush (1960) method also assumes vertical flow from overlying and underlying aquitards into the pumped zone. The equations and assumptions for both methods are detailed in the AQTESOLV user's guide (Hydrosolve, Inc. 2007).

Evaluation of recovery data was conducted using Theis (1935) straight-line solution for determining T and S from residual drawdown data obtained during the recovery phase of the pumping test. Recovery analyses are applicable to confined, homogeneous, isotropic aquifers of unlimited extent that are fully penetrated by a well pumped at a constant rate. The recovery data plots, especially for the pumped well MW-19I, showed deviation from the method conditions, with recovery occurring significantly quicker than expected. This indicates relatively low efficiency of the pumping wells (particularly MW-19I). Therefore, the recovery analyses were not considered in determining S based on recovery data for the pumped wells.

3.4 ESTIMATED HYDRAULIC PARAMETERS

Based on results of the step drawdown and constant discharge tests within the Eastern Parking Lot Area, the estimates of transmissivity (T), storage coefficient (S), and hydraulic conductivity (K) for the saturated zone average 64 ft^2/day, 0.0017, and 2.1 ft/day, respectively. The estimation of hydraulic conductivity assumed a 30-foot thickness of the saturated zone, and the estimated K values ranged from 1.1 to 3.4 ft/day, which are characteristic of silty sand and fine sand materials (Heath 1983, Domenico and Schwartz 1998). The estimated average anisotropy ratio K_z/K_r is approximately 0.005, which indicates much lower permeability of the subsurface materials vertically than horizontally.

Based on results of the step drawdown and constant discharge tests within the MW-14 Area (west of the Boulevard Mall), the estimates of T, S, and K for the saturated zone average 146 ft^2/day, 0.0009, and 4.2 ft/day, respectively. Based on the assumed 35-foot thickness of the saturated zone, the estimated K values ranged from 0.4 to 9.4 ft/day, which are characteristic of silty sand to medium clean sand materials (Heath 1983, Domenico and Schwartz 1998). The estimated average vertical to horizontal hydraulic conductivity anisotropy ratio (K_z/K_r) for the saturated water-bearing zone is approximately 0.013, which indicates nearly 100 times lower permeability of the subsurface materials vertically than horizontally.

Table 5 lists estimates of transmissivity and storage coefficient obtained on a well-by-well basis from the step tests and pumping tests. In addition, Table 5 provides

estimates of hydraulic conductivity, as well as the estimated anisotropy ratio K_z/K_r for the saturated water-bearing zone.

4.0 SUMMARY AND CONCLUSIONS

From July through August 2012, Tetra Tech conducted aquifer testing at the Maryland Square PCE Site to estimate the hydraulic properties (e.g., hydraulic conductivity, transmissivity, and storage coefficient) of geologic materials at the Site, and to obtain additional information on site hydrogeology.

Results of the step drawdown and 72- to 77-hour constant discharge tests within the Eastern Parking Lot Area and MW-14 Area (west of MSSC) are summarized as follows:

1. The formation in which pumped wells are screened supports only relatively low well yields, as indicated by the relatively low specific capacity for both pumped wells MW-14I and MW-19I of 0.07 to 0.16 gpm per foot of drawdown, which means that wells screened in the shallow water-bearing zone would not be productive and, therefore, are impractical for use in a pump-and-treat system.

2. On average, the estimated transmissivity and aquifer storage coefficient range from 64 to 146 ft^2/day and 0.0009 to 0.0017, respectively, which means that wells screened in the shallow water-bearing zone will have excessive drawdowns even at low pumping rates and, therefore, will render pump-and-treat system inefficient.

3. The average estimated hydraulic conductivity values range from 2.1 to 4.2 ft/day and correspond to silty and sandy materials of the saturated zone, which means that permeability of the tested materials in the shallow water-bearing zone is moderate. However, moderare permeability materials are likely present in the subsurface as thin disconnected lenses which would not support significant well yields.

Based on average hydraulic conductivity estimates and typical hydraulic gradients, the horizontal groundwater velocity at locations of the tests is estimated to range from 40 to 100 feet per year (ft/yr); with higher velocities associated with sand lenses of limited extent. Considering low total organic carbon (TOC) values reported in soil samples collected within both test areas, retardation of PCE migration due to sorption to organic carbon is expected to be low. Therefore, within the test areas, PCE migration rate with groundwater is likely to range from 30 to 70 ft/yr.

Estimates of hydraulic parameters obtained from the aquifer tests can be used for interpretation of the pilot tests, and for support of groundwater modeling applications and risk assessments.

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FIGURES



Legend

- Continuous Core and Discrete Depth Groundwater Sampling Location
- Monitoring Well Location (Sampled November 2010)
- Monitoring Well Location (Sampled March 2011)
- Monitoring Well Location (Not Sampled)
- 2500 ug/L PCE Contour
- 2000 ug/L PCE Contour
- 1500 ug/L PCE Contour
- 1000 ug/L PCE Contour
- 500 ug/L PCE Contour
- 100 ug/L PCE Contour
- 5 ug/L PCE Contour (Dashed Where Inferred)

ug/L	Micrograms Per Liter
NA	Not Analyzed
ND	Not Detected
NS	Not Sampled
PCE	Tetrachloroethylene
PQL	Practical Quantitation Limit
URS	URS Corporation

PCE PQL = 0.5 ug/L

N
W E
S

0 100 200 Feet

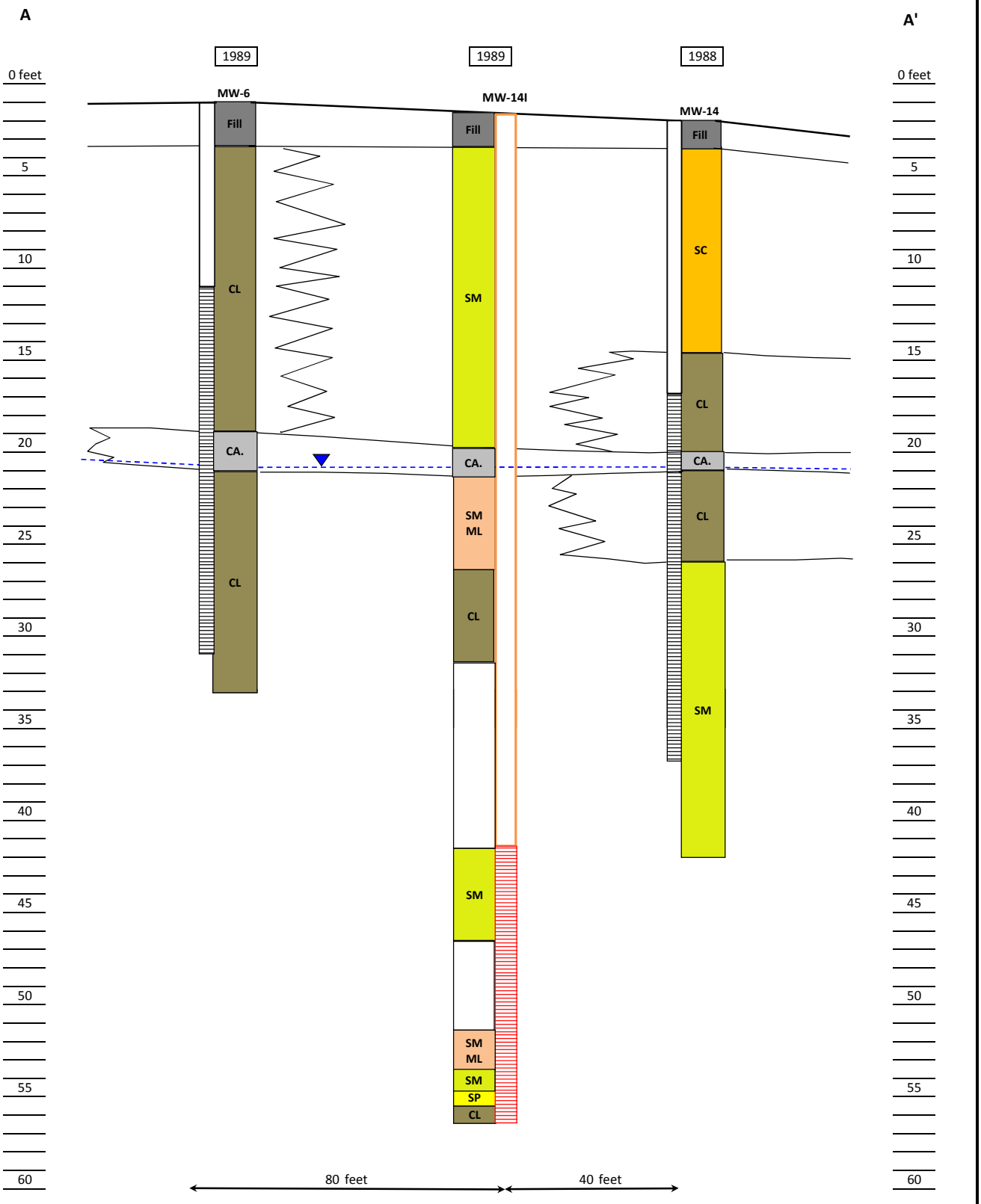
Approximate Scale in Feet

MARYLAND SQUARE SHOPPING CENTER
3661 South Maryland Parkway
Las Vegas, Nevada

FIGURE 1
WELL LOCATIONS AND CROSS SECTION LINES

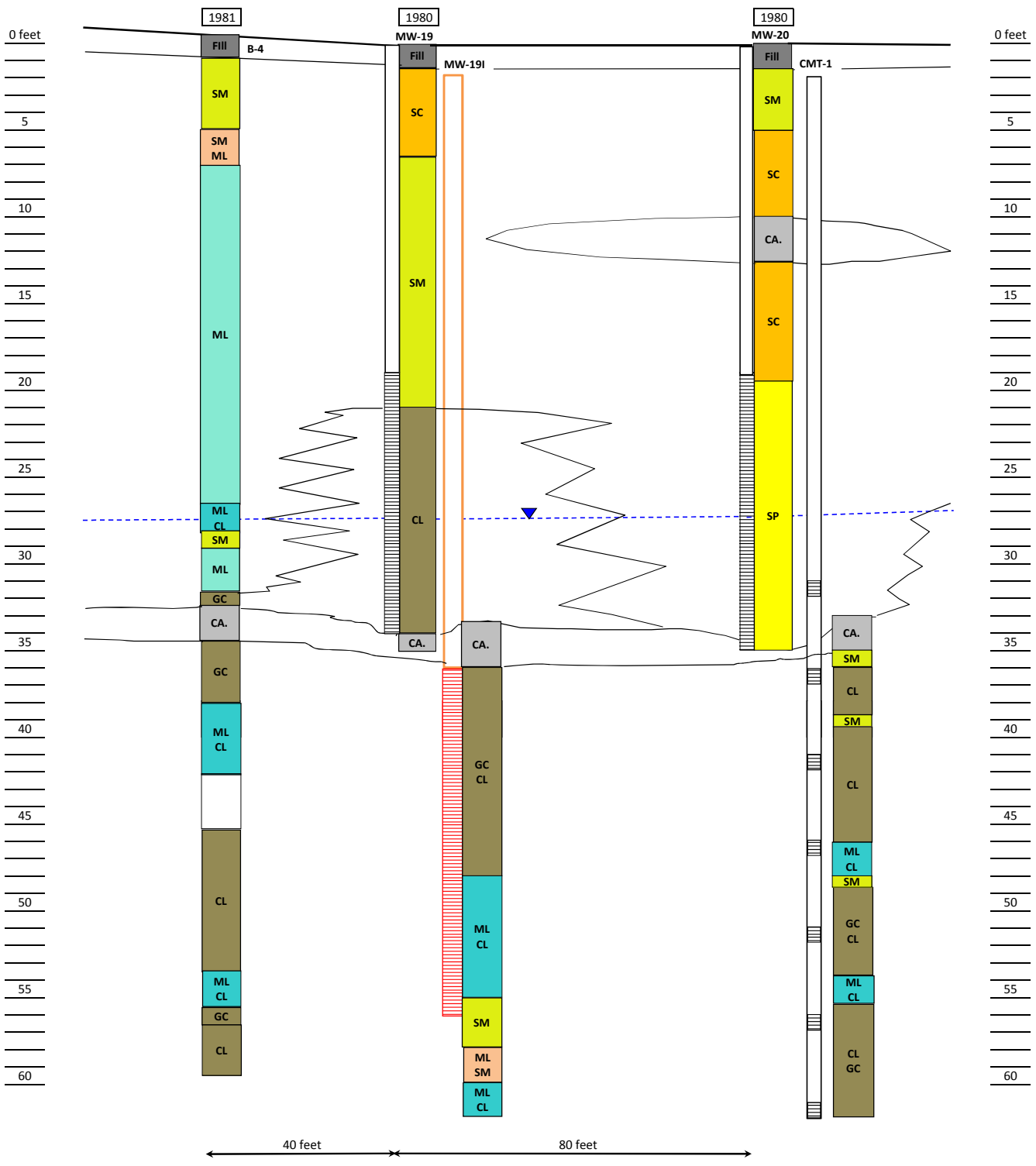
TETRA TECH

Path: S:\Projects Directory\Private Sector - Other Offices\Maryland Square\Figure 1 Proposed Pilot Test.mxd



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FIGURE 2
SCHEMATIC GEOLOGIC CROSS SECTION A-A'
MW-14 AREA (WEST OF MSSC)



Notes: Wells MW-19I and MW-CMT1 are projected to the line of cross section (approximately 40 feet from east)

Fill	Fill under asphalt surface	SP	Poorly graded sand, little fines	GC	Clayey gravel		Groundwater potentiometric surface
CL	Clay, silty clay, sandy clay	ML	Clayey silt, sandy silt	GC/CL	Gravel/Clay mixture		
SM	Silty sand	ML /CL	Silt, clayey silt, silt/clay mixtures	ML/SM	Sandy silt/silty sand		
	Caliche		Not recovered interval		Well casing and screen		
1980	Ground surface elevation in feet above mean sea level						

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FIGURE 3
SCHEMATIC GEOLOGIC CROSS SECTION B-B'
EASTERN PARKING LOT AREA





Notes:

1. BF 100 Filter System with 5 Micron Filter Bags
2. 1000-pound Carbon Vessel (to Treat PCE)
3. Canister with Ion Exchange Resin (to Treat TDS)
4. 18,000 Gallon Flip Top Tank with Containment Berms
5. Discharge Hosing with Flow Control Valve and Flow Meter
6. Low-noise Power Generator

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FIGURE 4
AQUIFER TEST SETUP

TABLES

TABLE 1: SUMMARY OF AQUIFER TEST FIELD INFORMATION
Maryland Square Shopping Center PCE Site

Date	Test Time		Test Step	Flow Rate (gpm)	Cumulative Drawdown (feet)	Change in Drawdown from Previous Step (feet)	Flow Totalizer (gallons)		Estimated Treated Volume (gallons)
	Start	End					Start	End	
Eastern Parking Lot Area -- Pumped Well MW-19I									
Step Test									
7/31/2012	15:01	15:31	1	0.95	6.12	6.12	0	--	--
	15:31	16:01	2	1.15	8.37	2.25	--	--	--
	16:01	16:31	3	1.40	10.2	1.83	--	115	115
Pumping Test									
8/1/2012	9:20		--	0.94	3.9	--	0	4061	4061
8/4/2012		9:20							
MW-14 Area (West of the MSSC) -- Pumped Well MW-14I									
Step Test									
8/6/2012	13:40	14:10	1	1.01	11.07	11.07	0	--	--
	14:10	14:40	2	1.53	18.98	7.91	--	--	--
	14:40	15:10	3	1.93	26.13	7.15	--	136	136
Pumping Test									
8/7/2012	11:01	--	--	1.0	13.26	--	0	4615	4615
8/10/2012	--	16:00							

Notes:
gpm Gallons per minute

TABLE 2: STEP DRAWDOWN TEST ANALYSIS
Maryland Square Shopping Center PCE Site

Step	Drawdown s (ft)	Pumping Rate Q (gpm)	s/Q (ft/gpm)	Specific Capacity Q/s (gpm/ft)	Well Efficiency (Laminar Flow) (%)
Eastern Parking Lot Area -- MW-19I					
1	6.12	0.95	6.44	0.16	74
2	8.37	1.15	7.28	0.14	70
3	10.20	1.40	7.29	0.14	66
MW-14 Area (West of the MSSC) -- MW-14I					
1	11.07	1.01	10.96	0.09	74
2	18.98	1.53	12.41	0.08	65
3	26.13	1.93	13.54	0.07	60

Notes:

ft Feet
gpm Gallons per minute

TABLE 3: SUMMARY OF PUMPING AND OBSERVATION WELL INFORMATION
Maryland Square Shopping Center PCE Site

Well Name	Well Type	Screen Interval (feet bgs)	TOC Elevation (feet MSL)	Depth to Static Water Level[1] (feet TOC)	Groundwater Elevation[1] (feet TOC)	Distance to Pumping Well (feet)	Well Affected by Aquifer Test Activities?	Pumping Test Maximum Drawdown[2] (feet)
Eastern Parking Lot Area								
MW-19I	Extraction	34 - 54	1978.34	26.85	1951.49	0	Yes	3.90
MW-19	Observation	19 - 34	1980.24	27.83	1952.41	40	Slightly	0.035
MW-20	Observation	19 - 34	1979.95	27.60	1952.35	92	Slightly	0.030
MW-CMT1*	Observation	30 - 60.5[3]	1978.69	26.72 - 26.53[4]	1951.97 - 1952.16[4]	81	Slightly	0.030[5]
MW-14 Area (West of the MSSC)								
MW-14I	Extraction	40 - 55	1987.40	19.35	1968.05	0.0	Yes	13.26
MW-14	Observation	15 - 35	1987.86	18.90	1968.96	40	Yes	0.23
MW-06	Observation	10 - 30	1989.03	19.93	1969.10	80	Yes	0.15
MW-13	Observation	9 - 29	1984.18	18.50	1965.68	231	Yes	0.11

Notes:

[1] Based on measurements on August 1 and 7, 2012, for the eastern parking lot and MW-14 area, respectively.

[2] Based on transducer readings

[3] 0.5-foot-long screens are from 30 to 60 feet bgs at every 5-foot interval.

[4] Based on measurements in zones 1 through 6; water level in zone #7 could not be measured because of internal obstruction.

[5] Based on manual water level measurements; a slight drawdown was observed in zone #6 only.

* Not equipped with pressure transducers

bgs Below ground surface

MSL Mean sea level

TOC Top of casing

TABLE 4: AQTESOLV INPUT PARAMETERS FOR WELLS
Maryland Square Shopping Center PCE Site

Well ID	Casing Radius (ft)	Well Radius (ft)	Radius of Downhole Equipment (ft)	Fully Penetrating?	Depth to Top of Well Screen[1] (ft)	Screen Length[2] (ft)
Eastern Parking Lot Area						
MW-19I	0.166667	0.166667	0.125	no	7.5	20
MW-19	0.083333	0.083333	--	no	0.0	6.5
MW-20	0.083333	0.083333	--	no	0.0	7.5
MW-14 Area (West of the MSSC)						
MW-14I	0.166667	0.166667	0.125	no	20	15
MW-14	0.083333	0.083333	--	no	0.0	11
MW-06	0.083333	0.083333	--	no	0.0	9
MW-13	0.083333	0.083333	--	no	0.0	6.5

Notes:

[1] Measured from the water table; 0.0 feet is entered for wells screened across the water table (all observation wells).

[2] For wells screened across the water table, the length of saturated screen is entered, excluding the length of the screen filled with sediment at the bottom.

ft Feet

TABLE 5: PUMPING TEST INTERPRETATION RESULTS
Maryland Square Shopping Center PCE Site

Well ID	Solution	T (ft^2/day)	S --	b (ft)	K = T/b (ft/day)	Kz/Kr --
	Eastern Parking Lot Area -- Pumped Well MW-19I					
Step Drawdown Test						
MW-19I	Theis (1935)/Hantush (1961)	45.5	--	30	1.5	--
MW-19I	Same - Recovery	33.9	--	30	1.1	--
MW-19	Hantush-Jacob (1960) without aquitard storage*	66.6	1.2E-03	30	2.2	5.2E-03
Constant Discharge Pumping Test						
MW-19I	Theis (1935)/Hantush (1961)	102.5	--	30	3.4	1.0E-02
MW-19I	Same - Recovery	92.5	--	30	3.1	--
MW-19I, MW-19, MW-20	Hantush-Jacob (1960) without aquitard storage*	68.1	2.6E-03	30	2.3	1.9E-03
	Geometric Mean	**63.6**	**1.7E-03**	**--**	**2.1**	**4.6E-03**
	MW-14 Area (West of the MSSC) -- Pumped Well MW-14I					
Step Drawdown Test						
MW-14I	Theis (1935)/Hantush (1961)	25.0	--	35	0.7	--
MW-14I	Same - Recovery	13.0	--	35	0.4	--
Constant Discharge Pumping Test						
MW-14	Theis (1935)/Hantush (1961)	329.1	6.0E-03	35	9.4	1.3E-01
MW-14	Same - Recovery	317.0	4.6E-03	35	9.1	--
MW-06	Theis (1935)/Hantush (1961)	319.7	4.3E-04	35	9.1	2.2E-03
MW-06	Same - Recovery	316.0	1.9E-04	35	9.0	--
MW-13	Theis (1935)/Hantush (1961)	216.5	4.8E-04	35	6.2	7.1E-03
MW-13	Same - Recovery	282.2	4.8E-04	35	8.1	--
	Geometric Mean	**146.2**	**8.9E-04**	**--**	**4.2**	**1.3E-02**

Notes: Parameters T, S, and Kz/Kr are estimated using AQTESOLV, version 4.5 (HydroSolve 2007) based on confined aqufer solutions except where indicated. Interpretation results for pumped wells accounted for well efficiency.

T	Aquifer transmissivity [ft^2/day]
S	Storage coefficient [dimensionless]
b	Saturated thickness [ft]
K	Aquifer hydraulic conductivity [ft/day]
r	Radial distance from pumping well [ft]
Kz/Kr	Hydraulic conductivity anisotropy ratio
ft/day	Feet per day
ft^2/day	Square feet per day
*	Based on leaky confined (semi-confined) aquifer solution
--	Not available or applicable

ATTACHMENT 1

BORING LOGS AND MONITORING WELL COMPLETION DIAGRAMS

ATTACHMENT A
BORING LOGS AND MONITORING WELL COMPLETION DIAGRAMS

BORING LOGS FOR MW-14 AREA

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BORING LOG
MW-14I

Project: Maryland Square Shopping Center	Borehole Depth: 55 feet bgs.	Sampling Method: Split spoon	Page 1 of 3
Location: 3661 S. Maryland Parkway	Borehole Diameter: 10 inches		
Project No.: 103P172824.01	Reviewed By: Becki Dano	Northing (feet): TBA	
Logged By: Vladimir Prilepin		Easting (feet): TBA	
Date Boring Started: 7/26/2012	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA	
Date Boring Completed: 7/26/2012	Drilling Method: HSA	Top of Casing Elevation (feet MSL): TBA	

Depth (feet bgs)	Drive Interval (% recovery)	Blow Counts	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description	OVA (ppm, BZ = breathing zone)
							Borehole was cleared w/air knife to 4.5 feet bgs	
0							0-1.5 feet bgs. Asphalt/aggregate base	
1					SM		1.5-4.5 feet bgs. Very hard to break with air knife - very dense SILTY SAND	
2								
3								
4								
5								
6	50%						5-10 feet bgs. SILTY SAND, very pale brown, 10YR 7/3 to 10YR 8/2, 70-85% very fine sand, 15-30% silt with occasional gravels; loose, dry	0.0
7								
8								
9								
10							10-15 feet bgs, poor recovery. Same as above.	0.0
11								
12								
13								
14								
15	10%						15-20 feet bgs. Becomes very dense at ~18', pinkish white 7.5YR 8/2, CALICHE rocks in the core (1-2.5" in size, angular) at ~18.5'-20'; whitish dry; amount of silt and fines increases w/depth to ~40-45%	
16								
17								
18								
19					CA.			
20	50%							

TETRA TECH

BORING LOG
MW-14I

Project: Maryland Square Shopping Center	Borehole Depth: 55 feet bgs.	Sampling Method: Split spoon	Page 2 of 3
Location: 3661 S. Maryland Parkway	Borehole Diameter: 10 inches		
Project No.: 103P172824.01	Reviewed By: Becki Dano	Northing (feet): TBA	
Logged By: Vladimir Prilepin		Easting (feet): TBA	
Date Boring Started: 7/26/2012	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA	
Date Boring Completed: 7/26/2012	Drilling Method: HSA	Top of Casing Elevation (feet MSL): TBA	

Depth (feet bgs)	Drive Interval (% recovery)	Blow Counts	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description	OVA (ppm, BZ = breathing zone)
20					SM/ML		20-26.5 feet bgs, poor recovery. SILTY SAND/SANDY SILT, pinkish white, 7.5YR 8/2, ~40-50% very fine sand, 60-50% silt, loose, dry	0.0
21								
22								
23								
24								
25	10%							7.5
26								
27					CL		26.5-30 feet bgs. Lean CLAY with gravels, strong brown 7.5YR 4/6, sticky, soft, plastic; gravels angular, 0.5-1" in size	
28								
29							First GW encountered at 29' bgs	
30	70%		3:25am	GW	SM?		TT-EW1-01-GW-30	
31							No recovery for 30-35 feet (likely loose silty sand material, because sticky clay would have stuck in the core barrel)	
32								
33								
34								
35	0%		3:55	GW			TT-EW1-02-GW-35	
36								
37								
38								
39								
40	0%							

TETRA TECH

BORING LOG
MW-14I

Project: Maryland Square Shopping Center	Borehole Depth: 55 feet bgs.	Sampling Method: Split spoon	Page 3 of 3
Location: 3661 S. Maryland Parkway	Borehole Diameter: 10 inches		
Project No.: 103P172824.01	Reviewed By: Becki Dano	Northing (feet): TBA	
Logged By: Vladimir Prilepin		Easting (feet): TBA	
Date Boring Started: 7/26/2012	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA	
Date Boring Completed: 7/26/2012	Drilling Method: HSA	Top of Casing Elevation (feet MSL): TBA	

Depth (feet bgs)	Drive Interval (% recovery)	Blow Counts	Time	Sample No.	USCS	Graphic Log	Interval and Lithologic Description	OVA (ppm, BZ = breathing zone)
40			4:25	GW	SM		Attempted to collect gw sample, but only collected 0.5 vial from 40-41 feet bgs	
41								
42							40-45 feet bgs. SILTY SAND, saturated, little retrieved. Driller suggests that drilling inside the 24" conductor casing (installed from 0-20' bgs) may be forcing deviations from the vertical direction that may lead to poor recovery of cores.	
43								
44					CL			
45	10%						44-45 feet bgs. SANDY CLAY, reddish yellow, 7.5YR 6/6, saturated, soft, plastic, amount of sand and gravels up to 15%	
			5:00	GW			TT-EW1-03-GW-45	
46					SM?		No recovery from 45-50 feet bgs - loose material, very easy drilling	
47								
48								
49								
50	0%							
			5:35	GW	SM/ML/CL		TT-EW1-04-GW-50 (collected only one vial - little water; couldn't get rid of a bubble in the vial)	3.4
51				SS			TT-EW1-01-SS-51 for 50-52 feet bgs - retreived ~1' soil sample w/Shelby tube; FINE SAND/SILT/CLAY mixture.	5.8
52					SM/GC		52-53 feet bgs. SILTY SAND, GRAVEL, CLAY mixture, yellowish brown 10YR 5/6, saturated, soft, plastic; 30% fine sand, 30% gravel, 40% fines	3.3
53					SP		53-54 feet bgs. Poorly graded SAND with little silt, strong brown 7.5YR 5/6, loose to medium dense, saturated.	2.2 / 0.0
54					CL		54-55 feet bgs. CLAY, strong brown 7.5YR 4/6, medium stiff to stiff, medium plasticity.	
55	75%							
			6:36	GW			TT-EW1-05-GW-55 (from 55-56 feet bgs.)	
56							**T.D. 55 feet bgs**	
57								
58								
59								
60								

Log No. MW-6

Date of Drilling: 10/03/00 | Location: | Ground Surface Elevation (ft):
Driller: Converse | Borehole Diameter: | Equipment: Air Rotary
Logged By: JMW | Groundwater Depth (ft): | Driving Wt. and Drop:

SUMMARY OF SUBSURFACE CONDITIONS

This log is part of the report prepared by Converse for this project and should be read with the report. This summary applies only at the location and time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplified model of the actual conditions encountered.

Depth (ft)	Graphic Log	Blow Count	PID/OVA Reading (ppm)	Hydrocarbon Odor/Staining	Well Design
0	ASPHALT Type II Fill				
2	CLAY w/Silt; dry, medium brown				
4					
6					
8					
10	slightly moist, light brown				
12	CLAY w/Silt; slightly moist, white/brown				
14	CLAY w/Silt; hard, light brown				
16					
18	CALICHE; hard				
20					

APPROVED BY ON

Maryland Square
3661 South Maryland Parkway
Las Vegas, NV

Project No.
00-43367-05

Drawing No.

Converse Consultants

Over 60 Years of Dedication
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Environmental Sciences

Log No. MW-6

Date of Drilling: 10/03/00
Driller: Converse
Logged By: JMW

Location:
Borehole Diameter:
Groundwater Depth (ft):

Ground Surface Elevation (ft):
Equipment: Air Rotary
Driving Wt. and Drop:

SUMMARY OF SUBSURFACE CONDITIONS

This log is part of the report prepared by Converse for this project and should be read with the report. This summary applies only at the location and time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplified model of the actual conditions encountered.

Depth (ft)	Graphic Log	Blow Count	PID/OVA Reading (ppm)	Hydrocarbon Odor/Staining	Well Design
22	CLAY w/Silt; slightly moist, light brown				
24	....wet				
26					
28					
30					
32					
34					
36					
38					
40					

End of Exploration at 32.0'

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Maryland Square
3661 South Maryland Parkway
Las Vegas, NV

Project No.
00-43367-05

Drawing No.

Converse Consultants

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Log No. MW-13

Date of Drilling: 05/06/03
Driller: Converse
Logged By: ALM

Location:
Borehole Diameter:
Groundwater Depth (ft):

Ground Surface Elevation (ft):
Equipment: Air Rotary
Driving Wt. and Drop:

SUMMARY OF SUBSURFACE CONDITIONS

This log is part of the report prepared by Converse for this project and should be read with the report. This summary applies only at the location and time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplified model of the actual conditions encountered.

Depth (ft)	Graphic Log	Blow Count	PID/OVA Reading (ppm)	Hydrocarbon Odor/Staining	Well Design
0	ASPHALT Type II Fill				
4	CALICHE				
6	SANDY SILT w/gravel; moist,tan				
16	CLAYEY SAND; moist, tan				
18	SANDY CLAY; very moist, red				
20					

APPROVED BY ON

Maryland Square
3661 South Maryland Parkway
Las Vegas, NV

Project No.
00-43367-05

Drawing No.

Converse Consultants

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Environmental Sciences

Log No. MW-13

Date of Drilling: 05/06/03
Driller: Converse
Logged By: ALM

Location:
Borehole Diameter:
Groundwater Depth (ft):

Ground Surface Elevation (ft):
Equipment: Air Rotary
Driving Wt. and Drop:

SUMMARY OF SUBSURFACE CONDITIONS

This log is part of the report prepared by Converse for this project and should be read with the report. This summary applies only at the location and time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplified model of the actual conditions encountered.

Depth (ft)	Graphic Log	Blow Count	PID/OVA Reading (ppm)	Hydrocarbon Odor/Staining	Well Design
22					
24					
26					
28					
30					
32					
34					
36					
38					
40					

APPROVED BY: ON

End of Exploration at 29.0'

Maryland Square
3661 South Maryland Parkway
Las Vegas, NV

Project No.
00-43367-05

Drawing No.

Converse Consultants

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Environmental Sciences

Log No. MW-14

Date of Drilling: 11/14/03 | Location: | Ground Surface Elevation (ft):
Driller: Elite | Borehole Diameter: 8.25" | Equipment: Mobile B-57
Logged By: JJ | Groundwater Depth (ft): | Driving Wt. and Drop:

DRAFTED BY ESB

APPROVED BY ON

SUMMARY OF SUBSURFACE CONDITIONS

This log is part of the report prepared by Converse for this project and should be read with the report. This summary applies only at the location and time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplified model of the actual conditions encountered.

Depth (ft)	Graphic Log		Blow Count	PID/OVA Reading (ppm)	Hydrocarbon Odor/Staining	Well Design
0		Asphalt/Aggregate base				
2		Clayey sand; tan, slightly moist				
4						
6						
8						
10						
12		Sandy lean clay; few caliche, gravel, white, moist				
14			50/6			
16						
18			13/20			
20						

Kishnor/Maryland Square
3661 So. Maryland Parkway
Las Vegas, Nevada

Project No.
00-43367-06

Drawing No.

Converse Consultants

Over 50 Years of Dedication
In Engineering and
Environmental Sciences

Log No. MW-14 14

Date of Drilling: 11/14/03 | Location: | Ground Surface Elevation (ft):
Driller: Elite | Borehole Diameter: 8.25" | Equipment: Mobile B-57
Logged By: JJ | Groundwater Depth (ft): | Driving Wt. and Drop:

SUMMARY OF SUBSURFACE CONDITIONS

This log is part of the report prepared by Converse for this project and should be read with the report. This summary applies only at the location and time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplified model of the actual conditions encountered.

Depth (ft)	Graphic Log		Blow Count	PID/OVA Reading (ppm)	Hydrocarbon Odor/Staining	Well Design
		Sandy lean clay; few caliche, gravel, white, moist				
22		Sandy lean clay; brown, moist				
24		Silty sand with gravel				
26						
28						
		Silty sand with gravel				
30						
32						
34						
36						
38						
40						

End of Exploration at 40.0'

Kishnor/Maryland Square
3661 So. Maryland Parkway
Las Vegas, Nevada

Project No.
00-43367-06

Drawing No.

Converse Consultants

Over 50 Years of Dedication
In Engineering and
Environmental Sciences

BORING LOGS FOR EASTERN PARKING LOT AREA

TETRA TECH

BORING LOG
MW-19I

Project:	Maryland Square Shopping Center	Borehole Depth:	59-60 feet bgs.	Sampling Method: Split spoon
Location:	3661 S. Maryland Parkway	Borehole Diameter:	10 inches	Page 1 of 3
Project No.:	103P172824.01	Reviewed By:	Becki Dano	Northing (feet): TBA
Logged By:	Vladimir Prilepin			Easting (feet): TBA
Date Boring Started:	7/19/2012	Drilling Contractor:	Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA
Date Boring Completed:	7/23/2012	Drilling Method:	HSA	Top of Casing Elevation (feet MSL): TBA

Depth (feet bgs)	Drive Interval (% recovery)	Blow Counts	Time	Sample Matrix	USCS	Graphic Log	Interval and Lithologic Description	OVA (ppm, BZ = breathing zone)
0			10:10				0.5' asphalt	
1							0-5 feet bgs. Cleared with air vacumn tool (silty sand w/gravel)	
2								
3								
4								
5		4			SM		5-7 feet bgs. SILTY SAND with gravel, very pale brown 10YR 7/3, loose, dry; gravels up to 2"	0.0
6		8						
		21						
7	70%	2						
		8			SM/SP		7-9 feet bgs. SILTY SAND to fine SAND, very pale brown 10YR 7/3, fine, poorly graded, loose dry to ~8', becomes dense with gypsum(?) crystals up to 1.5" long, 0.2" wide, color changes to 10YR 8/3	0.0
8		10						
		10						
9	90%	11						
		5			SM/ML		9-11 feet bgs. Fine SAND /SILT mixture, very pale brown, dry, medium desnity when pressed, occasional gravel, crumbles.	0.0
10		8						
		11						
11	95%	4						
		5			ML		11-13 feet bgs. SILT to CLAYEY SILT, very pale brown, 10YR 7/3, medium dense (crumbles when pressed), clay content increases with depth to ~15%, 85% silt; becomes brown at ~12 feet - 7.5YR 3/4	
12		8						
		10						
13	100%	12						
		9					13-15 feet bgs. CLAYEY SILT, brown 7.5YR 5/4, medium dense (crumbled), dry, clay content increases with depth to ~30	0.0
14		12						
		13						
15	100%	14						
		13					15-17 feet bgs. Same as above.	0.0
16		8						
		13						
17	100%	15						
		6					17-19 feet bgs. Same as above with gravelly to silty clay	0.0
18		13						
		15						
19	100%	16						
		5			ML/CL		19-21 feet bgs. SILTY CLAY/CLAYEY SILT, strong brown, 7.5YR 5/6, medium dense to soft (easily crumbles), dry, 60-50% silt,	
20	100%	5						

TETRA TECH

BORING LOG
MW-19I

Project:	Maryland Square Shopping Center	Borehole Depth: 59-60 feet bgs.	Sampling Method: Split spoon	
Location:	3661 S. Maryland Parkway	Borehole Diameter: 10 inches		
Project No.:	103P172824.01	Reviewed By: Becki Dano	Northing (feet): TBA	
Logged By:	Vladimir Prilepin		Easting (feet): TBA	
Date Boring Started:	7/19/2012	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA	
Date Boring Completed:	7/23/2012	Drilling Method: HSA	Top of Casing Elevation (feet MSL): TBA	

Depth (feet bgs)	Drive Interval (% recovery)	Blow Counts	Time	Sample Matrix	USCS	Graphic Log	Interval and Lithologic Description	OVA (ppm, BZ = breathing zone)
20		7					40-60% clay	
	100%	7						
21		3			CL		21-23 feet bgs. SILTY CLAY, srong brown 2.5YR 5/4, medium stiff to soft, dry, secondary mineralization traces	0.0
		7						
22		8						
	100%	7						
23		3					23-25 feet bgs. SILTY CLAY with gravels, to gravelly clay, brown, soft, gravels up to 1" in size, angular	
		5						
24		4						
	100%	6						
25		3					25-27 feet bgs. GRAVELLY CLAY. Amount of gravels increases to 30%	
		6						
26		4						
	100%	5						
27		2			CL		27-29 feet bgs. SANDY to SILTY CLAY, light brown 7.5YR 6/4, soft, low to medium plasticity, ~70% clay, fine to very fine sand 10-15%, silt 10-15%, moist	
		2						
28		4						
	100%	25		▼				
29		4			GC/CL		29-31 feet bgs. GRAVEL/CLAY mixture, brown, saturated, gravels up to 1", subangular to rounded, 60% gravel, 30% clay, 10% silt/sand.	
		7						
30		14						
	70%	24					Driller tried to push through sampler but in caliche	
31					CA		31-33 feet bgs. CALICHE (couldn't collect a core sample), pushed GW sampler 33-34 feet.	
32								
	0%							
33							Attempted to collect groundwater sample - no water	
		3			CL/GC		34-36 feet bgs. SILTY CLAY/CLAYEY GRAVEL mixture, saturated between 34' & 35', gravels to 1.5" to coarse sand, moist 35'-36'. Up to 50% gravel, ~50% fine, gravels rounder	
34		18						
		8						
35		7						
	80%							
36				GW			TT-EW2-01-GW-36 (water is muddy)	
37		nr			GC/CL		37-39 feet bgs. Similar to above, saturated ~36-38, grading to SILTY CLAY at ~38 feet, plastic, soft, 70% clay	
38								
	75%							
39		0			CL/GC		39-40 feet bgs. GRAVEL/CLAY mixture, saturated	
	80%	2						
40								

TETRA TECH

BORING LOG
MW-19I

Project: Maryland Square Shopping Center	Borehole Depth: 59-60 feet bgs.	Sampling Method: Split spoon	Page 3 of 3
Location: 3661 S. Maryland Parkway	Borehole Diameter: 10 inches		
Project No.: 103P172824.01	Reviewed By: Becki Dano	Northing (feet): TBA	
Logged By: Vladimir Prilepin		Easting (feet): TBA	
Date Boring Started: 7/19/2012	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA	
Date Boring Completed: 7/23/2012	Drilling Method: HSA	Top of Casing Elevation (feet MSL): TBA	

Depth (feet bgs)	Drive Interval (% recovery)	Blow Counts	Time	Sample Matrix	USCS	Graphic Log	Interval and Lithologic Description	OVA (ppm, BZ = breathing zone)
40								
		2			CL		40-41 feet bgs. CLAY, brown, soft, plastic, with occasional gravels, sticky, moist	
41	80%	3						
			13:55	GW	ML		TT-EW2-02-GW-41	
42								
				SS			TT-EW2-01-SS-42 Collected soil samle for physical parameters [with Shelby tube (2'), between 42-44 feet] - SANDY, CLAYEY SILT	
43								
44								
		2			GC/CL		44-46 feet bgs. GRAVEL/GRAVELLY CLAY mixture, saturated 44-45 feet; grading to SILTY CLAY, CLAYEY SILT, SANDY SILT, amount of sand increases with depth	
45		5						
		13			ML/SM			
46	70%	11						
							46-47 feet bgs. Attempted to collect water sample, no water in sampler after waiting ~10 min.; will increase waiting time	
47								
		6			CL/ML		47-49 feet bgs. SILTY/SANDY CLAY grading to CLAYEY SILT, strong brown, 7.5YR 4/6; saturated between 47-47.5' (water from above?), sand, very fine at 15%, some gravels, from 48-49' CLAYEY SILT, soft, medium plasticicity, dry to moist	
48		11						
		8						
49	80%	8						
				GW			TT-EW2-O3-GW-49	
50								
		27			ML		50-52.5 feet bgs. CLAYEY SILT to SANDY SILT with gravels, brown, saturated at the top, gravels angular to subangular.	
51		50/4						
		"						
52	60%	"						
		13						
		17			SM		52.5-54 feet bgs. SILTY SAND with gravel, strong brown 7.5YR 5/6; soft, some plasticity, very fine sand ~70%, 20% silt, 10% clay	
53		16						
54	80%	13						
				GW			TT-EW2-O4-GW-54	
55								
		4			ML/SM		55-57 feet bgs. CLAYEY SILT to SILTY SAND, strong brown, amount of fines decreases with depth; amount of fine sand increases with depth; 15-70% fine sand, 45-15% silt, 10-5% clay; moist	
56		6						
		9						
57	90%	8						
		4			ML/CL		57-59 feet bgs. GRAVELLY and CLAYEY SILT grading to SILTY CLAY with depth, brown 7.5YR 5/4, gravel is rounded to subangular; 0.25-1'; silt 60-30%, clay 30-50%, gravel ~10-30%	
58		6						
		5						
59	90%	15						
			16:40	GW			TT-EW2-05-GW-59 between 59-60 feet bgs	
							T.D. 60 feet bgs	
60								

TETRA TECH

BORING LOG
B-4

Project:	Maryland Square Shopping Center	Borehole Depth:	60 feet bgs.	Sampling Method: Split spoon
Location:	3661 S. Maryland Parkway	Borehole Diameter:	10 inches	
Project No.:	103P172824.01	Reviewed By: Becki Dano		Northing (feet): TBA
Logged By:	Vladimir Prilepin			Easting (feet): TBA
Date Boring Started:	7/18/2012	Drilling Contractor: Cascade Drilling L.P.		Ground Surface Elevation (feet MSL): TBA
Date Boring Completed:	7/18/2012	Drilling Method: HSA		Top of Casing Elevation (feet MSL): TBA

Depth (feet bgs)	Drive Interval (% recovery)	Blow Counts	Time	Sample Matrix	USCS	Graphic Log	Interval and Lithologic Description
0							Asphalt
1					SM		0.5-5 feet bgs (the borehole cleared with air vac tool: description per soil cuttings): SILTY SAND with GRAVEL, compacted, hard, dry.
2							
3							(PID readings every 2-4 feet to a total depth: 0.0 ppm)
4							
5			11:30				Began drilling w/HSA at 5' to collect continuous core samples every 2"
6		4			SM/ML		5-7 feet bgs. SILTY SAND/SILT, light brown, 7.5YR 6/3, with gravel of 1-1.5", very fine to fine sand, dry, loose; black with organics, fine grained, hard from 6 to 7'
		8					
		17					
7	85%	18					
		4			ML		7-9 feet bgs. CLAYEY SILT, brown, 7.5YR 5/4, slight plasticity, medium dense
8		4					
		10					
9	100%	17					
		8					9-11 feet bgs. Becomes hard, whitish to very pale brown, 10YR 8/2, with gypsum? or calcite? mineralization
10		14					
		14					
11	100%	20					
		21					11-13 feet bgs. SANDY SILT to SILT, very pale brown 10YR 8/2, dry, compacted, crumbles with fingers
12		23					
		28					
13	100%	28					
		13					13-15 feet bgs. SILT, whitish to very pale brown, 10YR 8/2, hardens at ~14'
14		11					
		16					
15	100%	17					
		7					15-17 feet bgs. SILT to CLAYEY SILT, color changes to light brown, 7.5YR 6/4, compacted, crumbles with fingers; dry
16		11					
		15					
17	100%	18					
		5					17-19 feet bgs. CLAYEY SILT, brown 7.5YR 5/4, clay content increases ~70 - 80% silt, 30 - 20% clay, medium hard, slight plasticity (fines)
18		9					
		11					
19	100%	12					
		3					19-21 feet bgs. Same as above
20		9					

TETRA TECH

BORING LOG
B-4

Project:	Maryland Square Shopping Center	Borehole Depth: 60 feet bgs.	Sampling Method: Split spoon	
Location:	3661 S. Maryland Parkway	Borehole Diameter: 10 inches		
Project No.:	103P172824.01	Reviewed By: Becki Dano	Northing (feet): TBA	
Logged By:	Vladimir Prilepin		Easting (feet): TBA	
Date Boring Started:	7/18/2012	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA	
Date Boring Completed:	7/18/2012	Drilling Method: HSA	Top of Casing Elevation (feet MSL): TBA	

Depth (feet bgs)	Drive Interval (% recovery)	Blow Counts	Time	Sample Matrix	USCS	Graphic Log	Interval and Lithologic Description
20		11					
	100%	13					
21		4					21-23 feet bgs. CLAYEY SILT, brown 7.5YR 5/4; with little very fine, sand, soft, loose, dry
		4					
22		4					
	100%	5					
23		2					23-25 feet bgs. Same as above
		2					
24		4					
	100%	4					
25		2					25-27 feet bgs. CLAYEY SILT with some very fine sand, becomes wet at ~26.5', plasticity increases at 26.7', 60% silt, 40% clay, <5% very fine sand
		2					
26		3					
	100%	3					
27		0			ML/CL		27-29 feet bgs. SILT/SILTY CLAY, strong brown 7.5YR 4/6, soft, grades from medium to high plasticity
		0					
28		1					
	90%	2					
29		2			SM		29-30 feet bgs. SILTY SAND, brown, fine to very fine, well sorted, moist
		1			▼		First groundwater encountered between 29.5 and 30 feet bgs.
30		1			ML		30-31 feet bgs. CLAYEY SILT with some gravels, mottled, light brown 7.5 YR 6/4, soft, plastic; gravels 0.5-0.75", subrounded to subangular; moist to dry
	85%	1					
31		0		GW			TT-B4-01-GW31; GW sample collected between 31 and 32' bgs; no soil retreival.
		5					
32		0					32-33.5 feet bgs. CLAYEY SILT, brown, soft, plastic, saturated
		5					
33		50					
	70%	4			GC		33.5-34 feet bgs. CLAYEY/SILTY GRAVEL, 0.25-1.5 in size,
34		50			Ca.		subangular to subrounded, coarse, saturated, 70% gravel, 30% fines.
		50					34-36 feet bgs. CALICHE. No recovery, hard drilling.
35		50					
	0%	50					
36			15:10	GW			TT-B4-02-GW-36. GW sample between 36-38 feet bgs; no soil core sample.
37							
	0%						
38		2			GC		38-39.5 feet bgs. CLAYEY GRAVEL w/coarse SAND, subangular to subrounded; saturated; (coarse sand, well graded, multicolored); 70% gravel, 15% sand, 15% clay.
		3					
39		3					
	80%	2					
40							

TETRA TECH

BORING LOG
B-4

Project: Maryland Square Shopping Center	Borehole Depth: 60 feet bgs.	Sampling Method: Split spoon	
Location: 3661 S. Maryland Parkway	Borehole Diameter: 10 inches		
Project No.: 103P172824.01	Reviewed By: Becki Dano	Northing (feet): TBA	
Logged By: Vladimir Prilepin		Easting (feet): TBA	
Date Boring Started: 7/18/2012	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA	
Date Boring Completed: 7/18/2012	Drilling Method: HSA	Top of Casing Elevation (feet MSL): TBA	

Depth (feet bgs)	Drive Interval (% recovery)	Blow Counts	Time	Sample Matrix	USCS	Graphic Log	Interval and Lithologic Description
40		2			ML/CL		39.5-42 feet bgs. CLAYEY SILT/SILTY CLAY with occasional gravels, brown, saturated between 39.5' & 40'; becomes dry at ~40.5'; medium soft, medium plasticity
41		3					
		3					
42	80%	3					
							(Attempted to collect GW sample; tip of the sampler got unplugged; discrete sample could not be collected from 42-43' interval)
43							
44							
			16:00	GW			TT-B4-03-GW-44
45	0%						
		3			ML/GC		45-47 feet bgs. Gravelly, sandy SILT w/CLAY, brown, 7.5 YR 4/6, wet; soft ~50% fines, 20% fine/very fine sand, 30% gravels, up to 1.0" in size; grading to clay; at ~46.5' medium stiff to stiff.
46		4					
		6					
47	90%	7					
		1			CL		47-49 feet bgs. CLAY with occasional gravels, brown 7.5YR 4/6, medium to high plasticity, medium stiff to stiff, 90% clay, silt <10%
48		4					
		6					
49	100%	8					
			16:30	GW			TT-B4-04-GW-49 (GW sampler pushed 49-50')
50							
		Not					50-54 feet bgs. Same as above, silt content increases to ~10%; plastic; grades into stiff clay at ~53.5 feet bgs (color changes to light brown 7.5YR 6/4)
51		recorded					
52	60%						
		3					
53		50					
54	50%						
					CL/ML		GW sampler pushed from 54', forgot plug, had to repush to 56'
55							
				GW			TT-B4-05-GW-55 - between 55'-56', water is muddy, some bubbles in water that was poured (previous samples had cloudy water)
56	0%						
		13					56-56.5 feet bgs. CLAYEY SILT w/gravel, soft, plastic, wet;
57		12			GC		56.5-57.5 feet bgs. CLAYEY GRAVEL, light brown, 0.25-1.5" gravels, angular to subangular, poorly sorted, ~70% gravel, 20% clay, 10% silt
		18					
58	90%	12			CL		57.5-60 feet bgs. SILTY CLAY/CLAY w/occasional gravels, brown, 7.5YR 5/4; low to medium plasticity, medium stiff to stiff.
		10					(Attempted to collect groundwater sample by pushing the sampler down to 61 feet bgs - no water encountered)
59		8					
		8					
60	100%	6					**T.D. 60 feet bgs**

TETRA TECH

BORING LOG
MW-CMT1

Project:	Maryland Square Shopping Center	Borehole Depth:	61 feet bgs.	Sampling Method: Split spoon
Location:	3661 S. Maryland Parkway	Borehole Diameter:	8 inches	Page 1 of 3
Project No.:	103P172824.01	Reviewed By:	Becki Dano	Northing (feet): TBA
Logged By:	Vladimir Prilepin			Easting (feet): TBA
Date Boring Started:	7/23/2012	Drilling Contractor:	Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA
Date Boring Completed:	7/25/2012	Drilling Method:	HSA	Top of Casing Elevation (feet MSL): TBA

Depth (feet bgs)	Drive Interval (% recovery)	Blow Counts	Time	Sample Matrix	USCS	Graphic Log	Interval and Lithologic Description	OVA (ppm, BZ = breathing zone)
0			14:45				0.5 feet Asphalt	
							0-5 feet bgs. Cleared with air vac tool (silty sand with pea gravel)	
1								
2								
3								
4								
5					SM		5-9 feet bgs. SILTY SAND, very pale brown 10YR 8/2, 70% very fine poorly graded sand, 30% silt; amount of silt increses between 8-9' bgs; loose, dry, compacted 8-9' bgs	0.0
6								
7								
8								
9					SP		9-10 feet bgs. Poorly graded SAND, color changes to light yellowish brown 10YR 6/4; very fine to fine, >95% sand, <5% silt; loose to slightly compacted, dry	0.0
10	10%				SP/SM		10-15 feet bgs. Same as above, grading to SILTY SAND at ~ 14 feet bgs; with occasional gravels, sabangular to subrounded, 0.5-0.75" in size.	0.0
11								
12								
13								
14								
15	40%				SP		15-20 feet gps. SAND (aeolean or dune sand), poorly graded, fine to very fine, light yellowish brown 10YR 6/4, dry, loose	0.0
16								
17								
18								
19								
20	40%							

TETRA TECH

BORING LOG
MW-CMT1

Project:	Maryland Square Shopping Center	Borehole Depth: 61 feet bgs.	Sampling Method: Split spoon	
Location:	3661 S. Maryland Parkway	Borehole Diameter: 8 inches		
Project No.:	103P172824.01	Reviewed By: Becki Dano	Northing (feet): TBA	
Logged By:	Vladimir Prilepin		Easting (feet): TBA	
Date Boring Started:	7/23/2012	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA	
Date Boring Completed:	7/25/2012	Drilling Method: HSA	Top of Casing Elevation (feet MSL): TBA	

Depth (feet bgs)	Drive Interval (% recovery)	Blow Counts	Time	Sample Matrix	USCS	Graphic Log	Interval and Lithologic Description	OVA (ppm, BZ = breathing zone)
20					SP/SM		20-25 feet bgs. Same as above; grading to SILTY SAND at ~23 feet	
21								
22								
23							23-25 feet bgs. SILTY SAND, very pale brown, 10YR 7/3, amount of silt increases to 30-35% with depth; fines plastic (~10%)	
24								
25	60%							
					SW/GP		25-30 feet bgs. Same as above, grading to GRAVEL/SAND mixture, strong brown 7.5YR 5/6 to multi-colored because of gravels (subrounded to rounded, 0.5-1.5" in size), damp at 28-29 feet bgs, sand is coarse to fine, well graded.	
26								
27								
28								
29				SS			TT-MW-40-01-PNOD - Collected composite sample from 29-55 feet bgs	
30	40%			▼				
					SM		30-31 feet bgs. SILTY SAND, strong brown 7.5YR 5/6, grading to compacted, hard caliche that crumbles along the horizontal planes but resulting thin plates are rigid and hard to break with fingers	0.0
31					CA.		31-32 feet bgs - CALICHE.	
32	100%							
			15:50	GW			TT-MW-40-01-GW-32 (from 32-33 feet bgs)	
33					SM		33-34 feet bgs. SILTY SAND, 70-80% fine sand, 20% silt, grading to SANDY LEAN CLAY, brown 7.5YR 5/4, medium plasticity, semisoft, damp (34-35 feet bgs), clay 85%, fine sand 15%	
34					CL			
35	100%							
				GW			TT-MW-40-02-GW-35 from 35-36 feet bgs	
36							35-37.5 feet bgs. Lean CLAY, brown as above, amount of fine sand decreasing with depth to 0; clay soft to medium stiff, damp, plastic, very sticky.	
37				SS			TT-MW-40-01-SS-36 - collected undisturbed soil sample (Shelby tube) from 36-38 feet bgs - SILTY SAND	
38					SM			
					CL		38-40 feet bgs. Lean CLAY (as above)	
39								
40	100%							

TETRA TECH

BORING LOG
MW-CMT1

Project:	Maryland Square Shopping Center	Borehole Depth: 61 feet bgs.	Sampling Method: Split spoon	Page 3 of 3
Location:	3661 S. Maryland Parkway	Borehole Diameter: 8 inches		
Project No.:	103P172824.01	Reviewed By: Becki Dano	Northing (feet): TBA	
Logged By:	Vladimir Prilepin		Easting (feet): TBA	
Date Boring Started:	7/23/2012	Drilling Contractor: Cascade Drilling L.P.	Ground Surface Elevation (feet MSL): TBA	
Date Boring Completed:	7/25/2012	Drilling Method: HSA	Top of Casing Elevation (feet MSL): TBA	

Depth (feet bgs)	Drive Interval (% recovery)	Blow Counts	Time	Sample Matrix	USCS	Graphic Log	Interval and Lithologic Description	OVA (ppm, BZ = breathing zone)
40			8:05	GW	CL		TT-MW-40-03-GW-40	
							40-45 feet bgs. Lean CLAY, yellowish brown 10YR 5/4, soft, plastic at ~42 feet (where saturated) becomes medium stiff, gravelly between 44.5-45 feet bgs, gravels subangular to subrounded, 0.5-1", 15% gravel, 85% clay	
41								
42								
43								
44								
45	60%							
			8:45	GW			TT-MW-40-04-GW-45	0.0
46							45-46 feet bgs. SANDY, GRAVELLY CLAY, yellowish brown 10YR 5/4; 15-30% fine sand & gravels (up to 0.25"), 85-70% clay	
					ML/CL			
47							46-47 feet bgs. SANDY SILT grading to SILTY CLAY, strong brown 7.5YR 4/6; moist, clay is plastic, medium stiff. A stringer of fine silty sand (4") at ~47 feet, saturated 70% sand - 30% fines	
					SM			
48					GC			
							47-50 feet bgs. Fine SAND, SILT, CLAY, GRAVEL mixture, yellowish brown 10YR 5/4, 30% fine sand, 35% silt & clay, 35% gravels (0.5-1", subangular), moist to wet, amount of gravels increases with depth	
49								
50	100%							
			9:30	GW	CL/GC		TT-MW40-05-GW-50 (for 50-51 feet bgs)	
51							50-53 feet bgs. GRAVELLY CLAY/CLAY-GRAVEL mixture, very pale brown 10YR 7/3, 30-40% gravels, light to dark colored, subangular to rounded, 0.2-1" in size; clay 70-60%, low plasticity, damp to moist (saturated at the top of the core)	0.0
52								
53					ML/CL		53-54.5 feet bgs. SANDY SILT with gravel, yellowish brown, ~15% very fine sand, 10% gravel, 75% silt, grades to SILTY CLAY, plastic, moist to wet	
54								
55	100%							
			10:05	GW	CL/GC		TT-MW40-06-GW-55 for 55-56 feet bgs	0.7ppm
56							55-59 feet bgs. SANDY/SILTY CLAY, grading to GRAVELLY CLAY/CLAYEY GRAVEL mixture at 57 feet, strong brown 7.5YR 5/6, with lighter colored secondary mineralization; stiff, plastic, sticky, gravels subangular to subrounded 0.2-1", gravel content increases with depth from 5 to 50%; wet, saturated at depth	
57								
58								
59							59-60 feet bgs. Same as above but clay content increases to 60-70%	
60	100%		11:15	GW			TT-MW40-07-GW-60 (for 60-61 feet bgs)	

T.D. 61 feet bgs

Log No. MW-19

19

Date of Drilling: 11/13/03
Driller: Elite
Logged By: JJ

Location:
Borehole Diameter: 8.25
Groundwater Depth (ft):

Ground Surface Elevation (ft):
Equipment: Mobile B-57
Driving Wt. and Drop:

DRAFTED BY ESB

APPROVED BY ON

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS This log is part of the report prepared by Converse for this project and should be read with the report. This summary applies only at the location and time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplified model of the actual conditions encountered.	Blow Count	PID/OVA Reading (ppm)	Hydrocarbon Odor/Staining	Well Design
0		Asphalt/Aggregate				
2		Clayey sand; light brown, slightly moist				
4						
6						
8		Silty sand with gravel; dark brown, slightly moist				
10		...tan				
12						
14		...brown				
16						
18						
20						

Kishner/Maryland Square
3661 So. Maryland Parkway
Las Vegas, Nevada

Project No.
00-43367-06

Drawing No.

Converse Consultants

Over 50 Years of Dedication
in Engineering and
Environmental Sciences

Log No. MW-13

Date of Drilling: 11/13/03 | Location: | Ground Surface Elevation (ft):
Driller: Hitc | Borehole Diameter: 8.25 | Equipment: Mobile B-57
Logged By: H | Groundwater Depth (ft): | Driving Wt. and Drop:

SUMMARY OF SUBSURFACE CONDITIONS

This log is part of the report prepared by Converse for this project and should be read with the report. This summary applies only at the location and time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplified model of the actual conditions encountered.

Depth (ft)	Graphic Log		Blow Count	PID/OVA Readings (ppm)	Hydrocarbon Odor Staining	Well Detail
22		Sandy lean clay; reddish brown, very moist				
24						
26						
28						
30						
32						
34		Caliche				
36						
38						
40						

End of Exploration at 35.0'

PLANNED BY: GK
APPROVED BY: ___

Kishner/Maryland Square
3661 So. Maryland Parkway
Las Vegas, Nevada

Project No.
00-43367-06

Drawing No.

Converse Consultants

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In Engineering and
Environmental Sciences

Log No. MW-20

Date of Drilling: 11/13/03 | Location: | Ground Surface Elevation (ft):
Driller: Elite | Borehole Diameter: 8.25" | Equipment: Mobile B-57
Logged By: JJ | Groundwater Depth (ft): | Driving Wt. and Drop:

DRAFTED BY: ESB

APPROVED BY: ON

SUMMARY OF SUBSURFACE CONDITIONS

This log is part of the report prepared by Converse for this project and should be read with the report. This summary applies only at the location and time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplified model of the actual conditions encountered.

Depth (ft)	Graphic Log		Blow Count	PID/OVA Reading (ppm)	Hydrocarbon Odor/Staining	Well Design
0		Asphalt/Aggregate				
2		Silty sand with gravel; dark brown, slightly moist				
4						
6		Clayey sand; tan, slightly moist				
		Poorly graded sand with silt; light brown, slightly moist				
8		Clayey sand few gravels; tan, slightly moist				
10		Caliche				
12		Clayey sand with gravel; tan, slightly moist				
14						
16						
18						
20		Poorly graded sand with silt; light brown, slightly moist				

Kishner/Maryland Square
3661 So. Maryland Parkway
Las Vegas, Nevada

Project No.
00-43367-06

Drawing No.

Converse Consultants

Over 50 Years of Dedication in Engineering and Environmental Sciences

Log No. MW-20 70

Date of Drilling: 11/13/03 | Location: | Ground Surface Elevation (ft):
Driller: Elite | Borehole Diameter: 8.25" | Equipment: Mobile B-57
Logged By: JD | Groundwater Depth (ft): | Driving Wt. and Drop:

SUMMARY OF SUBSURFACE CONDITIONS

This log is part of the report prepared by Converse for this project and should be read with the report. This summary applies only at the location and time of the exploration. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplified model of the actual conditions encountered.

Depth (ft)	Graphic Log	Blow Count	PID/OVA Reading (ppm)	Hydrocarbon Odor/Staining	Well Design
22					
24					
26					
28					
30					
32					
34					
36					
38					
40					

End of Exploration at 35.0'

APPROVED BY: JN

Kishner/Maryland Square
3661 So. Maryland Parkway
Las Vegas, Nevada

Project No.
00-43367-06

Drawing No.

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WELL CONSTRUCTION DETAILS

TABLE A1: WELL CONSTRUCTION DETAILS

Well Name	Well Constr. Date	Northing (feet)	Easting (feet)	TOC Elevation ft msl	Well Casing Diameter inches	Total Depth of Well feet bgs	Total Depth of Borehole feet	Top of Screen feet bgs	Bottom of Screen feet bgs	Screen Length feet	Logged geology of screened interval
Eastern Parking Lot Area:											
MW-19I	7/23/12	26746995.65	788955.09	1978.34	4	60	60	34	54	20	Silty Clay/Clayey Gravel; Silt; Silty Sand
MW-19	11/13/01	26746999.0	788915.2	1980.24	2	34	35	19	34	25	Silty Sand with Gravel; Sandy lean Clay
MW-20	11/13/03	26747078.76	788915.94	1979.95	2	34	35	19	34	25	Poorly graded Sand with Silt
MW-CMT1-1	7/25/12	26747076.44	788956.37	1978.39	0.75	60.5	61	30	30.5	0.5	Silty Sand
MW-CMT1-2	"	"	"	"	"	"	"	35	35.5	0.5	Lean Clay
MW-CMT1-3	"	"	"	"	"	"	"	40	40.5	0.5	Clay
MW-CMT1-4	"	"	"	"	"	"	"	45	45.5	0.5	Sandy, Gravelly Clay
MW-CMT1-5	"	"	"	"	"	"	"	50	50.5	0.5	Gravelly Clay/Clay-Gravel mixture
MW-CMT1-6	"	"	"	"	"	"	"	55	55.5	0.5	Sandy, Silty Clay
MW-CMT1-7	"	"	"	"	"	"	"	60	60.5	0.5	Gravelly Clay
MW-14 Area (West of the MSSC) and vicinity:											
MW-14I	7/26/12	26747026.16	787981.93	1987.4	4	55	55.6	40	55	15	Silty Sand, Silt-Clay mixture,
MW-06	10/3/00	26746947.5	787967.86	1989.03	2	30	32	10	30	20	Clay with Silt; 2' Caliche layer
MW-13	5/6/03	26747045.51	788211.81	1984.18	2	28.5	28.5	8.5	28.5	20	Sandy Silt, Clayey Sand, Sandy Clay
MW-14	11/14/03	26747065.67	787987.08	1987.86	2	40	35	15	35	20	Sandy lean Clay; Silty Sand with Gravel

Notes:

bgs	Below ground surface
msl	Mean sea level
TOC	Top of casing

ATTACHMENT 2
FIELD NOTES

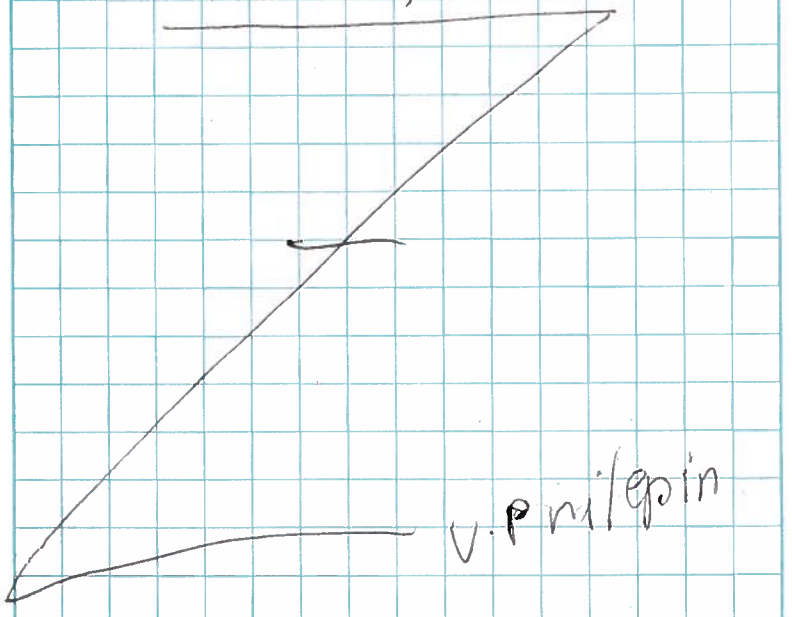
ATTACHMENT B
FIELD NOTES

Field Logbook No. 1 MSSC site Date 7/27/12

0:55 Completed EW-1 by pouring in bentonite grout mixture ~ 130 gal

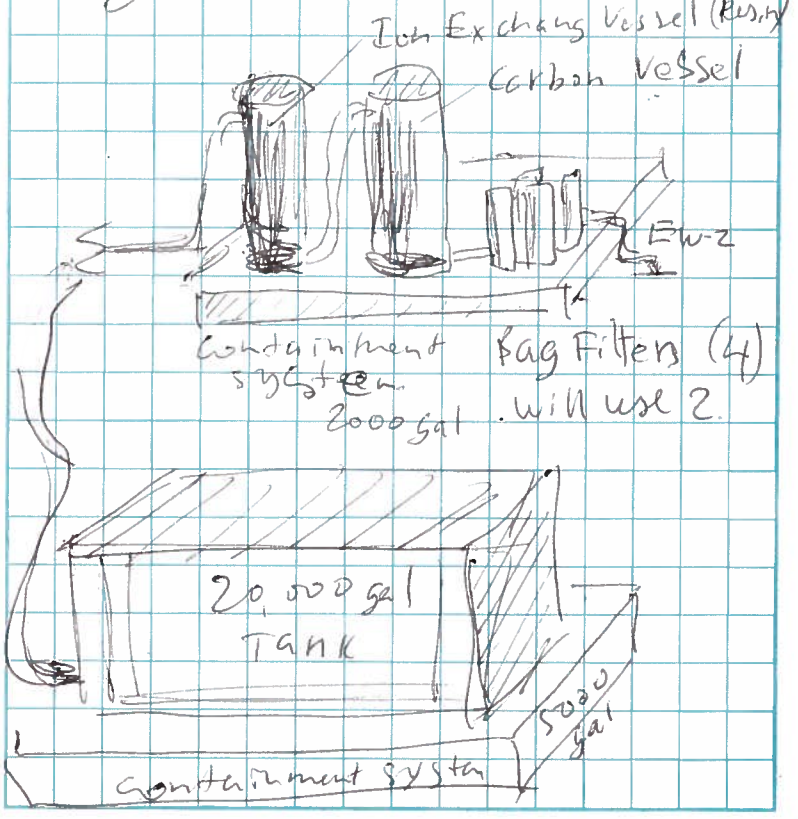
1:00 Spoke w/ Becki regarding plans for next week

1:10 Left the site (Becki will oversee surface completion of the well)



Field Logbook No. 1 MSSC site Date 7/30/12

11:30 Arrived to site from the airport; met w/ Dale Emerson. We went through each block of the treatment system that had been installed by ~11 am.



Field Logbook No. MSSC Site Date 7/30/12

12:15 Locked the gate. Dale will be working during nights at another site. He indicated we can talk at any time if questions arise

13:00 Tracy Spilotro called - the crew may not come until noon tomorrow I asked him to expedite mobilization as much as possible.

14:30 In the office, transducers and slim water level sounder already arrived, will set them up prior to setting into the wells.

15:00 Tracy Spilotro called to say that the crew w/ pump will arrive by 10 am tomorrow. I will meet them at the gate

Field Logbook No. MSSC Site Date 7/30/12

15-17:30 Preparation & water level measurements in up to 5 wells prior to the tests and during: tools; programming the transducers;

17:30 Left the office after coordinating w/ Becci Dano the upcoming activities (Becci will bring water level sounder - regular) In situ provided a slim sounder for MW-40.

18:30 Chid Christian called to inquire about subsurface geology at the Eastern parking Lot area and discuss a possibility of conducting tracer test. I replied that we'll have both the pumping test data and lab results for K, to calculate seepage velocity.

J. Pritepen.

Field Logbook No. IMSSC Site Date 7/31/12

8:30 At Target to buy field supplies & water

9:30 At the site; met w/ Rocki opened wells

10:30 Duke Emerson arrived; he brought Grundfos 3" pump

11:00 Rain for Dennis Tohn & Rodriguez (they installed treatment system.

11:30 Cascade crew arrived: Dale & Tessie - w/ well development rig; Tierced about moving up the pump & the GTS

Field Logbook No. IMSSC Site Date 7/31/12

11:40 PJSS tailgate meeting.

12:00 Cascade crew went to lunch.

12:20 - 12:30 Depth to water measurements from N TOC.

MW-19	27.83 ft BTOC
MW-20	27.60
EW-2	26.85

13:05 Set transducer at ~30 BTOC; Sediment in the well to 30.5 ft BTOC (should be 34') ~~ft~~ read -2.27 or so (makes sense - set reference to zero); will start pumping at 2:00 pm.

Field Logbook No. MSSC Site Date 7/31/12

14:05 - Set transducer at MW-20 at 32' BTOC. Sediment in well from 34 to 32.5' screen bottom.
LDTW = -4.315 ft
make sense.

0.8 1.2 1.6 2.0

15:01 started 1st step - hard to keep rate stable. Q = 1.7 after ~7 min into the test stabilized Q to 1.3 - 0.99

15:12 DTW 32.42 Q 0.99 - 0.96

15:31 Second step at 1.35-1.31

16:01 Third step
17:00 Dale H and Jessey left
17:12 EW-2 Recovery complete

18:15 Locked the gate; went to eat lunch/dinner +

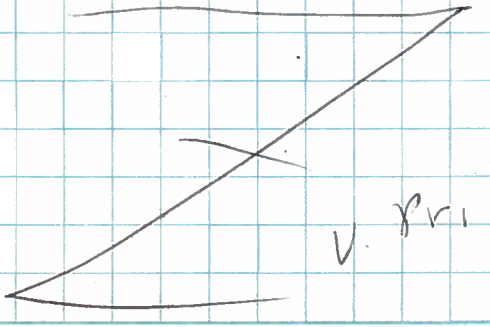
Field Logbook No. MSSC Site Date 7/31/12

and recharge computer battery.

20:00 Returned back to site to download transducer data - Downloaded ~~3 files~~ w.l. data from EW-2, MW-19, MW-20.

21:10 Attempted to open MW-40, the bolts are too tight my monkey wrench can't open it. will ask Dale tomorrow to help

21:30 Locked the gate, left the site.



Field Logbook No. 1 MSSC Site Date 08/1/12

Occasional showers, overcast

8:15 Arrived at the Site met w/ Dale

8:25-40 Measured levels in MW-40

	Date measured
#1	26.72
#2	26.53
#3	26.59
#4	26.53
#5	26.54
#6	26.55
#7	The sounder won't go deeper than 6' (to narrow tube in the middle

Field Logbook No. 1 MSSC Site Date 8/1/12

8:45-9:05 Began programming transducers.

EW-2 TR. reading

-1.802 ft.

Current depth reading 24.275 ft

started log 8:53 ft BTOC

Measured DTW - 26.87 ft.

MW-19 DTW - 27.85 ft BTOC

MW-20 27.62

MW-19 Transducer reading

-0.013 ft

Current depth reading

2.226 ft

Started log 9:03:51.

Field Logbook No. MSSC Site Date 8/1/12

9:05 Programming MW-20

Transducer reading
-0.020

Current depth reading:
4.337

Started logger 9:12

9:20:28 started the test

Q 0.53 after 1 min
0.57

2min 0.81
0.50

5min 0.86
keeping kind of stable
0.88-0.9

9min 0.88-0.9

9:50
30 min 0.93

Field Logbook No. MSSC Site Date 8/1/12

9:35 Cascade drillers (Dennis) arrived

9:42 DTW MW-40
Measured
#3 26.55
#4 26.53

9:30 Becca brought cooler etc.

9:39 MW-19 27.50 (?)

9:44 MW-20 27.62 + helped w/ w.l. measur.

10:11 Dale 27.82 MW-19

10:13 27.81 MW-20

10:14 #3 26.55 MW-40
10:13 #4 # 26.52

10:31 MW-19 26.82
MW-20 26.61

10:32-35 MW-40 #3 26.54
#4 26.52
checked w/ #1 26.53 #5 26.56
#2 26.55 #6 26.62

Field Logbook No. 1 MSSC Site Date 8/1/12

11:21-11:2 MW-40 DTW #BTOC

#1	26.55
#2	26.55
#3	26.54
#4	26.57
#5	26.54
#6	26.64

11:20-11:21 MW-19 27.82
MW-20 27.62

12:01-12:02 MW-19 27.82
27.62

12:04-8
MW-40

#1	26.53
#2	26.55
#3	26.55
#4	26.56
#5	26.53
#6	26.65

13:06-07
MW-19 27.82
MW-20 27.62

Field Logbook No. 1 MSSC Site Date 8/1/12

13:09
MW-40

#1	26.54
#2	26.54
#3	26.55
#4	26.56
#5	26.54
#6	26.62

14:00-14:05
MW-19 27.82
MW-20 27.62
MW-40

#1	26.53
#2	26.54
#3	26.54
#4	26.57
#5	26.53
#6	26.65

15:00-05 MW-19 27.83
MW-20 27.62

MW-40

#1	26.53	#4	26.56
#2	26.54	#5	26.53
#3	26.54	#6	26.65

Field Logbook No. 1 MSSC Site Date 8/1/12

16:01 - 16:05 Total 36 gal

MW 19 27.83

MW 20 27.62

MW 40

#1	26.54	#4	26.56
#2	26.55	#5	26.53
#3	26.55	#6	26.65.

17:01-05 MW 19 27.83 Tot gal 425

MW 20 27.62

MW 40

#1	26.54	#4	26.56
#2	26.55	#5	26.53
#3	26.55	#6	26.64

17:45 Left the site to take a break before returning at ~9 pm to download data.

Dale Gains at the site watching for flow rate (kept steady at ~0.93 since

Field Logbook No. 1 MSSC Side Date 8/1/12

the start of the test. Jessie will come for this shift at 19:00. Because nearest observation wells didn't show a response after 8+ hours of pumping, we decrease w.l. measurement to every 2 hours, will increase it once measurable drawdown is observed.

21:05 arrived at site; Jessie is watching for flow rate and taking water level readings in MW-19, MW-20, MW-40.

- Checked dd in EW-2 via transducer - relatively stable; rate was also steady at 0.95-0.9

DD in EW-2 3.6'

21:30 Explained to Jessie,

Field Logbook No. MSSC Site Date 8/1/12

that it's important to monitor dd in the pumping well (every hour readings are required)

21:40 Removed dedicated water level sounder from MW-20. (no change in level after ~13h of pumping; decided it and tied to measure w.l. at EW-2.

22:04 DTW ft BTOC EW-2: (=30.44 ft), i.e. ~3.5' available to the top of well screen. (34' below TOC)

dd ~ 3.589, Total Q = 709 gal. J. Prieto

22:15 left the site

Field Logbook No. MSSC Site Date 8/2/12

7:30 Spoke w/ Dale Goins (he ~~met w/~~ replaced Jessey at 7 a.m.

During the night shift flow rate remained stable

Drawdown at EW-2 was slightly increasing

8:00 Spoke w/ PTS Labs (they didn't receive TE's authorization to proceed w/ analyses) since last Friday.

Signed the authorization form on behalf of ROB and sent it via e-mail to Rachel at PTS Lab.

9:00 End on e-mail communication w/ team members data interpretation and evaluation of Lab data received to date; ATL, CARUS Lab (PARODI).

Field Logbook No. IMSSC Site Date 8/2/12

12:00 Arrived at site; met w/ Dale.
- flow rate is stable: 0.95-0.93
Total gallons. ~ 1,540

No significant response in observation wells yet.

13:00 measured levels in EW-2, MW-19, MW-40

DTW at EW-2 is pretty stable only 0.2' increase since last night

Flow rate keeps on at 0.95 gpm

No significant response in wells MW-19, MW-40 (MW-20 is currently not monitored, because water level meter is used for EW-2

14:00 measured levels in EW-2 - steady, same as rate

Field Logbook No. IMSSC Site Date 8/2/12

15:30 stopped by the site, drawdown at EW-2 is stable DTW. 30.64

15:30 - 16. Took a short trip to a golf course to take some pictures of the topography, ponds, wash etc

21:10 Arrived at the site to download transducer data. Jesse is monitoring flow rate, water levels in EW-2, MW-19, MW-40 since 7pm. (he replaced Dale)

It took about 40 minutes to download EW-2 Transducer data.

23:00 Began downloading data from MW-90 (~47 min).

12:50 Left the site

Field Logbook No. I MSSC Site Date 8/3/12

9:35 spoke w/ Dale - pumping rate is stable, no significant changes to water levels in obs. wells either

13:00 Dale noticed a slight drop in pumping rate to 0.81 from 0.9's (regular)

13:10 The rate was adjusted with a valve to ~0.95.

14:20 Arrived at the site current readings:
Q ≃ 0.98

14:52 Total Q = 3,033
Q = 0.98 - 1.00
EW-2:
S = 4,032.

~16:00 Stopped by - all pump meters SS

Field Logbook No. I MSSC Site Date 8/3/12-8/4

22:00 Talked w/ Jesse; the dd. in EW-2 increased by 0.2'; rate is stable; obs. wells unchanged

23:20 started downloading the data

00:00 Let Jesse to take a nap while downloading transducer data (will take a couple of hours from 3 wells).

00:10-00:25 - measured levels in EW-2, MW-19 and MW-40 (see Cascade forms)

00:20 Jeep with two people entered the site and one man talked about the tanks. (they probably intended to steal something). I escorted them off site and closed the gate.

00:55 Reprogrammed

Field Logbook No. LMSSC Site Date 8/4/12

transducer for EW-2

(at 10:48 am. 8/3 its memory got full, so about 9 hours of data were not recorded – We have manual readings though).

Set transducer referen to the current DTW

3.915' + read

every 15 sec; not 1sec.

current depth 20.359

1:15 Reprogramming transducer at MW-19 after downloading the data (~48 min)

Current reading 0.042'

Field Logbook No. LMSSC Site Date 8/4/12

2:13 Deleted full log for MW-19 transducer (after saving)

Set new reference at current value of 0.042

Tr. depth 2.281'

2:30 Began downloading data from MW-20 transducer

3:00 Measured levels in EW-2, MW-19, MW-20

3:15 Download complete for MW-20 reprogrammed to record last ~6 hours of the test

Ref. 0.043
depth reading 4.293

3:37 Left the site

V. Prv. Lepr

Field Logbook No. 1 MSSC Site Date 8/4/12

9:19 EW-2 S = 3.771
Q = 0.91 - 0.88;

9:20:50 Stopped the test.
4061.08

9:30 - 27.83 - MW-19

9:55 27.82

10:05 27.81

10:34:47 Stopped recovery test - complete recovery in EW-2

S = 0.038

10:55 Dale Emerson came to pick up the pump (to store @ Verne Wellcamp)

3" GRUNDFOS 5SQ

Field Logbook No. 1 MSSC Site Date 8/4/12

11:52 MW-19 Trans. reading -0.003
(Level still appears to be recovering — few hundredths of a foot total.

12:03 Transducer reading at MW-20 0.009

- level appears to be recovering just slightly.

12:30 - Left the site & grab. Lunch & let levels in MW-19 & MW-20 recover more.

13:10 on-site
13:20 stopped the logger at MW-19; current reading of depth -0.09.
- removed transducer, cleaned.;
13:40 MW-19 DTW 27.82

Field Logbook No. MSSC Site Date 8/4/12

15:53 Stopped data logger for transducer at MW-20

current reading -0.005'

14:02 MW-20 DTW 27.60

14:30 Finished deriving transducer + closed both wells MW-14, 20

14:30-14:45 MW-40 [all my prev. measurements in MW-40 deeper 0.01]

corrected here:

#1	26.50	#4	26.53
#2	26.53	#5	26.53
#3	26.57	#6	26.59

15:00 Packed all the equipment

15:10 Locked the gate, left for the day

V. Pritchin

Field Logbook No. MSSC Site Date 8/6/12

9:00 ~~Arrived at the site to meet w/ Dale~~ V.P. Dale Emerson called to say that heavy equipment will be moved by tomorrow morning, can't do this now per access agreement. Decided to proceed w/ step test now using poly tank that will hold ~250 gal, enough to hold water from all steps.

9:30 Arrived at the site to meet w/ Dale and install transducers into MW-14 and EW-1.

10:05 DTW EW-1 - 19.28' BTOC (T.D. 54.25')

MW-14 18.91'

T. depth 29.9 ⇒ ~5' sediment? (screen top 15', screen bot ~35' bgs)

Field Logbook No. IMSSC Site Date 8/6/12

11:30 Installed transducer at MW-14 ; 29' BTOC (sediment at 30' ~ 5' of sediment)
Level DTW = -7.884. MW-14

11:38 Programmed TX - current dept reading. 10.105'

11:40 started MW-14 TX
↳ DTW = -0.002.

12:15 Set & programmed TX at EW-1

Transducer set at 48' BTOC (2' above the pump top - pump is 2.5' long, its bottom is at ~~52'~~ 52'
Current depth reading 29.453

12:20 Started log EW-1

12:30 Attempted to start step one - pump ~~is~~ is

Field Logbook No. IMSSC Site Date 8/6/12

not pumping; but level seemed to have dropped a bit (0.6) started flashing 0.1.

13:40 Started 1st Step
adjusting pumping:
Q = 1.18 - 1.11, 1.02 ; 1.03 ; 0.98, 0.91, went to 0.7 - 0.6 adjusted back 1.1

13:44 DTW EW-1 - 24.00
13:47 26.12
Q = 1.1

13:50 DTW MW-14 18.91'
- no change yet

13:55 Q = 1.01 S = 9.374
14:00 Q = 1.01 S = 10.072
14:03 DTW MW-14 18.93' (BTOC)

14:06 DTW EW-1 30.15'
14:10 Q = 0.58 - 1 S = 10.404
14:10 Started 2d step
Q = 1.58, total ~ 3) gal

Field Logbook No. IMSSC Site Date 8/6/12

14:12 EW-1 DTW 31.50'
Q = 1.53

14:13 MW-14 DTW 18.93' static

14:15 EW-1 DTW 33.35 S=13.755
Q = 1.38 - 1.39.

14:20 adjusted Q = 1.56.

14:25 EW-1 S = 16.661. DTW 36.35'
MW-14 DTW 18.95'
Q = 1.54

14:30 EW-1 S = 17.703
S: 18.94 Q = 1.54
Q = 1.58 equilibrium
14:40 Third Step started
Q = 2.02

EW-1 S = 18.942

14:47 S = 22.49 DTW EW-1 40.2'

14:49 MW-14 DTW = 18.98'

14:50 S = 23.318 EW-1

Field Logbook No. IMSSC Site Date 8/6/12

14:55 DTW = 44.05 EW-1
Q = 1.91 - 1.89.

15:00 S = 25.413
Q = 1.91 - 1.89

15:05 DTW = 45.30 EW-1
Total ~ 148 gal

15:06 MW-14 DTW = 18.98'

15:16 S = 26.16 EW-1
Stop the test
Total Q = 135.79 gal.

15:38 > 95% recovery

15:50 Complete recovery EW-2
to within S = 0.085'

15:38 DTW at MW-14 18.99'
will be very slow to recover

16:20 Left for the office to pick up slug and read e-mails

Field Logbook No. MSSC Site Date 8/6/12

19:40 arrived at site to download MW-14 data

DTW = 18.93 MW-14

current tx reading 0.013. Levels appear to continue recovering (although displacement was only ~0.06.

Left tx for the night (just as a background measurement — collects data every 10sec — delete before programming for pumping test

20:20 Closed the gate; left the site, to Blue a rope for the slug.

20:40 Bought 4 sets of Rope for slug tests (Sears). Left the site

V. Prilepin

Field Logbook No. MSSC Site Date 9/7/12

8:00 Called to Dale, he's finishing setting up the equipment for the pumping test at EW-1

8:40 Arrived at the site, H,S meeting

9:00 Prepare to install/program transducers

9:18 MW-13 DTW — 18.50
Tot. depth ~25' (same as 2)

9:40 Programmed tx MW-13
Depth Reading (head above tx) 1.413

9:50 Programmed MW-14 head above tx — 10 ft

10:10 Programmed EW-1 depth reading 29.355

10:35 DTW MW-6 14.93
Tot. Depth 28.3 (~1' sediment)

R 24061 current depth 4.53

Field Logbook No. IMCSC Site Date 8/7/12

10:50 EW-1 19.35

10:55 MW-14 18.90

Started the test 11:01

stabilized the flow rate within first 3 minutes.

Q = 1.01 gpm (started from Q total = 0. (holds steel

11:42 MW-14 dTW tx 0.03 [0.025]

11:48 18.95 (responds!).

12:03 MW-6 current DTW 0.014.

(appears to respond just 0.01" T.D = 28.9 (1.2' submerged)

12:30 John from Raincoast Rest stopped by and bought lunch for Dale & me.

13:08 EW-1 S = 8.407 DTW =

Field Logbook No. IMSSC Site Date 8/7/12

13:20 Q ~ 1.00 – 0.98

13:25 Q ~ 0.95

13:26 Adjusted w/ valve to 1.00 (immediate response in levels (~ almost 0.1' increase in dd.

14:05 Adjusted Q from 0.95-0.93 to 1.08.

14:15 MW-6 DTW 19.57 (0.04' of response!).

14:20 Q = 1.00

14:30 Q = 0.95 : 0.93

14:35 adjusted Q, now 1.08-1.06 level tends to drop by 0.05 or so following Q adjustment. Once Q drops from say 1.10 to 1.03,

14:50 EW-2 S = 9.247

15:00 Q = 1.08

15:02 adjusted downward, now 1.01 (see his notes)

About 16:30 Dale adjusted flow rate upward, which

resulted in a short moment of Q = 3gpm, then it went to 1 gpm (100% for response in levels.

17-19 in the hotel, communicated w/ the team via e-mail

20:30 Arrived at site. Block replaced Dale at 6 pm. Flow rate is steady at 1 gpm.

Dinner bet'n 20 - 20:30.

20:30 - 21:15 Downloaded the data from EW-1, MW-14, MW-6 and MW-13.

Wells MW-14 and MW-6 showed distinct response to pumping. Well 13 also indicated tendency to respond.

21:30 Left the site

V P Zilep.

8/8 - 8/10 off-site, in communication w/ Beeri Dapo, who is on site while constant discharge test is running at MW-14 area.

Field Logbook No. NISSC Site Date 8/11/12

23:00 Arrived to the tel, recharged battery for computer

23:50 Arrived to the office to take equipment for downloading data, decon of transducers & closing wells.

NI MSSE Site

Field Logbook No. 8/12/12 Date

01:50 Arrived at site

Downloaded data for EW-1, MW-14, MW-6, the observation wells showed good response to pumping and recovery.

Transducer in EW-1 was removed on Friday, 8/10 at ~ 18:00 to let remove the pump & pumping from the well.

However, because Logging was set in the Logarithmic scale (for 6 days), late time data were collected rarely, so the transducer pullout and return didn't visibly affect the record.

Field Logbook No. 1 MSSC Site Date 8/12/12

DTW / BTOC:

2:29 | MW-6 19.99 |

3:15 | MW-13 18.55 | - resampled! (see tx data)

3:45 | MW-14 19.03 |

4:00 ~~MW~~ | EW-1 19.38 |

4:25 Left the site to prepare tXs for shipment

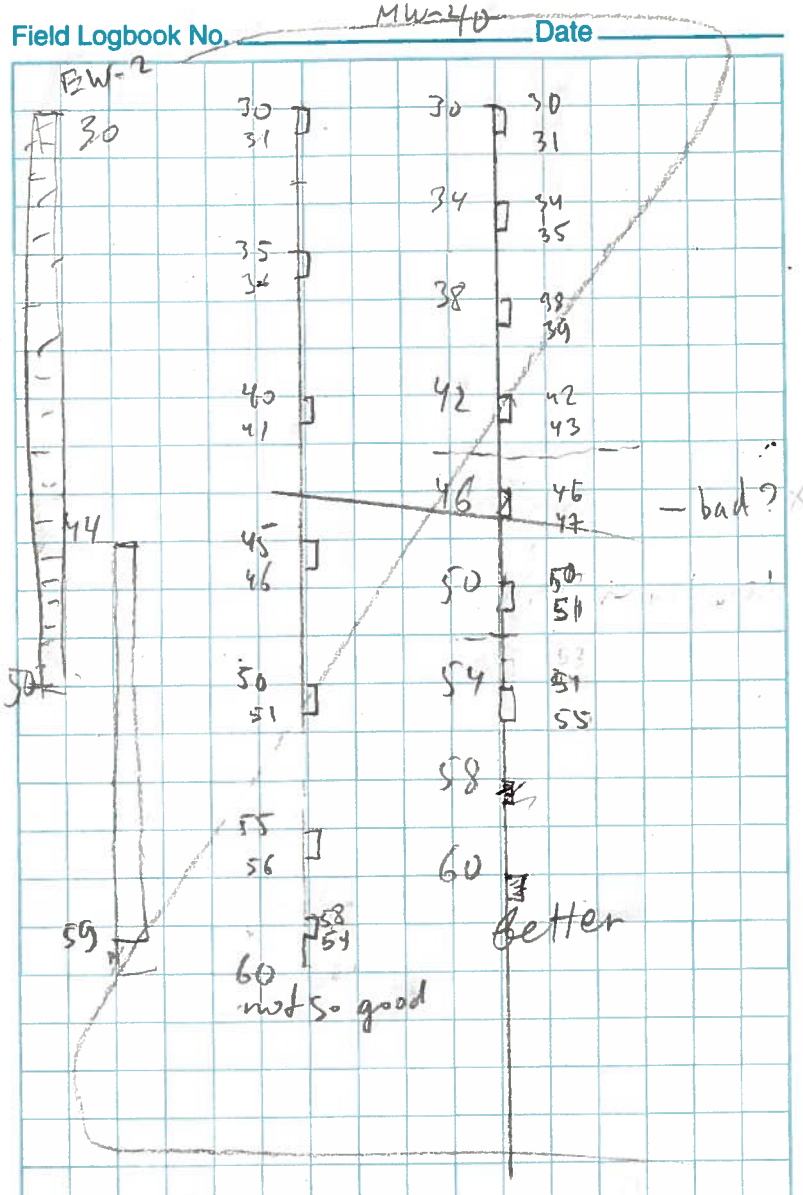
702 735 0110

~~Pro~~ Tech Sec

Mike Scott Arm

~~702~~ 743 8237.

Field Logbook No. MW-40 Date



ATTACHMENT 3
DE MINIMIS DISCHARGE PROGRAM APPROVAL

ndep
NEVADA DIVISION OF ENVIRONMENTAL PROTECTION
protecting the future for generations

STATE OF NEVADA
Department of Conservation & Natural Resources
DIVISION OF ENVIRONMENTAL PROTECTION

Brian Sandoval, Governor
Leo M. Drozdoff, P.E., Director
Colleen Cripps, Ph.D., Administrator

10/1/2012

MS. TAMARA PELHAM

TETRA TECH

639 ISBELL ROAD SUITE 390

RENO, NV 89509

Dear: MS. TAMARA PELHAM

Re: De Minimis General Permit: NVG2010000

Project ID Number: DDP - I57

Category 3: Yes

Project Name: Boulevard Mall

Your submittal to be included under the De Minimis General Permit has been approved effective 10/01/2012 .

Please note that Nevada Administrative Code (NAC) 445A.268 Section (5)(b) reads, in part, that a Permittee (discharger) who is covered under a general permit shall pay to the Director a nonrefundable fee of $200 not later than July 1 of each year that the discharger is covered under that permit.

To Terminate coverage of the Nevada NPDES General Permit for De Minimis Discharges, the Permittee must submit a Notice of Termination ("NOT") form when their facilities no longer have any De Minimis discharges associated with the site identified in this application for General Permit coverage.

Should you have any questions, I can be reached at (775) 687-9468.

Sincerely,

Alexi Lanza , P.E.

De Minimis Discharge Permit Program
Bureau of Water Pollution Control
Nevada Division of Environmental Protection

CC: Ms.Tamara Pelham Tetra Tech 639 Isbell Road Suite 390 Reno NV 89509

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT

NVG201000

In compliance with the provisions of the Clean Water Act (33 U.S.C. 1251 et. Seq. the "Act") and the Nevada Revised Statutes (Chapter NRS 445A), eligible dischargers who have submitted a Notice of Intent (NOI) and filing fee in accordance with Nevada Administrative Code (NAC) 445A.268, are authorized to discharge

DeMinimis discharges as defined in this permit

To :

Waters of the United States

In accordance with conditions set forth in Parts A, B and C hereof,

This permit became effective on February 11th, 2011.

This permit was modified and shall become effective on July 30th, 2012.

This permit and authorization to discharge shall expire at Midnight, February 11, 2016

Signed this 8th day of August, 2012

Alexi Lanza, P. E.
Bureau of Water Pollution Control
Nevada Division of Environmental Protection

A PART I - GENERAL PERMIT CONDITIONS

A.1 PERMIT OBJECTIVE:

A.1.1 GNV201000 is for DeMinimis discharges as defined below and may be intermittent or continuous. Its purpose is to provide timely authorization for discharges to Waters of the United States. This general permit establishes Notice of Intent (NOI) requirements, water quality limitations, prohibitions and management practices for five (5) separate discharge categories. For each discharge, a separate permit is required.

A.2 PERMIT COVERAGE:

A.2.1 This General Permit covers the State of Nevada.

A.3 **DISCHARGE CATEGORIES**: Category 1is hereby established as DeMinimis and shall report the duration and quantity in accordance with Section A.9.1.1. Category 2 is hereby established as DeMinimis and up to 1500 gallons per minute (gpm). Categories 3, 4, and 5 are hereby established as DeMinimis and shall be less than 250 gallons per minute (gpm):

A.3.1 **Category 1 – Public Water System (NRS 445A.235) Emergency discharges** – Permitted Public Water System Emergency discharges are a situations which pose an immediate risk to health, life, property or environment.

A.3.2 **Category 2 – Existing Public Water System supply discharges -** Permitted activities include discharges related to construction, maintenance, and testing (quantity, duration and capacity) of a public water system up to 1500 gpm (including the pipes, tanks, and reservoirs) such as:

A.3.2.1 Disinfection and flushing activities;

A.3.2.2 Discharges resulting from pressure releases, or overflows;

A.3.2.3 Discharge from wells and storage reservoirs;

A.3.2.4 Drilling of **NEW** Public Water System wells; or,

A.3.2.5 Public Water System discharges from other devices.

A.3.3 **Category 3 - Well development, testing & maintenance / aquifer testing / water quality testing -** Permitted discharges include discharges of water associated with:

A.3.3.1 Drilling of **NEW** wells (excluding Public Water System wells);

A.3.3.2 Rehabilitation or maintenance of water or geothermal wells, piezometers, and boreholes;

A.3.3.3 Water supply quantity or quality evaluations;

A.3.3.4 Well/aquifer test pumping and/or purging;

A.3.3.5 Discharges from any borehole not fully developed.

A.3.4 **Category 4 - Subsurface water discharges** - Permitted discharges include:

A.3.4.1 Groundwater from foundation, footer drain, basement, underground structure or other dewatering, provided the discharge is not contaminated with pollutants, chemicals or co-mingled with other wastewaters;

A.3.4.2 Water from intercepted or pumped groundwater.

A.3.5 **Category 5 - Utility vault water discharges** - Permitted discharges include:

A.3.5.1 Groundwater or surface water collected in vaults;

A.3.5.2 Water from subterranean seepage;

A.3.5.3 Snow melt, storm water, or water present as a result of inclement weather.

A.4 **PROHIBITED DISCHARGES:** Discharges not covered by this permit include:

A.4.1 Discharges in excess of 250 gpm, except as defined in Categories 1 and 2 (above);

A.4.2 Category 3. Category 4, or Category 5 type discharges that are within the BMI Complex as defined in Attachment I;

A.4.3 Discharges that are subject to effluent limitation guidelines at 40 CFR Part 440;

A.4.4 Discharges near or adjacent to hazardous waste sites, remediation sites, or where discharge activities may encounter naturally occurring constituents that would cause a violation of Water Quality Standards;

A.4.5 Subsurface (tile) drainage systems(or equivalent);

A.4.6 Discharges from mining activities;

A.4.7 Leaking chemical and fuel tanks;

A.4.8 Discharge of industrial waste;

A.4.9 Discharge of domestic/sanitary waste;

A.4.10 Biohazardous waste (e.g. wastes from hospitals, dentists, and/or veterinary clinics);

A.4.11 Discharges authorized by other NDEP permits;

A.4.12 Discharges that are not in conformance with an approved Total Maximum Daily Load

(TMDL);

A.4.13 Discharges into impaired waters on the Federal Clean Water Act Section 303(d) list, unless the discharge does not contain the pollutant for which the waterbody is impaired, or does not cause or contribute to an exceedance of water quality standards; or that there are sufficient remaining wasteload allocations in an EPA approved or established TMDL to allow the discharge.

A.4.14 Discharges from vehicle or equipment washing or maintenance activities including mobile washes (e.g. car, carpet, animal, and heavy equipment);

A.4.15 Underground injection control (UIC) activities;

A.4.16 Continuous discharges from existing geothermal wells or sources;

A.4.17 Working in Waters of the U.S.; or,

A.4.18 Discharges not authorized under this permit.

A.5 ELIGIBILITY, PERMIT REQUIREMENT, AND REQUEST FOR INCLUSION

A.5.1 All facilities or persons who are planning on conducting any discharge activities described in Section A.1 are eligible for this general permit.

A.5.2 Existing dischargers who are covered under a current Permit may continue to discharge until such valid permit expires.

A.5.3 The Division may require the holder of this General Permit apply for and obtain an individual permit in accordance with NRS 445A.480

A.5.4 Water quality standards included in this permit are promulgated by the Nevada Division of Environmental Protection (NDEP); current toxicity standards are defined in **NAC 445A.1236** – Standards for toxic materials applicable to designated waters.

A.5.5 New water quality standards for chlorine, toluene, ethylbenzene, *escherichia coli (*e. coli) and fecal coliform are being considered by NDEP. If adopted, these new standards may be included in general permit NVG201000 as a "minor permit modification".

A.5.6 To apply for permit coverage all new qualifying dischargers must request inclusion under this permit by completing and submitting an approved NDEP Notice of Intent (NOI) application to the Division along with appropriate permit fees. **The NOI submittal shall be submitted through NDEP's online permitting system at** http://ndep.nv.gov/bwpc/.

A.6 NOI REQUIREMENTS:

A.6.1 The minimum information required on a NOI consists of the following:

A.6.1.1 Applicant Information:

A.6.1.1.1 Applicant Name, Phone, Address, City, State, and Zip Code.

A.6.1.2 Operator Information:

A.6.1.2.1 Operator Name, Phone, Address, City, State, and Zip Code.

A.6.1.3 Billing Information:

A.6.1.3.1 Billing Name, Phone, Address, City, State, and Zip Code.

A.6.1.4 Site Information:

A.6.1.4.1 Project Name, Address, City, State, Zip Code;

A.6.1.4.2 Discharge latitude and longitude; and,

A.6.1.4.3 Scaled Site location Map showing the path from the initial outfall to the point of discharge to the receiving water.

A.6.1.5 Discharge Information:

A.6.1.5.1 Estimated Start Date;

A.6.1.5.2 Estimated Completion Date;

A.6.1.5.3 Name of the Receiving Water

A.6.1.5.4 Estimated daily flow rate;

A.6.1.5.5 Category of Discharge the permittee is requesting; and,

A.6.1.5.6 Water quality results as required by the Applicable NOI submittal requirements in Section A, below.

A.7 CERTIFICATION:

A.7.1 A signed and dated NOI Certification statement in accordance with Section C of this permit (SIGNATURES, CERTIFICATION REQUIRED ON APPLICATION AND REPORTING FORMS)

A.7.2 If water discharge (disposal) is to property other than the Permittee's, a letter of authorization (from the property owner where the discharge is to occur that explicitly allows the discharge to occur) must be included with the NOI.

A.8 NOTICE OF TERMINATION (NOT) REQUIREMENTS:

A.8.1 An approved NDEP Notice of Termination (NOT) shall be submitted upon cessation of

discharge. NOT applications are available online at http://ndep.nv.gov/bwpc/.

A.8.2 The minimum information required on a NOT consists of the following:

A.8.2.1 General Permit and authorization number;

A.8.2.2 Discharge Operator / Permittee / Applicant information: name, address, city, county, state, zip code, and phone;

A.8.2.3 Project (Site) location information: project name, project address, city, county, state, zip code;

A.8.3 A signed and dated NOT Certification statement in accordance with Section C of this permit (SIGNATURES, CERTIFICATION REQUIRED ON APPLICATION AND REPORTING FORMS)

A.9 **DISCHARGE NOI REQUIREMENTS:**

A.9.1 Based on the Category of Discharge, the following parameters must be sampled and submitted with the permit NOI:

A.9.1.1 **Category 1 – Public Water System Emergency Discharges: NOI Requirements**

A.9.1.1.1 For each Public Water System Emergency Discharge, the permittee shall provide a draft narrative report that describes the location of the discharge;

A.9.1.1.2 The estimated duration of the discharge;

A.9.1.1.3 Estimated Quantity of discharge; and,

A.9.1.1.4 A description of where the discharge entered the Municipal Storm Sewer System (MS4) and/or the associated receiving water.

A.9.1.2 **Category 2 – Public Water System Supply discharges: Supplemental Application and NOI Sampling Requirements**

A.9.1.2.1 For each New Well discharge, the permittee shall provide a draft narrative report that describes:

A.9.1.2.1.1 The location of the discharge;

A.9.1.2.1.2 The estimated duration of the discharge;

A.9.1.2.1.3 Estimated Quantity of discharge;

A.9.1.2.1.4 A description of the BMP's implemented to control drilling fluids, mud or material; and,

A.9.1.2.1.5 A representative water quality sample of the discharge.

A.9.1.2.2 For discharges in this category not associated with New well development, or where disinfection with chlorine based compounds were used, samples must be taken and submitted in accordance with the table below

Parameters	Discharge Limit - Daily Maximum	Measurement Frequency	Sample Type
Total Residual Chlorine[1] – mg/L	0.10	With NOI	Discrete
Total Dissolved Solids[2] (TDS) – mg/L	Monitor & Report	With NOI	Discrete
Turbidity – NTU [2, 3]	Monitor & Report	With NOI	Discrete

1. Only if disinfection with chlorine based compounds were carried out. Samples must be collected during the first hour of discharge. For discharges that extend beyond an hour in duration, a second sample shall be collected prior to end of discharge, or as specified by the division.
2. BMPs shall be implemented to minimize erosion and sediment.
3. During the discharge, if a visible turbidity plume is generated, a grab sample shall be obtained. Turbidity shall be less than or equal to 10 Nephelometric Turbidity Units (NTUs) over the background value of the receiving water.

A.9.1.3 Category 3 - Well development, testing & maintenance / aquifer testing / water quality testing: Supplemental Application and NOI Sampling Requirements

A.9.1.3.1 For each New Well development discharge, the permittee shall provide a draft narrative report that describes:

A.9.1.3.1.1 The location of the discharge;

A.9.1.3.1.2 The estimated duration of the discharge;

A.9.1.3.1.3 Estimated Quantity of discharge;

A.9.1.3.1.4 A description of the BMP's implemented to control drilling fluids, mud or material; and,

A.9.1.3.1.5 A representative water quality sample of the groundwater.

A.9.1.3.2 For discharges not associated with New well development, or where disinfection with chlorine based compounds were used, samples shall be taken and submitted in accordance with the table below.

Parameters	Discharge Limit - Daily Maximum	Measurement Frequency	Sample Type
Total Residual Chlorine[1] – mg/L	0.10	With NOI	Discrete
Total Dissolved Solids (TDS) – mg/L	Monitor & Report	With NOI	Discrete
Total Suspended Solids (TSS) – mg/L	Monitor & Report	With NOI	Discrete
Total Petroleum Hydrocarbon (TPH) (C6 – C40) – mg/L[5]	1.0	With NOI	Discrete
Methyl tert-Butyl Ether (MTBE) - µg/L	20.0	With NOI	Discrete
Total Nitrogen as N – mg/L	10.0	With NOI	Discrete
Total Phosphorus as P – mg/L	Monitor & Report	With NOI	Discrete
Trichloroethylene (TCE) - µg/L	5.0	With NOI	Discrete
Tetrachloroethylene (PCE) - µg/L	5.0	With NOI	Discrete

Benzene - µg/L	5.0	With NOI	Discrete
Ethyl benzene - µg/L	100	With NOI	Discrete
Toluene - µg/L	100	With NOI	Discrete
Xylene - µg/L	200	With NOI	Discrete
pH – S.U.	6.5 – 9.0	With NOI	Discrete
Turbidity – NTU[2, 3]	Monitor & Report	With NOI	Discrete
Barium – mg/L	2.0	With NOI	Discrete
Fluoride – mg/L	Monitor & Report	With NOI	Discrete
Iron – mg/L	1.0	With NOI	Discrete
Sulfate – mg/L	Monitor & Report	With NOI	Discrete
Dissolved Oxygen	Monitor & Report	With NOI	Discrete
Molybdenum - mg/L	6.16	With NOI	Discrete
Antimony	Monitor & Report	With NOI	Discrete
Arsenic	Monitor & Report	With NOI	Discrete
Beryllium	Monitor & Report	With NOI	Discrete
Boron	Monitor & Report	With NOI	Discrete
Cadmium	Monitor & Report	With NOI	Discrete
Calcium	Monitor & Report	With NOI	Discrete
Copper	Monitor & Report	With NOI	Discrete
Lead	Monitor & Report	With NOI	Discrete
Magnesium	Monitor & Report	With NOI	Discrete
Manganese	Monitor & Report	With NOI	Discrete
Mercury	Monitor & Report	With NOI	Discrete
Nickel	Monitor & Report	With NOI	Discrete
Selenium	Monitor & Report	With NOI	Discrete
Silver	Monitor & Report	With NOI	Discrete
Sulfur	Monitor & Report	With NOI	Discrete
Thallium	Monitor & Report	With NOI	Discrete
Zinc - total recoverable	Monitor & Report	With NOI	Discrete
Fecal Coliform - MPN100 mL	Monitor & Report	With NOI	Discrete
E Coli[4] - MPN/100mL	Monitor & Report	With NOI	Discrete
Hardness (expressed as $CaCO_3$) - mg/L	Monitor & Report	With NOI	Discrete

1. Samples must be collected during the first hour of discharge. For discharges that extend beyond an hour in duration, a second sample shall be collected prior to end of discharge, or as specified by the division.
2. BMPs shall be implemented to minimize erosion and sediment.
3. During the discharge, if a visible turbidity plume is generated, a grab sample shall be obtained. Turbidity shall be less than or equal to 10 Nephelometric Turbidity Units (NTUs) over the background value of the receiving water.
4. Single Value.
5. EPA Method 8015B and EPA Method 8260B, extractable and purgeable, C6-C40. Summation must meet permit limit.

A.9.1.4 Category 4 - Subsurface water discharges: NOI Sampling Requirements

Parameters	Discharge Limit Daily Maximum	Measurement Frequency	Sample Type
Total Residual Chlorine[1] – mg/L	0.10	With NOI	Discrete
Total Dissolved Solids (TDS) – mg/L	Monitor & Report	With NOI	Discrete
Total Suspended Solids (TSS) – mg/L	Monitor & Report	With NOI	Discrete
Total Petroleum Hydrocarbon (TPH) (C6 – C40) – mg/L[5]	1.0	With NOI	Discrete
Methyl tert-Butyl Ether (MTBE) - µg/L	20.0	With NOI	Discrete
Total Nitrogen as N – mg/L	10.0	With NOI	Discrete
Total Phosphorus as P – mg/L	Monitor & Report	With NOI	Discrete
Trichloroethylene (TCE) - µg/L	5.0	With NOI	Discrete
Tetrachloroethylene (PCE) - µg/L	5.0	With NOI	Discrete

Benzene - µg/L	5.0	With NOI	Discrete
Ethyl benzene - µg/L	100	With NOI	Discrete
Toluene - µg/L	100	With NOI	Discrete
Xylene - µg/L	200	With NOI	Discrete
pH – S.U.	6.5 – 9.0	With NOI	Discrete
Turbidity – NTU[2, 3]	Monitor & Report	With NOI	Discrete
Barium – mg/L	2.0	With NOI	Discrete
Fluoride – mg/L	Monitor & Report	With NOI	Discrete
Iron – mg/L	1.0	With NOI	Discrete
Sulfate – mg/L	Monitor & Report	With NOI	Discrete
Dissolved Oxygen	Monitor & Report	With NOI	Discrete
Molybdenum - mg/L	6.16	With NOI	Discrete
Antimony	Monitor & Report	With NOI	Discrete
Arsenic	Monitor & Report	With NOI	Discrete
Beryllium	Monitor & Report	With NOI	Discrete
Boron	Monitor & Report	With NOI	Discrete
Cadmium	Monitor & Report	With NOI	Discrete
Calcium	Monitor & Report	With NOI	Discrete
Copper	Monitor & Report	With NOI	Discrete
Lead	Monitor & Report	With NOI	Discrete
Magnesium	Monitor & Report	With NOI	Discrete
Manganese	Monitor & Report	With NOI	Discrete
Mercury	Monitor & Report	With NOI	Discrete
Nickel	Monitor & Report	With NOI	Discrete
Selenium	Monitor & Report	With NOI	Discrete
Silver	Monitor & Report	With NOI	Discrete
Sulfur	Monitor & Report	With NOI	Discrete
Thallium	Monitor & Report	With NOI	Discrete
Zinc - total recoverable	Monitor & Report	With NOI	Discrete
Fecal Coliform - MPN100 mL	Monitor & Report	With NOI	Discrete
E Coli[4] - MPN/100mL	Monitor & Report	With NOI	Discrete
Hardness (expressed as $CaCO_3$) - mg/L	Monitor & Report	With NOI	Discrete

1. Samples must be collected during the first hour of discharge. For discharges that extend beyond an hour in duration, a second sample shall be collected prior to end of discharge, or as specified by the division.
2. BMPs shall be implemented to minimize erosion and sediment.
3. During the discharge, if a visible turbidity plume is generated, a grab sample shall be obtained. Turbidity shall be less than or equal to 10 Nephelometric Turbidity Units (NTUs) over the background value of the receiving water.
4. Single Value.
5. EPA Method 8015B and EPA Method 8260B, extractable and purgeable, C6-C40. Summation must meet permit limit.

A.9.1.5 Category 5 - Utility vault water discharges: NOI Sampling Requirements

Parameters	Discharge Limit Daily Maximum	Measurement Frequency	Sample Type
Total Residual Chlorine[1] – mg/L	0.10	With NOI	Discrete
Total Dissolved Solids (TDS) – mg/L	Monitor & Report	With NOI	Discrete
Total Suspended Solids (TSS) – mg/L	Monitor & Report	With NOI	Discrete
Total Petroleum Hydrocarbon (TPH) (C6 – C40) – mg/L[5]	1.0	With NOI	Discrete
Methyl tert-Butyl Ether (MTBE) - µg/L	20.0	With NOI	Discrete
Total Nitrogen as N – mg/L	10.0	With NOI	Discrete
Total Phosphorus as P – mg/L	Monitor & Report	With NOI	Discrete
Trichloroethylene (TCE) - µg/L	5.0	With NOI	Discrete
Tetrachloroethylene (PCE) - µg/L	5.0	With NOI	Discrete

Benzene - µg/L	5.0	With NOI	Discrete
Ethyl benzene - µg/L	100	With NOI	Discrete
Toluene - µg/L	100	With NOI	Discrete
Xylene - µg/L	200	With NOI	Discrete
pH – S.U.	6.5 – 9.0	With NOI	Discrete
Turbidity – NTU[2, 3]	Monitor & Report	With NOI	Discrete
Barium – mg/L	2.0	With NOI	Discrete
Fluoride – mg/L	Monitor & Report	With NOI	Discrete
Iron – mg/L	1.0	With NOI	Discrete
Sulfate – mg/L	Monitor & Report	With NOI	Discrete
Dissolved Oxygen	Monitor & Report	With NOI	Discrete
Molybdenum - mg/L	6.16	With NOI	Discrete
Antimony	Monitor & Report	With NOI	Discrete
Arsenic	Monitor & Report	With NOI	Discrete
Beryllium	Monitor & Report	With NOI	Discrete
Boron	Monitor & Report	With NOI	Discrete
Cadmium	Monitor & Report	With NOI	Discrete
Calcium	Monitor & Report	With NOI	Discrete
Copper	Monitor & Report	With NOI	Discrete
Lead	Monitor & Report	With NOI	Discrete
Magnesium	Monitor & Report	With NOI	Discrete
Manganese	Monitor & Report	With NOI	Discrete
Mercury	Monitor & Report	With NOI	Discrete
Nickel	Monitor & Report	With NOI	Discrete
Selenium	Monitor & Report	With NOI	Discrete
Silver	Monitor & Report	With NOI	Discrete
Sulfur	Monitor & Report	With NOI	Discrete
Thallium	Monitor & Report	With NOI	Discrete
Zinc - total recoverable	Monitor & Report	With NOI	Discrete
Fecal Coliform - MPN100 mL	Monitor & Report	With NOI	Discrete
E Coli[4] - MPN/100mL	Monitor & Report	With NOI	Discrete
Hardness (expressed as $CaCO_3$) - mg/L	Monitor & Report	With NOI	Discrete

1. Samples must be collected during the first hour of discharge. For discharges that extend beyond an hour in duration, a second sample shall be collected prior to end of discharge, or as specified by the division.
2. BMPs shall be implemented to minimize erosion and sediment.
3. During the discharge, if a visible turbidity plume is generated, a grab sample shall be obtained. Turbidity shall be less than or equal to 10 Nephelometric Turbidity Units (NTUs) over the background value of the receiving water.
4. Single Value.
5. EPA Method 8015B and EPA Method 8260B, extractable and purgeable, C6-C40. Summation must meet permit limit.

A.10 DISCHARGE LIMITATIONS, MONITORING REQUIREMENTS AND CONDITIONS:

A.10.1 Samples taken in compliance with the monitoring requirements specified below shall be taken prior to discharge into the receiving water.

A.10.2 The discharge sample must be collected from an approved sampling location or taken from the end of the discharge pipe following the final treatment component of the system including BMPs.

A.10.3 During the period beginning on the effective date of this General Permit, and lasting until the General Permit expires, discharge activities shall be limited and, as applicable, monitored by the Permittee as specified by the tables in this section below.

A.10.3.1 Category 1 – Public Water System Emergency Discharges: Discharge Limitations, Monitoring Requirements and Conditions

A.10.3.1.1 For each Public Water System Emergency Discharge the permittee shall provide a Final narrative report that describes the location of the discharge;

A.10.3.1.2 The duration of the discharge;

A.10.3.1.3 Estimated Quantity of discharge;

A.10.3.1.4 A description of where the discharge entered the Municipal Storm Sewer System (MS4) and the associated receiving water;

A.10.3.1.5 A description of how the emergency event occurred;

A.10.3.1.6 A description of the corrective action to discontinue the discharge and the repair plan that was implemented;

A.10.3.1.7 Where applicable, a description of action taken to prevent a future discharge at the same location; and

A.10.3.1.8 A description of any environmental impacts that may have occurred as a result of the discharge.

A.10.3.2 Category 2 – Public Water System Supply discharges: Discharge Limitations, Monitoring Requirements and Conditions

Parameters	Discharge Limit Daily Maximum	Measurement Frequency[2]	Sample Type
Flow – gallons per minute (gpm)	1500	Continuous	Continuous
Total Residual Chlorine[1] - mg/L	0.10	Two/Discharge	Discrete
Total Dissolved Solids (TDS) - mg/L	Monitor & Report	Annual – 4th Qtr.	Discrete

1. Samples must be collected during the first hour of discharge. For discharges that extend beyond an hour in duration, a second sample shall be collected prior to end of discharge, or as specified by the division.
2. Test results to be submitted by **Jan 28th** of the calendar year.

A.10.3.3 Category 3 - Well testing and maintenance / aquifer testing / water quality testing: Discharge Limitations, Monitoring Requirements and Conditions

Parameters	Discharge Limit Daily Maximum	Measurement Frequency[2]	Sample Type
Flow – gallons per minute (gpm)	250	Continuous	Continuous
Total Residual Chlorine[1] - mg/L	0.10	Two/Discharge	Discrete
Total Dissolved Solids (TDS) - mg/L	Monitor & Report	Annual – 4th Qtr.	Discrete
Total Suspended Solids (TSS) - mg/L	Monitor & Report	Annual – 4th Qtr.	Discrete
Methyl tert-Butyl Ether (MTBE) - µg/L	20.0	Annual – 4th Qtr.	Discrete
Total Nitrogen as N - mg/L	10.0	Annual – 4th Qtr.	Discrete
Total Phosphorus as P	Monitor & Report	Annual – 4th Qtr.	Discrete
Trichloroethylene (TCE) - ug/L	5.0	Annual – 4th Qtr.	Discrete

Tetrachloroethylene (PCE) - ug/L	5.0	Annual – 4th Qtr.	Discrete
Benzene - ug/L	5.0	Annual – 4th Qtr.	Discrete
Ethyl benzene - ug/L	100.0	Annual – 4th Qtr.	Discrete
Toluene - ug/L	100.0	Annual – 4th Qtr.	Discrete
Xylene - ug/L	200.0	Annual – 4th Qtr.	Discrete
pH – SU	6.5 – 9.0	Annual – 4th Qtr.	Discrete
Total Petroleum Hydrocarbon (TPH) (C6 – C40) mg/L[3]	1.0	Annual – 4th Qtr.	Discrete

1. Samples must be collected during the first hour of discharge. For discharges that extend beyond an hour in duration, a second sample shall be collected prior to end of discharge, or as specified by the division.
2. Test results to be submitted by **Jan 28th** of the calendar year.
3. EPA Method 8015B and EPA Method 8260B, extractable and purgeable, C6-C40. Summation must meet permit limit.

A.10.3.4 Category 4 - Subsurface water discharges: Discharge Limitations, Monitoring Requirements and Conditions

Parameters	Discharge Limit - Daily Maximum	Measurement Frequency[5]	Sample Type
Flow – gallons per minute (gpm)	250	Continuous	Continuous
Total Residual Chlorine[1] - mg/L	0.10	Two/Discharge	Discrete
Total Dissolved Solids (TDS) - mg/L	Monitor & Report	Annual – 4th Qtr.	Discrete
Total Suspended Solids (TSS) - mg/L	Monitor & Report	Annual – 4th Qtr.	Discrete
Methyl tert-Butyl Ether (MTBE) - µg/L	20.0	Annual – 4th Qtr.	Discrete
Total Nitrogen as N - mg/L	10.0	Annual – 4th Qtr.	Discrete
Total Phosphorus as P	Monitor & Report	Annual – 4th Qtr.	Discrete
Trichloroethylene (TCE) - ug/L	5.0	Annual – 4th Qtr.	Discrete
Tetrachloroethylene (PCE) - ug/L	5.0	Annual – 4th Qtr.	Discrete
Benzene - ug/L	5.0	Annual – 4th Qtr.	Discrete
Ethyl benzene - ug/L	100.0	Annual – 4th Qtr.	Discrete
Toluene - ug/L	100.0	Annual – 4th Qtr.	Discrete
Xylene - ug/L	200.0	Annual – 4th Qtr.	Discrete
pH – SU	6.5 – 9.0	Annual – 4th Qtr.	Discrete
Total Petroleum Hydrocarbon (TPH) (C6 – C40) mg/L[6]	1.0	Annual – 4th Qtr.	Discrete
Barium – mg/L	2.0	Annual – 4th Qtr.	Discrete
Fluoride – mg/L	Monitor & Report	Annual – 4th Qtr.	Discrete
Iron – mg/L	1.0	Annual – 4th Qtr.	Discrete
Sulfate – mg/L	Monitor & Report	Annual – 4th Qtr.	Discrete
Molybdenum - mg/L	6.16	Annual – 4th Qtr.	Discrete
Turbidity – NTU[2, 3]	Monitor & Report	Annual – 4th Qtr.	Discrete
Fecal Coliform - MPN100 mL	Monitor & Report	Annual – 4th Qtr.	Discrete
E Coli[4] - MPN/100 mL	Monitor & Report	Annual – 4th Qtr.	Discrete
Dissolved Oxygen - mg/L	Monitor & Report	Annual – 4th Qtr.	Discrete

1. Samples must be collected during the first hour of discharge. For discharges that extend beyond an hour in duration, a second sample shall be collected prior to end of discharge, or as specified by the division.
2. BMPs shall be implemented to minimize erosion and sediment.
3. During the discharge, if a visible turbidity plume is generated, a grab sample shall be obtained. Turbidity shall be less than or equal to 10 Nephelometric Turbidity Units (NTUs) over the background value of the receiving water.
4. Single Value.
5. Test results to be submitted by **Jan 28th** of the calendar year.
6. EPA Method 8015B and EPA Method 8260B, extractable and purgeable, C6-C40. Summation must meet permit limit.

A.10.3.5 Category 5 - Utility vault water discharges: Discharge Limitations, Monitoring Requirements and Conditions

Parameters	Discharge Limit - Daily Maximum	Measurement Frequency[5]	Sample Type
Flow – gallons per minute (gpm)	250	Continuous	Continuous
Total Residual Chlorine[1] - mg/L	0.10	Two/Discharge	Discrete
Total Dissolved Solids (TDS) - mg/L	Monitor & Report	Annual – 4th Qtr.	Discrete
Total Suspended Solids (TSS) - mg/L	Monitor & Report	Annual – 4th Qtr.	Discrete
Methyl tert-Butyl Ether (MTBE) - µg/L	20.0	Annual – 4th Qtr.	Discrete
Total Nitrogen as N - mg/L	10.0	Annual – 4th Qtr.	Discrete
Total Phosphorus as P	Monitor & Report	Annual – 4th Qtr.	Discrete
Trichloroethylene (TCE) - ug/L	5.0	Annual – 4th Qtr.	Discrete
Tetrachloroethylene (PCE) - ug/L	5.0	Annual – 4th Qtr.	Discrete
Benzene - ug/L	5.0	Annual – 4th Qtr.	Discrete
Ethyl benzene - ug/L	100.0	Annual – 4th Qtr.	Discrete
Toluene - ug/L	100.0	Annual – 4th Qtr.	Discrete
Xylene - ug/L	200.0	Annual – 4th Qtr.	Discrete
pH - SU	6.5 – 9.0	Annual – 4th Qtr.	Discrete
Total Petroleum Hydrocarbon (TPH) (C6 – C40) mg/L[6]	1.0	Annual – 4th Qtr.	Discrete
Barium – mg/L	2.0	Annual – 4th Qtr.	Discrete
Fluoride – mg/L	Monitor & Report	Annual – 4th Qtr.	Discrete
Iron – mg/L	1.0	Annual – 4th Qtr.	Discrete
Sulfate – mg/L	Monitor & Report	Annual – 4th Qtr.	Discrete
Molybdenum - mg/L	6.16	Annual – 4th Qtr.	Discrete
Turbidity – NTU[2, 3]	Monitor & Report	Annual – 4th Qtr.	Discrete
Fecal Coliform - MPN100 mL	Monitor & Report	Annual – 4th Qtr.	Discrete
E Coli[4] - MPN/100 mL	Monitor & Report	Annual – 4th Qtr.	Discrete
Dissolved Oxygen - mg/L	Monitor & Report	Annual – 4th Qtr.	Discrete
Antimony	Monitor & Report	Annual – 4th Qtr.	Discrete
Arsenic	Monitor & Report	Annual – 4th Qtr.	Discrete
Beryllium	Monitor & Report	Annual – 4th Qtr.	Discrete
Boron	Monitor & Report	Annual – 4th Qtr.	Discrete
Cadmium	Monitor & Report	Annual – 4th Qtr.	Discrete
Calcium	Monitor & Report	Annual – 4th Qtr.	Discrete
Copper	Monitor & Report	Annual – 4th Qtr.	Discrete
Lead	Monitor & Report	Annual – 4th Qtr.	Discrete
Magnesium	Monitor & Report	Annual – 4th Qtr.	Discrete
Manganese	Monitor & Report	Annual – 4th Qtr.	Discrete
Mercury	Monitor & Report	Annual – 4th Qtr.	Discrete
Nickel	Monitor & Report	Annual – 4th Qtr.	Discrete
Selenium	Monitor & Report	Annual – 4th Qtr.	Discrete
Silver	Monitor & Report	Annual – 4th Qtr.	Discrete
Sulfur	Monitor & Report	Annual – 4th Qtr.	Discrete
Thallium	Monitor & Report	Annual – 4th Qtr.	Discrete
Zinc - total recoverable	Monitor & Report	Annual – 4th Qtr.	Discrete

1. Samples must be collected during the first hour of discharge. For discharges that extend beyond an hour in duration, a second sample shall be collected prior to end of discharge, or as specified by the division.
2. BMPs shall be implemented to minimize erosion and sediment.
3. During the discharge, if a visible turbidity plume is generated, a grab sample shall be obtained. Turbidity shall be less than or equal to 10 Nephelometric Turbidity Units (NTUs) over the background value of the receiving water.

4. Single Value.
5. Test results to be submitted by **Jan 28th** of the calendar year.
6. EPA Method 8015B and EPA Method 8260B, extractable and purgeable, C6-C40. Summation must meet permit limit.

A.11 MONITORING AND REPORTING:

A.11.1 Monitoring:

A.11.1.1 Representative Samples:

A.11.1.1.1 Samples and measurements taken as required herein shall be representative of the nature and volume of the monitored discharge. Analysis shall be performed by a State of Nevada certified laboratory. Results from this laboratory must accompany the Discharge Monitoring Report (DMR) Form; monitoring results shall be submitted to the address listed in I.D.9 within 30 days of the discharge, or as required.

A.11.1.1.2 Copies of sample and measurement results shall be maintained on site.

A.11.1.2 Recording the Results:

A.11.1.2.1 For each measurement or sample taken pursuant to the requirements of this General Uncontaminated Water Discharge Permit, the Permittee shall record the following information:

A.11.1.2.2 The exact place, date, and time of sampling;

A.11.1.2.3 The dates the analyses were performed;

A.11.1.2.4 The person(s) who performed the analyses;

A.11.1.2.5 The analytical techniques or methods used (list field testing equipment);

A.11.1.2.6 The results of all required analyses, including reporting limits.

A.11.1.3 Additional Monitoring by Permittee:

A.11.1.3.1 If the Permittee monitors any constituent at the location(s) designated herein more frequently than required by this general discharge permit, using approved analytical methods and laboratories as specified above, the results of that monitoring shall be included in the next annual or monitoring report submitted to the Division on the DMR form. Such increased frequency shall also be indicated on the DMR.

A.11.1.4 Annual Sampling:

A.11.1.4.1 Required sampling protocol is defined in Section C of the permit;

A.11.1.4.2 Discharge monitoring reports are due on January 28th (4th Quarter) of the calendar year as defined in Section A of the permit;

A.11.1.4.3 Additionally, the Permittee shall document and report inspection findings, update spill and unauthorized discharge information including clean up and preventive actions taken and report any modifications to the BMPs. The reports shall include all monitoring data collected, including data collected in accordance with Section C of this permit and a summary/ interpretation of that data;

A.11.1.4.4 The discharge shall not cause the following in the receiving water:

A.11.1.4.4.1 Concentrations of dissolved oxygen (DO) in the receiving water to fall below 7.0 mg/L. During any period when the receiving water DO concentration is already below 7.0 mg/L, the discharge shall not further diminish the DO content;

A.11.1.4.4.2 Alteration to the color, taste or odor beyond present natural ambient levels;

A.11.1.4.4.3 Turbidity in amounts which adversely affect beneficial uses in the receiving waters. Turbidity shall not increase more than 20 percent over background levels;

A.11.1.4.4.4 Significant erosion, sedimentation or alteration of the watercourse;

A.11.1.4.4.5 Biostimulatory substances to be present in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses;

A.11.1.4.4.6 The normal ambient receiving water to be altered more than 5° F (Fahrenheit), if a temperature standard is present;

A.11.1.4.4.7 Further degradation of any 303d listed receiving water for an established parameter.

A.11.2 Reporting:

A.11.2.1 Annual Reports:

A.11.2.1.1 Annual reports are required for NDEP approved discharge operations as defined in Section C of the permit.

A.11.2.1.2 Annual monitoring results obtained pursuant to Section A of the permit are due each January 28th (4th Quarter) of the current calendar year. Reports shall be summarized and reported on a Discharge Monitoring Report (DMR) form. The Permittee shall also submit the data in an electronic format provided by the Division addressed in Section C below.

A.11.2.1.3 Summaries of laboratory results for analyses conducted by outside laboratories must accompany the DMR, and the full data package provided by the laboratory must be provided if requested in writing by the Division. If at any time the Permittee concludes that submitted data were incorrect, the Permittee shall notify the Division in writing, identify the incorrect data, and replace the incorrect data with corrected data, which shall thereafter be used for determining compliance with this permit

A.11.2.2 Compliance Report:

A.11.2.2.1 Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date.

A.11.3 Other information:

A.11.3.1 Where the Permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Administrator, it shall promptly submit such facts or information.

A.12 ANNUAL FEE:

A.12.1 The Permittee shall remit an annual review and services fee in accordance with NAC 445A.268 on or before July 1st of every year that the Permittee is authorized to discharge under this General Permit.

SECTION B:

B.1 GENERAL PERMIT COVERAGE FOR ONGOING PROJECTS:

B.1.1 Current permits are valid until expiration date. To be covered by this permit, holders of an expired permit must submit a new NOI with the proper filing fee.

B.2 NARRATIVE STANDARDS:

B.2.1 Discharges shall not cause the following standards to be violated in any surface waters of the state. Waters must be free from:

B.2.1.1 Substances that will settle to form sludge or bottom deposits in amounts sufficient to be unsightly, putrescent or odorous;

B.2.1.2 Floating debris, oil, grease, scum, and other floating materials in amounts sufficient to be unsightly;

B.2.1.3 Materials in amounts sufficient to produce taste or odor in the water or detectable off-flavor in the flesh of fish or in amounts sufficient to change the existing color, turbidity or other conditions in the receiving stream to such a degree as to create a public nuisance;

B.2.1.4 High temperature, biocides, organisms pathogenic to human beings, toxic, corrosive or other deleterious substances at levels or combinations sufficient to be toxic to human, animal, plant or aquatic life;

B.2.1.5 Radioactive materials must not result in accumulations of radioactivity in plants or animals that result in a hazard to humans or harm to aquatic life;

B.2.1.6 Untreated or uncontrolled wastes or effluents that are reasonably amenable to treatment or control; and

B.2.1.7 Substances or conditions, which interfere with the beneficial use of the receiving waters.

B.2.2 The narrative standards are not considered violated when the natural conditions of the receiving water are outside the established limits, including periods of high or low flow. Where effluents are discharged to such waters, the discharges are not considered a contributor to substandard conditions provided maximum treatment in compliance with permit requirements is maintained.

B.2.3 There shall be no objectionable odors from the collection system, treatment facility or disposal area, or biosolids treatment, use, storage or disposal area that the Permittee owns or operates.

B.2.4 There shall be no discharge of substances that would cause a violation of water quality standards of the State of Nevada as defined by the permit.

B.2.5 The permit may be reopened, and additional limits imposed, if it is determined that the discharge is causing a violation of ambient water quality standards of the State of Nevada.

B.2.6 There shall be no discharge from the collection, treatment and disposal facilities except as authorized by this permit or in accordance with the Division's Spill Reporting Policy.

B.2.7 The treatment and disposal facility shall be fenced and posted.

B.2.8 There shall be no discharge of floating solids or visible foam in other than trace amounts.

B.3 BEST MANAGEMENT PRACTICES (BMP):

B.3.1 BMP's shall be implement and maintained to the Maximum Extent Practicable

B.3.2 Permittees shall implement BMPs prior to commencement of discharge.

B.3.3 A Permittee shall implement the BMP requirements to ensure compliance with the terms and conditions of this general permit.

B.3.4 The Permittee shall make all BMP records and plans available to the Division upon request.

B.3.5 All sediment control measures and other protective measures must be maintained in effective operating condition.

B.3.6 If existing BMPs need to be modified or additional BMPs are necessary, implementation must be completed as soon as possible.

B.3.7 All erosion and sediment control measures and other protective measures must be maintained in effective operating condition. If site inspections identify BMPs that are not operating effectively or if the capacity has been reduced by 50%, maintenance

shall be performed.

B.3.8 NDEP may require modifications to the site BMP's.

B.4 24 HOUR REPORTING:

B.4.1 The Permittee shall orally report any noncompliance or discharge which may seriously endanger human health or the environment as soon as possible, but no later than 24 hours from the time the Permittee becomes aware of the circumstances. The report shall be made to the Division at (888) 331-6337 during normal business hours. A written report shall also be submitted to the Division within ten days of the time the Permittee becomes aware of the circumstances. The written submission shall contain a description of the event, and its cause; the period of time over which it occurred, including exact dates and times, and if the situation has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence.

B.5 PHOTOGRAPHIC DOCUMENTATION:

B.5.1 Discharges conducted under the terms and conditions of this General Permit shall also be monitored by means of photographic documentation to verify performance of the water management BMPs and the discharge point BMPs. The photographs shall be submitted with a brief summary narrative report quarterly if conditions have changed. Photographs shall be taken from established photograph points, and shall depict representative views of the discharge activities on site, as well as the scope of operations with project sites, monitoring location(s), discharge point(s), and any relevant activity related to the discharge.

C SECTION C:

C.1 DEFINITIONS AND GENERAL REQUIREMENTS:

C.1.1 **Municipal Separate Storm Sewer Systems (MS4),** as defined in 40 CFR 122.26 (b) (8) http://edocket.access.gpo.gov/cfr_2002/julqtr/40cfr122.26.htm, is a conveyance or system of conveyances that is: Owned by a state, city, town, village, or other public entity that discharges to waters of the U.S.; Designed or used to collect or convey stormwater (including storm drains, pipes, ditches, etc.); Not a combined sewer; and Not part of a Publicly Owned Treatment Works (sewage treatment plant).

C.1.2 **Best Management Practices (BMPs**) means schedules of activities, prohibitions of practices, maintenance procedures and other management practices to prevent or reduce the pollution of Waters of the U.S. BMPs also include treatment requirements, operating procedures and practices to control site runoff, spillage, leaks, or other sources of pollution.

C.1.3 **DeMinimis discharge** means a discharge that is relatively pollutant free water which when discharged, in conjunction with appropriate BMPs that are used to reduce any and all pollutants to below the applicable limits set by this permit, has minimal or no

adverse impact to the environment or public health.

C.1.4 **Utility** means a system to provide for the distribution of water, natural gas, electricity, communications (including telephone, cellular telephone towers, and fiber optics), cable television and other such systems.

C.1.5 **Waters of the U. S**. is defined at 40 CFR §122.2, and includes but is not limited to lakes, reservoirs, ponds, rivers, streams (including intermittent and ephemeral streams), creeks, washes, draws, sloughs, playas and wetlands.

C.1.6 **303 (d) List - Nevada:** Criteria – Please see the following link: http://ndep.nv.gov/bwqp/file/303d_list09.pdf

C.1.7 **303 (d) List - Nevada:** Nevada's 303(d) List of Impaired Waters – Please see the following link: http://ndep.nv.gov/bwqp/file/303d_list09-att1.pdf

C.2 TEST PROCEDURES:

C.2.1 Test procedures for the analysis of pollutants shall conform to regulations (40 CFR, Part 136) published pursuant to Section 304(h) of the Act, under which such procedures may be required unless the Division approves other procedures. For the purpose of this permit, the Permittee may use alternate field test kits and instrumentation for field screening. Field testing is permitted, using suitable methods for flow, pH, total chlorine residual and temperature.

C.3 PLANNED CHANGES:

C.3.1 The Permittee shall give notice to the Administrator as soon as possible of any planned physical alterations or additions to the permitted facility.

C.3.2 Notice is required only when the alteration or addition to a permitted facility, may meet one of the criteria for determining whether a facility is a new source (40 CFR 122.29(b)), or could significantly change the nature or increase the quantity of pollutants discharged.

C.4 ANTICIPATED NON-COMPLIANCE:

C.4.1 The Permittee shall give advance notice to the Administrator of any planned changes in the permitted facility or activity, which may result in noncompliance with permit requirements.

C.4.2 Reports shall include a certification that the Permittee is in compliance with the permit, and identify any incidents of non-compliances; a narrative explanation must be attached to every non-compliance incident.

C.5 ADDRESS FOR SUBMITTAL:

C.5.1 All monitoring results and annual reports shall be submitted to the Division; an original signed copy of all reports required herein, shall be submitted to the Division at the following address:

Division of Environmental Protection
Bureau of Water Pollution Control
901 South Stewart Street, Suite 4001
Carson City, Nevada 89701
ATTN: Compliance Coordinator

C.6 CHANGE IN DISCHARGE:

C.6.1 All discharges authorized herein shall be consistent with the terms and conditions of this general permit. Any anticipated new discharges at the site related to the discharges as described in Section A which will result in new, different, or increased discharges of pollutants must be reported to the Division. Pursuant to NAC 445A.263, the General Permit may be modified to specify and limit any pollutants not previously limited.

C.7 OPERATION:

C.7.1 The Permittee shall at all times maintain in good working order and operate as efficiently as possible all equipment and ancillary BMPs used by the Permittee to achieve compliance with the terms and conditions of this general discharge permit.

C.8 ADVERSE IMPACT:

C.8.1 The Permittee shall take all reasonable steps to minimize any adverse impact to receiving waters resulting from noncompliance with this General Permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge. The Permittee shall carry out such measures, as reasonable, to prevent significant adverse impacts on human health or the environment.

C.9 REMOVED SUBSTANCES:

C.9.1 Solids removed during the control of discharged water shall be disposed of in a manner to prevent pollution from such materials from entering any surface or ground water.

C.10 MODIFICATION OF MONITORING FREQUENCY AND SAMPLE TYPE:

C.10.1 After considering monitoring data, discharge flow and receiving water conditions, the Division, may, for just cause, modify the monitoring frequency and/or sample type by issuing an order to the Permittee.

C.11 RECORDS RETENTION:

C.11.1 All records and information resulting from the monitoring activities required by this General Permit, including all records of analyses performed and calibration and maintenance of instrumentation and recordings from continuous monitoring instrumentation, shall be retained for a minimum of three (3) years after approval to discharge under this permit, or longer if required by the Administrator.

C.12 DETECTION LIMITS:

C.12.1 All laboratory analysis conducted in accordance with this discharge permit must meet the following criteria:

C.12.1.1 All methods used must be specified or approved in either 40 CFR 136, SW-846 or otherwise approved by the Division. All analytical results must be generated by analytical laboratories certified by the Nevada State laboratory certification program; and

C.12.1.2 Each parameter shall have detection at or below the permit limits or the Reported Detection Level as defined in the analytical method, whichever is lower.

C.13 RIGHT OF ENTRY:

C.13.1 The Permittee shall allow the Administrator and/or his authorized representatives, upon the presentation of credentials;

C.13.2 To enter upon the Permittee's premises (and other property) where a discharge occurs and/or in which any records are required to be kept under the terms and conditions of this General Permit;

C.13.3 At reasonable times, to have access to and copy any records required to be kept under the terms and conditions of this General Permit;

C.13.4 Inspect any monitoring equipment or monitoring method required in this General Permit; or,

C.13.5 Perform any necessary inspection and/or sampling to determine compliance with this General Dewatering Permit or to sample any discharge.

C.14 TRANSFER OF OWNERSHIP OR CONTROL:

C.14.1 In the event of any change in control or ownership from which the authorized discharge emanates, the Permittee shall notify the succeeding owner or controller of the existence of this General Permit, by letter, a copy of which shall be forwarded to the Administrator. The Division must approve ALL transfers of the permit.

C.15 AVAILABILITY OF REPORTS:

C.15.1 Except for data determined to be confidential under NRS 445A.665, all reports prepared in accordance with the terms of this General Permit shall be available for public inspection at the office of the Division. As required by the Clean Water Act and NRS, discharge data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in NRS 445A.710.

C.16 FURNISHING FALSE INFORMATION AND TAMPERING WITH MONITORING DEVICES:

C.16.1 Any person who knowingly makes any false statement, representation, or certification in any application, record, report, plan or other document filed or required to be maintained by the provisions of NRS 445A.300 to 445A.730, inclusive, or by any General Permit, rule, regulation or order issued pursuant thereto, or who falsifies, tampers with or knowingly renders inaccurate any monitoring device or method required to be maintained under the provisions of NRS 445A.300 to 445A.730, inclusive, or by any General Permit, rule, regulation or order issued pursuant thereto, is guilty of a gross misdemeanor and shall be punished by a fine of not more than $10,000 or by imprisonment. This penalty is in addition to any other penalties, civil or criminal, provided pursuant to NRS 445A.300 to 445A.730 inclusive.

C.17 PENALTY FOR VIOLATION OF PERMIT CONDITIONS:

C.17.1 NRS 445A.675 provides that any person who violates a General Permit condition is subject to administrative and judicial sanctions as outlined in NRS 445A.690 through 445A.705.

C.18 PERMIT MODIFICATION, SUSPENSION OR REVOCATION:

C.18.1 After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to, the following:

C.18.1.1 Violation of any terms or conditions of this permit;

C.18.1.2 Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts;

C.18.1.3 A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge;

C.18.1.4 A determination that the permitted activity endangers human health or the environment and can only be regulated to acceptable levels by permit modification or termination;

C.18.1.5 There are material and substantial alterations or additions to the permitted facility or activity;

C.18.1.6 The Administrator has received new information;

C.18.1.7 The standards or regulations have changed; or

C.18.1.8 The Administrator has received notification that the permit will be transferred.

C.19 LIABILITY:

C.19.1 Nothing in this General Permit shall be construed to preclude the institution of any legal action or relieve the Permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable Federal, State or local laws, regulations, or ordinances.

C.20 PROPERTY RIGHTS:

C.20.1 The issuance of this General Permit does not convey any property rights, in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State or local laws, regulations or ordinances.

C.21 SEVERABILITY:

C.21.1 The provisions of this General Permit are severable, and if any provision of this Permit, or the application of any provisions of this Permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this Permit, shall not be affected thereby.

C.22 SIGNATURES, CERTIFICATION REQUIRED ON APPLICATION AND REPORTING FORMS:

C.22.1 All applications, reports, or information submitted to the Administrator shall be signed and certified by making the following certification.

"I hereby certify that I am familiar with the information contained in the application and that to the best of my knowledge and ability such information is true, complete, and accurate."

C.22.2 All applications, reports or other information submitted to the Administrator shall be signed by one of the following:

C.22.2.1 A principal executive officer of the corporation (of at least the level of vice president) or his authorized representative who is responsible for the overall operation of the facility from which the discharge described in the application or reporting form originates;

C.22.2.2 A general partner of the partnership;

C.22.2.3 The proprietor of the sole proprietorship; or

C.22.2.4 A principal executive officer, ranking elected official or other authorized employee of the municipal, state or other public facility.

C.23 CHANGES TO AUTHORIZATION:

C.23.1 If an authorization under Section C (Signatures, Certification Required on Application and Reporting Forms) is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Section C (Signatures, Certification Required on Application and Reporting Forms) must be submitted to the Administrator prior to or together with any reports, information, or applications to be signed by an authorized representative.

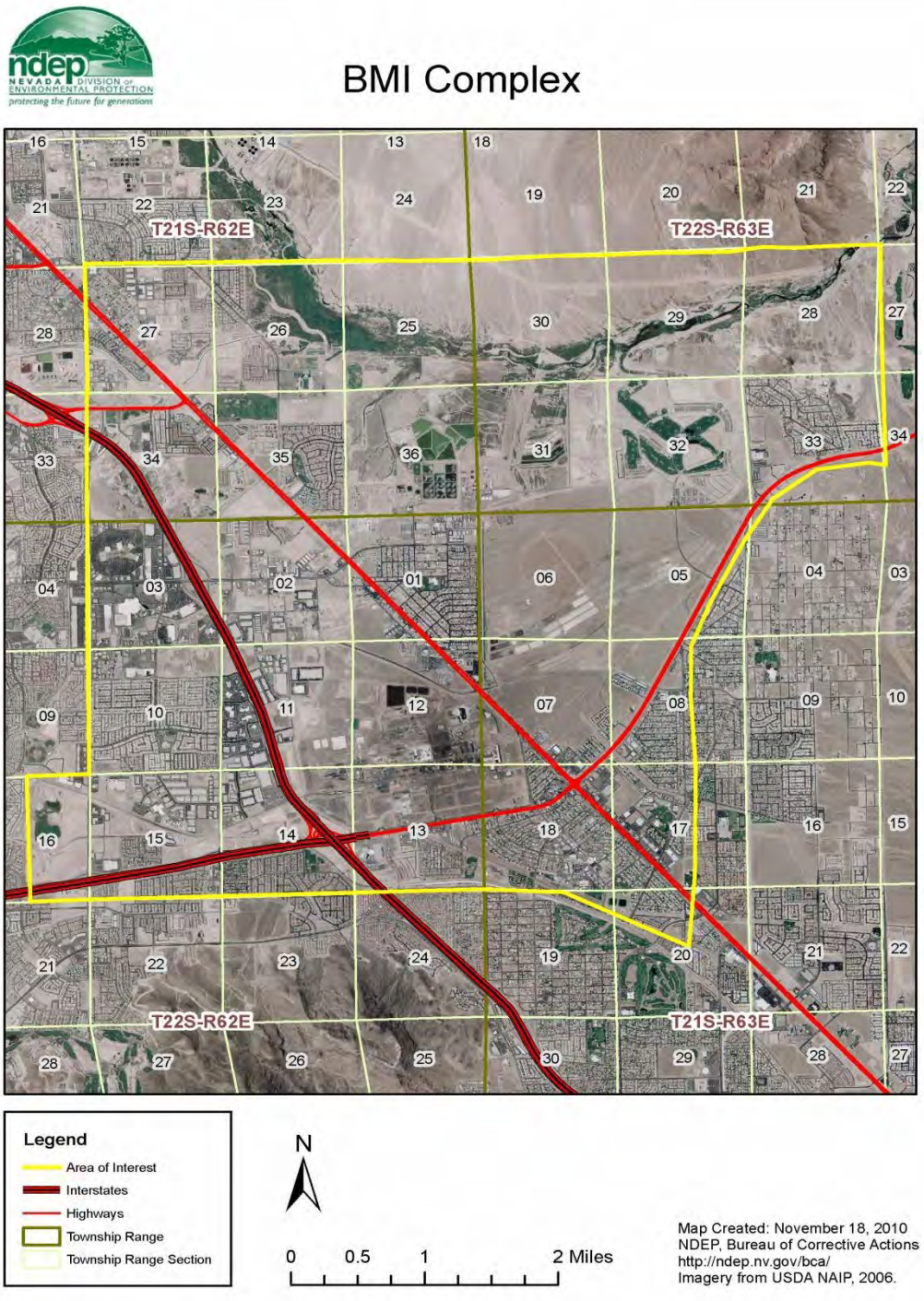
C.24 REAPPLICATION:

C.24.1 If the Permittee desires to continue to discharge, he shall reapply not later than 180 days before this permit expires on the application forms then in use. The renewal application shall be accompanied by the fee required by NAC 445A.268.

C.25 DUTY TO PROVIDE INFORMATION:

C.25.1 The Permittee shall furnish to the Administrator, within a reasonable time, any relevant information which the Administrator may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The Permittee shall also furnish to the Administrator, upon request, copies of records required to be kept by this permit.

Attachment I



ATTACHMENT 4

WATER LEVEL DATA – HYDROGRAPH PLOTS FOR PUMPING TESTS

ATTACHMENT C
WATER LEVEL DATA – HYDROGRAPH PLOTS FOR PUMPING TESTS

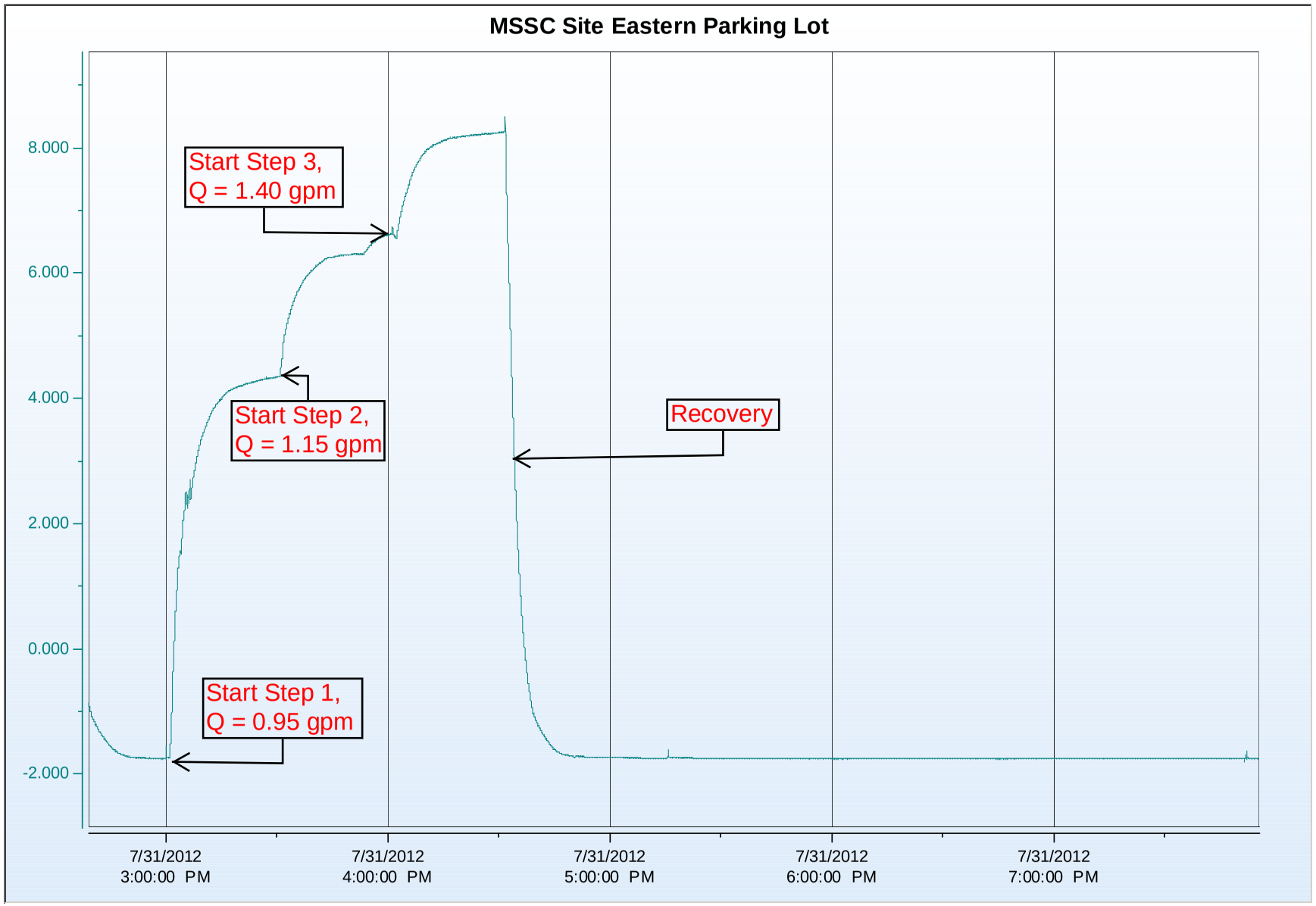


Figure C1. Time-Drawdown Plot of Field Data from Step Drawdown Test in Pumped Well MW-19I.

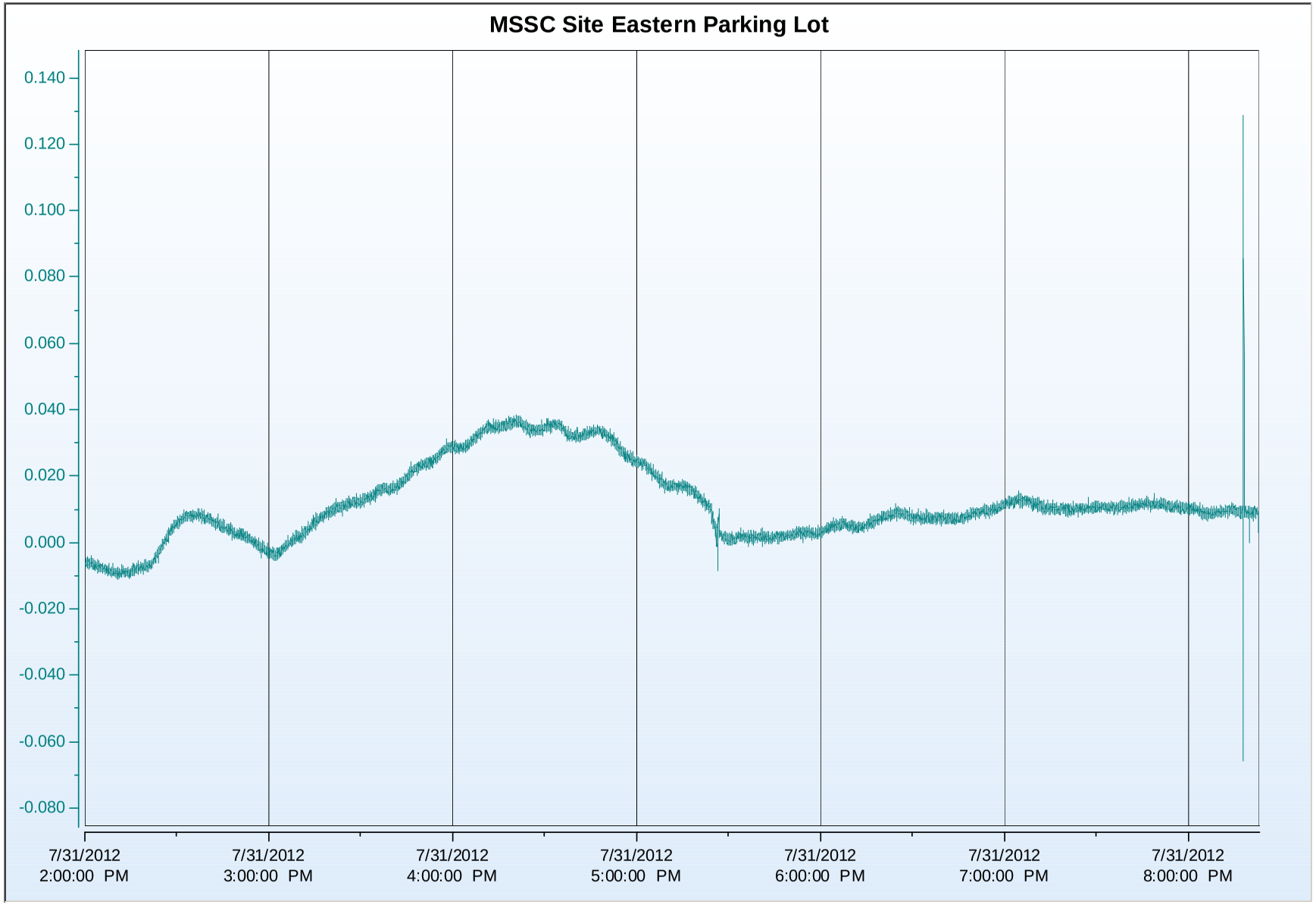


Figure C2. Time-Drawdown Plot of Field Data from Step Drawdown Test in Observation Well MW-19.

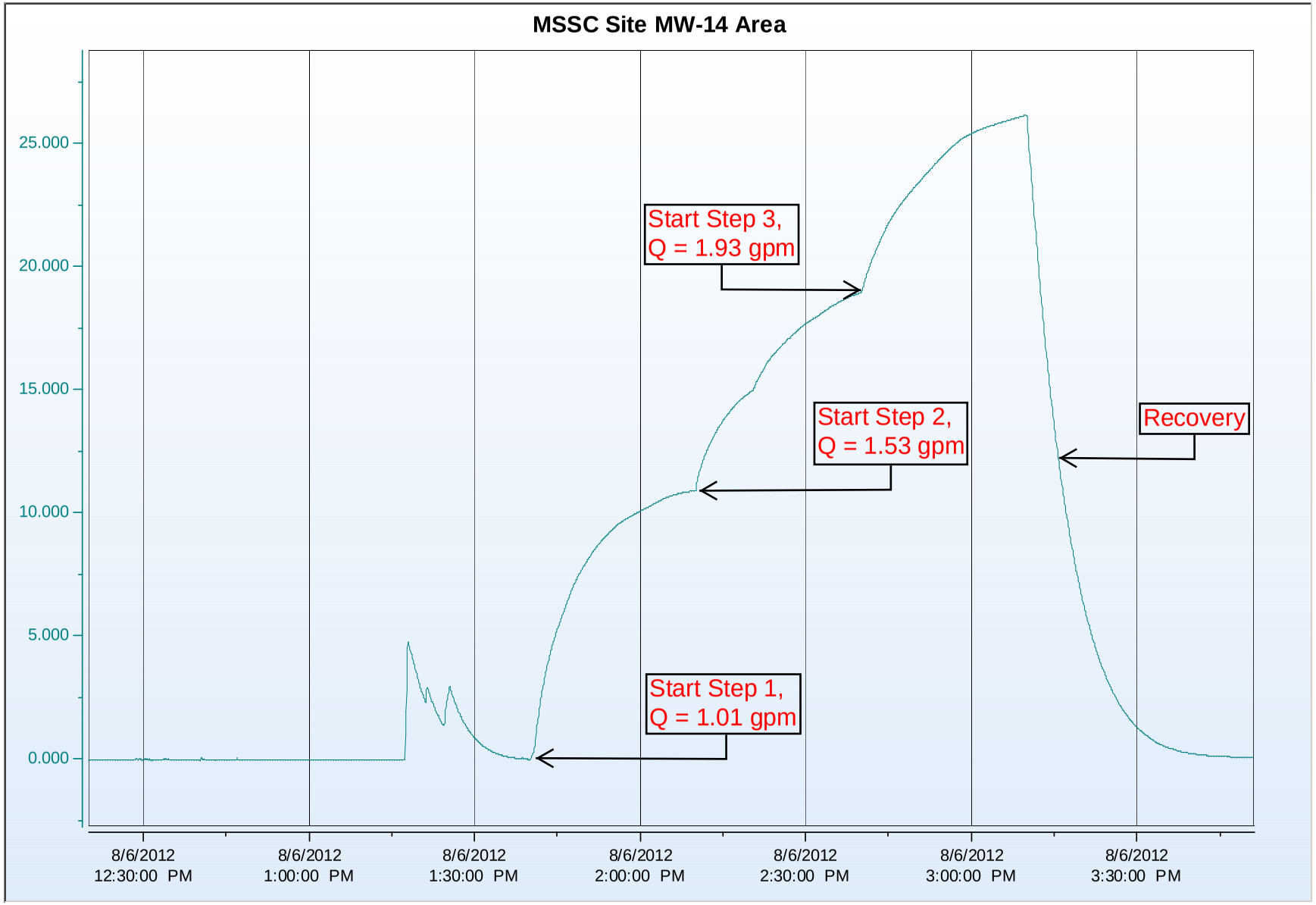


Figure C3. Time-Drawdown Plot of Field Data from Step Drawdown Test in Pumped Well MW-14I.

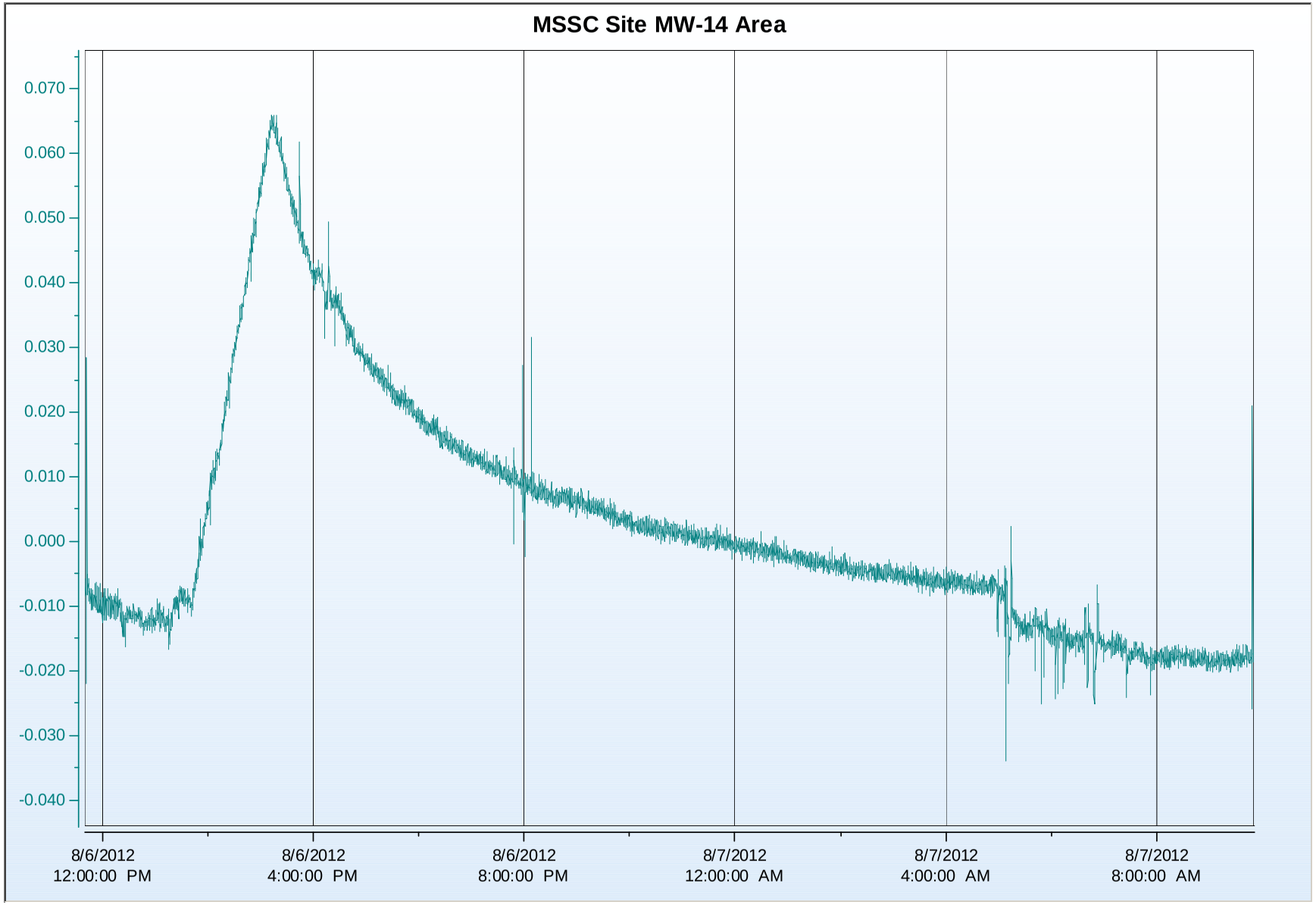


Figure C4. Time-Drawdown Plot of Field Data from Step Drawdown Test in Observation Well MW-14.

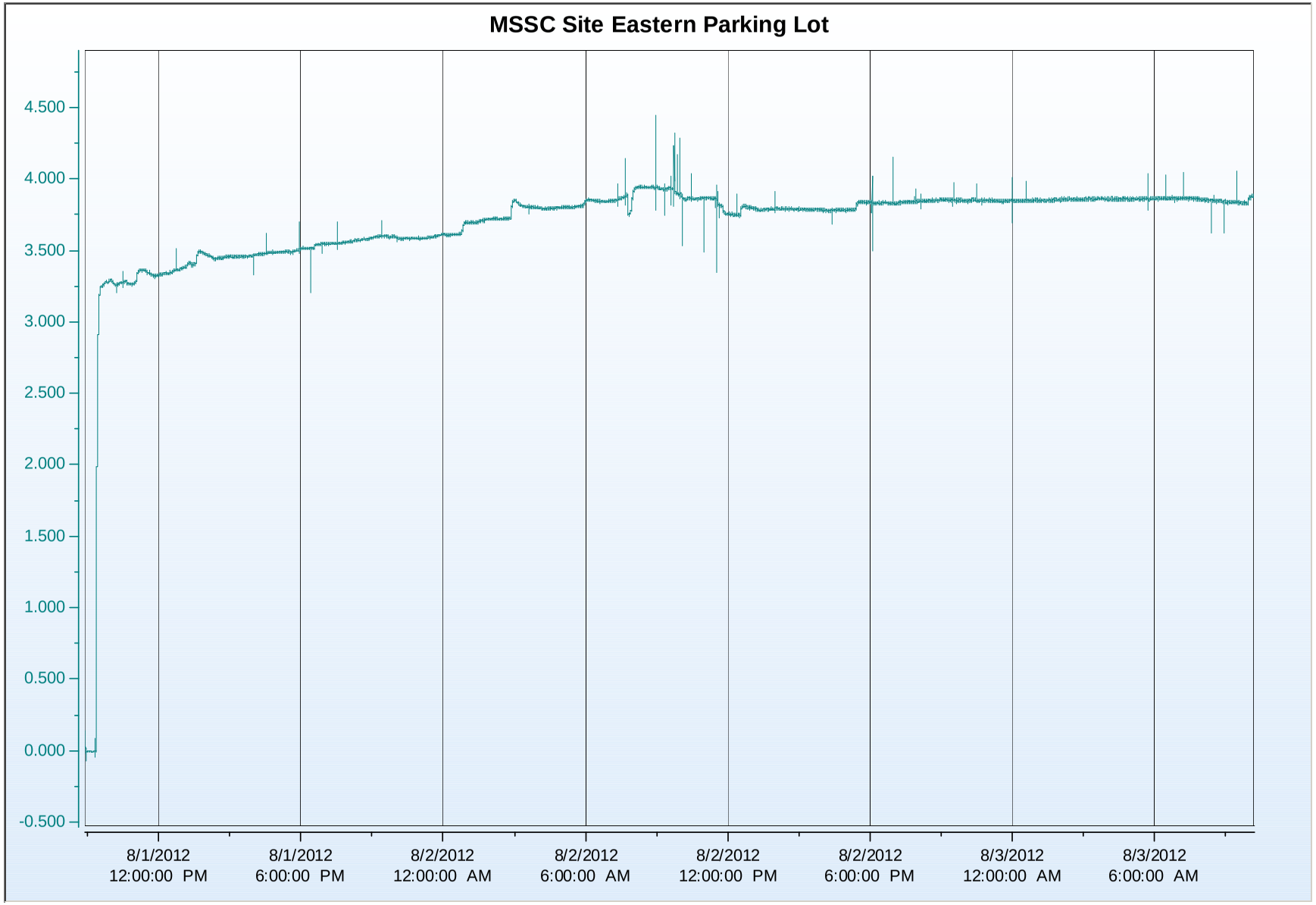


Figure C5. Time-Drawdown Plot of Field Data from Constant Discharge Test in Pumped Well MW-19I (Part 1).

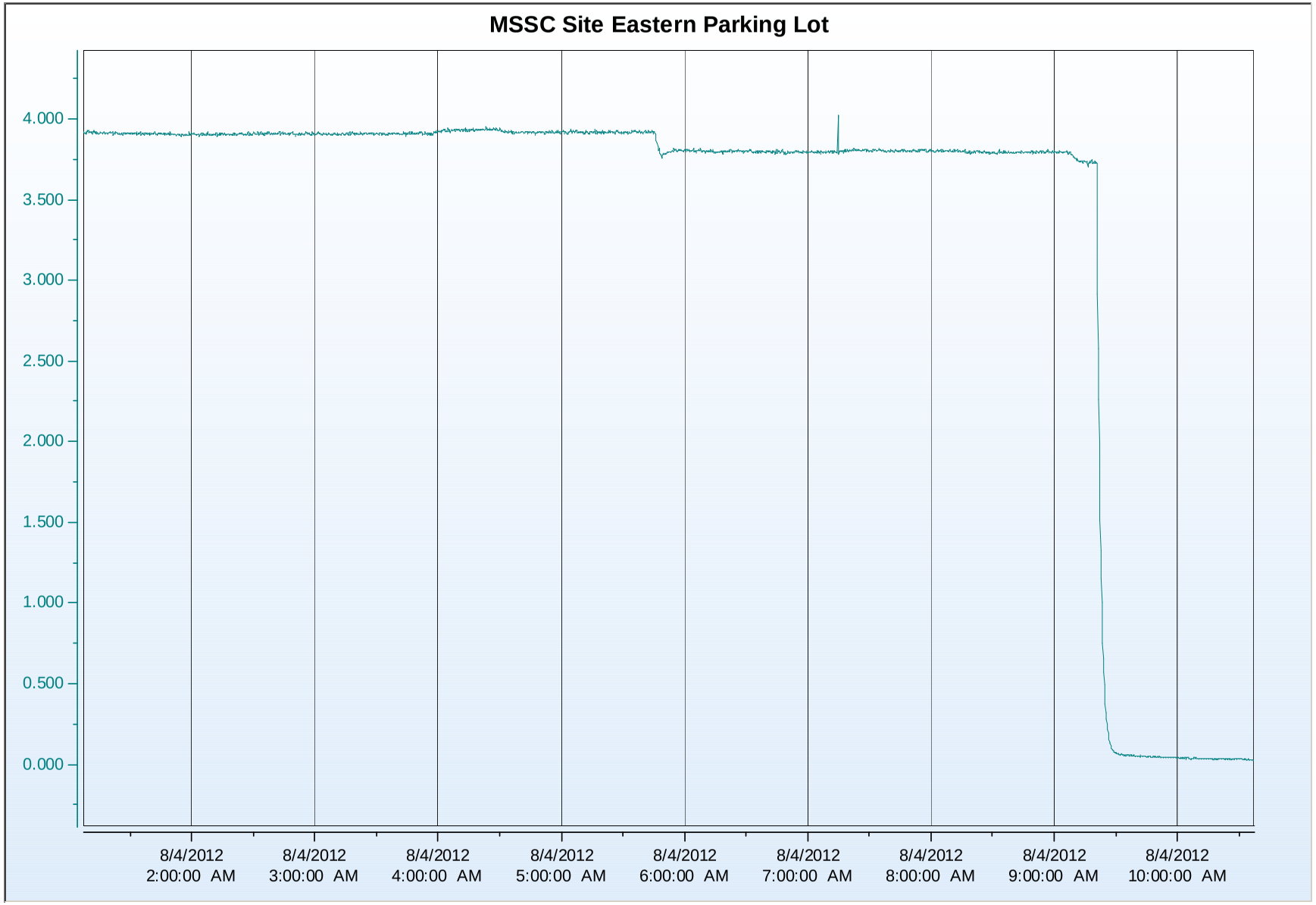


Figure C6. Time-Drawdown Plot of Field Data from Constant Discharge Test in Pumped Well MW-19I (Part 2).

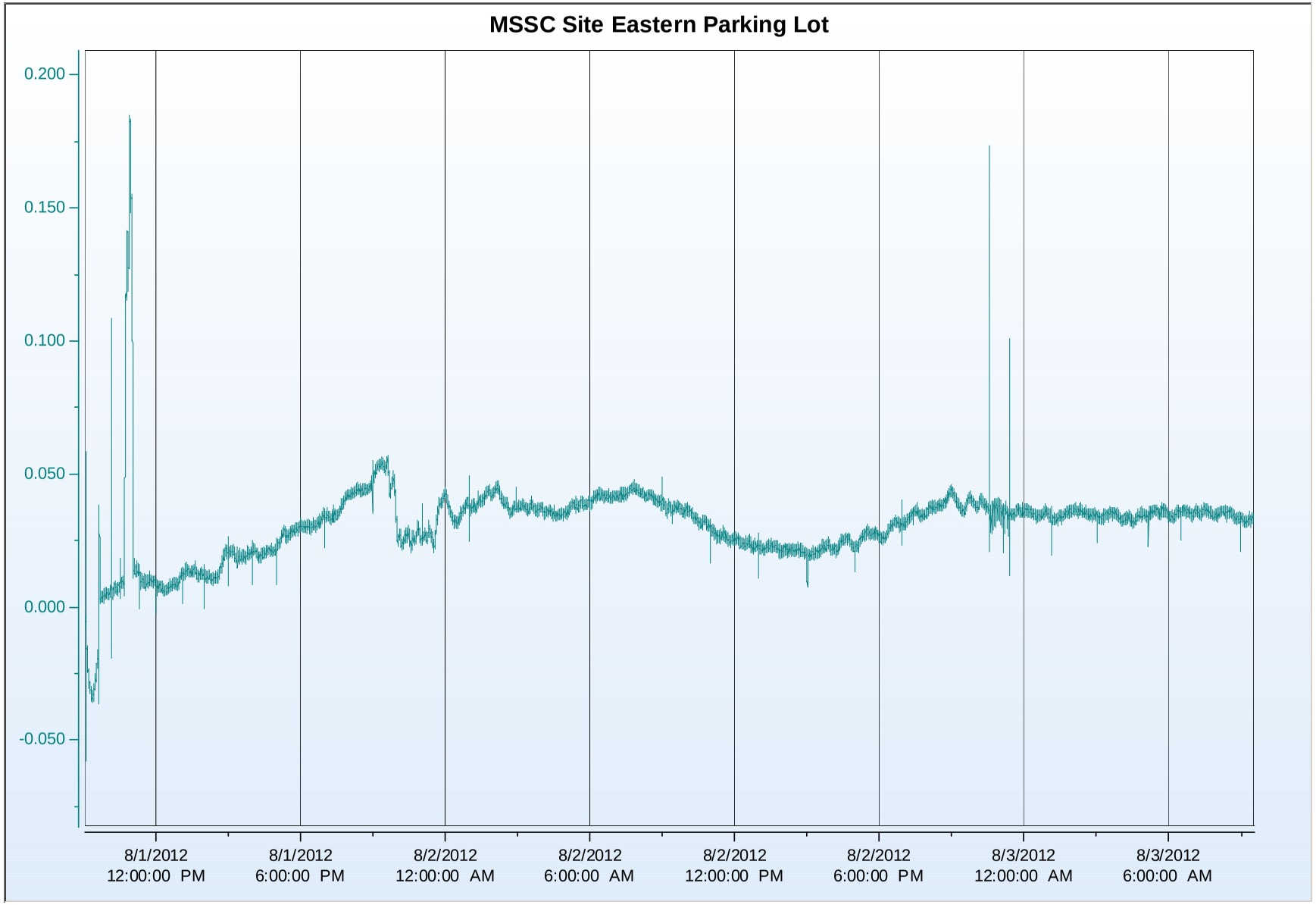


Figure C7. Time-Drawdown Plot of Field Data from Constant Discharge Test in Observation Well MW-19 (Part 1).

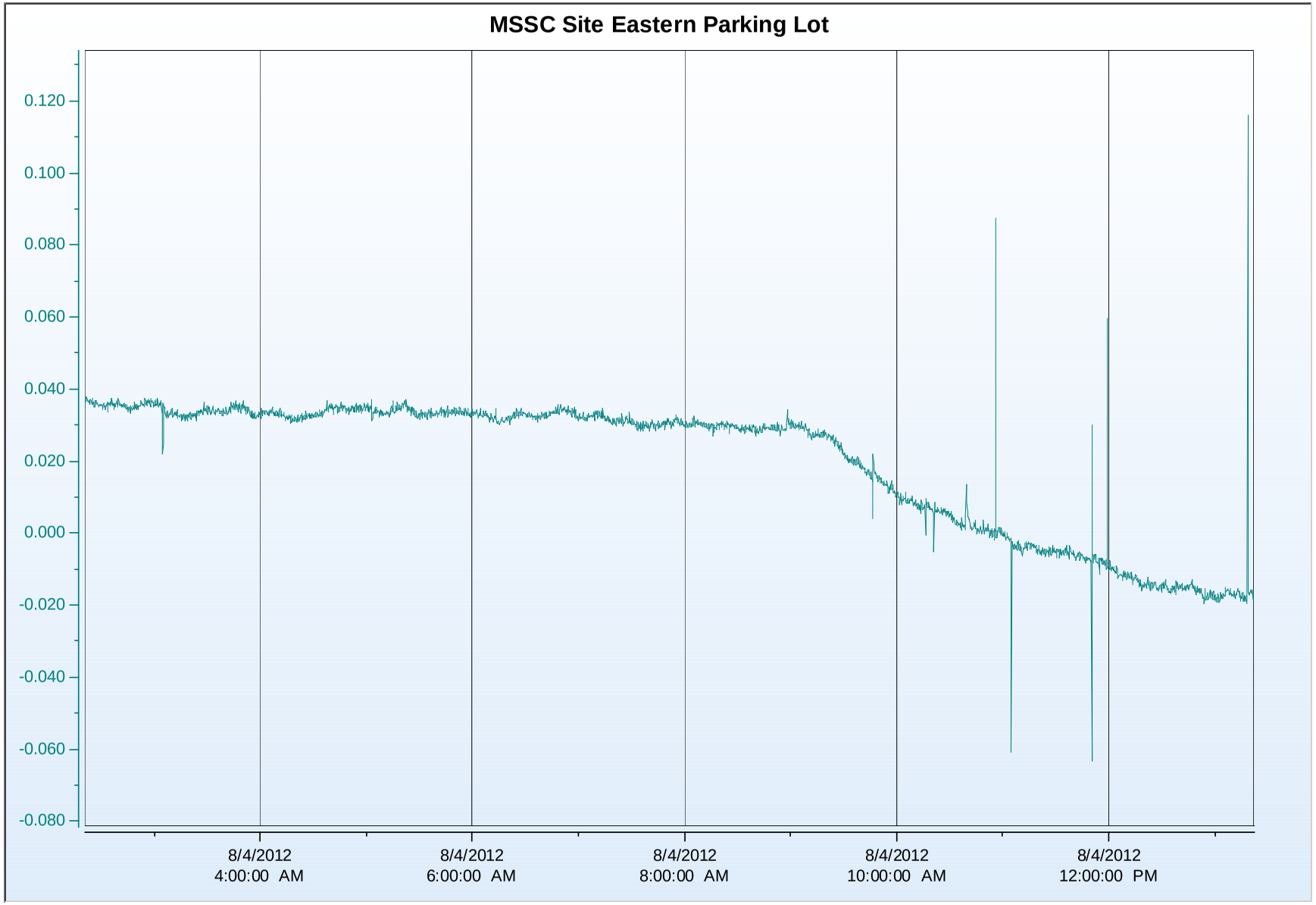


Figure C8. Time-Drawdown Plot of Field Data from Constant Discharge Test in Observation Well MW-19 (Part 2).

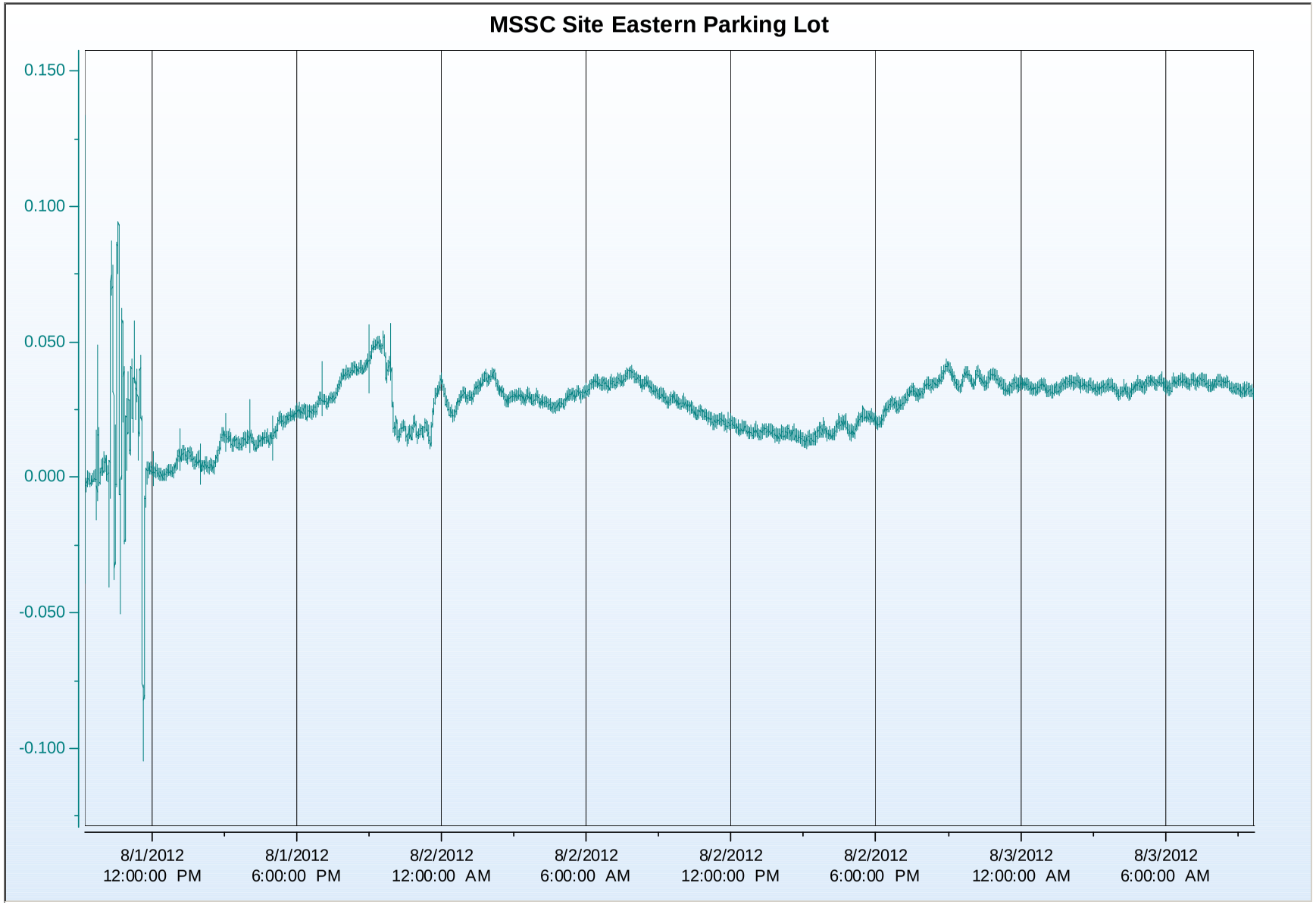


Figure C9. Time-Drawdown Plot of Field Data from Constant Discharge Test in Observation Well MW-20 (Part 1).

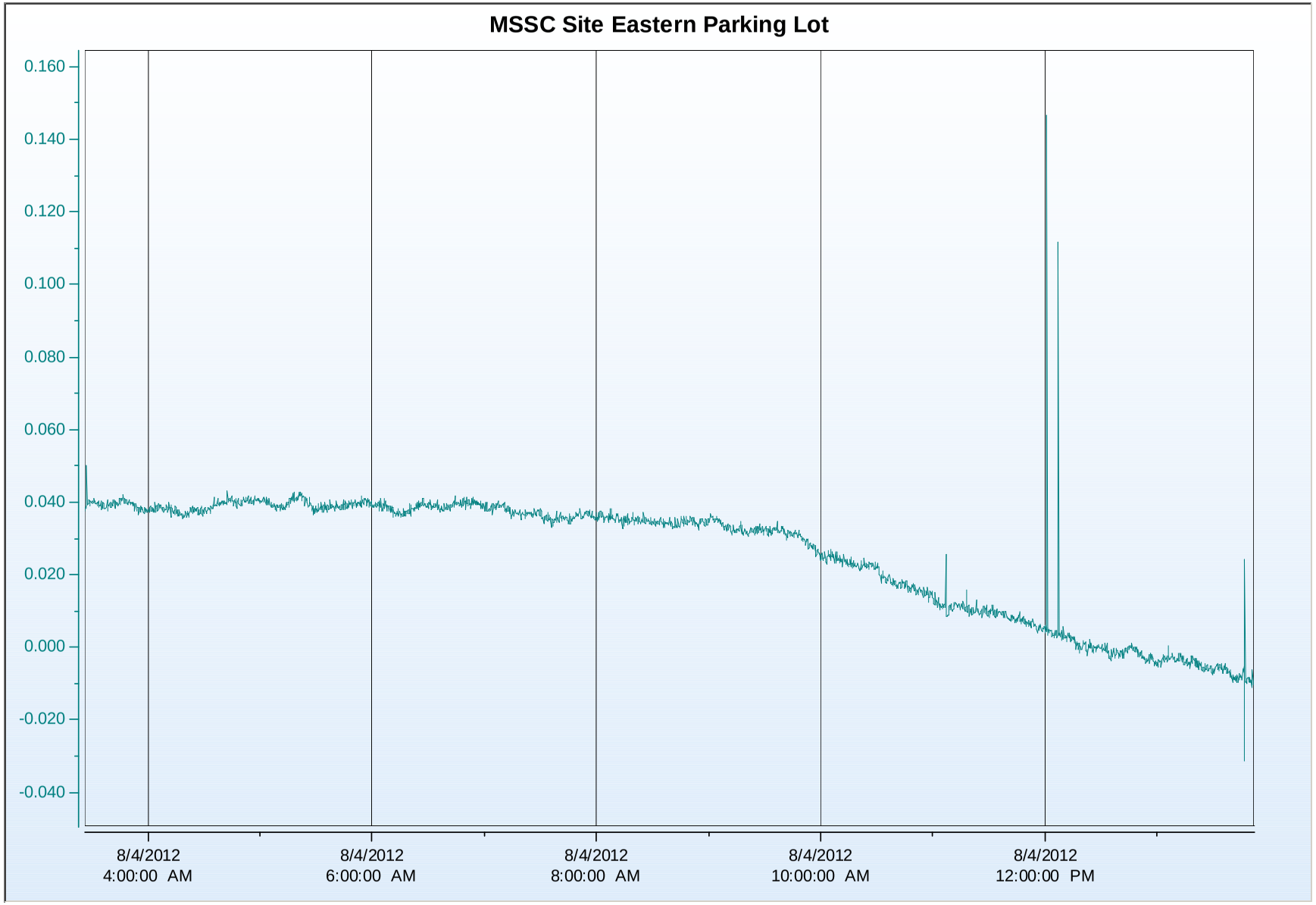


Figure C10. Time-Drawdown Plot of Field Data from Constant Discharge Test in Observation Well MW-20 (Part 2).

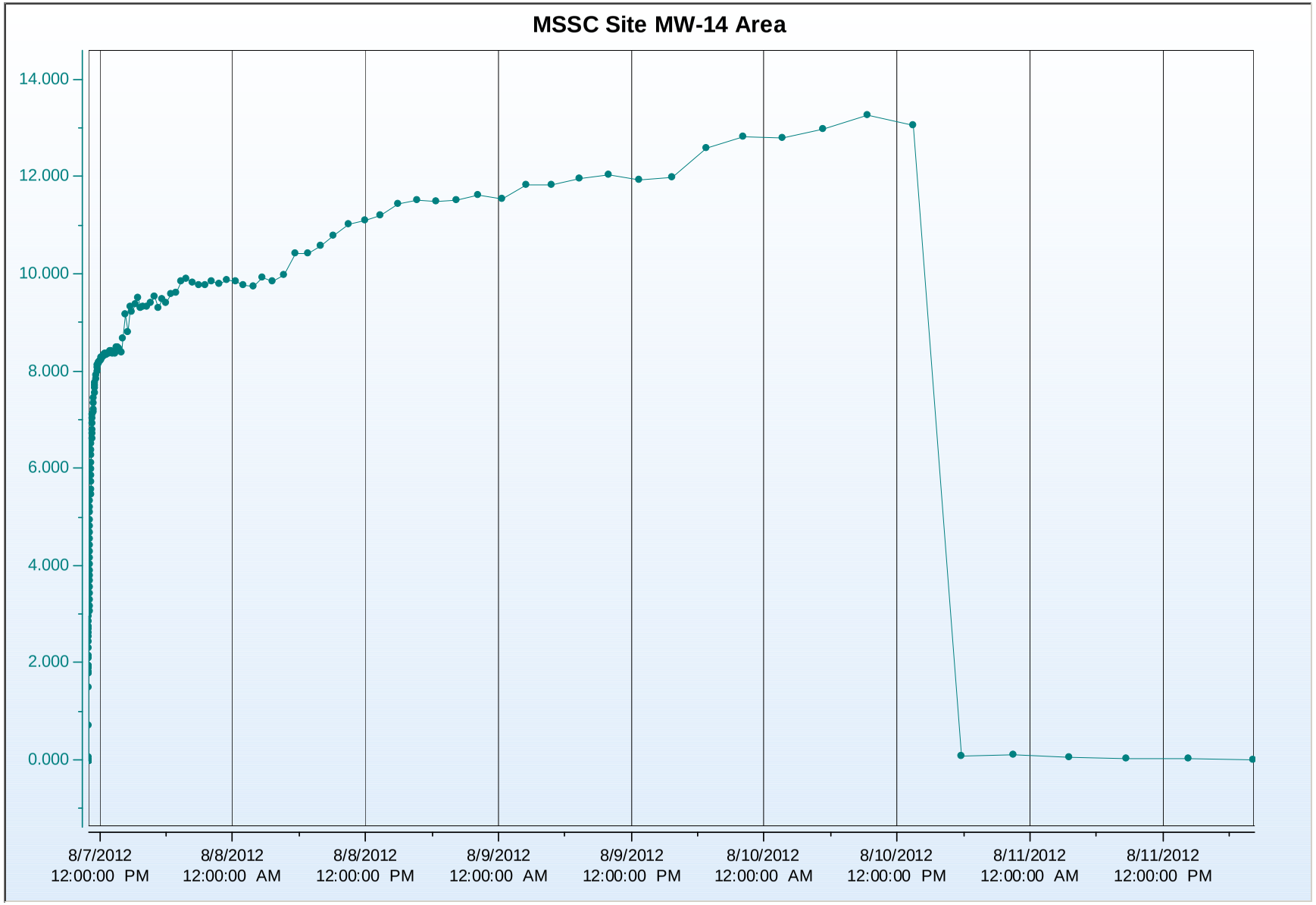


Figure C11. Time-Drawdown Plot of Field Data from Constant Discharge Test in Pumped Well MW-14I.

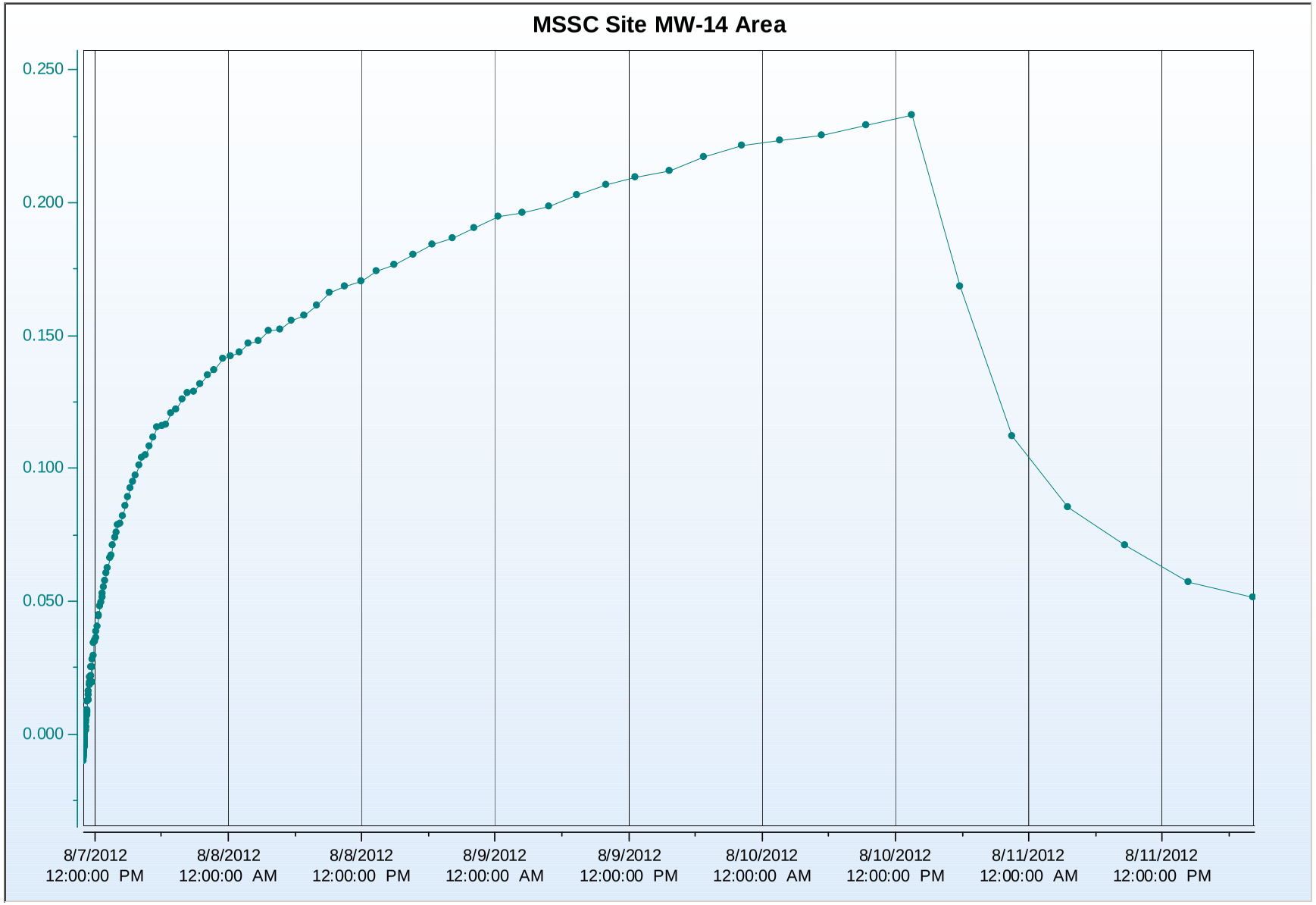


Figure C12. Time-Drawdown Plot of Field Data from Constant Discharge Test in Observation Well MW-14.

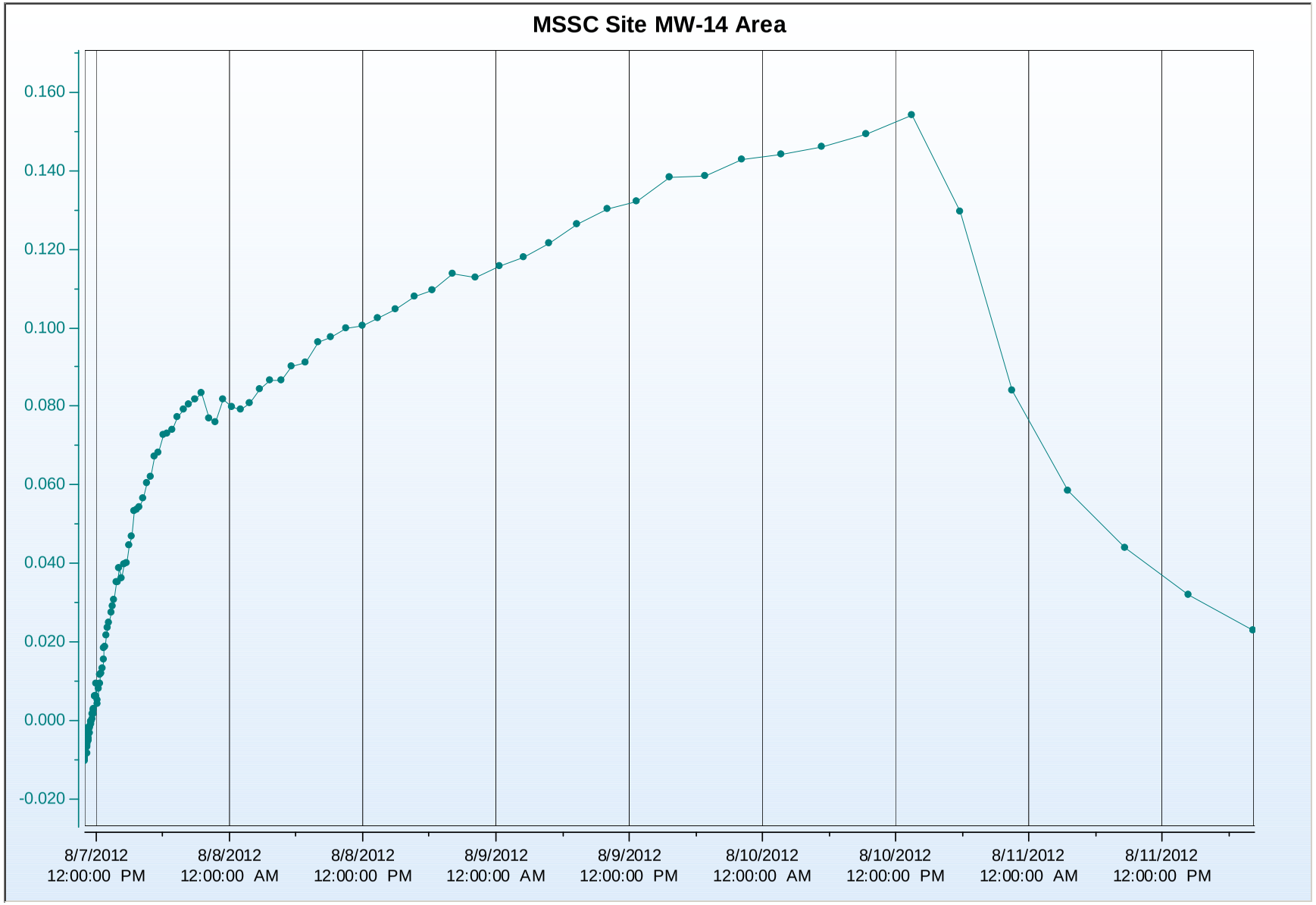


Figure C13. Time-Drawdown Plot of Field Data from Constant Discharge Test in Observation Well MW-6.

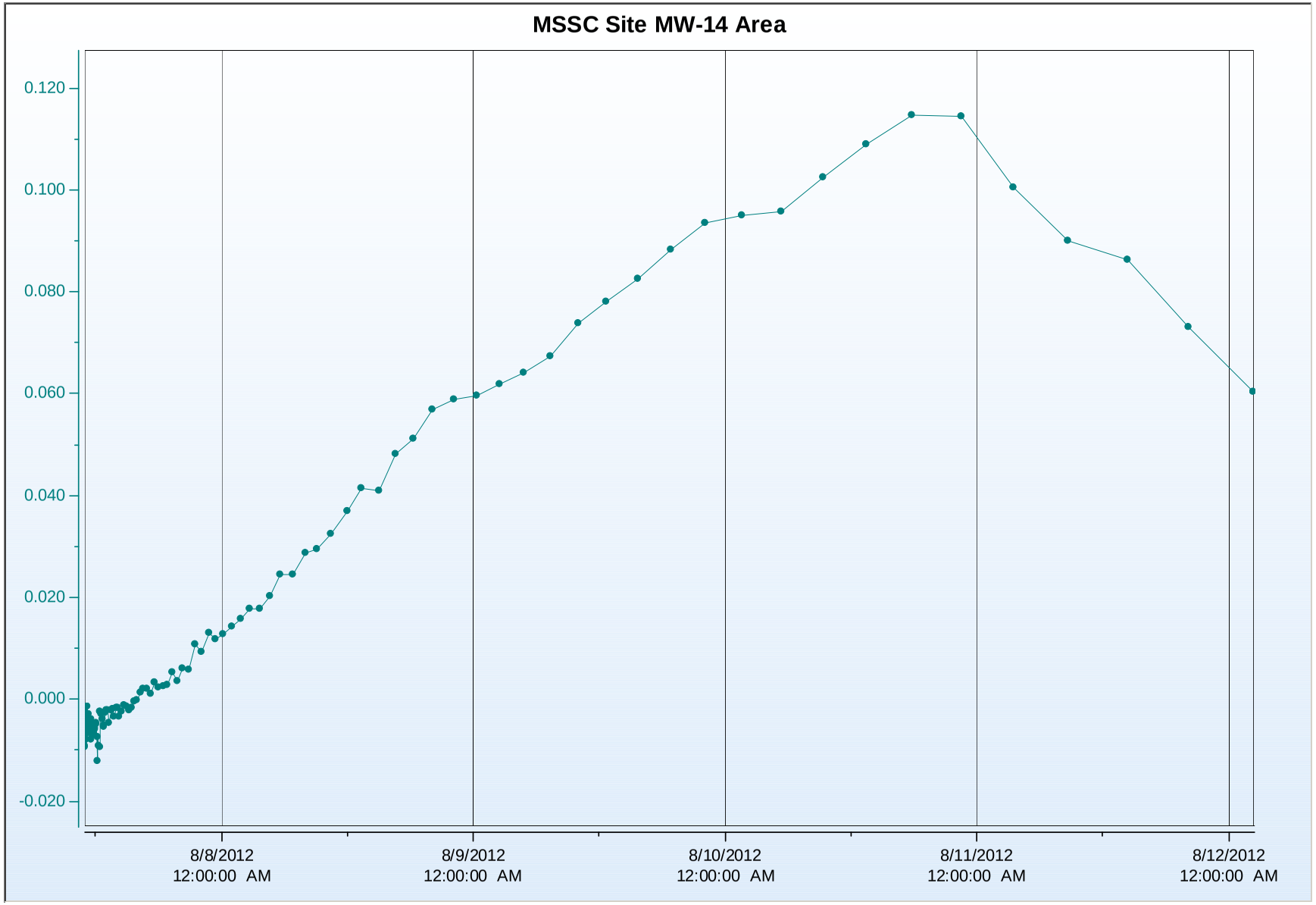
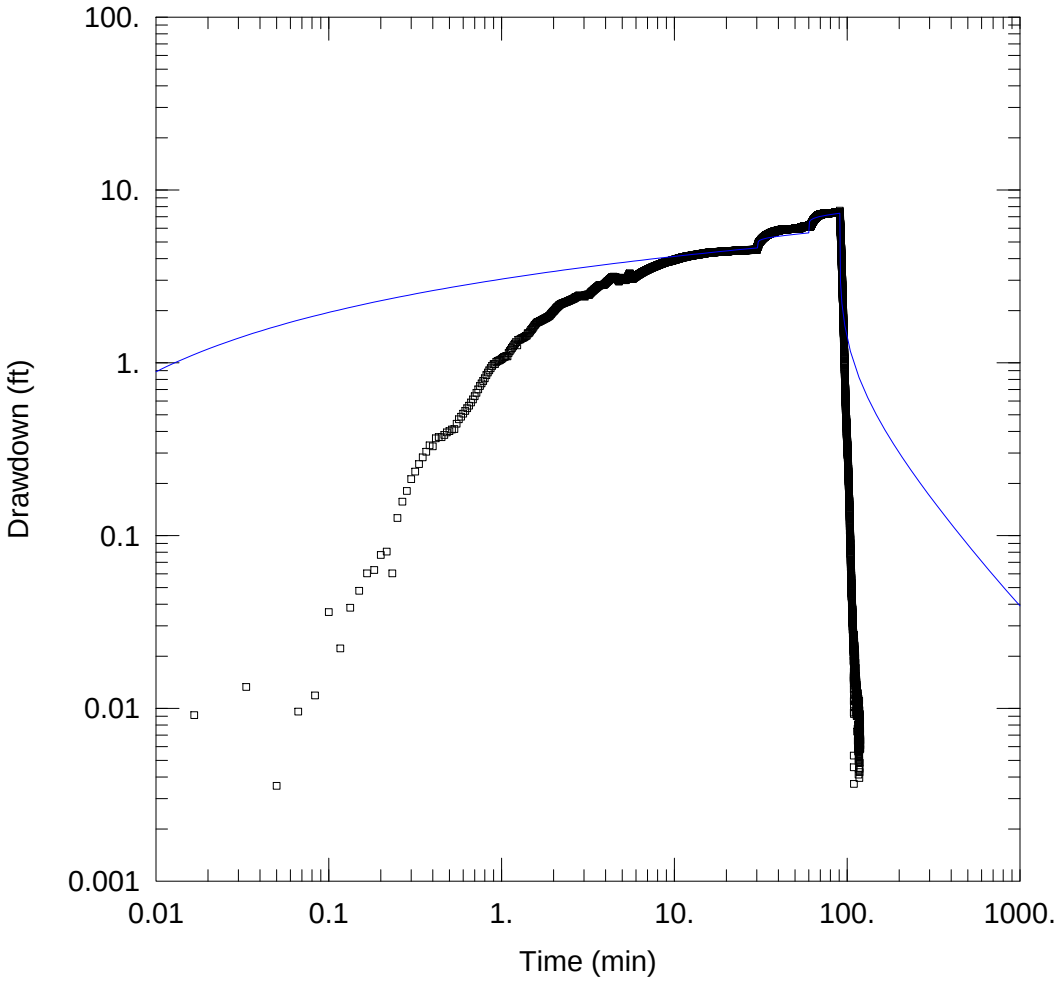


Figure C14. Time-Drawdown Plot of Field Data from Constant Discharge Test in Observation Well MW-13.

ATTACHMENT 5
AQTESOLV PRINTOUTS OF PUMPING TEST INTERPRETATIONS

ATTACHMENT D
AQTESOLV PRINTOUTS OF PUMPING TEST INTERPRETATIONS

EASTERN PARKING LOT AREA: STEP DRAWDOWN TEST



MSSC SITE, EASTERN PARKING LOT : STEP TEST

Data Set: C:\...\PTest_EW-2_step test_Weff.aqt
Date: 05/04/13 Time: 00:57:35

PROJECT INFORMATION

Company: Tetra Tech
Client: Herman Kishner Trust
Project: 103P172824.02
Location: MSSC Site, Eastern Parking Lot
Test Well: EW-2
Test Date: July 31, 2012

AQUIFER DATA

Saturated Thickness: 30. ft Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-19I	788955.0938	26746995.65

Observation Wells

Well Name	X (ft)	Y (ft)
MW-19I	788955.0938	26746995.65

SOLUTION

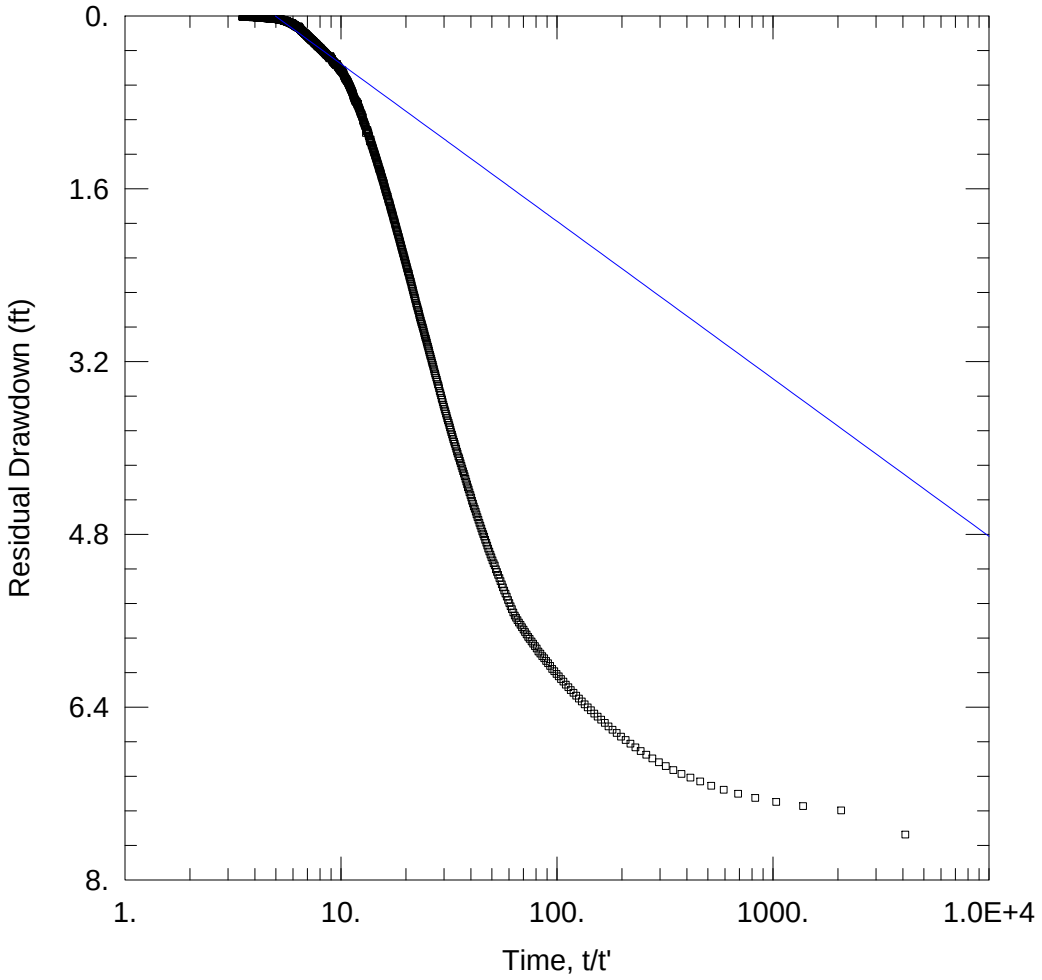
Aquifer Model: Confined
Solution Method: Theis (Step Test)

T = 45.47 ft^2/day
Sw = 0.
P = 2.432

S = 0.00441
C = 1. min^2/ft^5

Step Test Model: Jacob-Rorabaugh
Time (t) = 1. min Rate (Q) in cu. ft/min

$s(t) = 23.94Q + 1.Q^{2.432}$
W.E. = 99.62% (Q from last step)



MSSC SITE, EASTERN PARKING LOT : STEP TEST

Data Set: C:\...\PTest_EW-2_step test_Weff_rcvry.aqt
Date: 05/04/13 Time: 02:23:40

PROJECT INFORMATION

Company: Tetra Tech
Client: Herman Kishner Trust
Project: 103P172824.02
Location: MSSC Site, Eastern Parking Lot
Test Well: EW-2
Test Date: July 31, 2012

AQUIFER DATA

Saturated Thickness: 30. ft Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-19I	788955.0938	26746995.65

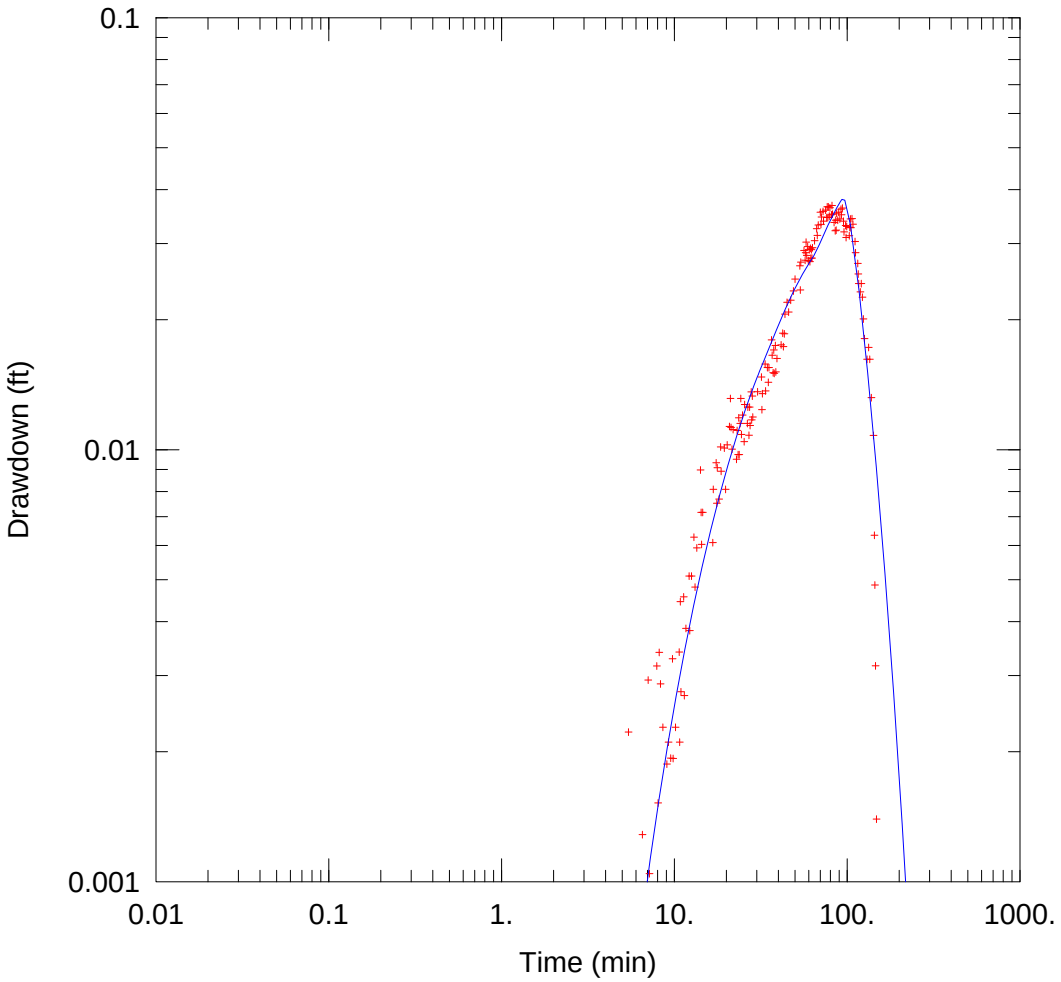
Observation Wells

Well Name	X (ft)	Y (ft)
MW-19I	788955.0938	26746995.65

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 33.87 ft^2/day S/S' = 4.97



MSSC SITE, EASTERN PARKING LOT : STEP TEST

Data Set: C:\...\PTest_EW2_MW19_step test_HJ.aqt
Date: 05/04/13 Time: 16:00:16

PROJECT INFORMATION

Company: Tetra Tech
Client: Herman Kishner Trust
Project: 103P172824.02
Location: MSSC Site, Eastern Parking Lot
Test Well: EW-2
Test Date: July 31, 2012

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-19I	788955.0938	26746995.65

Observation Wells

Well Name	X (ft)	Y (ft)
MW-19	788915.196	26746998.95

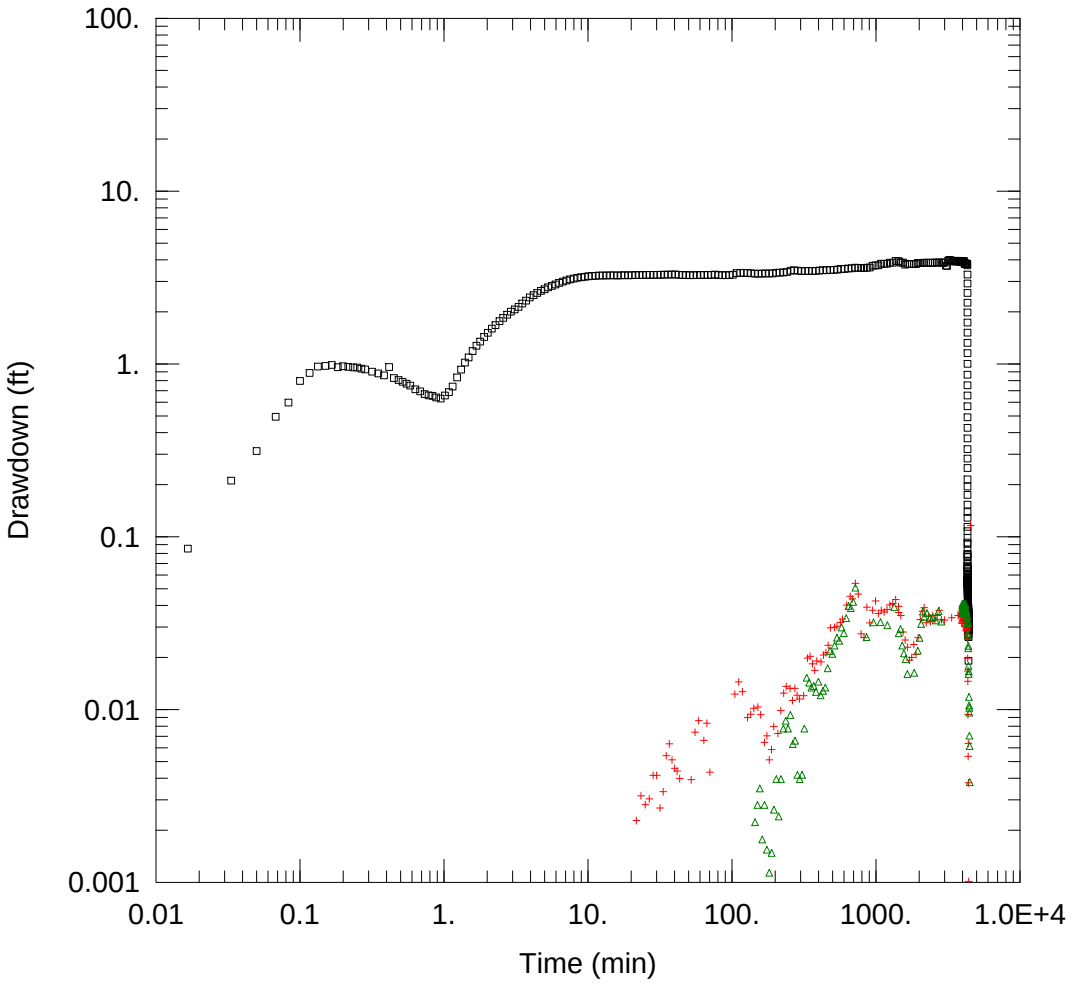
SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 66.6 ft^2/day
1/B = 0.02638 ft^{-1}
b = 30. ft

S = 0.001151
Kz/Kr = 0.005188

EASTERN PARKING LOT AREA: CONSTANT DISCHARGE TEST



MSSC SITE, EASTERN PARKING LOT : 72-HOUR CONSTANT RATE PUMPING TEST

Data Set: C:\...\PTest_EW-2_all_printer.aqt
Date: 05/04/13 Time: 16:31:25

PROJECT INFORMATION

Company: Tetra Tech
Client: Herman Kishner Trust
Project: 103P172824.02
Location: MSSC Site, Eastern Parking Lot
Test Well: EW-2
Test Date: August 1-4, 2012

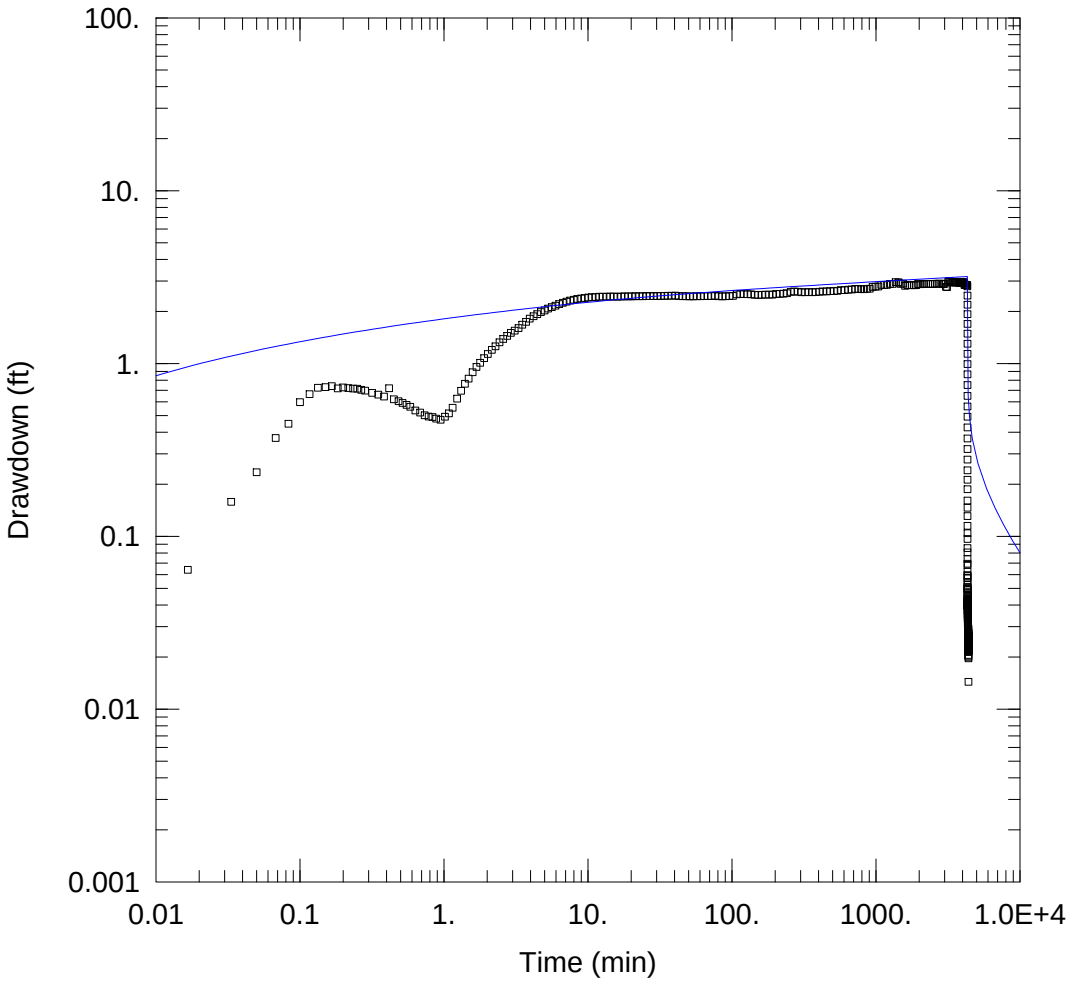
WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-19I	788955.0938	26746995.65

Observation Wells

Well Name	X (ft)	Y (ft)
MW-19I	788955.0938	26746995.65
MW-19	788915.196	26746998.95
MW-20	788915.939	26747078.76



MSSC SITE, EASTERN PARKING LOT : 72-HOUR CONSTANT RATE PUMPING TEST

Data Set: C:\...\PTest_EW-2_Theis_adj for WEff.aqt
Date: 05/04/13 Time: 16:14:45

PROJECT INFORMATION

Company: Tetra Tech
Client: Herman Kishner Trust
Project: 103P172824.02
Location: MSSC Site, Eastern Parking Lot
Test Well: EW-2
Test Date: August 1-4, 2012

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-19I	788955.0938	26746995.65

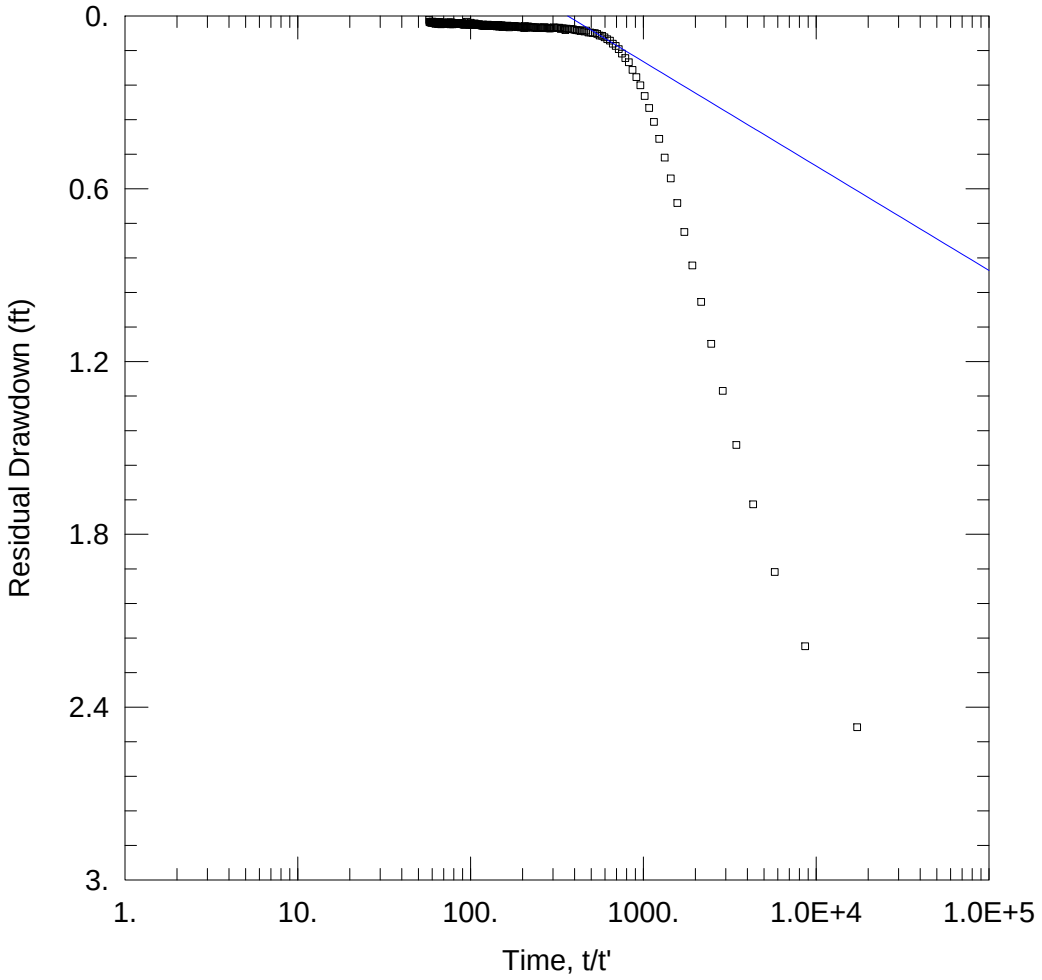
Observation Wells

Well Name	X (ft)	Y (ft)
MW-19I	788955.0938	26746995.65

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 102.5 ft^2/day
S = 0.001052
Kz/Kr = 0.01012
b = 30. ft



MSSC SITE, EASTERN PARKING LOT : 72-HOUR CONSTANT RATE PUMPING TEST

Data Set: C:\...\PTest_EW-2_Theis_adj for WEff_rcvry.aqt
Date: 05/04/13 Time: 16:25:50

PROJECT INFORMATION

Company: Tetra Tech
Client: Herman Kishner Trust
Project: 103P172824.02
Location: MSSC Site, Eastern Parking Lot
Test Well: EW-2
Test Date: August 1-4, 2012

AQUIFER DATA

Saturated Thickness: 30. ft Anisotropy Ratio (Kz/Kr): 0.02399

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-19I	788955.0938	26746995.65

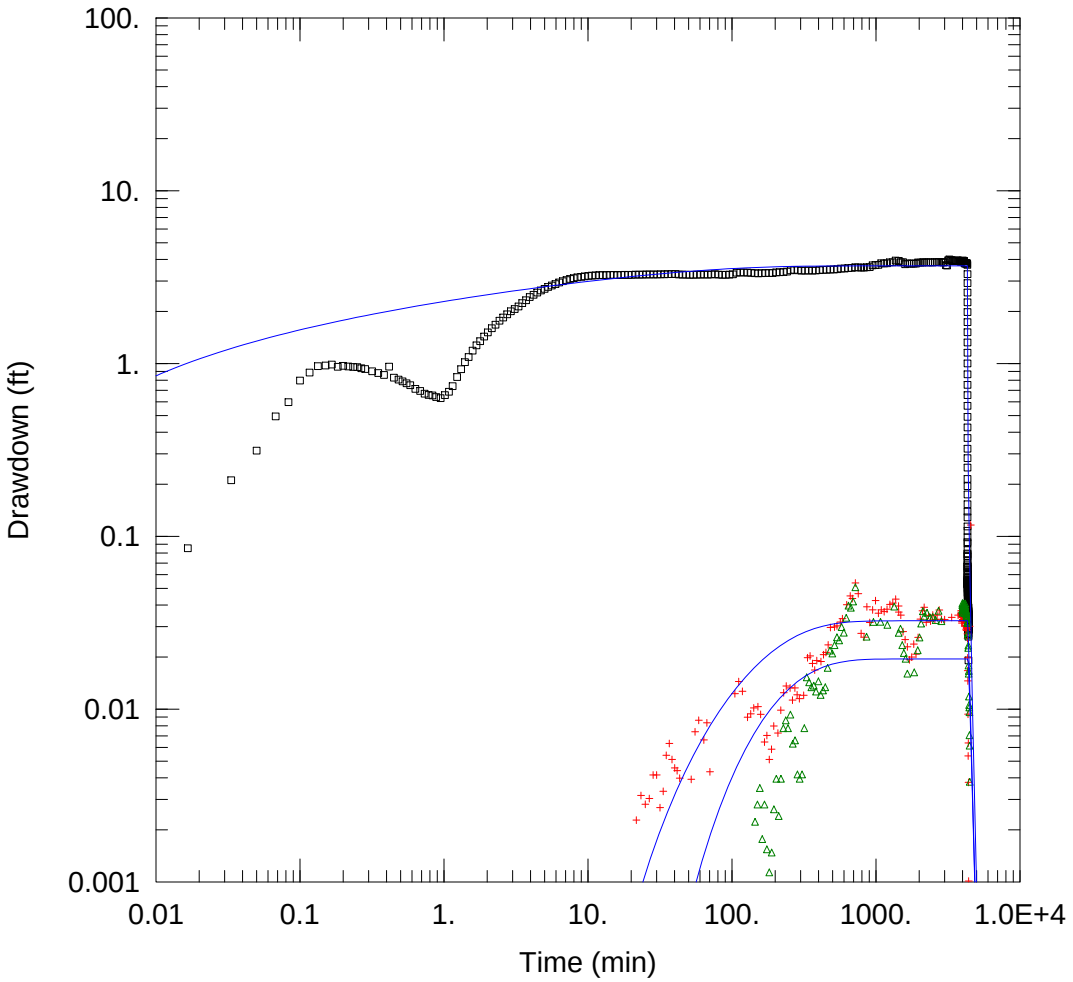
Observation Wells

Well Name	X (ft)	Y (ft)
MW-19I	788955.0938	26746995.65

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 92.45 ft^2/day S/S' = 365.3



MSSC SITE, EASTERN PARKING LOT : 72-HOUR CONSTANT RATE PUMPING TEST

Data Set: C:\...\PTest_EW-2_all_HJ.aqt
Date: 05/04/13 Time: 16:35:30

PROJECT INFORMATION

Company: Tetra Tech
Client: Herman Kishner Trust
Project: 103P172824.02
Location: MSSC Site, Eastern Parking Lot
Test Well: EW-2
Test Date: August 1-4, 2012

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-19I	788955.0938	26746995.65

Observation Wells

Well Name	X (ft)	Y (ft)
MW-19I	788955.0938	26746995.65
MW-19	788915.196	26746998.95
MW-20	788915.939	26747078.76

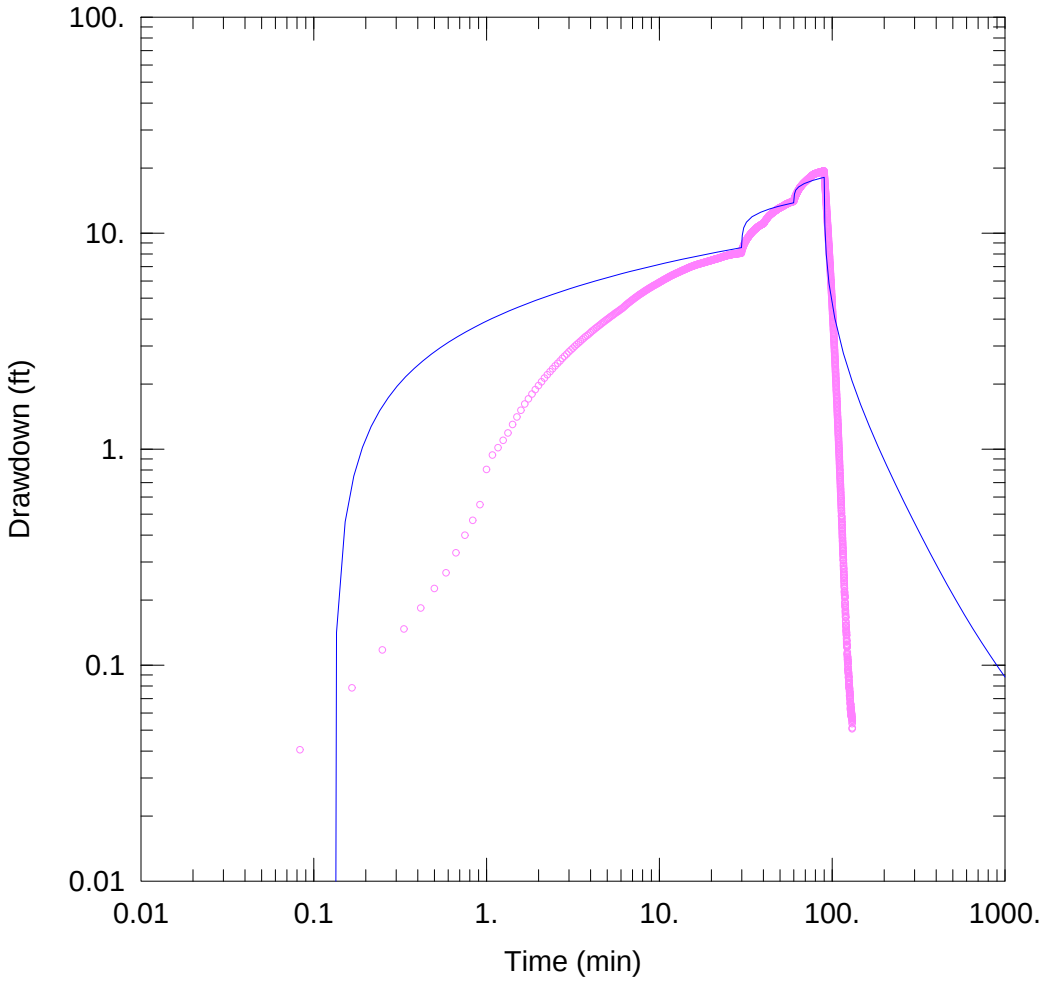
SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 68.13 ft^2/day
1/B = 0.01802 ft^{-1}
b = 30. ft

S = 0.002613
Kz/Kr = 0.001862

MW-14 AREA: STEP DRAWDOWN TEST



MSSC SITE, MW-14 AREA : STEP-DRAWDOWN TEST

Data Set: C:\...\StepTest_EW-1_theisstep_Weff.aqt
Date: 05/04/13 Time: 00:40:12

PROJECT INFORMATION

Company: Tetra Tech
Client: Herman Kishner Trust
Project: 103P172824.02
Location: MSSC Site, IR14 Area
Test Well: EW-1
Test Date: August 7-10, 2012

AQUIFER DATA

Saturated Thickness: 35. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-14I	787981.9335	26747026.16

Observation Wells

Well Name	X (ft)	Y (ft)
◦ MW-14I	787981.9335	26747026.16

SOLUTION

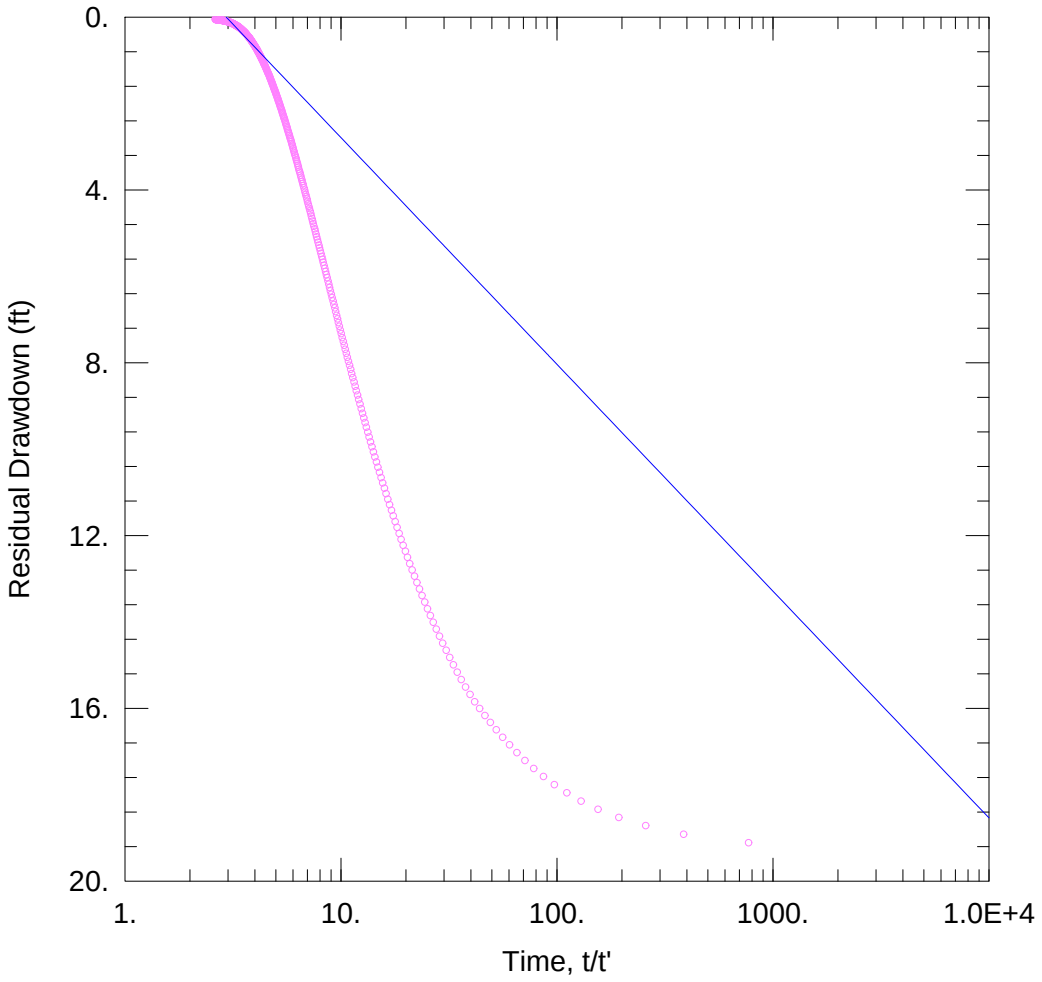
Aquifer Model: Confined
Solution Method: Theis (Step Test)

T = 24.98 ft^2/day
Sw = -0.4927
P = 1.5

S = 0.03218
C = 1. min^2/ft^5

Step Test Model: Jacob-Rorabaugh
Time (t) = 1. min Rate (Q) in cu. ft/min

$s(t) = 28.62Q + 1.Q^{1.5}$
W.E. = 113.8% (Q from last step)



MSSC SITE, MW-14 AREA : STEP-DRAWDOWN TEST

Data Set: C:\...\StepTest_EW-1_theisstep_Weff_rcvry.aqt
Date: 05/04/13 Time: 02:30:52

PROJECT INFORMATION

Company: Tetra Tech
Client: Herman Kishner Trust
Project: 103P172824.02
Location: MSSC Site, IR14 Area
Test Well: EW-1
Test Date: August 7-10, 2012

AQUIFER DATA

Saturated Thickness: 35. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-14I	787981.9335	26747026.16

Observation Wells

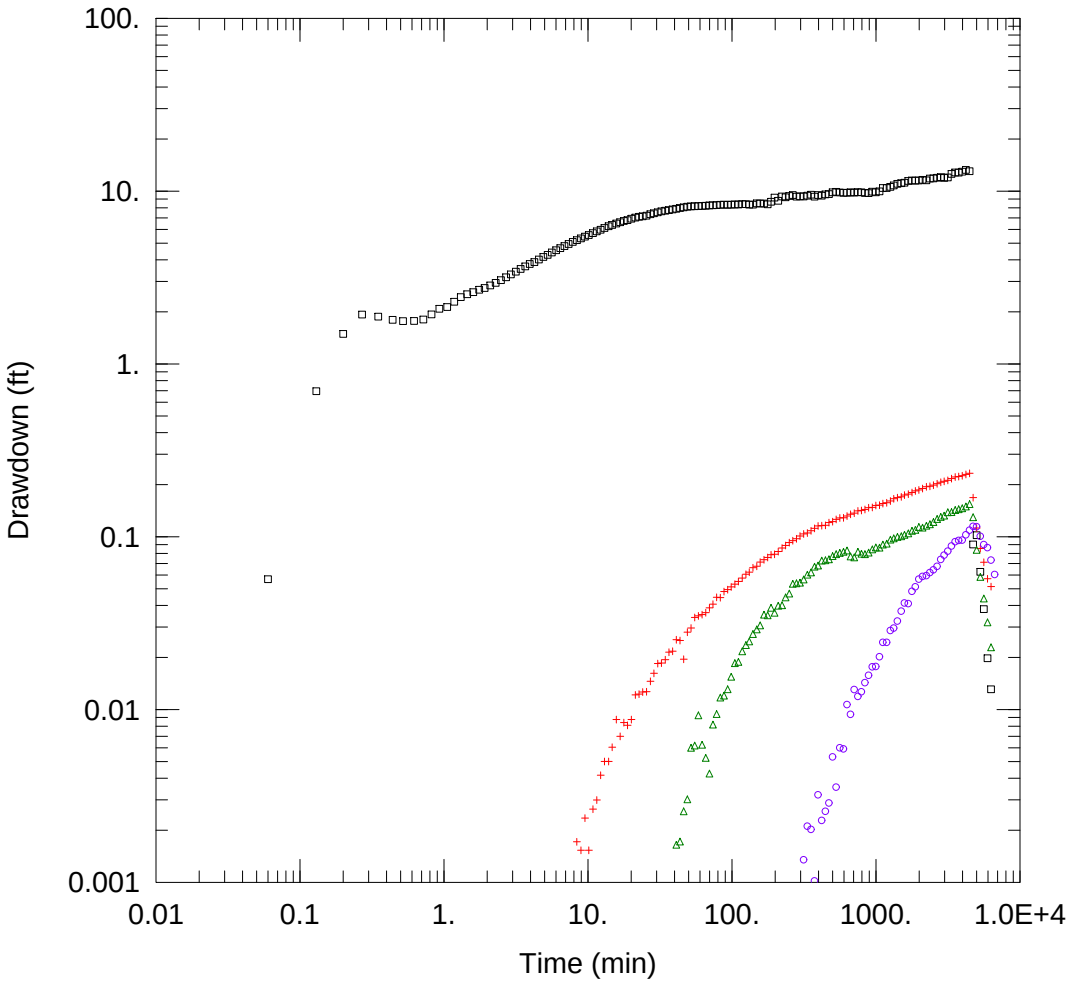
Well Name	X (ft)	Y (ft)
◦ MW-14I	787981.9335	26747026.16

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 12.97 ft^2/day S/S' = 2.947

MW-14 AREA: CONSTANT DISCHARGE TEST



MSSC SITE, MW-14 AREA: 77-HOUR CONSTANT RATE PUMPING TEST

Data Set: C:\...\PTest_EW-1_ALL_fxd_printer.aqt
Date: 05/04/13 Time: 16:41:20

PROJECT INFORMATION

Company: Tetra Tech
Client: Herman Kishner Trust
Project: 103P172824.02
Location: MSSC Site, West
Test Well: EW-1
Test Date: August 7-10, 2012

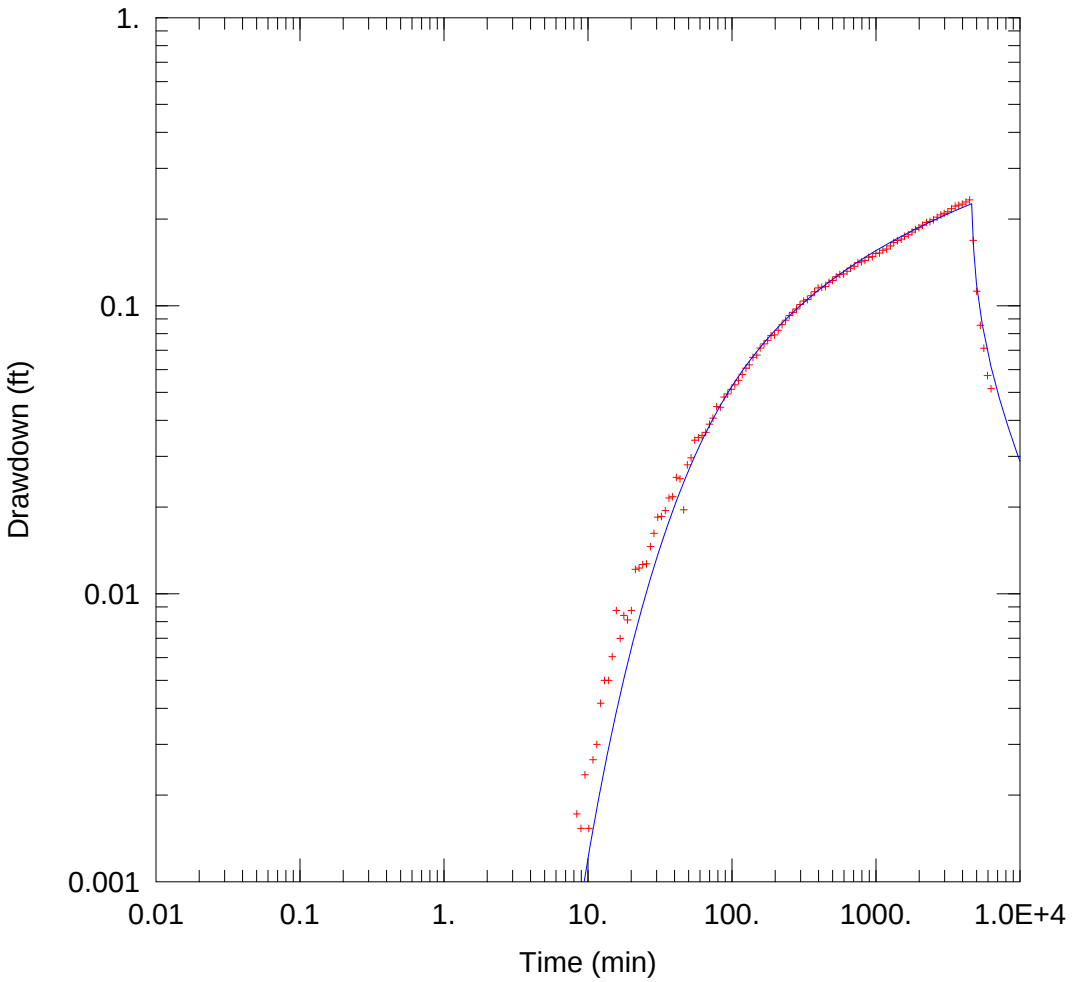
WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-14I	787981.9335	26747026.16

Observation Wells

Well Name	X (ft)	Y (ft)
MW-14I	787981.9335	26747026.16
MW-14	787987.079	26747065.67
MW-06	787967.862	26746947.5
MW-13	788211.806	26747045.51



MSSC SITE, MW-14 AREA: 77-HOUR CONSTANT RATE PUMPING TEST

Data Set: C:\...\PTest_EW-1_MW-14_Theis.aqt
Date: 05/04/13 Time: 16:43:00

PROJECT INFORMATION

Company: Tetra Tech
Client: Herman Kishner Trust
Project: 103P172824.02
Location: MSSC Site, West
Test Well: EW-1
Test Date: August 7-10, 2012

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-14I	787981.9335	26747026.16

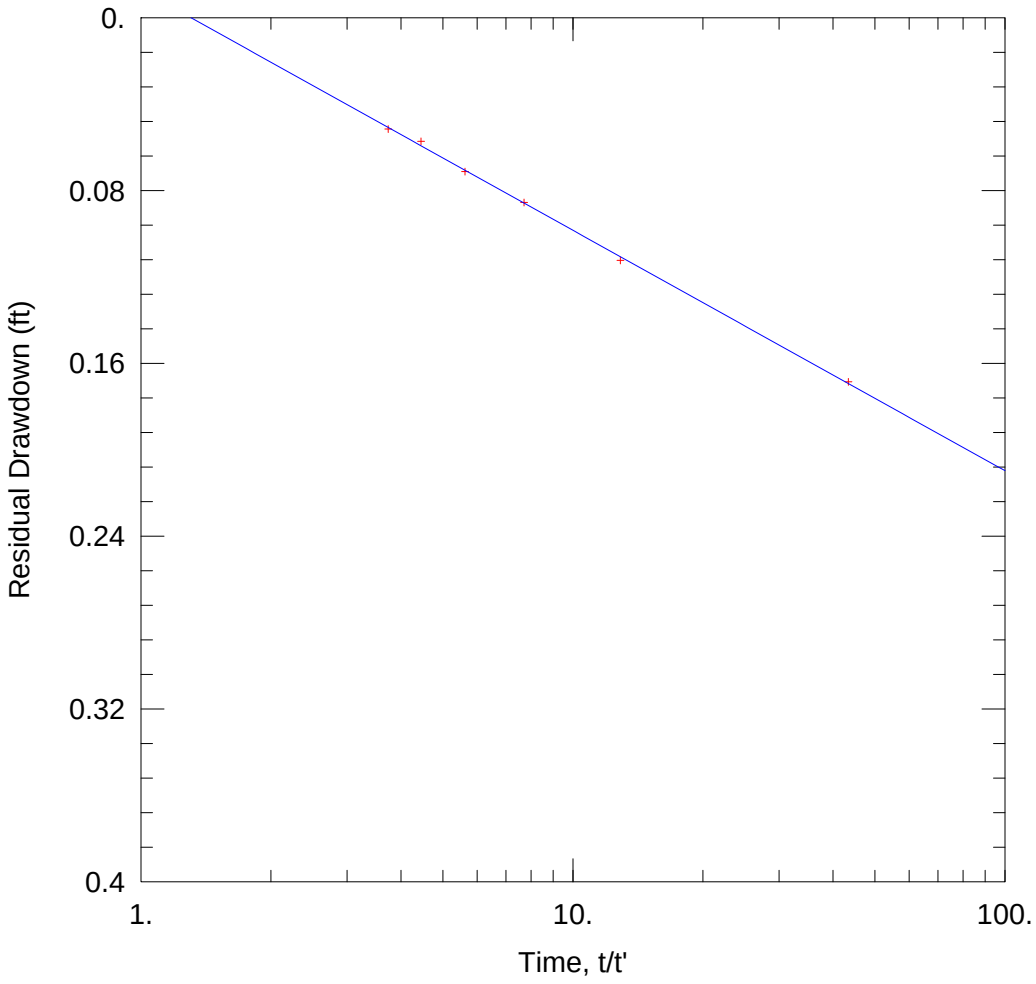
Observation Wells

Well Name	X (ft)	Y (ft)
+ MW-14	787987.079	26747065.67

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 329.1 ft^2/day
S = 0.005957
Kz/Kr = 0.1307
b = 35. ft



MSSC SITE, MW-14 AREA: 77-HOUR CONSTANT RATE PUMPING TEST

Data Set: C:\...\PTest_EW-1_MW-14_Theis rcvry.aqt
Date: 05/04/13 Time: 16:45:22

PROJECT INFORMATION

Company: Tetra Tech
Client: Herman Kishner Trust
Project: 103P172824.02
Location: MSSC Site, West
Test Well: EW-1
Test Date: August 7-10, 2012

AQUIFER DATA

Saturated Thickness: 35. ft Anisotropy Ratio (Kz/Kr): 0.1847

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-14I	787981.9335	26747026.16

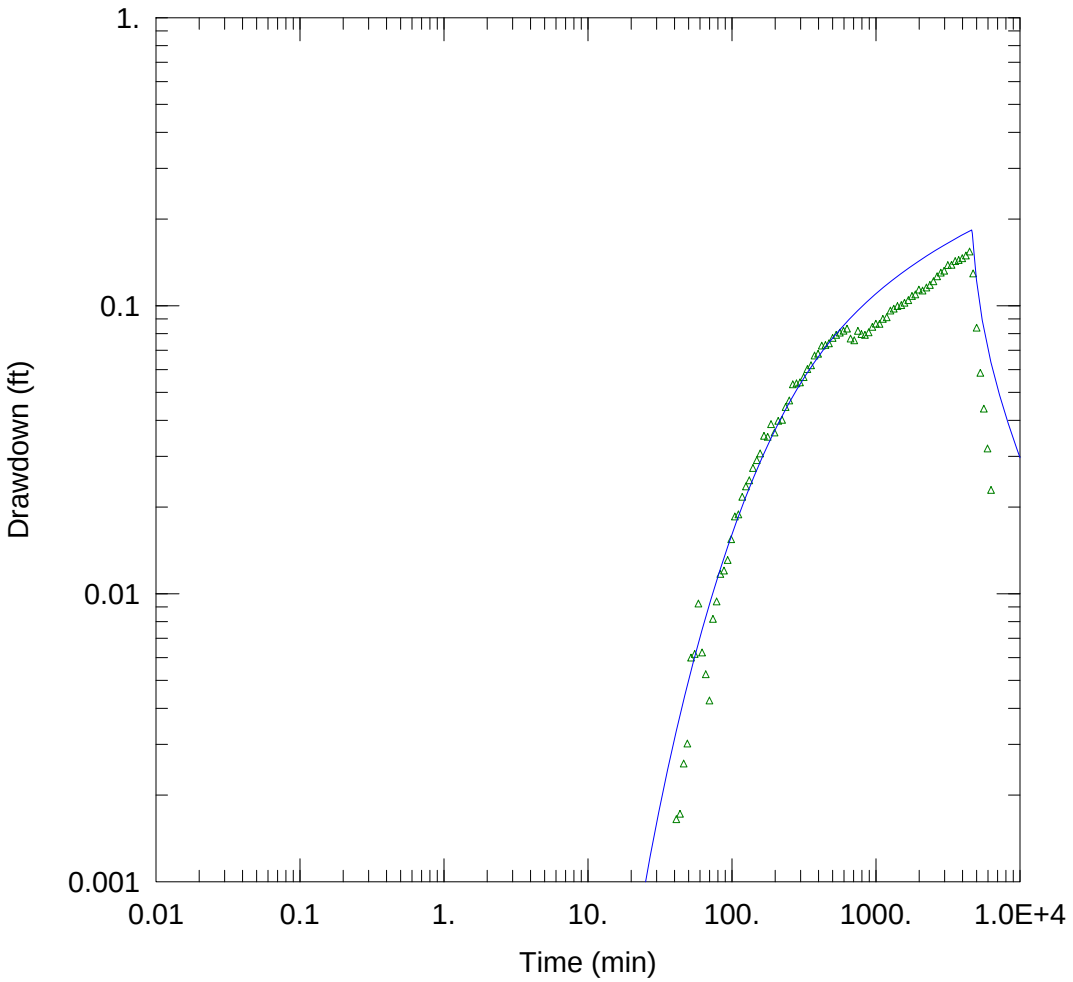
Observation Wells

Well Name	X (ft)	Y (ft)
+ MW-14	787987.079	26747065.67

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 317. ft^2/day S/S' = 1.306



MSSC SITE, MW-14 AREA: 77-HOUR CONSTANT RATE PUMPING TEST

Data Set: C:\...\PTest_EW-1_MW-06_Th.aqt
Date: 05/04/13 Time: 16:56:34

PROJECT INFORMATION

Company: Tetra Tech
Client: Herman Kishner Trust
Project: 103P172824.02
Location: MSSC Site, West
Test Well: EW-1
Test Date: August 7-10, 2012

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-14I	787981.9335	26747026.16

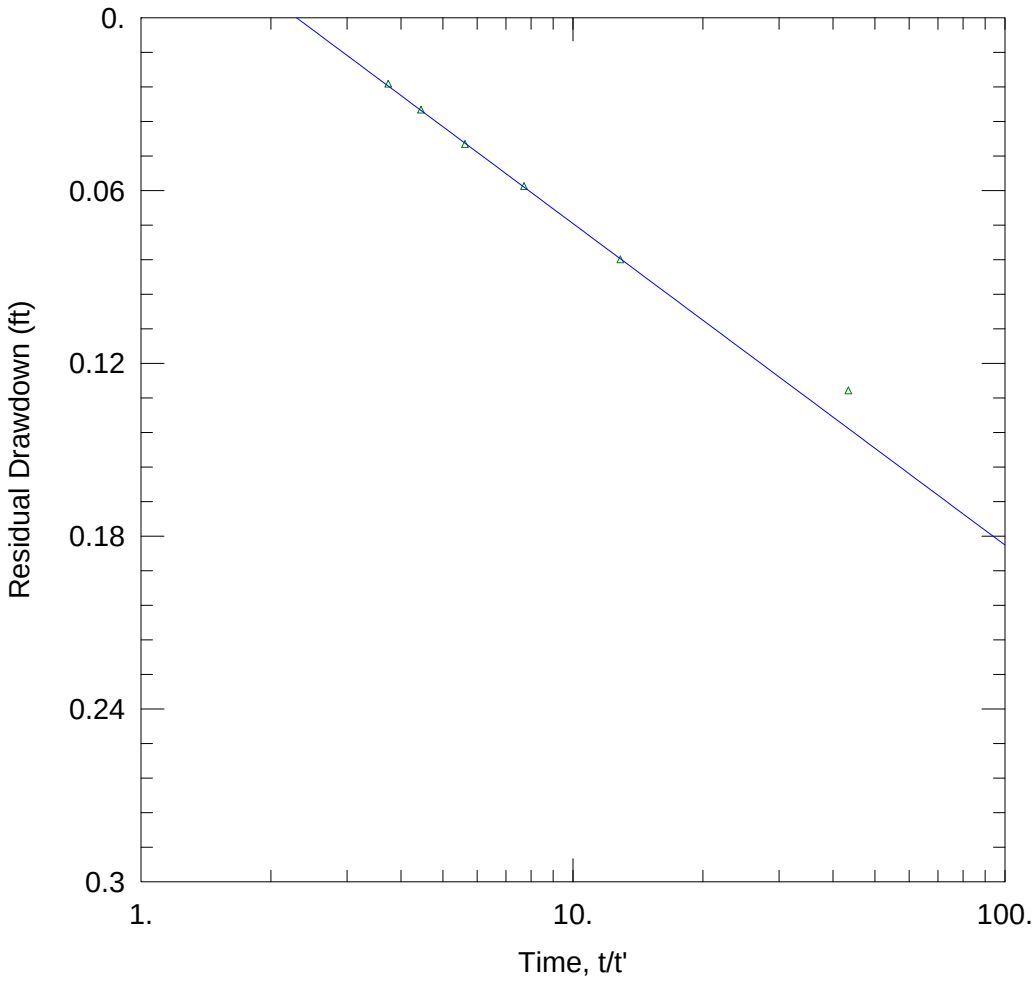
Observation Wells

Well Name	X (ft)	Y (ft)
MW-06	787967.862	26746947.5

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 319.7 ft^2/day
S = 0.0004254
Kz/Kr = 0.002207
b = 35. ft



MSSC SITE, MW-14 AREA: 77-HOUR CONSTANT RATE PUMPING TEST

Data Set: C:\...\PTest_EW-1_MW-06_Theis rcvry.aqt
Date: 05/04/13 Time: 16:59:40

PROJECT INFORMATION

Company: Tetra Tech
Client: Herman Kishner Trust
Project: 103P172824.02
Location: MSSC Site, West
Test Well: EW-1
Test Date: August 7-10, 2012

AQUIFER DATA

Saturated Thickness: 35. ft Anisotropy Ratio (Kz/Kr): 0.1847

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-14I	787981.9335	26747026.16

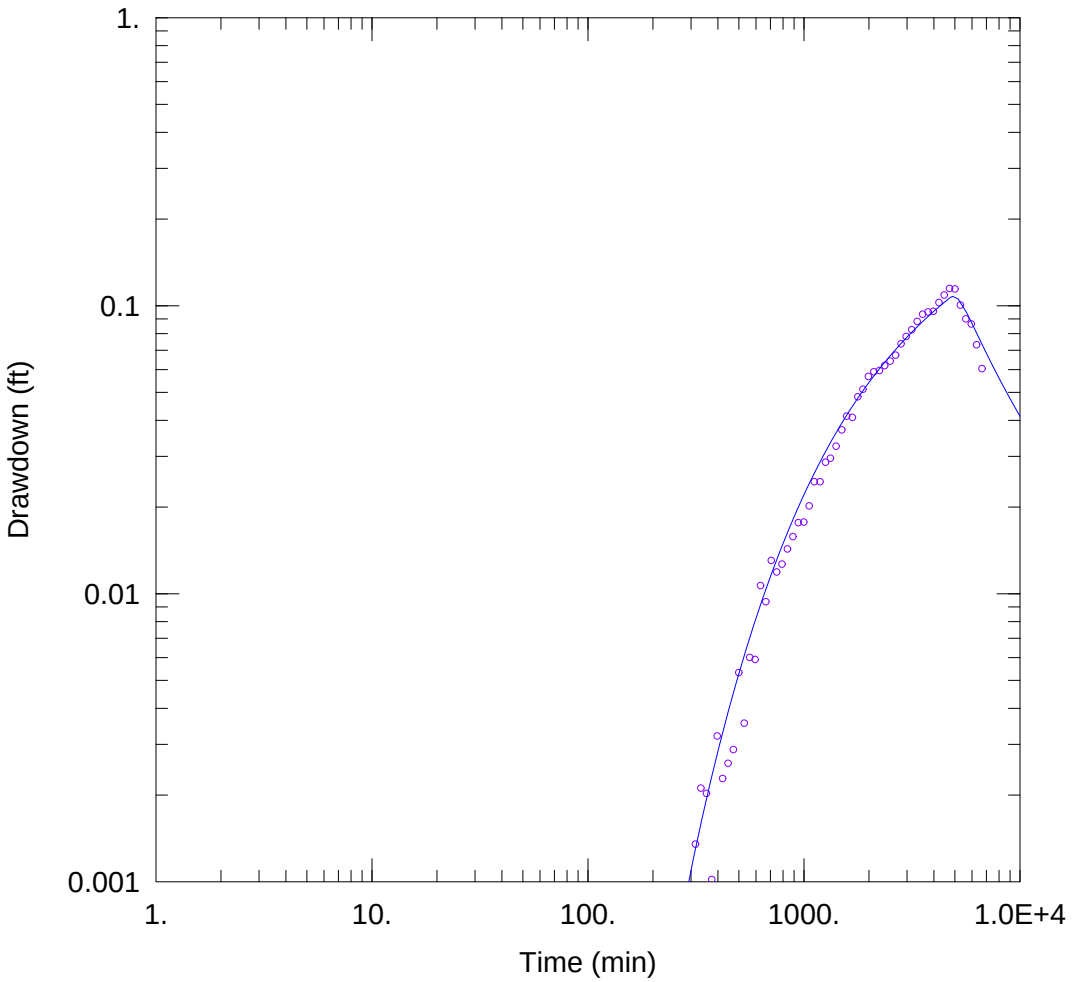
Observation Wells

Well Name	X (ft)	Y (ft)
MW-06	787967.862	26746947.5

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 316. ft^2/day S/S' = 2.292



MSSC SITE, MW-14 AREA: 77-HOUR CONSTANT RATE PUMPING TEST

Data Set: C:\...\PTest_EW-1_MW-13_Th.aqt
Date: 05/04/13 Time: 17:01:29

PROJECT INFORMATION

Company: Tetra Tech
Client: Herman Kishner Trust
Project: 103P172824.02
Location: MSSC Site, West
Test Well: EW-1
Test Date: August 7-10, 2012

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-14I	787981.9335	26747026.16

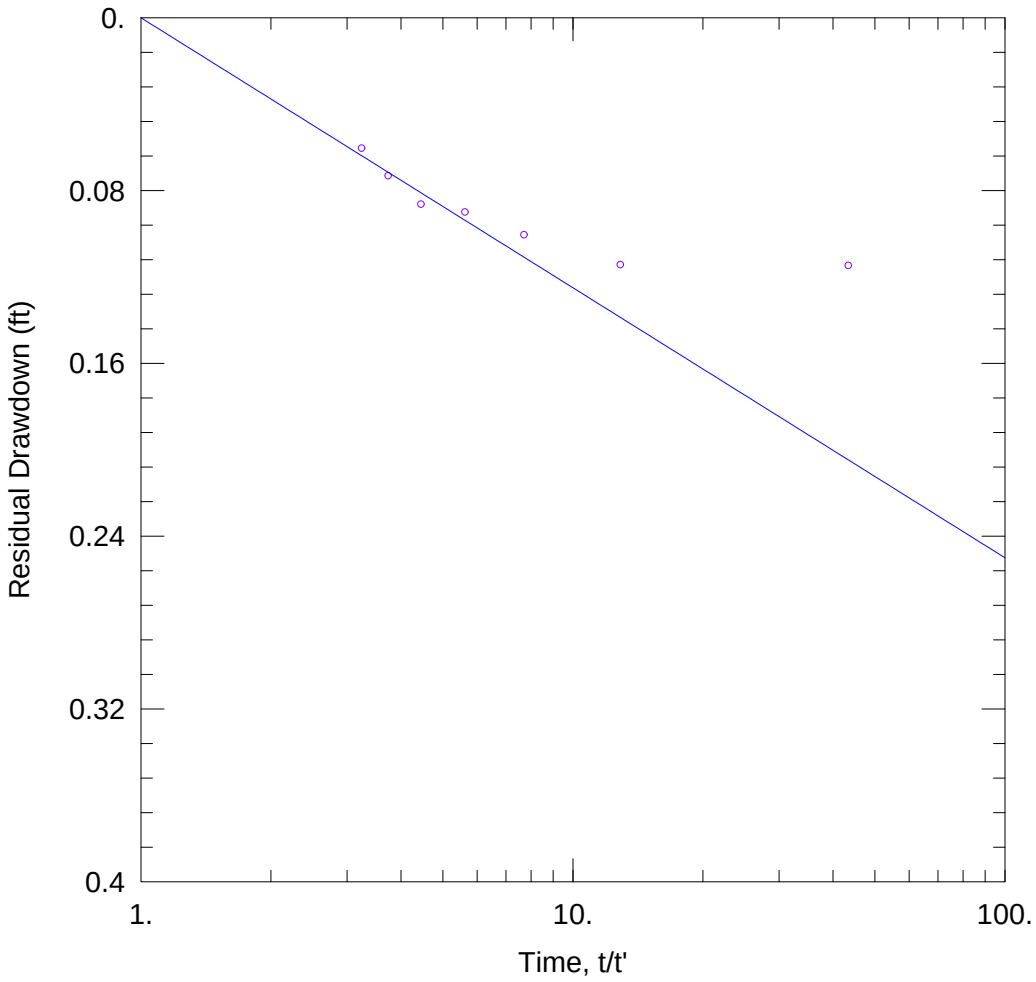
Observation Wells

Well Name	X (ft)	Y (ft)
◦ MW-13	788211.806	26747045.51

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 216.5 ft^2/day
S = 0.004793
Kz/Kr = 0.007082
b = 35. ft



MSSC SITE, MW-14 AREA: 77-HOUR CONSTANT RATE PUMPING TEST

Data Set: C:\...\PTest_EW-1_MW-13_Theis_recvry.aqt
Date: 05/04/13 Time: 17:03:44

PROJECT INFORMATION

Company: Tetra Tech
Client: Herman Kishner Trust
Project: 103P172824.02
Location: MSSC Site, West
Test Well: EW-1
Test Date: August 7-10, 2012

AQUIFER DATA

Saturated Thickness: 35. ft Anisotropy Ratio (Kz/Kr): 0.1847

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-14I	787981.9335	26747026.16

Observation Wells

Well Name	X (ft)	Y (ft)
◦ MW-13	788211.806	26747045.51

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 282.2 ft^2/day S/S' = 1.

APPENDIX C

Daily Field Data Sheets

On Appendix CD-Rom

SUMMARY

On-Site Staff:

- Tetra Tech
- Cascade

Completed:

January 8

- Securing the fence (Cascade installed it on Monday, 1/7/13)
- Resurveying (clearance) of MW-19D location using GPR – it was marked nearly 30 feet away from MW-19
- Clearance of both MW-20D and MW-19D with air vac tool down to 5 feet bgs
- Drilled MW-20D down to 30 feet bgs [started drilling at 14:15, in 45 minutes or so went to 30'; harder drilling was at 9-11.5' and 24-26' where caliche and caliche-like layers were encountered; first saturated zone was encountered at ~ 23' bgs, likely perched gw atop of the caliche-like layer; the materials below the caliche-like layer <gravelly clay, gravel/clay mixture> appeared relatively dry; depth to water was later tagged at ~ 26' bgs]
- Assembled SimulProbe tool to collect first groundwater sample in the a.m. on Wednesday, 1/9/13

Look Ahead:

Plan for January 9, 2013

- continue drilling MW-20D to a total depth of 100 feet
- collect grab groundwater samples every 10 feet starting from below the water table.

Discussion:

None.



Photograph 1: Air-knife clearance of MW-20D down to 5 feet bgs.



Photograph 2 GPR-resurveying of revised location for MW-19D (white dot in the middle of the picure).



Photograph 3: Sonic rig at MW-20D.



Photograph 4. Retrieved materials from the borehole (MW-20D) for 20 – 30 feet bgs

SUMMARY

On-Site Staff:

- Tetra Tech
- Cascade

Completed:

January 9

- Groundwater sampling slowed us down today. We attempted to collect groundwater samples at 27' and 37' bgs, but the sampler came back empty. Testing the sampler and driving in the 10" and then 8" conductor casings also took time.
- We drilled down to 55' bgs (i.e. only 25 feet today), then installed SimulProbe sampler down to 56.5' bgs and left it overnight.

Look Ahead:

Plan for January 9, 2013

- continue drilling MW-20D to a total depth of 100 feet
- collect grab groundwater samples every 10 feet starting from below the water table.

Discussion:

If SimulProbe sampler comes empty in the a.m. Thursday we'll have to switch to Hydropunch Type 2 technology (after consulting with NDEP). This technology for depth-discrete groundwater sampling worked fine for us last summer.



Photograph 1: Sonic drilling of MW-20D: retrieval of the soil core sample.



Photograph 2. Preparing SimulProbe® to be installed into the borehole (to collect grab groundwater sample from an undisturbed formation)

SUMMARY

On-Site Staff:

- Tetra Tech
- Cascade

Completed:

January 10

- Collected first groundwater sample with SimulProbe at ~ 56 feet bgs (the sampler was left in place overnight from the previous day).
- Attempted to collect groundwater samples at 66 and 86 feet bgs (after waiting for an hour each), but the sampler came out with insufficient amount of water.
- Didn't attempt to collect samples at 76 and 96 feet bgs as we encountered lean or stiff clay at these intervals, so proceeded with drilling
- Below approximately 96 feet bgs silty sand was encountered, so drilled to a total depth of 100 feet bgs and installed SimulProbe at ~ 101 feet bgs and let it stay overnight. Plan to collect water sample on 1/11/13.
- Drilled to a total depth of 100 feet bgs; encountered competent clay layer between 65 and 81 feet bgs.

Look Ahead:

Plan for January 11, 2013

- Collect Groundwater sample from approximately 101 feet bgs from Simulprobe left- in- place over night
- Install a triple-nested well with the following screen intervals (based on the observed relatively more permeable materials):

MW-20D1	30-45 feet bgs
MW-20D2	55-65 feet bgs
MW-20D3	90-100 feet bgs

Discussion:

- If a sufficient volume for groundwater sample is NOT collected (3 vials 250 mL each), then will propose to NDEP switching to Hydropunch type 2 technology



Photograph 1: MW-20D – collection of groundwater sample (SimulProbe was set at the end of previous day, at ~ 56 feet bgs).



Photograph 2. Windy day; Cascade will attach screens to the fence bottom.



Photograph 3. Silty sand materials retrieved from 95 to 100 feet bgs.

SUMMARY

On-Site Staff:

- Tetra Tech
- Cascade

Completed:

January 11

- Collected the second groundwater sample (and a duplicate) with SimulProbe at ~ 101 feet bgs (the sampler was left in place overnight from the previous day). Plenty of water in a sampler; water crystal clear.

- Installed triple-nested well with the following specifications:

Well ID	Screen Interval (feet bgs)	Logged geology of screened interval
MW-20D1	25 - 45	Silty Sand; Poorly Graded Sand
MW-20D2	55 - 65	Sandy Silt
MW-20D3	90 - 100	Silty Sand

- Submitted groundwater and soil samples to the Advanced Technology Labs. Groundwater samples will be analyzed for VOCs (PCE and byproducts) by 01/16/13. Soil samples will be analyzed for VOCs for off-site disposal purposes.

- Relocated the Sonic rig to the MW-19D to begin drilling tomorrow

- Cleaned the site and secured loose portions of the privacy screen on the fence

Look Ahead:

Plan for January 12, 2013

- Drill boring MW-19D

- Collect depth-discrete groundwater samples using HydroPunch II technology (per NDEP concurrence as of 01/11/13) instead of SimulProbe that is too time-consuming

- If a thick clay layer is reached (likely between 60 and 80 feet bgs), a representative soil sample will be collected with the SimulProbe sampler – to be analyzed for geophysical parameters.



Photograph 1: Installation of well MW-20D3.



Photograph 2. Placement of bentonite chips atop of filter pack sand.



Photograph 3. Surface completion of the triple-nested well MW-20D1/D2/D3 will be finished tomorrow.



Photograph 4. Sonic rig relocated to begin drilling MW-19D tomorrow morning.

SUMMARY

On-Site Staff:

- Tetra Tech
- Cascade

Completed:

January 12

- At MW-19D: drilled down to 53 feet bgs, logging continuous cores of soil.
- Collected three depth-discrete groundwater samples: (1) the first one was collected with a disposable bailer (Hydropunch II has not arrived until noon, so once we drilled to 30 feet bgs, we decided to take a sample of standing groundwater in the borehole at approximately 27 feet bgs); (2) the second was collected at 36 feet bgs using SimulProbe sampler (as we were still waiting for Hydropunch II to arrive); (3) the third sample was collected at 46 feet bgs using.
- Attempted to collect the fourth groundwater sample at 54 feet bgs with Hydropunch II, waited about 45 minutes, but the sampler came out empty. The sampler possibly was pushed into clay, (the interval of 45-53 feet bgs included only saturated clayey gravel).

Look Ahead:

Plan for January 13, 2013

- Drill boring MW-19D to a total depth
- Collect depth-discrete groundwater samples with HydroPunch II sampler
- If a thick clay layer is reached (likely between 60 and 80 feet bgs), a representative and undisturbed soil sample will be collected with the SimulProbe sampler – to be analyzed for geophysical parameters.



Photograph 1: Well graded gravel interbedded with 2 to 3.5-foot thick layers of clay was encountered from 30.5 to 53 feet bgs beneath 1-foot thick layer of caliche (29.5 to 30.5 feet bgs).

SUMMARY

On-Site Staff:

- Tetra Tech
- Cascade

Completed:

January 13

- At MW-19D: drilled down to 90 feet bgs, logging continuous cores of soil.
- Attempted to collect four groundwater samples at 61, 71, 81, and 91 feet bgs. Used SimulProbe sampler to collect both soil and groundwater sample at 81 feet bgs, for other depths used Hydropunch II sampler. In all cases waited at least 1 hour before retrieving the sampler. However, in all cases the sampler collected very little or no water. The inability to collect groundwater samples below 60 feet bgs is related to the overall low permeability of the formation (silty or sandy clay).
- A soil sample was collected with SimulProbe near the bottom of the clay unit (observed from approximately 65 to 81 feet bgs in previous boring MW-20D). Compared with MW-20D, clay encountered in the same interval at location of MW-19D contained somewhat greater percentage or silt and fine to very fine sand.
- Collected soil samples from each of the drums filled with soil cuttings to analyze for VOCs prior to disposal.

Look Ahead:

Plan for January 14, 2013

- Complete drilling MW-19D to a total depth of 100 feet bgs
- Collect a groundwater sample with HydroPunch II sampler at 101 feet bgs
- Submit groundwater and soil samples to the Lab for analyses
- Install triple-nested well with screens at 31-51, 60-70, and 90-100 feet bgs
- Move all the drums with IDW to a designated area across the street
- Install fencing on the west side of the Mall (parking garage building) and conduct air-knife clearance at location of MW-6D



Photograph 1: Hydropunch II.

SUMMARY

On-Site Staff:

- Tetra Tech
- Cascade

Completed:

January 14

- Drilled MW-19D down to 104 feet bgs, encountered caliche layer between 102 and 103 feet bgs underlain by silty clay.
- Collected groundwater sample at 101 feet bgs (in silt).
- Constructed triple-nested well MW-19D1, -D2, and -D3 with screens at 31-51, 60-70, and 92-102 feet bgs.
- Submitted 4 groundwater samples (collected at 27, 36, 46, and 101 feet bgs) and 5 soil samples from drums with soil cuttings to the Advanced Technology Labs

Look Ahead:

Plan for January 14, 2013

- Complete grouting of MW-19D
- Install fencing and conduct utility clearance down to 5 feet bgs using air vac tool at location of MW-6D (west side).
- Relocate rig to the west side and start drilling MW-6D



Photograph 1: Drilling MW-19D: caliche layer encountered at 102 feet bgs.

SUMMARY

On-Site Staff:

- Tetra Tech
- Cascade

Completed:

January 15

- Completed construction of the triple-nested well with the following specifications:

Well ID	Screen Interval (feet bgs)	Logged geology of screened interval
MW-19D1	31 - 51	Gravel, interbedded with Clay
MW-19D2	60 - 70	Silty to Sandy Clay, Silty Sand
MW-19D3	92 - 102	Clayey Silt, Sandy Silt, Clay

- Installed fencing and conducted utility clearance down to 5 feet bgs using air vac tool at location of MW-6D (west side).

- Removed 17 drums with IDW from the eastern parking lot area to the waste storage area across the street; cleaned up asphalt surface in the eastern parking lot area.

Look Ahead:

Plan for January 16, 2013

- Relocate Sonic rig to the MW-6D area (the rig became immobile, so it will be towed from the eastern parking lot area in early morning, well before the Mall opening).

- Start drilling and collecting depth-discrete groundwater samples from the MW-6D borehole.



Photograph 1: Surface completion of the triple-nested well.

SUMMARY

On-Site Staff:

- Tetra Tech
- Cascade

Completed:

January 16 (first day of drilling on the west side)

- Relocated Sonic rig to the MW-6D area using a towing truck; tidied up the eastern parking lot area.

- Drilled MW-6D to 40 feet bgs; collected groundwater sample at 32 feet bgs. Installed Hydropunch II at 41 feet bgs to collect sample tomorrow morning.

Look Ahead:

Plan for January 17, 2013

- Continue drilling and collecting depth-discrete groundwater samples from the MW-6D borehole.

- Below 60 feet bgs the groundwater and soil samples will be collected using SimulProbe. If no groundwater is retrieved, then a soil sample will be sent for analysis. If groundwater samples are collected below 60 feet bgs, they will be submitted to the lab with rush turnaround time.



Photograph 1: Caliche layer between 18 and 20 feet bgs caused us to stop to cool down the drill bit; later in the day it took more than 2 hours to install a 10-inch conductor casing down to 30 feet bgs because of obstructions created by caliche rocks.

SUMMARY

On-Site Staff:

- Tetra Tech
- Cascade

Completed:

January 17

- Drilled MW-6D to 70 feet bgs; collected groundwater samples at 41 and 51 feet bgs using Hydropunch II sampler, Also attempted to collect a groundwater sample at 60 feet bgs by installing Hydropunch II and waiting more than an hour. However, the sampler came empty. In addition, collected groundwater sample directly from the borehole at approximately 65 feet bgs using disposable bailer (the borehole was cased down to 60 feet bgs prior to sample collection).

- Silty clay with some gravels was encountered in the interval between 60 and 70 feet bgs, the clay is very stiff from 68 to 70 (similar clay was observed in borings MW-19D and MW-20D)

- Installed SimulProbe at 71 feet bgs to collect both groundwater and soil sample tomorrow morning.

- Submitted to the lab 4 groundwater samples from MW-6D (from depths 32, 41, 51, and 65 feet bgs), one soil sample from MW-19 (from 81 feet bgs), and 3 soil samples from individual drums with soil cuttings. All samples will be analyzed for VOCs (method 8260B) on a standard turn-around time basis.

Look Ahead:

Plan for January 18, 2013

- Continue drilling and collecting depth-discrete groundwater samples from the MW-6D borehole.

- Ggroundwater and soil samples will be collected using SimulProbe. Samples from 71, 81, and 91 will be sent to the lab one by one with a rush turnaround time.



Photograph 1: General view of the fencing in the MW-6D area.



Photograph 2: Stiff clay encountered between 68 and 70 feet bgs.

SUMMARY

On-Site Staff:

- Tetra Tech
- Cascade

Completed:

January 18

- Drilled MW-6D to 100 feet bgs; collected groundwater and soil samples at 71, 81, and 91 feet bgs using SimulProbe sampler. Select soil samples will be analyzed for geophysical parameters and total organic carbon (TOC). The interval between 70 and 90 feet bgs includes silty clay to clayey silt with zones of calcite cementation and gravels.

- Installed SimulProbe at 101 feet bgs to collect both groundwater and soil sample tomorrow morning.

- Submitted to the lab 3 groundwater samples from MW-6D (from depths 71, 81, and 91 feet bgs) to be analyzed for VOCs (method 8260B) on a rush turn-around time basis. The preliminary results for the deepest samples so far:

Depth (feet bgs)	PCE (ug/L)
71	17
81	0.76
91	ND

Look Ahead:

Plan for January 19, 2013

- Continue drilling to 120 and collecting depth-discrete groundwater samples from the MW-6D borehole.

- Ggroundwater and soil samples will be collected using SimulProbe. Groundwater samples from 101, 111, and 121 feet bgs will be sent to the lab with a rush turnaround time (to be analyzed on Monday, January 21 because the lab is closed on Saturday and Sunday).



Photograph 1: Clayey silt and silty clay with gravels and zones of calcite cementation encountered between 70 and 90 feet bgs at location of MW-6D.

SUMMARY

On-Site Staff:

- Tetra Tech
- Cascade

Completed:

January 19

- Drilled MW-6D to 120 feet bgs; collected groundwater and soil samples at 101, 111, and 121 feet bgs using SimulProbe sampler. Select soil samples will be analyzed for geophysical parameters and total organic carbon (TOC). The interval between 100 and 120 feet bgs includes clayey and sandy silt with zones of calcite cementation and concretions. Approximately 1-foot thick layer of very fine silty sand was encountered from 109 to 110 feet bgs.

- Submitted to the lab 3 groundwater samples from MW-6D (from 101, 111, and 121 feet bgs) to be analyzed for VOCs (method 8260B) on Monday, 1/21/13 (rush turn-around time).

Look Ahead:

Plan for January 21, 2013

- The lab results are expected in the a.m. on 1/21/13. If all are non-detect for PCE, then a triple nested well will be set with the screens at: 30-50; 65-85; and 100-110 feet bgs.

- Complete well box installation for MW-19D at the Eastern parking lot area. Clean out the area inside the fence.



Photograph 1: Sandy, clayey silt with occasional zones of caliche like materials encountered between 110 and 120 feet bgs at location of MW-6D.

SUMMARY

On-Site Staff:

- Tetra Tech
- Cascade

Completed:

January 21

- The lab results for PCE in the deepest groundwater samples were nondetect or near the detection limit. A triple nested well was set with the screens at: 50-60; 80-90; and 100-110 feet bgs.

- Completed well box installation for MW-19D at the Eastern parking lot area. Cleaned out the area inside the fence.

Look Ahead:

Field effort is complete. IDW management, fencing removal etc. will be completed in the following week of two.

SUMMARY

On-Site Staff:

- Tetra Tech
- Cascade

Completed:

July 18

- Drilled the first borehole (B-4) down to 60 feet bgs.
- Continuously cored with 2' split spoon; collected 5 depth-discrete groundwater samples.
- We started collecting groundwater samples just below the first encountered groundwater (29'); couldn't collect the 6th sample from 60 to 61' which was in competent clay.
- Soils sampling goes really fast if gw samples are not collected in between. We drilled first 22' in 2 hours (so the rate is 10-11' per hour).
- GW sampler is pushed 1 or 2' ahead of augers, then we wait 5 or more minutes, retrieve a sample and pour water from a sampler into a vial (Becki was collecting up to 3 vials per interval). It took roughly an hour between each gw sample (drill, retrieve 2 two feet soil cores, the push sampler, collect gw sample).
- After 5' air vac clearance (which takes about 40-50 minutes per hole), we started drilling ~11:30 and finished ~ 18:00 (with about 40 min break for lunch). Thus, we did this hole with all sampling in just under 6 hours.
- The fence had been anchored, luckily winds were very light the whole day.

Look Ahead:

Plan for July 19, 2012

- Boring B-4 will be grouted in early a.m.
- Drill/sample EW-2 (MW-19I).

Discussion:

- No deviations from the work plan so far.

SUMMARY

On-Site Staff:

- Tetra Tech
- Cascade

Completed:

July 19

- Grouted borehole B-4 (drilled yesterday) from bottom to top using tremie pipe; it took a bit over an hour;
- Drilled EW-2 (MW-19I) to 60 feet bgs;
- Collected/logged soil continuously using 2' split spoon sampler;
- Collected 5 depth-discrete groundwater samples from ~29-60' bgs (attempted to collect 7, but at two intervals no water was encountered;
- Collected an undisturbed soil sample from 42-44' bgs for physical parameters (permeability, density etc.) using a 2' Shelby tube;
- Collected a composite sample for Permanganate Natural Oxidant Demand analysis – from 30-59' bgs (soil samples will be stored in refrigerator and sent to the labs on Monday);
- All drums with soil cuttings were moved from the eastern parking lot to a designated area across Maryland Parkway.

Look Ahead:

Plan for July 22, 2012

- Iinstall well EW-2 (MW-19I).

Discussion:

- It took a bit over 6 hours to drill/sample EW-2 (MW-19). Cascade crew did a great job of making today's drilling/sampling a success.

SUMMARY

On-Site Staff:

- Tetra Tech
- Cascade

Completed:

July 23

- Completed installation of well EW-2 (MW-19I) that will be used as an extraction well during the first pumping test
- Drilled borehole down to 40 feet bgs (we're drilling with 5' core barrels which speeds up the process)
- Collected two depth discrete groundwater samples, one undisturbed soil sample for geophysical parameters, and one soil sample for permanganate natural oxidant demand
- It took about 3 hours to install the well (putting bentonite chips at the bottom 5 feet, placing filter pack sand, then bentonite seal, and finally grouting up to the top). This time included a 30 min trip to fill truck with water.
- At about 5 pm we couldn't proceed with groundwater sampling (below 40) as the sampler's tip got broken. Cascade made arrangements to get a replacement by tomorrow am.
- Today was hot and humid. We kept the rig down at one point to let a thunderstorm system pass through. No lightning occurred though. Had some sprinkles of rain and cloudy skies.
-

Look Ahead:

Plan for July 24, 2012

- complete drilling/sampling MW-40 (CMT-1)
- install continuous multi-channel tubing system into the boring.

Discussion:

- None.

SUMMARY

On-Site Staff:

- Tetra Tech
- Cascade

Completed:

July 24

- Completed drilling of MW-40 (CMT-1) from 40 to 60' bgs;
- Collected 5 depth discrete groundwater samples (7 altogether from this well), the deepest one was at 60-61' bgs;
- Installed continuous multi-channel tubing (CMT) well (with 7 well screens placed every 5 feet from 30 to 60.5' bgs); placed filter pack sand around each screen and transition sand, bentonite seal between adjacent screens (to isolate aquifer zones to be monitored). It took about 4.5 hours to install CMT well (without grouting and surface completion);
- Shipped soil samples (PNOD and geophysical parameters) to respective labs; groundwater samples were picked up by the ATL.
- We didn't have time to grout the borehole up (along the blank casing) as we had to move drums with soil cuttings and decon water offsite.

Look Ahead:

Plan for July 25, 2012

- Complete the well installation in the a.m.; the team will then take a break until evening when we start working on the last borehole (EW-1 [MW-14I]), west side of the Mall.

Discussion:

- It is possible that we'll drill/sample EW-2 (MW-14I) Wednesday night and complete well installation on Thursday night.

SUMMARY

On-Site Staff:

- Tetra Tech
- Cascade

Completed:

July 25

This morning field activities in the Eastern Parking lot area included:

- Grouting and surface completion of the well MW-40 (CMT-1);
- Removal of 3 drums (2 with decon water and 1 with soil cuttings) to a designated storage area;
- Initial cleanup of the asphalt surfaces around the boring locations.
- Locked the gate at 11 a.m.

Look Ahead:

Plan for July 25-26, 2012

- The team is taking a break until we meet at 8:30 p.m. to get ready for night work in the MW-14 area (west of the Mall). The plan is to do air-knifing clearance of the borehole location down to 5 feet and then proceed with drilling/sampling EW-1 (MW-14I), west side of the Mall.

Discussion:

- None.

SUMMARY

On-Site Staff:

- Tetra Tech
- Cascade

Completed:

July 26

During the night of Wednesday to Thursday:

- Drilled/logged/sampled borehole EW-1 (MW-14I) (west of the Mall) down to 55 feet below ground surface. Boring terminated as competent clay was encountered.
- Collected 5 depth discrete groundwater samples
- Collected one undisturbed sample for physical analyses
- Began development of EW-2 (MW-19I) (eastern parking lot area) this morning. It may take up to 4 hours to do cycles of surging and bailing, and then pumping until water quality parameters stabilized. According to Dale Emerson (Cascade's well developer, EW-2 [MW-14I] recharges quickly).
- Yesterday and this morning 6 drums with soil cuttings and decon water were removed from working areas to the designated storage area.

Look Ahead:

Plan for July 26-27, 2012

- We will start installing well EW-1 (MW-14I) tonight at 9 pm after the team gets some sleep.

Discussion:

- None.

SUMMARY

On-Site Staff:

- Tetra Tech
- Cascade

Completed:

July 27

During Thursday and the night from Thursday to Friday:

- Eastern parking lot area (during the day) – Developed well EW-2 (MW-19I). Only shallow interval could be developed for well MW-40 (CMT-1) with a peristaltic pump. Cascade is looking for ways to develop deeper intervals;
- West side of the Mall (after 9 pm and through the night) – Completed well EW-1 (MW-14I) construction; this well is ready to be developed on Saturday;
- Removed 2 drums with soil cuttings and 4 drums with water (decon and development) off-site;
- Demobilized the rig and other drilling equipment off-site.

Look Ahead:

Plan for Monday, July 30, 2012

- Set up all the equipment for the first pumping test in the Eastern parking lot area;
- Install pressure transducers into the pumping well and observation wells for background water level measurements.

Discussion:

- If all the equipment is in place and hooked up by noon, it will be possible to conduct the first phase of pumping test (step test) in the p.m. The 72-hour pumping test will be conducted next, after water levels recovered (likely on Tuesday).

SUMMARY

On-Site Staff:

- Tetra Tech
- Cascade

Completed:

Here a list of field activities over the weekend and on Monday, July 30:

- West side of the mall: well EW-1 (MW-14I) had been developed on Saturday
- Well development water has been moved off-site
- Eastern Parking Lot Area: equipment for the groundwater treatment system (GTS) was installed Monday morning. The GTS includes 4 bag filters, the carbon vessel (for treatment of volatile organic compounds], and an ion-exchange vessel with resin (for treatment of TDS)]. The treated water will go to the 20,000 gal tank. There are also two spill containment areas for 2,000 gal (around treatment units) and 5,000 gal (around the tank).

Look Ahead:

Plan for July 31, 2012

- The Cascade crew is arriving around 10 a.m. to set up the pump into the well and connect the discharge pipe to the GTS.
- Pressure transducers will be installed in several wells to measure change in water levels during the tests.
- The plan is to conduct step-rate test on Tuesday, let water level recover to within 90-95% of static (prior to the test), and after the sustainable rate is determined begin the long term constant rate pumping test.

Discussion:

- None.

SUMMARY

On-Site Staff:

- Tetra Tech
- Cascade

Completed:

July 31:

- A 1.5-hour step test; also monitored for water level recovery.
- Relatively low permeable materials predominate in the saturated zone at location of well EW-2 (MW-19I) (pumping well), so this well is capable of producing 1.5 gpm.
- We tried three 0.5 hour steps with each of flow rates: 0.9, 1.2, and 1.4 gpm. During the last step we drew water level to below the top of the screen interval. The total drawdown was ~10 feet.

Look Ahead:

Plan for August 1, 2012

- Start the constant-rate pumping test. We'll use the lowest possible rate (close to 1 gpm).

Discussion:

- Considering the tightness of formation, it's unlikely we'll be able to pump continuously for 3 days. We'll be lucky to run the test for a day. We have a better chance of running a longer pumping test on the west side of the Mall.

SUMMARY

On-Site Staff:

- Tetra Tech
- Cascade

Completed:

August 1:

- The pumping test is running smoothly since 9:20 a.m. Based on the step test, well performs most efficiently at a flow rate of 0.9 gallons per minute. This rate was used for the ongoing constant rate pumping test.

- As of 10 pm, i.e. after 12 hours 40 minutes of continuous pumping the drawdown in the pumping well EW-2 (MW-19I) is 3.6 ft. The drawdown stabilized within the first couple of hours into the test at ~ 3.3; it was very slowly increasing thereafter. A total of 709 gallons of water was extracted and treated for PCE and total dissolved solids.

- Cascade crew member is at the site through the night to monitor flow rate and water levels in EW-2 and nearby observation wells.

Look Ahead:

Plan for August 2, 2012

- Continue pumping and monitor water levels.

Discussion:

- None

SUMMARY

On-Site Staff:

- Tetra Tech
- Cascade

Completed:

August 2:

- Pumping test at the Eastern parking lot area continued on Thursday and through the night. As of 10 pm of 8/2/12 (after 36 hours of pumping), 2080 gallons of contaminated groundwater was extracted and treated.

- Drawdown in the pumping well (EW-2) was slightly increasing over time, currently is 3.86 ft. The response of the nearby observation well is still pretty weak (few hundreds of a foot).

Look Ahead:

Plan for August 3, 2012

- The plan for Friday and Friday night is to continue pumping and monitor water levels in the nearby observation wells

Discussion:

- None

SUMMARY

On-Site Staff:

- Tetra Tech
- Cascade

Completed:

August 3 – 6, 2012:

- Pumping test at the Eastern parking lot area was completed on Saturday a.m., 8/4. During continuous pumping for 3 days at a rate of 0.94 gpm, a total of 4,061 gallons of groundwater was extracted and treated. Sufficient water level data was collected for interpretation of test results.

- On Monday, 8/6 a step-test was completed at MW-14 area (west side of the Mall). The step test was run at progressively increasing rates (1, 1.5, and 2 gpm). The results of the step test indicate that a sustainable pumping rate for this area will be about 1 gpm.

- Water (136 gallons) extracted during the step test was temporarily stored in the poly tank. Once all the equipment of the groundwater treatment system is installed (before the Mall hours on Tuesday), the extracted water will be pumped through the system for treatment.

Look Ahead:

Plan for August 7, 2012

- The plan for Tuesday is to begin the long-term pumping test at MW-14 area.

Discussion:

- None

SUMMARY

On-Site Staff:

- Tetra Tech
- Cascade

Completed:

August 7:

- Rain for Rent and Cascade installed and hooked up all the components of the groundwater treatment system at MW-14 area;

- Pressure transducers to monitor water levels during the pumping tests were installed in four wells (EW-1 [MW-14I], MW-14, MW-6, and MW-13); the wells MW-14 and MW-6 are located 40 and 80 feet cross gradient from the pumping well EW-1 [MW-14I]; well MW-13 is 220 feet down gradient from EW-1 [MW-14I].

- Long term pumping test started at 11 a.m. By 9 p.m., i.e. after 10 hours of pumping at 1 gpm, about 600 gallons of groundwater was extracted and treated. Drawdown in the pumping well was 9.8'; both wells MW-14 and MW-6 showed a measurable response to pumping. The 10th hour data suggest that well MW-13 also responding to pumping.

Look Ahead:

Plan for August 8-9, 2012

- The pumping will be continued for the next two days.

Discussion:

- The data will be evaluated to determine whether the pumping test should be stopped on Friday morning or continued to more than 3 days total.

SUMMARY

On-Site Staff:

- Tetra Tech
- Cascade

Completed:

August 8:

- As of 7 pm on Thursday about 3300 gallons was pumped out and treated. Flow rate was maintained at 1 gpm. The drawdown in the pumping well EW-1 was 12.4 feet.

Look Ahead:

Plan for August 10, 2012

- On Friday at 11 a.m. it will be exactly 3 days since the start of the pumping test. We may continue pumping after 11 a.m. until drawdown in EW-1 (MW-14I) is about 15 ft.

Discussion:

- None.

SUMMARY

On-Site Staff:

- Tetra Tech
- Cascade

Completed:

August 9 – 12, 2012:

- The pumping test at MW-14 area (west side of the Mall) has been successfully completed on Friday, 8/10. Approximately 4,620 gallons of groundwater was extracted and treated (during 77 hours of pumping). Site was tidied up, filter tanks drained and pumped into the Baker tank.

- The test was stopped at 4 pm and the pump was pulled out at 6 pm after the water level in the pumping well EW-1 (MW-14I) recovered. The transducers were left in all wells (MW-6, MW-13, MW-14, and EW-1 [MW-14I]) to continue water level monitoring over the weekend. After data downloading, the transducers were removed from all wells on Sunday a.m.

- The test produced a good set of data, with maximum drawdowns in the pumping well of 13 feet and 0.1 to 0.23 foot in observation wells (all of which responded to pumping, including down gradient well MW-13).

Look Ahead:

Plan for August 13, 2012

- The treated water in both Baker tanks (one at the eastern parking lot area and another at the MW-14 area) will be sampled for lab analyses for PCE and total dissolved solids.

Discussion:

- None.

APPENDIX D

Photo Log

On Appendix CD-Rom

PHOTOGRAPHIC DOCUMENTATION
Maryland Square PCE Site
Vertical Delineation, Aquifer and Pilot Scale Testing
3661 South Maryland Parkway
Las Vegas, Clark County, Nevada

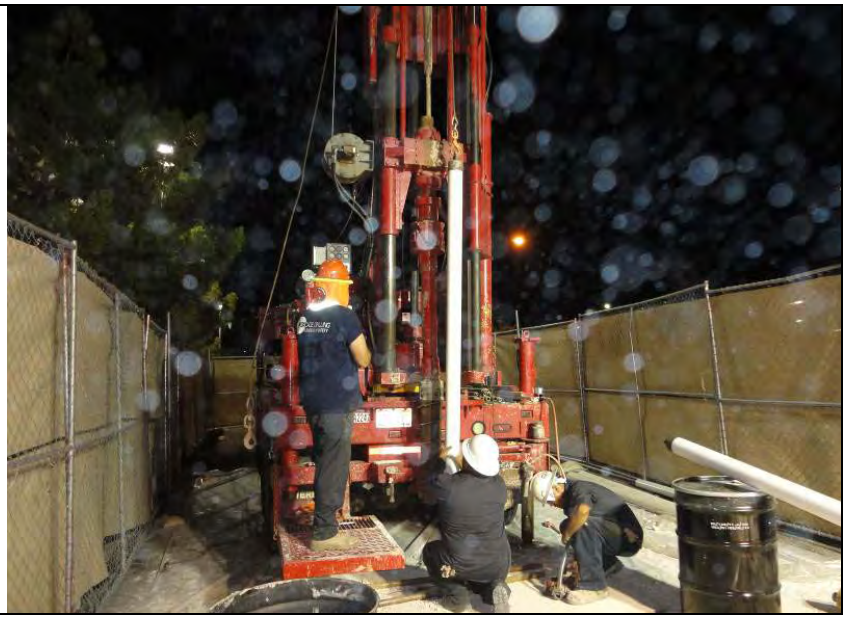
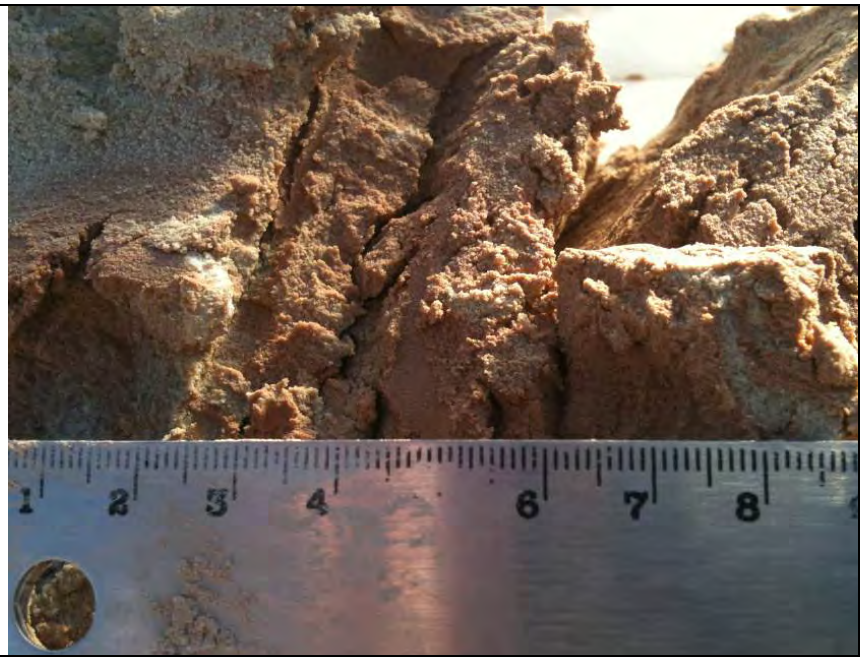
Photo: 1 **Description: View of casing placement during the night shift for the installation of MW-14I located on the western side of the mall, July 26, 2012.**	

Photo: 2 **Description: View of the pump test assembly area and equipment used during aquifer testing, August 1, 2012.**	

PHOTOGRAPHIC DOCUMENTATION
Maryland Square PCE Site
Vertical Delineation, Aquifer and Pilot Scale Testing
3661 South Maryland Parkway
Las Vegas, Clark County, Nevada

Photo: 3 **Description: View of a soil core of fine grained, sand extracted using sonic drilling methods, January 14, 2013**	
Photo: 4 **Description: View of groundwater sample collection during additional vertical delineation phase, January 14, 2013.**	

PHOTOGRAPHIC DOCUMENTATION
Maryland Square PCE Site
Vertical Delineation, Aquifer and Pilot Scale Testing
3661 South Maryland Parkway
Las Vegas, Clark County, Nevada

Photo: 5 **Description: View of the air knife/vacuum truck and drilling rig breaking ground for pilot scale testing on March 5, 2013**	

Photo: 6 **Description: View of the hollow stem auger used to advance the boring for the permanganate injection point (PIP well), March 6, 2013 facing south.**	

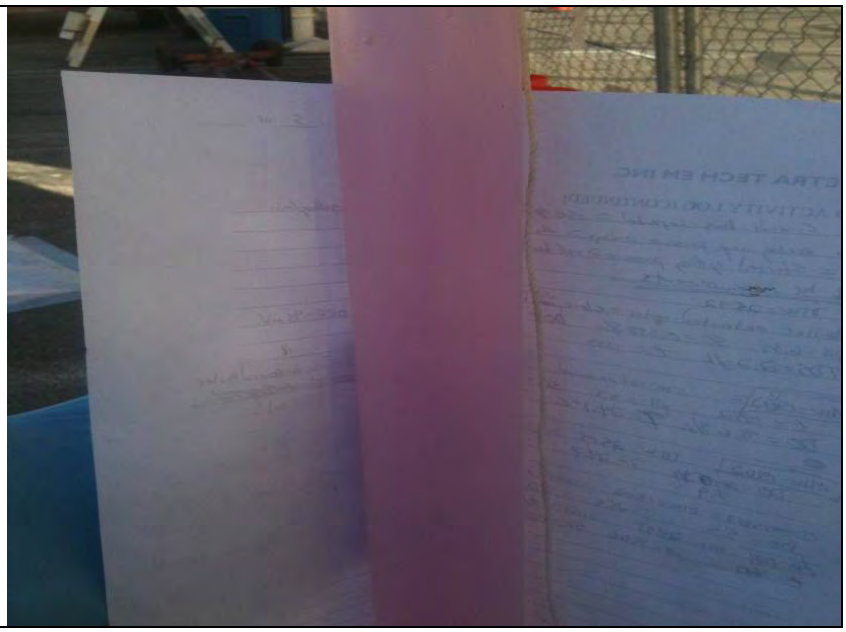
PHOTOGRAPHIC DOCUMENTATION
Maryland Square PCE Site
Vertical Delineation, Aquifer and Pilot Scale Testing
3661 South Maryland Parkway
Las Vegas, Clark County, Nevada

Photo: 7 **Description: Low-flow sampling of MW-19I for baseline groundwater chemistry, March 8, 2013.**	

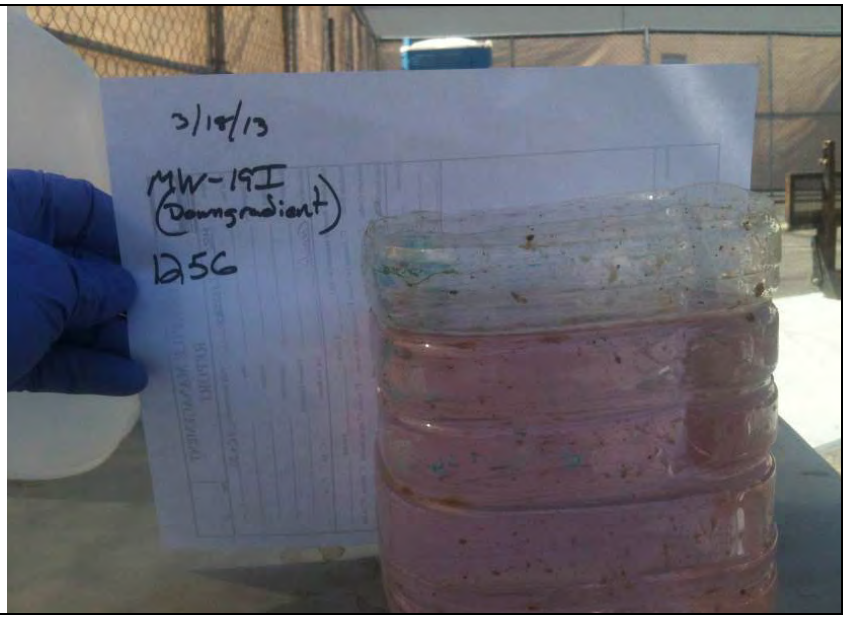
Photo: 8 **Description: View of the permanganate injection area and drilling equipment used to deliver the oxidant, March 11, 2013, facing north.**	

PHOTOGRAPHIC DOCUMENTATION
Maryland Square PCE Site
Vertical Delineation, Aquifer and Pilot Scale Testing
3661 South Maryland Parkway
Las Vegas, Clark County, Nevada

Photo: 9 **Description: View of the secondary containment area and permanganate injection mixing and delivery system, March 11, 2013, facing north.**	

Photo: 10 **Description: View of the initial contact of permanganate with groundwater from up-gradient well MW-19, March 11, 2013.**	

PHOTOGRAPHIC DOCUMENTATION
Maryland Square PCE Site
Vertical Delineation, Aquifer and Pilot Scale Testing
3661 South Maryland Parkway
Las Vegas, Clark County, Nevada

Photo: 11 **Description:** **Permanganate visible in groundwater collected from downgradient well MW-19I, March 18, 2013.**	
Photo: 12 **Description** **Permanganate visible in groundwater collected from cross-gradient well MW-19D1, March 20, 2013.**	

PHOTOGRAPHIC DOCUMENTATION
Maryland Square PCE Site
Vertical Delineation, Aquifer and Pilot Scale Testing
3661 South Maryland Parkway
Las Vegas, Clark County, Nevada

Photo: 13 **Description: View of the wellhead totalizer for the permanganate injection, March 20, 2011.**	

Photo: 14 **Description: View of soil cuttings at ~24 feet bgs. Sourced from down-gradient Step-out confirmatory boring 2, March 26, 2013.**	

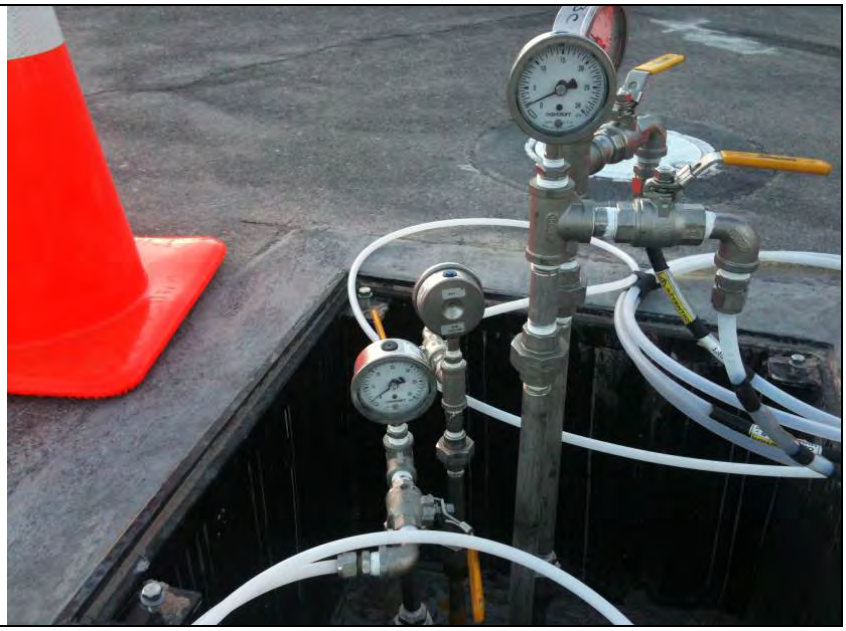
PHOTOGRAPHIC DOCUMENTATION
Maryland Square PCE Site
Vertical Delineation, Aquifer and Pilot Scale Testing
3661 South Maryland Parkway
Las Vegas, Clark County, Nevada

Photo: 15 **Description: Collection of baseline groundwater samples from CMT well prior to PulseOx treatment.**	

Photo: 16 **Description: View of the installation process for the nested PulseOx injection wells on March 27, 2013.**	

PHOTOGRAPHIC DOCUMENTATION
Maryland Square PCE Site
Vertical Delineation, Aquifer and Pilot Scale Testing
3661 South Maryland Parkway
Las Vegas, Clark County, Nevada

Photo: 17 **Description: View of the PulseOx hydrogen peroxide containment system, April 27, 2013.**	

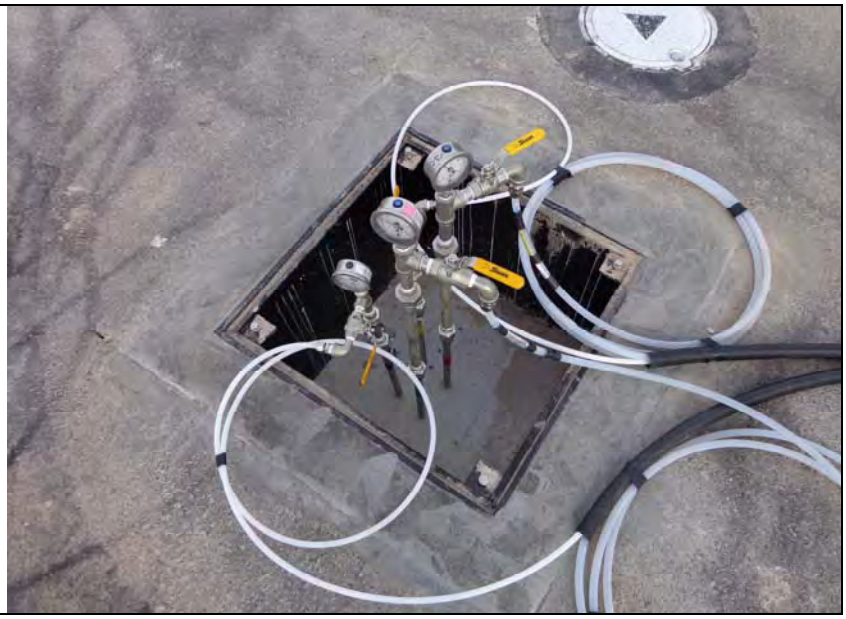
Photo: 18 **Description: View of the PulseOx injection system at the wellhead, April 27, 2013.**	

PHOTOGRAPHIC DOCUMENTATION
Maryland Square PCE Site
Vertical Delineation, Aquifer and Pilot Scale Testing
3661 South Maryland Parkway
Las Vegas, Clark County, Nevada

Photo: 19 **Description: View of the interior of the PulseOx trailer.**	

Photo: 20 **Description: View of the PulseOx injection system manifold.**	

PHOTOGRAPHIC DOCUMENTATION
Maryland Square PCE Site
Vertical Delineation, Aquifer and Pilot Scale Testing
3661 South Maryland Parkway
Las Vegas, Clark County, Nevada

Photo: 21 **Description: View of the PulseOx injection wellhead and vault.**	

APPENDIX E

Permits

On Appendix CD-Rom

ndep
NEVADA DIVISION OF ENVIRONMENTAL PROTECTION
protecting the future for generations

STATE OF NEVADA
Department of Conservation & Natural Resources
DIVISION OF ENVIRONMENTAL PROTECTION

Brian Sandoval, Governor
Leo M. Drozdoff, P.E., Director
Colleen Cripps, Ph.D., Administrator

March 14, 2013

Mr. Jerry Engel
Maryland Square Shopping Center LLC
700 Pont Chartrain Drive
Las Vegas, Nevada 89145

RE: Short-Term UIC General Permit GU07RS-52020
Maryland Square PCE Site, Las Vegas, Nevada

Dear Mr. Engel:

The Nevada Division of Environmental Protection (NDEP) has reviewed your request for minor modification of the short-term remediation underground injection control (UIC) General Permit GU07RS for the remediation activities identified in the UIC application and modification request letter. Authorization for an increase in injection rate of potassium permanganate from 10 gpm to 20 gpm is granted. Injection pressures shall be increased incrementally to ensure that fracture pressures are not reached.

Please note the following Sections of the permit:

1. The issue date of permit is March 8, 2013, and **expires September 7, 2013**;
2. I.A.1 – Authorized injectate is identified on the cover of the permit;
3. I.A.3 Reporting – monitoring reports are not required for the UIC general permit for short-term remediation. All requirements in this permit will be summarized and reported in the Corrective Action Workplan reports to Bureau of Corrective Actions.

If you have any questions or comments, please contact me at (775) 687-9502 or jferrin@ndep.nv.gov.

Sincerely,

Jason Ferrin

Jason Ferrin
Underground Injection Control Program
Bureau of Water Pollution Control

Enclosure: UIC permit GU07RS-52020 – Cover page

ecc: Mary Siders, NDEP Bureau of Corrective Actions, Site Case Officer
Greg Lovato, NDEP Bureau of Corrective Actions, Bureau Chief
Cliff Lawson, NDEP Bureau of Water Pollution Control, Permits Supervisor

cc: Robert Manriquez, Tetra Tech Inc., 1230 Columbia Street, Suite 750, San Diego, CA 92101

NEVADA DIVISION OF ENVIRONMENTAL PROTECTION

UIC GENERAL PERMIT GU07RS ID# 52020

SHORT TERM REMEDIATION – Six months or less

AUTHORIZATION TO INJECT

In compliance with the provisions of the Nevada Revised Statutes (NRS) and the Nevada Underground Injection Control (UIC) Regulations, Nevada Administrative Code (NAC) 445A.810 through 445A.925, eligible applicants are authorized to inject the following compounds and/or water from a treatment facility operated in conjunction with a Corrective Action (CA) project overseen by the Nevada Division of Environmental Protection Bureau of Corrective Actions or other CA agency into Class V injection wells in accordance with limitations, requirements and other conditions set forth in Parts I and II hereof.

This General Permit is for Corrective Action (remediation) projects lasting **six months or less** and allows injection of 1) those materials identified below in Category 1; and/or 2) water which has been treated to meet groundwater quality criteria.

Facility/Site Name: Maryland Square PCE Site

Facility Address: 3528 South Maryland Parkway, Las Vegas, Nevada 89169

Legal Description: T. 21S, R. 61E, Sec. 14

Well Owner Name: Maryland Square Shopping Center LLC/ Herman Kishner Trust

Address: 700 Pont Chartrain Drive, Las Vegas, NV 89145 Facility CA ID: H-000086

Operator Name & Address: Tetra Tech Inc., 1230 Columbia St. Suite 750, San Diego, CA

Authorized injection wells: Two (2). Well OS-1 and temporary injection point between MW-19 and MW-19I

Authorized rates/volumes: Max. of 20 gallons/day/well of H_2O_2 (34%); max. of 25 pounds of ozone; one time injection of 2% Potassium Permanganate at up to 20 gpm. Injection pressures shall remain below fracture pressure.

Required for Quarterly sampling: ☒ Per approved State or County Corrective Action Workplan

☒ See UIC permit issuance cover letter Approved plan date: February 2011

☐ Additional UIC Sampling required: _____

Coverage under this general permit will be authorized if a Notice of Intent (NOI) is submitted and the following injection occurs at a specific site:

CATEGORY 1 - One of the following is injected:

- X Low-percentage solution of hydrogen peroxide (H_2O_2);
- X Potassium and sodium permanganate;
- X Ozone;
- ☐ Oxygen infusers (note: direct oxygen injection – no infuser);
- ☐ Carbon sources/electron donors (including, but not limited to acetate, lactate, glucose, and complex sugars);
- ☐ Surfactant;
- ☐ Sulfate or Polysulfide;
- ☐ Nutrients: nitrate, ammonia, phosphate, vitamins;
- ☐ Hydrogen releasing compounds;
- ☐ Chemical oxidation compounds

CATEGORY 2 - Injection of water that has been treated to meet groundwater quality criteria.

Modifications to the above requirements must be pre-approved by the UIC Program pursuant to Part I.A.8. The Permittee shall comply with all provisions of this permit and any letter of authorization issued pursuant to it.

This general permit was issued on **October 10, 2012**. This general permit shall expire on: **October 9, 2017** Effective date for the project above is: **March 8, 2013.** The authorization issued under this permit shall expire at midnight 180 days from the effective date.

Jason Ferrin

Modified and signed this 14th day of March, 2013.

Jason Ferrin, UIC Program
Bureau of Water Pollution Control

Clark County Fire Department
PERMIT

Fire Prevention Bureau (FPB) • 4701 W Russell Rd • Las Vegas, NV 89118 • (702) 455-7316

IMPORTANT: Always use the permit number below when requesting inspections or information regarding this permit.

PERMIT NUMBER	PHONE SYSTEM NUMBER	ISSUE DATE	EXPIR. DATE
13-12274 FDCG	14669551	4/01/13	5/03/13

PROJECT NAME: BOULEVARD MALL, THE
SUB PROJECT NAME: EAST PARKING LOT
EVENT NAME: PULSE QX PILOT TEST
PARCEL NO: 162-15-602-009 RANGE-TOWNSHIP-SECTION 61-21-15
SITE ADDRESS: 3661 S MARYLAND PKWY
TENANT NAME: EAST PARKING LOT TENANT NO:
PROPERTY OWNER: MARYLAND SQUARE L L C
CONTRACTOR: GROUNDWATER & ENVIRONMENTAL
PERMIT CATEGORY: TEMPORARY
PERMIT: FD COMPRESSED GASES
APP TYPE: FD COMPRESSED GAS TEMPORARY

If the permit category above is renewable or temporary, an inspector's signature is required below to perform the operations as described in the approved permit conditions.

Inspector Signature _____ Date 4/5/13

*** This Permit must be posted on-site and a set of approved plans, signed by CCFD Fire Prevention Bureau, available for inspection at all times. ***

RENEWABLE PERMIT CUSTOMERS: You are responsible for ensuring the renewal of said Permit 30 days prior to expiration. If you have not received a renewal notice from CCFD Fire Prevention Bureau, you may contact our Plan Intake Staff at Permits@ClarkCountyNV.gov or by calling 702-455-7122.

This Permit is issued and accepted on condition that all applicable ordinances and regulations now adopted, or that hereafter be adopted, shall be complied with, and on the additional condition that the permittee shall comply with any and all further rules and regulations which the CCFD Fire Prevention Bureau shall, from time to time impose. This Permit does not take the place of any license required by law and is not transferable. Any alterations to the fire protection systems, or changes in the use/occupancy or ownership of premises, shall void this Permit and require a new plan.

COMMENTS/CONDITIONS:
3/27/13 Approved for the temporary (up to 6 month with one 6 month extension) use of a pressure swing oxygen generator that can produce up to 500 lbs (6040 cu ft) of oxygen/day.

RECD 3-25-13 UPS.

13-12274

TEMPORARY PERMIT - Application

Clark County Fire Department
Fire Prevention Bureau

4701 W Russell Rd
~~575 E Flamingo Rd~~ • Las Vegas, NV 89119 • Phone (702) 455-7100 • Fax (702) 735-0775
Website: www.ClarkCountyNV.gov/depts/fire • Email Address: Permits@ClarkCountyNV.gov

$75 minimum application fee is due at time of submittal. Additional fees may be required depending on event timeframe. Fee is payable in exact cash, check/money order (drawn from US bank – payable to CCFD), or FD escrow account only.

Application Date: 3/22/13 **Payment Type:** Cash (Check) -or- FD Escrow Account #: _____
(Please circle one)

CCFD Code Enforcement Case No.: *(If applicable)* _____ **Building Permit No.:** *(If applicable)* _____

Please check appropriate box

- ☐ Amusement Buildings (FABT)
- ☐ Asbestos Removal (FART)
- ☐ Auto Sprinkler Sys – Indoor Covered Booth(s) > 1,000 SF & Tent(s) > 2,000 SF (FDSC) Sq Ft: _____
- ☐ Candles and Open Flame (FDCT)
- ☐ Carnivals & Fairs (FCFT)
- ☒ Compressed Gas (FDCG)
- ☐ Cryogens Systems (FCST) *(Includes: Fog Effects)*
- ☐ Exhibits & Trade Shows (FDET) Sq Ft: _____
- ☐ Explosive Materials (FEMT) Number of Magazines: _____
- ☐ Fireworks Booth (FFBT)
- ☐ Fireworks Display Outdoor (FFDO) Device Count: _____
- ☐ Fireworks/Pyrotechnics Proximate Indoor/Outdoor (FFPT) Device Count: _____
- ☐ Filming (FDFT)
- ☐ Firewood Sales (FWFC)
- ☐ Flame Effects (FFET)
- ☐ Flammable/Combustible Liquids Storage and/or Use (FFCT) *(Includes: Aboveground Tanks, Cabinets, Diesel Generators, Drums, Safety Cans, etc.)*
- ☐ Floor Finishing (FFFI)
- ☐ Hazardous Materials (FDHT)
- ☐ Hot-Works Fixed (FHFT)
- ☐ Hot-Works Mobile (FHMT)
- ☐ Hot-Works Combination Fixed/Mobile (FHWT)
- ☐ Liquefied Petroleum Gases (FPGT)
- ☐ Liquid or Gas-Fueled Vehicles or Equip in Assembly Area (FLQT)
- ☐ Mall Covered Kiosk (FMKT)
- ☐ Mobile Fueling Site (FMFT)
- ☐ Mobile Fueling Vehicle (FMVT)
- ☐ Open Burning Agricultural (FOBT)
- ☐ Places of Assembly (FDAT) Sq Ft: _____
- ☐ Special Activity Lot (FCTL)
- ☐ Spraying or Dipping (FSDT)
- ☐ Temporary Membrane/Bldg Structure/Tent - Outdoor (FTTT) Sq Ft: _____ *(Note: Tent(s) > 400 SF / Canopy(s) > 700 SF / Bldg(s) > 4,500 SF)*

PERMIT INFORMATION

Plans: (New) Revision Correction *(Please circle one)* Application # *(If applicable)*: _____
Note: If plan is a revision or a correction then the original application number must be provided.

Expedite: Yes or (No) Municipal Project/Property: Yes or (No) APN: _____

Venue Address: ~~3661~~ 3661 S. Maryland Pky Bldg-Suite#: Parking lot

Name of Venue: Boulevard Mall - eastern parking lot

Exact Location within Venue: East Parking Lot 36.124023 -115.133688
(i.e.: Name of ballroom, hall or parking lot location)

Name of Event: Pulse Ox Pilot Test

Event Move-In Date: April 1, 2013 Event Move-Out Date: May 3, 2013

*** **Date & Time Event Will Be Set Up For Inspection:** Apr 3, 2013 ***

On-Site Inspection Contact Name: Thomas Veasey **Cell #:** 609-929-2676

APPLICANT INFORMATION

Submitting Company Name: Groundwater & Environmental Services, Inc.

Mailing Address: 440 Creamery Way Bldg-Suite #: 500

City, State, Country, Zip Code: Exton, PA, USA, 08052

Company E-mail Address: tveasey@gesonline.com

Company Phone #: (610) 458 - 1077 Company Fax #: (610) 458 - 2300

Applicant Phone #: (610) 458 - 1077 Ext: 3015 Fax #: (610) 458 - 2300

Applicant E-Mail Address: tveasey@gesonline.com

Thomas Veasey/Senior Remediation Specialist
Applicant Name and Title

Applicant Signature

Clark County Fire Department
PERMIT

Fire Prevention Bureau (FPB) • 4701 W Russell Rd • Las Vegas, NV 89118 • (702) 455-7316

IMPORTANT: Always use the permit number below when requesting inspections or information regarding this permit.

PERMIT NUMBER	PHONE SYSTEM NUMBER	ISSUE DATE	EXPIR. DATE
13-12272 FDHM	14669544	4/01/13	5/30/13

PROJECT NAME: BOULEVARD MALL, THE
SUB PROJECT NAME: EAST PARKING LOT
EVENT NAME: MSSC PILOT TEST
PARCEL NO: 162-15-602-009 RANGE-TOWNSHIP-SECTION 61-21-15
SITE ADDRESS: 3661 S MARYLAND PKWY
TENANT NAME: EAST PARKING LOT TENANT NO:
PROPERTY OWNER: MARYLAND SQUARE L L C
CONTRACTOR: GROUNDWATER & ENVIRONMENTAL
PERMIT CATEGORY: TEMPORARY
PERMIT: FD HAZARDOUS MATERIALS
APP TYPE: FD HAZARDOUS MATERIALS TEMPORARY

If the permit category above is renewable or temporary, an inspector's signature is required below to perform the operations as described in the approved permit conditions.

Inspector Signature 4/5/13 Date

*** This Permit must be posted on-site and a set of approved plans, signed by CCFD Fire Prevention Bureau, available for inspection at all times. ***

RENEWABLE PERMIT CUSTOMERS: You are responsible for ensuring the renewal of said Permit 30 days prior to expiration. If you have not received a renewal notice from CCFD Fire Prevention Bureau, you may contact our Plan Intake Staff at Permits@ClarkCountyNV.gov or by calling 702-455-7122.

This Permit is issued and accepted on condition that all applicable ordinances and regulations now adopted, or that hereafter be adopted, shall be complied with, and on the additional condition that the permittee shall comply with any and all further rules and regulations which the CCFD Fire Prevention Bureau shall, from time to time impose. This Permit does not take the place of any license required by law and is not transferable. Any alterations to the fire protection systems, or changes in the use/occupancy or ownership of premises, shall void this Permit and require a new plan.

COMMENTS/CONDITIONS:
3/27/13 Approved for the use of an ozone generator capable of producing 25 lb/day ozone. This unit will be used at an outdoor soil remediation project. The unit will shut down if ozone is detected outside the generator of injection well. Per section 3704.3.2.1.1 the generator shall not be located within 75 feet of a lot line, public street, public alley public way exit discharge or a building. The perimeter fencing will be routinely checked for ozone at or above the OSHA PEL limit of 0.1 ppm. All entrances to the fence enclosure containing the generator will be placarded for Ozone.
Also approved for the storage/use of 1100 gallons of 34% (Class II oxidizer) hydrogen peroxide. This tank will also be outdoors and will be placarded and placed at least 35 feet from other exposures and occupied areas (Table 4004.1.2).

RECD 3-21-13 FEDEX

TEMPORARY PERMIT - Application

13-12272

Clark County Fire Department
Fire Prevention Bureau

575 E Flamingo Rd • Las Vegas, NV 89119 • Phone (702) 455-7100 • Fax (702) 735-0775
Website: www.ClarkCountyNV.gov/depts/fire • Email Address: Permits@ClarkCountyNV.gov

$75 minimum application fee is due at time of submittal. Additional fees may be required depending on event timeframe. Fee is payable in exact cash, check/money order (drawn from US bank – payable to CCFD), or FD escrow account only.

Application Date: 3/14/13 **Payment Type:** Cash (Check) -or- FD Escrow Account #: _____
(Please circle one)

CCFD Code Enforcement Case No.: *(If applicable)* _____ **Building Permit No.:** *(If applicable)* _____

Please check appropriate box

- ☐ Amusement Buildings (FABT)
- ☐ Asbestos Removal (FART)
- ☐ Auto Sprinkler Sys – Indoor Covered Booth(s) > 1,000 SF & Tent(s) > 2,000 SF (FDSC) Sq Ft: _____
- ☐ Candles and Open Flame (FDCT)
- ☐ Carnivals & Fairs (FCFT)
- ☒ Compressed Gas (FDCG)
- ☐ Cryogens Systems (FCST) *(Includes: Fog Effects)*
- ☐ Exhibits & Trade Shows (FDET) Sq Ft: _____
- ☐ Explosive Materials (FEMT) Number of Magazines: _____
- ☐ Fireworks Booth (FFBT)
- ☐ Fireworks Display Outdoor (FFDO) Device Count: _____
- ☐ Fireworks/Pyrotechnics Proximate Indoor/Outdoor (FFPT) Device Count: _____
- ☐ Filming (FDFT)
- ☐ Firewood Sales (FWFC)
- ☐ Flame Effects (FFET)
- ☐ Flammable/Combustible Liquids Storage and/or Use (FFCT) *(Includes: Aboveground Tanks, Cabinets, Diesel Generators, Drums, Safety Cans, etc.)*
- ☐ Floor Finishing (FFFI)
- ☒ Hazardous Materials (FDHT)
- ☐ Hot-Works Fixed (FHFT)
- ☐ Hot-Works Mobile (FHMT)
- ☐ Hot-Works Combination Fixed/Mobile (FHWT)
- ☐ Liquefied Petroleum Gases (FPGT)
- ☐ Liquid or Gas-Fueled Vehicles or Equip in Assembly Area (FLQT)
- ☐ Mall Covered Kiosk (FMKT)
- ☐ Mobile Fueling Site (FMFT)
- ☐ Mobile Fueling Vehicle (FMVT)
- ☐ Open Burning Agricultural (FOBT)
- ☐ Places of Assembly (FDAT) Sq Ft: _____
- ☐ Special Activity Lot (FCTL)
- ☐ Spraying or Dipping (FSDT)
- ☐ Temporary Membrane/Bldg Structure/Tent - Outdoor (FTTT) Sq Ft: _____ *(Note: Tent(s) > 400 SF / Canopy(s) > 700 SF / Bldg(s) > 4,500 SF)*

PERMIT INFORMATION

Plans: (New) Revision Correction *(Please circle one)* Application # *(If applicable)*: _____
Note: If plan is a revision or a correction then the original application number must be provided.

Expedite: Yes or (No) Municipal Project/Property: Yes or (No) APN: _____

Venue Address: 3661 S. Maryland Parkway, Las Vegas, Nevada Bldg-Suite#: _____

Name of Venue: MSSC

Exact Location within Venue: eastern parking lot of Boulevard Mall (Lat: 36.124023 Long: -115.133688)
(i.e.: Name of ballroom, hall or parking lot location)

Name of Event: MSSC Pilot Test

Event Move-In Date: April 1, 2013 Event Move-Out Date: May 30, 2013

*** * * Date & Time Event Will Be Set Up For Inspection:** April 2-4, 2013 *** * ***

On-Site Inspection Contact Name: Thomas Veasey **Cell #:** 609-929-2676

APPLICANT INFORMATION

Submitting Company Name: Groundwater & Environmental Services, Inc.

Mailing Address: 440 Creamery Way Bldg-Suite #: 500

City, State, Country, Zip Code: Exton, PA, USA, 08052

Company E-mail Address: tveasey@gesonline.com

Company Phone #: (610) 458 - 1077 Company Fax #: (610) 458 - 2300

Applicant Phone #: (610) 458 - 1077 Ext: 3116 Fax #: (610) 458 - 2300

Applicant E-Mail Address: giosue@gesonline.com

Glenn Nicholas Iosue / Corporate Manager
Applicant Name and Title

Applicant Signature

Clark County Fire Department
PERMIT

575 E Flamingo Rd • Las Vegas, NV 89119 • (702) 455-7316

IMPORTANT: Always use the permit number below when requesting inspections or information regarding this permit.

PERMIT NUMBER	PHONE SYSTEM NUMBER	ISSUE DATE	EXPIR. DATE
13-8507 FDHM	14606165	3/07/13	4/12/13

PROJECT NAME: BOULEVARD MALL, THE
SUB PROJECT NAME: EAST PARKING LOT
EVENT NAME: PERMANGANATE INJECTION
PARCEL NO: 162-15-602-009 RANGE-TOWNSHIP-SECTION 61-21-15
SITE ADDRESS: 3661 S MARYLAND PKWY
TENANT NAME: EAST PARKING LOT TENANT NO:
PROPERTY OWNER: MARYLAND SQUARE L L C
CONTRACTOR: CASCADE DRILLING LP
PERMIT CATEGORY: TEMPORARY
PERMIT: FD HAZARDOUS MATERIALS
APP TYPE: FD HAZARDOUS MATERIALS TEMPORARY

If the permit category above is renewable or temporary, an inspector's signature is required below to perform the operations as described in the approved permit conditions.

Joseph Dwyer #5 3-14-13

Inspector Signature **Date**

*** This Permit must be posted on-site and a set of approved plans, signed by Clark County Fire Department, available for inspection at all times. ***

RENEWABLE PERMIT CUSTOMERS: You are responsible for ensuring the renewal of said Permit 30 days prior to expiration. If you have not received a renewal notice from Clark County Fire Department, you may contact our Plan Intake Staff at Permits@ClarkCountyNV.gov or by calling 702-455-7122.

This Permit is issued and accepted on condition that all applicable ordinances and regulations now adopted, or that hereafter be adopted, shall be complied with, and on the additional condition that the permittee shall comply with any and all further rules and regulations which the Clark County Fire Prevention Division shall, from time to time impose. This Permit does not take the place of any license required by law and is not transferable. Any alterations to the fire protection systems, or changes in the use/occupancy or ownership of premises, shall void this Permit and require a new plan.

COMMENTS/CONDITIONS:
2/28/13 Plans approved for the temporary storage/use of 3,500 pounds of a class II oxidizer (Potassium Permanganate). The storage of potassium permaganate is in 5 gallon size containers (approximately 50 pounds per container)and is stored outdoors a minimum of 35 feet from buildings, public streets, property lines, parking and from incompatible materials (such as combustible materials).
NOTE: The potassium permaganate is to be diluted down to a 2% in water and then that solution is injected into wells for treating underground soil and groundwater contaminated with TCE. The 2% solution of potassium permaganate is classified as an irritant and is not regulated by the fire code.

13-8507

TEMPORARY PERMIT - Application

Clark County Fire Department
Fire Prevention Bureau

575 E Flamingo Rd • Las Vegas, NV 89119 • Phone (702) 455-7100 • Fax (702) 735-0775
Website: www.ClarkCountyNV.gov/depts/fire • Email Address: Permits@ClarkCountyNV.gov

$75 minimum application fee is due at time of submittal. Additional fees may be required depending on event timeframe. Fee is payable in exact cash, check/money order (drawn from US bank – payable to CCFD), or FD escrow account only.

Application Date: 2/28/13 **Payment Type:** Cash (Check) -or- FD Escrow Account #: _____
(Please circle one)

CCFD Code Enforcement Case No.: *(If applicable)* _____ **Building Permit No.:** *(If applicable)* _____

Please check appropriate box

- ☐ Amusement Buildings (FABT)
- ☐ Asbestos Removal (FART)
- ☐ Auto Sprinkler Sys – Indoor Covered Booth(s) > 1,000 SF & Tent(s) > 2,000 SF (FDSC) Sq Ft: _____
- ☐ Candles and Open Flame (FDCT)
- ☐ Carnivals & Fairs (FCFT)
- ☐ Compressed Gas (FDCG)
- ☐ Cryogens Systems (FCST) *(Includes: Fog Effects)*
- ☐ Exhibits & Trade Shows (FDET) Sq Ft: _____
- ☐ Explosive Materials (FEMT) Number of Magazines: _____
- ☐ Fireworks Booth (FFBT)
- ☐ Fireworks Display Outdoor (FFDO) Device Count: _____
- ☐ Fireworks/Pyrotechnics Proximate Indoor/Outdoor (FFPT) Device Count: _____
- ☐ Filming (FDFT)
- ☐ Firewood Sales (FWFC)
- ☐ Flame Effects (FFET)
- ☐ Flammable/Combustible Liquids Storage and/or Use (FFCT) *(Includes: Aboveground Tanks, Cabinets, Diesel Generators, Drums, Safety Cans, etc.)*
- ☐ Floor Finishing (FFFI)
- ☒ Hazardous Materials (FDHT)
- ☐ Hot-Works Fixed (FHFT)
- ☐ Hot-Works Mobile (FHMT)
- ☐ Hot-Works Combination Fixed/Mobile (FHWT)
- ☐ Liquefied Petroleum Gases (FPGT)
- ☐ Liquid or Gas-Fueled Vehicles or Equip in Assembly Area (FLQT)
- ☐ Mall Covered Kiosk (FMKT)
- ☐ Mobile Fueling Site (FMFT)
- ☐ Mobile Fueling Vehicle (FMVT)
- ☐ Open Burning Agricultural (FOBT)
- ☐ Places of Assembly (FDAT) Sq Ft: _____
- ☐ Special Activity Lot (FCTL)
- ☐ Spraying or Dipping (FSDT)
- ☐ Temporary Membrane/Bldg Structure/Tent - Outdoor (FTTT) Sq Ft: _____
(Note: Tent(s) > 400 SF / Canopy(s) > 700 SF / Bldg(s) > 4,500 SF)

RECEIVED FEB 28 2013 FIRE PREVENTION BUREAU

PERMIT INFORMATION

Plans: (New) Revision Correction *(Please circle one)* Application # *(If applicable)*: _____
Note: If plan is a revision or a correction then the original application number must be provided.

Expedite: (Yes) or No Municipal Project/Property: Yes or (No) APN: _____

Venue Address: [redacted]/3661 South Maryland Parkway Bldg-Suite#: Parking lot

Name of Venue: Boulevard Mall

Exact Location within Venue: East Parking lot 36.124023, -115.133688
(i.e.: Name of ballroom, hall or parking lot location)

Name of Event: Permanganate Injection, Maryland Square PCE site

Event Move-In Date: ~March 7, 2013 Event Move-Out Date: ~April 12, 2013

*** **Date & Time Event Will Be Set Up For Inspection:** March 11, 2013 ***

On-Site Inspection Contact Name: Michael Thomas **Cell #:** 702-672-6349

APPLICANT INFORMATION

Submitting Company Name: Cascade Drilling, L.P.

Mailing Address: 4590 Copper Sage St. Bldg-Suite #: _____

City, State, Country, Zip Code: Las Vegas, NV 89115

Company E-mail Address: _____

Company Phone #: (702) 643 - 0023 Company Fax #: (702) 446 - 0122

Applicant Phone #: (415) 302 - 1231 Ext: _____ Fax #: (916) 638 - 5611

Applicant E-Mail Address: aamort@cascadedrilling.com

Alexander Amort Director Compliance, safety
Applicant Name and Title

Applicant Signature

February 27, 2013

Clark County Fire Department
Fire Prevention Bureau
575 E Flamingo Rd
Las Vegas, NV 89119

RE: Temporary Hazardous Materials Permit, 3528/3661 South Maryland Parkway, Las Vegas, NV

To Whom It May Concern:

Please find the attached Temporary Permit Application (3 copies), maps (3 copies) and one copy of our Site Health and Safety Plan for your review and approval.

Below is a description of the process we intend to perform at the Boulevard Mall.

Process and Storage:

Cascade Drilling will receive approximately 3,500 lbs of solid Potassium Permanganate in containers of approximately 5 gallons in size, weighing approximately 50 lbs each. Potassium Permanganate is a class II oxidizer. Cascade Drilling will keep this material 35 feet from all buildings, sources of combustible material, public streets, the property line and will utilize fencing to keep the public from parking within 35 feet of the material.

Cascade Drilling will dilute the material with water in tanks ranging in size up to 1000 gallons down to a 2% solution by weight. The solution will then be injected into the injection well to treat PCE contamination in the groundwater. It is estimated that approximately 20,000 gallons of water solution will be injected over a 3 week period.

We are requesting the permit for the storage and handling of the 3,500 lbs of potassium permanganate solids. As a 2% solution, based on our discussion with your office, it would only be an irritant, and thus not regulated under this permit.

If you have any questions, please do not hesitate to contact me at 415-302-1231 or by email at aamort@cascadedrilling.com

Sincerely,

Alexander Amort
Director Compliance and Safety
Cascade Drilling, LP

Reviewed by C.C. Fire Department
By:
Date: 2/28/13
Clark County makes no representations by this review as to the accuracy or completeness of these plans. This review shall not be construed to be a permit for, or approval of any violation of State or County laws.



Overview Map of site work with Potassium Permanganate at 3528/3661 South Maryland Parkway, Las Vegas, NV.



Overview Map of site work with Potassium Permanganate at 3528/3661 South Maryland Parkway, Las Vegas, NV

Reviewed by C.C. Fire Department
By:
Date: 3/28/13
Clark County makes no representations by this review as to the accuracy or completeness of these plans. This review shall not be construed to be a permit for, or approval of any violation of State or County laws.



Satellite view of above picture: Overview Map of site work with Potassium Permanganate at 3528/3661 South Maryland Parkway, Las Vegas, NV



Reviewed by Clark County Fire Department
By: [signature]
Date: 2/28/13
Clark County makes no representations by this review as to the accuracy or completeness of these plans. This review shall not be construed to be a permit for, or approval of any violation of State or County laws.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT

NVG201000

In compliance with the provisions of the Clean Water Act (33 U.S.C. 1251 et. Seq. the "Act") and the Nevada Revised Statutes (Chapter NRS 445A), eligible dischargers who have submitted a Notice of Intent (NOI) and filing fee in accordance with Nevada Administrative Code (NAC) 445A.268, are authorized to discharge

DeMinimis discharges as defined in this permit

To :

Waters of the United States

In accordance with conditions set forth in Parts A, B and C hereof,

This permit became effective on February 11th, 2011.

This permit was modified and shall become effective on July 30th, 2012.

This permit and authorization to discharge shall expire at Midnight, February 11, 2016

Signed this 8th day of August, 2012

Alexi Lanza, P. E.
Bureau of Water Pollution Control
Nevada Division of Environmental Protection

A PART I - GENERAL PERMIT CONDITIONS

A.1 PERMIT OBJECTIVE:

A.1.1 GNV201000 is for DeMinimis discharges as defined below and may be intermittent or continuous. Its purpose is to provide timely authorization for discharges to Waters of the United States. This general permit establishes Notice of Intent (NOI) requirements, water quality limitations, prohibitions and management practices for five (5) separate discharge categories. For each discharge, a separate permit is required.

A.2 PERMIT COVERAGE:

A.2.1 This General Permit covers the State of Nevada.

A.3 **DISCHARGE CATEGORIES**: Category 1is hereby established as DeMinimis and shall report the duration and quantity in accordance with Section A.9.1.1. Category 2 is hereby established as DeMinimis and up to 1500 gallons per minute (gpm). Categories 3, 4, and 5 are hereby established as DeMinimis and shall be less than 250 gallons per minute (gpm):

A.3.1 **Category 1 – Public Water System (NRS 445A.235) Emergency discharges** – Permitted Public Water System Emergency discharges are a situations which pose an immediate risk to health, life, property or environment.

A.3.2 **Category 2 – Existing Public Water System supply discharges -** Permitted activities include discharges related to construction, maintenance, and testing (quantity, duration and capacity) of a public water system up to 1500 gpm (including the pipes, tanks, and reservoirs) such as:

A.3.2.1 Disinfection and flushing activities;

A.3.2.2 Discharges resulting from pressure releases, or overflows;

A.3.2.3 Discharge from wells and storage reservoirs;

A.3.2.4 Drilling of **NEW** Public Water System wells; or,

A.3.2.5 Public Water System discharges from other devices.

A.3.3 **Category 3 - Well development, testing & maintenance / aquifer testing / water quality testing -** Permitted discharges include discharges of water associated with:

A.3.3.1 Drilling of **NEW** wells (excluding Public Water System wells);

A.3.3.2 Rehabilitation or maintenance of water or geothermal wells, piezometers, and boreholes;

A.3.3.3 Water supply quantity or quality evaluations;

A.3.3.4 Well/aquifer test pumping and/or purging;

A.3.3.5 Discharges from any borehole not fully developed.

A.3.4 **Category 4 - Subsurface water discharges** - Permitted discharges include:

A.3.4.1 Groundwater from foundation, footer drain, basement, underground structure or other dewatering, provided the discharge is not contaminated with pollutants, chemicals or co-mingled with other wastewaters;

A.3.4.2 Water from intercepted or pumped groundwater.

A.3.5 **Category 5 - Utility vault water discharges** - Permitted discharges include:

A.3.5.1 Groundwater or surface water collected in vaults;

A.3.5.2 Water from subterranean seepage;

A.3.5.3 Snow melt, storm water, or water present as a result of inclement weather.

A.4 **PROHIBITED DISCHARGES:** Discharges not covered by this permit include:

A.4.1 Discharges in excess of 250 gpm, except as defined in Categories 1 and 2 (above);

A.4.2 Category 3. Category 4, or Category 5 type discharges that are within the BMI Complex as defined in Attachment I;

A.4.3 Discharges that are subject to effluent limitation guidelines at 40 CFR Part 440;

A.4.4 Discharges near or adjacent to hazardous waste sites, remediation sites, or where discharge activities may encounter naturally occurring constituents that would cause a violation of Water Quality Standards;

A.4.5 Subsurface (tile) drainage systems(or equivalent);

A.4.6 Discharges from mining activities;

A.4.7 Leaking chemical and fuel tanks;

A.4.8 Discharge of industrial waste;

A.4.9 Discharge of domestic/sanitary waste;

A.4.10 Biohazardous waste (e.g. wastes from hospitals, dentists, and/or veterinary clinics);

A.4.11 Discharges authorized by other NDEP permits;

A.4.12 Discharges that are not in conformance with an approved Total Maximum Daily Load

(TMDL);

A.4.13 Discharges into impaired waters on the Federal Clean Water Act Section 303(d) list, unless the discharge does not contain the pollutant for which the waterbody is impaired, or does not cause or contribute to an exceedance of water quality standards; or that there are sufficient remaining wasteload allocations in an EPA approved or established TMDL to allow the discharge.

A.4.14 Discharges from vehicle or equipment washing or maintenance activities including mobile washes (e.g. car, carpet, animal, and heavy equipment);

A.4.15 Underground injection control (UIC) activities;

A.4.16 Continuous discharges from existing geothermal wells or sources;

A.4.17 Working in Waters of the U.S.; or,

A.4.18 Discharges not authorized under this permit.

A.5 ELIGIBILITY, PERMIT REQUIREMENT, AND REQUEST FOR INCLUSION

A.5.1 All facilities or persons who are planning on conducting any discharge activities described in Section A.1 are eligible for this general permit.

A.5.2 Existing dischargers who are covered under a current Permit may continue to discharge until such valid permit expires.

A.5.3 The Division may require the holder of this General Permit apply for and obtain an individual permit in accordance with NRS 445A.480

A.5.4 Water quality standards included in this permit are promulgated by the Nevada Division of Environmental Protection (NDEP); current toxicity standards are defined in **NAC 445A.1236** – Standards for toxic materials applicable to designated waters.

A.5.5 New water quality standards for chlorine, toluene, ethylbenzene, *escherichia coli (*e. coli) and fecal coliform are being considered by NDEP. If adopted, these new standards may be included in general permit NVG201000 as a "minor permit modification".

A.5.6 To apply for permit coverage all new qualifying dischargers must request inclusion under this permit by completing and submitting an approved NDEP Notice of Intent (NOI) application to the Division along with appropriate permit fees. **The NOI submittal shall be submitted through NDEP's online permitting system at** http://ndep.nv.gov/bwpc/.

A.6 NOI REQUIREMENTS:

A.6.1 The minimum information required on a NOI consists of the following:

A.6.1.1 Applicant Information:

A.6.1.1.1 Applicant Name, Phone, Address, City, State, and Zip Code.

A.6.1.2 Operator Information:

A.6.1.2.1 Operator Name, Phone, Address, City, State, and Zip Code.

A.6.1.3 Billing Information:

A.6.1.3.1 Billing Name, Phone, Address, City, State, and Zip Code.

A.6.1.4 Site Information:

A.6.1.4.1 Project Name, Address, City, State, Zip Code;

A.6.1.4.2 Discharge latitude and longitude; and,

A.6.1.4.3 Scaled Site location Map showing the path from the initial outfall to the point of discharge to the receiving water.

A.6.1.5 Discharge Information:

A.6.1.5.1 Estimated Start Date;

A.6.1.5.2 Estimated Completion Date;

A.6.1.5.3 Name of the Receiving Water

A.6.1.5.4 Estimated daily flow rate;

A.6.1.5.5 Category of Discharge the permittee is requesting; and,

A.6.1.5.6 Water quality results as required by the Applicable NOI submittal requirements in Section A, below.

A.7 CERTIFICATION:

A.7.1 A signed and dated NOI Certification statement in accordance with Section C of this permit (SIGNATURES, CERTIFICATION REQUIRED ON APPLICATION AND REPORTING FORMS)

A.7.2 If water discharge (disposal) is to property other than the Permittee's, a letter of authorization (from the property owner where the discharge is to occur that explicitly allows the discharge to occur) must be included with the NOI.

A.8 NOTICE OF TERMINATION (NOT) REQUIREMENTS:

A.8.1 An approved NDEP Notice of Termination (NOT) shall be submitted upon cessation of

discharge. NOT applications are available online at http://ndep.nv.gov/bwpc/.

A.8.2 The minimum information required on a NOT consists of the following:

A.8.2.1 General Permit and authorization number;

A.8.2.2 Discharge Operator / Permittee / Applicant information: name, address, city, county, state, zip code, and phone;

A.8.2.3 Project (Site) location information: project name, project address, city, county, state, zip code;

A.8.3 A signed and dated NOT Certification statement in accordance with Section C of this permit (SIGNATURES, CERTIFICATION REQUIRED ON APPLICATION AND REPORTING FORMS)

A.9 **DISCHARGE NOI REQUIREMENTS:**

A.9.1 Based on the Category of Discharge, the following parameters must be sampled and submitted with the permit NOI:

A.9.1.1 **Category 1 – Public Water System Emergency Discharges: NOI Requirements**

A.9.1.1.1 For each Public Water System Emergency Discharge, the permittee shall provide a draft narrative report that describes the location of the discharge;

A.9.1.1.2 The estimated duration of the discharge;

A.9.1.1.3 Estimated Quantity of discharge; and,

A.9.1.1.4 A description of where the discharge entered the Municipal Storm Sewer System (MS4) and/or the associated receiving water.

A.9.1.2 **Category 2 – Public Water System Supply discharges: Supplemental Application and NOI Sampling Requirements**

A.9.1.2.1 For each New Well discharge, the permittee shall provide a draft narrative report that describes:

A.9.1.2.1.1 The location of the discharge;

A.9.1.2.1.2 The estimated duration of the discharge;

A.9.1.2.1.3 Estimated Quantity of discharge;

A.9.1.2.1.4 A description of the BMP's implemented to control drilling fluids, mud or material; and,

A.9.1.2.1.5 A representative water quality sample of the discharge.

A.9.1.2.2 For discharges in this category not associated with New well development, or where disinfection with chlorine based compounds were used, samples must be taken and submitted in accordance with the table below

Parameters	Discharge Limit - Daily Maximum	Measurement Frequency	Sample Type
Total Residual Chlorine[1] – mg/L	0.10	With NOI	Discrete
Total Dissolved Solids[2] (TDS) – mg/L	Monitor & Report	With NOI	Discrete
Turbidity – NTU [2, 3]	Monitor & Report	With NOI	Discrete

1. Only if disinfection with chlorine based compounds were carried out. Samples must be collected during the first hour of discharge. For discharges that extend beyond an hour in duration, a second sample shall be collected prior to end of discharge, or as specified by the division.
2. BMPs shall be implemented to minimize erosion and sediment.
3. During the discharge, if a visible turbidity plume is generated, a grab sample shall be obtained. Turbidity shall be less than or equal to 10 Nephelometric Turbidity Units (NTUs) over the background value of the receiving water.

A.9.1.3 Category 3 - Well development, testing & maintenance / aquifer testing / water quality testing: Supplemental Application and NOI Sampling Requirements

A.9.1.3.1 For each New Well development discharge, the permittee shall provide a draft narrative report that describes:

A.9.1.3.1.1 The location of the discharge;

A.9.1.3.1.2 The estimated duration of the discharge;

A.9.1.3.1.3 Estimated Quantity of discharge;

A.9.1.3.1.4 A description of the BMP's implemented to control drilling fluids, mud or material; and,

A.9.1.3.1.5 A representative water quality sample of the groundwater.

A.9.1.3.2 For discharges not associated with New well development, or where disinfection with chlorine based compounds were used, samples shall be taken and submitted in accordance with the table below.

Parameters	Discharge Limit - Daily Maximum	Measurement Frequency	Sample Type
Total Residual Chlorine[1] – mg/L	0.10	With NOI	Discrete
Total Dissolved Solids (TDS) – mg/L	Monitor & Report	With NOI	Discrete
Total Suspended Solids (TSS) – mg/L	Monitor & Report	With NOI	Discrete
Total Petroleum Hydrocarbon (TPH) (C6 – C40) – mg/L[5]	1.0	With NOI	Discrete
Methyl tert-Butyl Ether (MTBE) - µg/L	20.0	With NOI	Discrete
Total Nitrogen as N – mg/L	10.0	With NOI	Discrete
Total Phosphorus as P – mg/L	Monitor & Report	With NOI	Discrete
Trichloroethylene (TCE) - µg/L	5.0	With NOI	Discrete
Tetrachloroethylene (PCE) - µg/L	5.0	With NOI	Discrete

Benzene - µg/L	5.0	With NOI	Discrete
Ethyl benzene - µg/L	100	With NOI	Discrete
Toluene - µg/L	100	With NOI	Discrete
Xylene - µg/L	200	With NOI	Discrete
pH – S.U.	6.5 – 9.0	With NOI	Discrete
Turbidity – NTU[2, 3]	Monitor & Report	With NOI	Discrete
Barium – mg/L	2.0	With NOI	Discrete
Fluoride – mg/L	Monitor & Report	With NOI	Discrete
Iron – mg/L	1.0	With NOI	Discrete
Sulfate – mg/L	Monitor & Report	With NOI	Discrete
Dissolved Oxygen	Monitor & Report	With NOI	Discrete
Molybdenum - mg/L	6.16	With NOI	Discrete
Antimony	Monitor & Report	With NOI	Discrete
Arsenic	Monitor & Report	With NOI	Discrete
Beryllium	Monitor & Report	With NOI	Discrete
Boron	Monitor & Report	With NOI	Discrete
Cadmium	Monitor & Report	With NOI	Discrete
Calcium	Monitor & Report	With NOI	Discrete
Copper	Monitor & Report	With NOI	Discrete
Lead	Monitor & Report	With NOI	Discrete
Magnesium	Monitor & Report	With NOI	Discrete
Manganese	Monitor & Report	With NOI	Discrete
Mercury	Monitor & Report	With NOI	Discrete
Nickel	Monitor & Report	With NOI	Discrete
Selenium	Monitor & Report	With NOI	Discrete
Silver	Monitor & Report	With NOI	Discrete
Sulfur	Monitor & Report	With NOI	Discrete
Thallium	Monitor & Report	With NOI	Discrete
Zinc - total recoverable	Monitor & Report	With NOI	Discrete
Fecal Coliform - MPN100 mL	Monitor & Report	With NOI	Discrete
E Coli[4] - MPN/100mL	Monitor & Report	With NOI	Discrete
Hardness (expressed as $CaCO_3$) - mg/L	Monitor & Report	With NOI	Discrete

1. Samples must be collected during the first hour of discharge. For discharges that extend beyond an hour in duration, a second sample shall be collected prior to end of discharge, or as specified by the division.
2. BMPs shall be implemented to minimize erosion and sediment.
3. During the discharge, if a visible turbidity plume is generated, a grab sample shall be obtained. Turbidity shall be less than or equal to 10 Nephelometric Turbidity Units (NTUs) over the background value of the receiving water.
4. Single Value.
5. EPA Method 8015B and EPA Method 8260B, extractable and purgeable, C6-C40. Summation must meet permit limit.

A.9.1.4 Category 4 - Subsurface water discharges: NOI Sampling Requirements

Parameters	Discharge Limit Daily Maximum	Measurement Frequency	Sample Type
Total Residual Chlorine[1] – mg/L	0.10	With NOI	Discrete
Total Dissolved Solids (TDS) – mg/L	Monitor & Report	With NOI	Discrete
Total Suspended Solids (TSS) – mg/L	Monitor & Report	With NOI	Discrete
Total Petroleum Hydrocarbon (TPH) (C6 – C40) – mg/L[5]	1.0	With NOI	Discrete
Methyl tert-Butyl Ether (MTBE) - µg/L	20.0	With NOI	Discrete
Total Nitrogen as N – mg/L	10.0	With NOI	Discrete
Total Phosphorus as P – mg/L	Monitor & Report	With NOI	Discrete
Trichloroethylene (TCE) - µg/L	5.0	With NOI	Discrete
Tetrachloroethylene (PCE) - µg/L	5.0	With NOI	Discrete

Benzene - µg/L	5.0	With NOI	Discrete
Ethyl benzene - µg/L	100	With NOI	Discrete
Toluene - µg/L	100	With NOI	Discrete
Xylene - µg/L	200	With NOI	Discrete
pH – S.U.	6.5 – 9.0	With NOI	Discrete
Turbidity – NTU[2, 3]	Monitor & Report	With NOI	Discrete
Barium – mg/L	2.0	With NOI	Discrete
Fluoride – mg/L	Monitor & Report	With NOI	Discrete
Iron – mg/L	1.0	With NOI	Discrete
Sulfate – mg/L	Monitor & Report	With NOI	Discrete
Dissolved Oxygen	Monitor & Report	With NOI	Discrete
Molybdenum - mg/L	6.16	With NOI	Discrete
Antimony	Monitor & Report	With NOI	Discrete
Arsenic	Monitor & Report	With NOI	Discrete
Beryllium	Monitor & Report	With NOI	Discrete
Boron	Monitor & Report	With NOI	Discrete
Cadmium	Monitor & Report	With NOI	Discrete
Calcium	Monitor & Report	With NOI	Discrete
Copper	Monitor & Report	With NOI	Discrete
Lead	Monitor & Report	With NOI	Discrete
Magnesium	Monitor & Report	With NOI	Discrete
Manganese	Monitor & Report	With NOI	Discrete
Mercury	Monitor & Report	With NOI	Discrete
Nickel	Monitor & Report	With NOI	Discrete
Selenium	Monitor & Report	With NOI	Discrete
Silver	Monitor & Report	With NOI	Discrete
Sulfur	Monitor & Report	With NOI	Discrete
Thallium	Monitor & Report	With NOI	Discrete
Zinc - total recoverable	Monitor & Report	With NOI	Discrete
Fecal Coliform - MPN100 mL	Monitor & Report	With NOI	Discrete
E Coli[4] - MPN/100mL	Monitor & Report	With NOI	Discrete
Hardness (expressed as $CaCO_3$) - mg/L	Monitor & Report	With NOI	Discrete

1. Samples must be collected during the first hour of discharge. For discharges that extend beyond an hour in duration, a second sample shall be collected prior to end of discharge, or as specified by the division.
2. BMPs shall be implemented to minimize erosion and sediment.
3. During the discharge, if a visible turbidity plume is generated, a grab sample shall be obtained. Turbidity shall be less than or equal to 10 Nephelometric Turbidity Units (NTUs) over the background value of the receiving water.
4. Single Value.
5. EPA Method 8015B and EPA Method 8260B, extractable and purgeable, C6-C40. Summation must meet permit limit.

A.9.1.5 Category 5 - Utility vault water discharges: NOI Sampling Requirements

Parameters	Discharge Limit Daily Maximum	Measurement Frequency	Sample Type
Total Residual Chlorine[1] – mg/L	0.10	With NOI	Discrete
Total Dissolved Solids (TDS) – mg/L	Monitor & Report	With NOI	Discrete
Total Suspended Solids (TSS) – mg/L	Monitor & Report	With NOI	Discrete
Total Petroleum Hydrocarbon (TPH) (C6 – C40) – mg/L[5]	1.0	With NOI	Discrete
Methyl tert-Butyl Ether (MTBE) - µg/L	20.0	With NOI	Discrete
Total Nitrogen as N – mg/L	10.0	With NOI	Discrete
Total Phosphorus as P – mg/L	Monitor & Report	With NOI	Discrete
Trichloroethylene (TCE) - µg/L	5.0	With NOI	Discrete
Tetrachloroethylene (PCE) - µg/L	5.0	With NOI	Discrete

Benzene - µg/L	5.0	With NOI	Discrete
Ethyl benzene - µg/L	100	With NOI	Discrete
Toluene - µg/L	100	With NOI	Discrete
Xylene - µg/L	200	With NOI	Discrete
pH – S.U.	6.5 – 9.0	With NOI	Discrete
Turbidity – NTU[2, 3]	Monitor & Report	With NOI	Discrete
Barium – mg/L	2.0	With NOI	Discrete
Fluoride – mg/L	Monitor & Report	With NOI	Discrete
Iron – mg/L	1.0	With NOI	Discrete
Sulfate – mg/L	Monitor & Report	With NOI	Discrete
Dissolved Oxygen	Monitor & Report	With NOI	Discrete
Molybdenum - mg/L	6.16	With NOI	Discrete
Antimony	Monitor & Report	With NOI	Discrete
Arsenic	Monitor & Report	With NOI	Discrete
Beryllium	Monitor & Report	With NOI	Discrete
Boron	Monitor & Report	With NOI	Discrete
Cadmium	Monitor & Report	With NOI	Discrete
Calcium	Monitor & Report	With NOI	Discrete
Copper	Monitor & Report	With NOI	Discrete
Lead	Monitor & Report	With NOI	Discrete
Magnesium	Monitor & Report	With NOI	Discrete
Manganese	Monitor & Report	With NOI	Discrete
Mercury	Monitor & Report	With NOI	Discrete
Nickel	Monitor & Report	With NOI	Discrete
Selenium	Monitor & Report	With NOI	Discrete
Silver	Monitor & Report	With NOI	Discrete
Sulfur	Monitor & Report	With NOI	Discrete
Thallium	Monitor & Report	With NOI	Discrete
Zinc - total recoverable	Monitor & Report	With NOI	Discrete
Fecal Coliform - MPN100 mL	Monitor & Report	With NOI	Discrete
E Coli[4] - MPN/100mL	Monitor & Report	With NOI	Discrete
Hardness (expressed as $CaCO_3$) - mg/L	Monitor & Report	With NOI	Discrete

1. Samples must be collected during the first hour of discharge. For discharges that extend beyond an hour in duration, a second sample shall be collected prior to end of discharge, or as specified by the division.
2. BMPs shall be implemented to minimize erosion and sediment.
3. During the discharge, if a visible turbidity plume is generated, a grab sample shall be obtained. Turbidity shall be less than or equal to 10 Nephelometric Turbidity Units (NTUs) over the background value of the receiving water.
4. Single Value.
5. EPA Method 8015B and EPA Method 8260B, extractable and purgeable, C6-C40. Summation must meet permit limit.

A.10 DISCHARGE LIMITATIONS, MONITORING REQUIREMENTS AND CONDITIONS:

A.10.1 Samples taken in compliance with the monitoring requirements specified below shall be taken prior to discharge into the receiving water.

A.10.2 The discharge sample must be collected from an approved sampling location or taken from the end of the discharge pipe following the final treatment component of the system including BMPs.

A.10.3 During the period beginning on the effective date of this General Permit, and lasting until the General Permit expires, discharge activities shall be limited and, as applicable, monitored by the Permittee as specified by the tables in this section below.

A.10.3.1 Category 1 – Public Water System Emergency Discharges: Discharge Limitations, Monitoring Requirements and Conditions

A.10.3.1.1 For each Public Water System Emergency Discharge the permittee shall provide a Final narrative report that describes the location of the discharge;

A.10.3.1.2 The duration of the discharge;

A.10.3.1.3 Estimated Quantity of discharge;

A.10.3.1.4 A description of where the discharge entered the Municipal Storm Sewer System (MS4) and the associated receiving water;

A.10.3.1.5 A description of how the emergency event occurred;

A.10.3.1.6 A description of the corrective action to discontinue the discharge and the repair plan that was implemented;

A.10.3.1.7 Where applicable, a description of action taken to prevent a future discharge at the same location; and

A.10.3.1.8 A description of any environmental impacts that may have occurred as a result of the discharge.

A.10.3.2 Category 2 – Public Water System Supply discharges: Discharge Limitations, Monitoring Requirements and Conditions

Parameters	Discharge Limit Daily Maximum	Measurement Frequency[2]	Sample Type
Flow – gallons per minute (gpm)	1500	Continuous	Continuous
Total Residual Chlorine[1] - mg/L	0.10	Two/Discharge	Discrete
Total Dissolved Solids (TDS) - mg/L	Monitor & Report	Annual – 4th Qtr.	Discrete

1. Samples must be collected during the first hour of discharge. For discharges that extend beyond an hour in duration, a second sample shall be collected prior to end of discharge, or as specified by the division.
2. Test results to be submitted by **Jan 28th** of the calendar year.

A.10.3.3 Category 3 - Well testing and maintenance / aquifer testing / water quality testing: Discharge Limitations, Monitoring Requirements and Conditions

Parameters	Discharge Limit Daily Maximum	Measurement Frequency[2]	Sample Type
Flow – gallons per minute (gpm)	250	Continuous	Continuous
Total Residual Chlorine[1] - mg/L	0.10	Two/Discharge	Discrete
Total Dissolved Solids (TDS) - mg/L	Monitor & Report	Annual – 4th Qtr.	Discrete
Total Suspended Solids (TSS) - mg/L	Monitor & Report	Annual – 4th Qtr.	Discrete
Methyl tert-Butyl Ether (MTBE) - µg/L	20.0	Annual – 4th Qtr.	Discrete
Total Nitrogen as N - mg/L	10.0	Annual – 4th Qtr.	Discrete
Total Phosphorus as P	Monitor & Report	Annual – 4th Qtr.	Discrete
Trichloroethylene (TCE) - ug/L	5.0	Annual – 4th Qtr.	Discrete

Tetrachloroethylene (PCE) - ug/L	5.0	Annual – 4th Qtr.	Discrete
Benzene - ug/L	5.0	Annual – 4th Qtr.	Discrete
Ethyl benzene - ug/L	100.0	Annual – 4th Qtr.	Discrete
Toluene - ug/L	100.0	Annual – 4th Qtr.	Discrete
Xylene - ug/L	200.0	Annual – 4th Qtr.	Discrete
pH – SU	6.5 – 9.0	Annual – 4th Qtr.	Discrete
Total Petroleum Hydrocarbon (TPH) (C6 – C40) mg/L[3]	1.0	Annual – 4th Qtr.	Discrete

1. Samples must be collected during the first hour of discharge. For discharges that extend beyond an hour in duration, a second sample shall be collected prior to end of discharge, or as specified by the division.
2. Test results to be submitted by **Jan 28th** of the calendar year.
3. EPA Method 8015B and EPA Method 8260B, extractable and purgeable, C6-C40. Summation must meet permit limit.

A.10.3.4 Category 4 - Subsurface water discharges: Discharge Limitations, Monitoring Requirements and Conditions

Parameters	Discharge Limit - Daily Maximum	Measurement Frequency[5]	Sample Type
Flow – gallons per minute (gpm)	250	Continuous	Continuous
Total Residual Chlorine[1] - mg/L	0.10	Two/Discharge	Discrete
Total Dissolved Solids (TDS) - mg/L	Monitor & Report	Annual – 4th Qtr.	Discrete
Total Suspended Solids (TSS) - mg/L	Monitor & Report	Annual – 4th Qtr.	Discrete
Methyl tert-Butyl Ether (MTBE) - µg/L	20.0	Annual – 4th Qtr.	Discrete
Total Nitrogen as N - mg/L	10.0	Annual – 4th Qtr.	Discrete
Total Phosphorus as P	Monitor & Report	Annual – 4th Qtr.	Discrete
Trichloroethylene (TCE) - ug/L	5.0	Annual – 4th Qtr.	Discrete
Tetrachloroethylene (PCE) - ug/L	5.0	Annual – 4th Qtr.	Discrete
Benzene - ug/L	5.0	Annual – 4th Qtr.	Discrete
Ethyl benzene - ug/L	100.0	Annual – 4th Qtr.	Discrete
Toluene - ug/L	100.0	Annual – 4th Qtr.	Discrete
Xylene - ug/L	200.0	Annual – 4th Qtr.	Discrete
pH – SU	6.5 – 9.0	Annual – 4th Qtr.	Discrete
Total Petroleum Hydrocarbon (TPH) (C6 – C40) mg/L[6]	1.0	Annual – 4th Qtr.	Discrete
Barium – mg/L	2.0	Annual – 4th Qtr.	Discrete
Fluoride – mg/L	Monitor & Report	Annual – 4th Qtr.	Discrete
Iron – mg/L	1.0	Annual – 4th Qtr.	Discrete
Sulfate – mg/L	Monitor & Report	Annual – 4th Qtr.	Discrete
Molybdenum - mg/L	6.16	Annual – 4th Qtr.	Discrete
Turbidity – NTU[2, 3]	Monitor & Report	Annual – 4th Qtr.	Discrete
Fecal Coliform - MPN100 mL	Monitor & Report	Annual – 4th Qtr.	Discrete
E Coli[4] - MPN/100 mL	Monitor & Report	Annual – 4th Qtr.	Discrete
Dissolved Oxygen - mg/L	Monitor & Report	Annual – 4th Qtr.	Discrete

1. Samples must be collected during the first hour of discharge. For discharges that extend beyond an hour in duration, a second sample shall be collected prior to end of discharge, or as specified by the division.
2. BMPs shall be implemented to minimize erosion and sediment.
3. During the discharge, if a visible turbidity plume is generated, a grab sample shall be obtained. Turbidity shall be less than or equal to 10 Nephelometric Turbidity Units (NTUs) over the background value of the receiving water.
4. Single Value.
5. Test results to be submitted by **Jan 28th** of the calendar year.
6. EPA Method 8015B and EPA Method 8260B, extractable and purgeable, C6-C40. Summation must meet permit limit.

A.10.3.5 Category 5 - Utility vault water discharges: Discharge Limitations, Monitoring Requirements and Conditions

Parameters	Discharge Limit - Daily Maximum	Measurement Frequency[5]	Sample Type
Flow – gallons per minute (gpm)	250	Continuous	Continuous
Total Residual Chlorine[1] - mg/L	0.10	Two/Discharge	Discrete
Total Dissolved Solids (TDS) - mg/L	Monitor & Report	Annual – 4th Qtr.	Discrete
Total Suspended Solids (TSS) - mg/L	Monitor & Report	Annual – 4th Qtr.	Discrete
Methyl tert-Butyl Ether (MTBE) - µg/L	20.0	Annual – 4th Qtr.	Discrete
Total Nitrogen as N - mg/L	10.0	Annual – 4th Qtr.	Discrete
Total Phosphorus as P	Monitor & Report	Annual – 4th Qtr.	Discrete
Trichloroethylene (TCE) - ug/L	5.0	Annual – 4th Qtr.	Discrete
Tetrachloroethylene (PCE) - ug/L	5.0	Annual – 4th Qtr.	Discrete
Benzene - ug/L	5.0	Annual – 4th Qtr.	Discrete
Ethyl benzene - ug/L	100.0	Annual – 4th Qtr.	Discrete
Toluene - ug/L	100.0	Annual – 4th Qtr.	Discrete
Xylene - ug/L	200.0	Annual – 4th Qtr.	Discrete
pH - SU	6.5 – 9.0	Annual – 4th Qtr.	Discrete
Total Petroleum Hydrocarbon (TPH) (C6 – C40) mg/L[6]	1.0	Annual – 4th Qtr.	Discrete
Barium – mg/L	2.0	Annual – 4th Qtr.	Discrete
Fluoride – mg/L	Monitor & Report	Annual – 4th Qtr.	Discrete
Iron – mg/L	1.0	Annual – 4th Qtr.	Discrete
Sulfate – mg/L	Monitor & Report	Annual – 4th Qtr.	Discrete
Molybdenum - mg/L	6.16	Annual – 4th Qtr.	Discrete
Turbidity – NTU[2, 3]	Monitor & Report	Annual – 4th Qtr.	Discrete
Fecal Coliform - MPN100 mL	Monitor & Report	Annual – 4th Qtr.	Discrete
E Coli[4] - MPN/100 mL	Monitor & Report	Annual – 4th Qtr.	Discrete
Dissolved Oxygen - mg/L	Monitor & Report	Annual – 4th Qtr.	Discrete
Antimony	Monitor & Report	Annual – 4th Qtr.	Discrete
Arsenic	Monitor & Report	Annual – 4th Qtr.	Discrete
Beryllium	Monitor & Report	Annual – 4th Qtr.	Discrete
Boron	Monitor & Report	Annual – 4th Qtr.	Discrete
Cadmium	Monitor & Report	Annual – 4th Qtr.	Discrete
Calcium	Monitor & Report	Annual – 4th Qtr.	Discrete
Copper	Monitor & Report	Annual – 4th Qtr.	Discrete
Lead	Monitor & Report	Annual – 4th Qtr.	Discrete
Magnesium	Monitor & Report	Annual – 4th Qtr.	Discrete
Manganese	Monitor & Report	Annual – 4th Qtr.	Discrete
Mercury	Monitor & Report	Annual – 4th Qtr.	Discrete
Nickel	Monitor & Report	Annual – 4th Qtr.	Discrete
Selenium	Monitor & Report	Annual – 4th Qtr.	Discrete
Silver	Monitor & Report	Annual – 4th Qtr.	Discrete
Sulfur	Monitor & Report	Annual – 4th Qtr.	Discrete
Thallium	Monitor & Report	Annual – 4th Qtr.	Discrete
Zinc - total recoverable	Monitor & Report	Annual – 4th Qtr.	Discrete

1. Samples must be collected during the first hour of discharge. For discharges that extend beyond an hour in duration, a second sample shall be collected prior to end of discharge, or as specified by the division.
2. BMPs shall be implemented to minimize erosion and sediment.
3. During the discharge, if a visible turbidity plume is generated, a grab sample shall be obtained. Turbidity shall be less than or equal to 10 Nephelometric Turbidity Units (NTUs) over the background value of the receiving water.

4. Single Value.
5. Test results to be submitted by **Jan 28th** of the calendar year.
6. EPA Method 8015B and EPA Method 8260B, extractable and purgeable, C6-C40. Summation must meet permit limit.

A.11 MONITORING AND REPORTING:

A.11.1 Monitoring:

A.11.1.1 Representative Samples:

A.11.1.1.1 Samples and measurements taken as required herein shall be representative of the nature and volume of the monitored discharge. Analysis shall be performed by a State of Nevada certified laboratory. Results from this laboratory must accompany the Discharge Monitoring Report (DMR) Form; monitoring results shall be submitted to the address listed in I.D.9 within 30 days of the discharge, or as required.

A.11.1.1.2 Copies of sample and measurement results shall be maintained on site.

A.11.1.2 Recording the Results:

A.11.1.2.1 For each measurement or sample taken pursuant to the requirements of this General Uncontaminated Water Discharge Permit, the Permittee shall record the following information:

A.11.1.2.2 The exact place, date, and time of sampling;

A.11.1.2.3 The dates the analyses were performed;

A.11.1.2.4 The person(s) who performed the analyses;

A.11.1.2.5 The analytical techniques or methods used (list field testing equipment);

A.11.1.2.6 The results of all required analyses, including reporting limits.

A.11.1.3 Additional Monitoring by Permittee:

A.11.1.3.1 If the Permittee monitors any constituent at the location(s) designated herein more frequently than required by this general discharge permit, using approved analytical methods and laboratories as specified above, the results of that monitoring shall be included in the next annual or monitoring report submitted to the Division on the DMR form. Such increased frequency shall also be indicated on the DMR.

A.11.1.4 Annual Sampling:

A.11.1.4.1 Required sampling protocol is defined in Section C of the permit;

A.11.1.4.2 Discharge monitoring reports are due on January 28th (4th Quarter) of the calendar year as defined in Section A of the permit;

A.11.1.4.3 Additionally, the Permittee shall document and report inspection findings, update spill and unauthorized discharge information including clean up and preventive actions taken and report any modifications to the BMPs. The reports shall include all monitoring data collected, including data collected in accordance with Section C of this permit and a summary/ interpretation of that data;

A.11.1.4.4 The discharge shall not cause the following in the receiving water:

A.11.1.4.4.1 Concentrations of dissolved oxygen (DO) in the receiving water to fall below 7.0 mg/L. During any period when the receiving water DO concentration is already below 7.0 mg/L, the discharge shall not further diminish the DO content;

A.11.1.4.4.2 Alteration to the color, taste or odor beyond present natural ambient levels;

A.11.1.4.4.3 Turbidity in amounts which adversely affect beneficial uses in the receiving waters. Turbidity shall not increase more than 20 percent over background levels;

A.11.1.4.4.4 Significant erosion, sedimentation or alteration of the watercourse;

A.11.1.4.4.5 Biostimulatory substances to be present in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses;

A.11.1.4.4.6 The normal ambient receiving water to be altered more than 5° F (Fahrenheit), if a temperature standard is present;

A.11.1.4.4.7 Further degradation of any 303d listed receiving water for an established parameter.

A.11.2 Reporting:

A.11.2.1 Annual Reports:

A.11.2.1.1 Annual reports are required for NDEP approved discharge operations as defined in Section C of the permit.

A.11.2.1.2 Annual monitoring results obtained pursuant to Section A of the permit are due each January 28th (4th Quarter) of the current calendar year. Reports shall be summarized and reported on a Discharge Monitoring Report (DMR) form. The Permittee shall also submit the data in an electronic format provided by the Division addressed in Section C below.

A.11.2.1.3 Summaries of laboratory results for analyses conducted by outside laboratories must accompany the DMR, and the full data package provided by the laboratory must be provided if requested in writing by the Division. If at any time the Permittee concludes that submitted data were incorrect, the Permittee shall notify the Division in writing, identify the incorrect data, and replace the incorrect data with corrected data, which shall thereafter be used for determining compliance with this permit

A.11.2.2 Compliance Report:

A.11.2.2.1 Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date.

A.11.3 Other information:

A.11.3.1 Where the Permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Administrator, it shall promptly submit such facts or information.

A.12 ANNUAL FEE:

A.12.1 The Permittee shall remit an annual review and services fee in accordance with NAC 445A.268 on or before July 1st of every year that the Permittee is authorized to discharge under this General Permit.

SECTION B:

B.1 GENERAL PERMIT COVERAGE FOR ONGOING PROJECTS:

B.1.1 Current permits are valid until expiration date. To be covered by this permit, holders of an expired permit must submit a new NOI with the proper filing fee.

B.2 NARRATIVE STANDARDS:

B.2.1 Discharges shall not cause the following standards to be violated in any surface waters of the state. Waters must be free from:

B.2.1.1 Substances that will settle to form sludge or bottom deposits in amounts sufficient to be unsightly, putrescent or odorous;

B.2.1.2 Floating debris, oil, grease, scum, and other floating materials in amounts sufficient to be unsightly;

B.2.1.3 Materials in amounts sufficient to produce taste or odor in the water or detectable off-flavor in the flesh of fish or in amounts sufficient to change the existing color, turbidity or other conditions in the receiving stream to such a degree as to create a public nuisance;

B.2.1.4 High temperature, biocides, organisms pathogenic to human beings, toxic, corrosive or other deleterious substances at levels or combinations sufficient to be toxic to human, animal, plant or aquatic life;

B.2.1.5 Radioactive materials must not result in accumulations of radioactivity in plants or animals that result in a hazard to humans or harm to aquatic life;

B.2.1.6 Untreated or uncontrolled wastes or effluents that are reasonably amenable to treatment or control; and

B.2.1.7 Substances or conditions, which interfere with the beneficial use of the receiving waters.

B.2.2 The narrative standards are not considered violated when the natural conditions of the receiving water are outside the established limits, including periods of high or low flow. Where effluents are discharged to such waters, the discharges are not considered a contributor to substandard conditions provided maximum treatment in compliance with permit requirements is maintained.

B.2.3 There shall be no objectionable odors from the collection system, treatment facility or disposal area, or biosolids treatment, use, storage or disposal area that the Permittee owns or operates.

B.2.4 There shall be no discharge of substances that would cause a violation of water quality standards of the State of Nevada as defined by the permit.

B.2.5 The permit may be reopened, and additional limits imposed, if it is determined that the discharge is causing a violation of ambient water quality standards of the State of Nevada.

B.2.6 There shall be no discharge from the collection, treatment and disposal facilities except as authorized by this permit or in accordance with the Division's Spill Reporting Policy.

B.2.7 The treatment and disposal facility shall be fenced and posted.

B.2.8 There shall be no discharge of floating solids or visible foam in other than trace amounts.

B.3 BEST MANAGEMENT PRACTICES (BMP):

B.3.1 BMP's shall be implement and maintained to the Maximum Extent Practicable

B.3.2 Permittees shall implement BMPs prior to commencement of discharge.

B.3.3 A Permittee shall implement the BMP requirements to ensure compliance with the terms and conditions of this general permit.

B.3.4 The Permittee shall make all BMP records and plans available to the Division upon request.

B.3.5 All sediment control measures and other protective measures must be maintained in effective operating condition.

B.3.6 If existing BMPs need to be modified or additional BMPs are necessary, implementation must be completed as soon as possible.

B.3.7 All erosion and sediment control measures and other protective measures must be maintained in effective operating condition. If site inspections identify BMPs that are not operating effectively or if the capacity has been reduced by 50%, maintenance

shall be performed.

B.3.8 NDEP may require modifications to the site BMP's.

B.4 24 HOUR REPORTING:

B.4.1 The Permittee shall orally report any noncompliance or discharge which may seriously endanger human health or the environment as soon as possible, but no later than 24 hours from the time the Permittee becomes aware of the circumstances. The report shall be made to the Division at (888) 331-6337 during normal business hours. A written report shall also be submitted to the Division within ten days of the time the Permittee becomes aware of the circumstances. The written submission shall contain a description of the event, and its cause; the period of time over which it occurred, including exact dates and times, and if the situation has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence.

B.5 PHOTOGRAPHIC DOCUMENTATION:

B.5.1 Discharges conducted under the terms and conditions of this General Permit shall also be monitored by means of photographic documentation to verify performance of the water management BMPs and the discharge point BMPs. The photographs shall be submitted with a brief summary narrative report quarterly if conditions have changed. Photographs shall be taken from established photograph points, and shall depict representative views of the discharge activities on site, as well as the scope of operations with project sites, monitoring location(s), discharge point(s), and any relevant activity related to the discharge.

C SECTION C:

C.1 DEFINITIONS AND GENERAL REQUIREMENTS:

C.1.1 **Municipal Separate Storm Sewer Systems (MS4),** as defined in 40 CFR 122.26 (b) (8) http://edocket.access.gpo.gov/cfr_2002/julqtr/40cfr122.26.htm, is a conveyance or system of conveyances that is: Owned by a state, city, town, village, or other public entity that discharges to waters of the U.S.; Designed or used to collect or convey stormwater (including storm drains, pipes, ditches, etc.); Not a combined sewer; and Not part of a Publicly Owned Treatment Works (sewage treatment plant).

C.1.2 **Best Management Practices (BMPs**) means schedules of activities, prohibitions of practices, maintenance procedures and other management practices to prevent or reduce the pollution of Waters of the U.S. BMPs also include treatment requirements, operating procedures and practices to control site runoff, spillage, leaks, or other sources of pollution.

C.1.3 **DeMinimis discharge** means a discharge that is relatively pollutant free water which when discharged, in conjunction with appropriate BMPs that are used to reduce any and all pollutants to below the applicable limits set by this permit, has minimal or no

adverse impact to the environment or public health.

C.1.4 **Utility** means a system to provide for the distribution of water, natural gas, electricity, communications (including telephone, cellular telephone towers, and fiber optics), cable television and other such systems.

C.1.5 **Waters of the U. S**. is defined at 40 CFR §122.2, and includes but is not limited to lakes, reservoirs, ponds, rivers, streams (including intermittent and ephemeral streams), creeks, washes, draws, sloughs, playas and wetlands.

C.1.6 **303 (d) List - Nevada:** Criteria – Please see the following link: http://ndep.nv.gov/bwqp/file/303d_list09.pdf

C.1.7 **303 (d) List - Nevada:** Nevada's 303(d) List of Impaired Waters – Please see the following link: http://ndep.nv.gov/bwqp/file/303d_list09-att1.pdf

C.2 TEST PROCEDURES:

C.2.1 Test procedures for the analysis of pollutants shall conform to regulations (40 CFR, Part 136) published pursuant to Section 304(h) of the Act, under which such procedures may be required unless the Division approves other procedures. For the purpose of this permit, the Permittee may use alternate field test kits and instrumentation for field screening. Field testing is permitted, using suitable methods for flow, pH, total chlorine residual and temperature.

C.3 PLANNED CHANGES:

C.3.1 The Permittee shall give notice to the Administrator as soon as possible of any planned physical alterations or additions to the permitted facility.

C.3.2 Notice is required only when the alteration or addition to a permitted facility, may meet one of the criteria for determining whether a facility is a new source (40 CFR 122.29(b)), or could significantly change the nature or increase the quantity of pollutants discharged.

C.4 ANTICIPATED NON-COMPLIANCE:

C.4.1 The Permittee shall give advance notice to the Administrator of any planned changes in the permitted facility or activity, which may result in noncompliance with permit requirements.

C.4.2 Reports shall include a certification that the Permittee is in compliance with the permit, and identify any incidents of non-compliances; a narrative explanation must be attached to every non-compliance incident.

C.5 ADDRESS FOR SUBMITTAL:

C.5.1 All monitoring results and annual reports shall be submitted to the Division; an original signed copy of all reports required herein, shall be submitted to the Division at the following address:

Division of Environmental Protection
Bureau of Water Pollution Control
901 South Stewart Street, Suite 4001
Carson City, Nevada 89701
ATTN: Compliance Coordinator

C.6 CHANGE IN DISCHARGE:

C.6.1 All discharges authorized herein shall be consistent with the terms and conditions of this general permit. Any anticipated new discharges at the site related to the discharges as described in Section A which will result in new, different, or increased discharges of pollutants must be reported to the Division. Pursuant to NAC 445A.263, the General Permit may be modified to specify and limit any pollutants not previously limited.

C.7 OPERATION:

C.7.1 The Permittee shall at all times maintain in good working order and operate as efficiently as possible all equipment and ancillary BMPs used by the Permittee to achieve compliance with the terms and conditions of this general discharge permit.

C.8 ADVERSE IMPACT:

C.8.1 The Permittee shall take all reasonable steps to minimize any adverse impact to receiving waters resulting from noncompliance with this General Permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge. The Permittee shall carry out such measures, as reasonable, to prevent significant adverse impacts on human health or the environment.

C.9 REMOVED SUBSTANCES:

C.9.1 Solids removed during the control of discharged water shall be disposed of in a manner to prevent pollution from such materials from entering any surface or ground water.

C.10 MODIFICATION OF MONITORING FREQUENCY AND SAMPLE TYPE:

C.10.1 After considering monitoring data, discharge flow and receiving water conditions, the Division, may, for just cause, modify the monitoring frequency and/or sample type by issuing an order to the Permittee.

C.11 RECORDS RETENTION:

C.11.1 All records and information resulting from the monitoring activities required by this General Permit, including all records of analyses performed and calibration and maintenance of instrumentation and recordings from continuous monitoring instrumentation, shall be retained for a minimum of three (3) years after approval to discharge under this permit, or longer if required by the Administrator.

C.12 DETECTION LIMITS:

C.12.1 All laboratory analysis conducted in accordance with this discharge permit must meet the following criteria:

C.12.1.1 All methods used must be specified or approved in either 40 CFR 136, SW-846 or otherwise approved by the Division. All analytical results must be generated by analytical laboratories certified by the Nevada State laboratory certification program; and

C.12.1.2 Each parameter shall have detection at or below the permit limits or the Reported Detection Level as defined in the analytical method, whichever is lower.

C.13 RIGHT OF ENTRY:

C.13.1 The Permittee shall allow the Administrator and/or his authorized representatives, upon the presentation of credentials;

C.13.2 To enter upon the Permittee's premises (and other property) where a discharge occurs and/or in which any records are required to be kept under the terms and conditions of this General Permit;

C.13.3 At reasonable times, to have access to and copy any records required to be kept under the terms and conditions of this General Permit;

C.13.4 Inspect any monitoring equipment or monitoring method required in this General Permit; or,

C.13.5 Perform any necessary inspection and/or sampling to determine compliance with this General Dewatering Permit or to sample any discharge.

C.14 TRANSFER OF OWNERSHIP OR CONTROL:

C.14.1 In the event of any change in control or ownership from which the authorized discharge emanates, the Permittee shall notify the succeeding owner or controller of the existence of this General Permit, by letter, a copy of which shall be forwarded to the Administrator. The Division must approve ALL transfers of the permit.

C.15 AVAILABILITY OF REPORTS:

C.15.1 Except for data determined to be confidential under NRS 445A.665, all reports prepared in accordance with the terms of this General Permit shall be available for public inspection at the office of the Division. As required by the Clean Water Act and NRS, discharge data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in NRS 445A.710.

C.16 FURNISHING FALSE INFORMATION AND TAMPERING WITH MONITORING DEVICES:

C.16.1 Any person who knowingly makes any false statement, representation, or certification in any application, record, report, plan or other document filed or required to be maintained by the provisions of NRS 445A.300 to 445A.730, inclusive, or by any General Permit, rule, regulation or order issued pursuant thereto, or who falsifies, tampers with or knowingly renders inaccurate any monitoring device or method required to be maintained under the provisions of NRS 445A.300 to 445A.730, inclusive, or by any General Permit, rule, regulation or order issued pursuant thereto, is guilty of a gross misdemeanor and shall be punished by a fine of not more than $10,000 or by imprisonment. This penalty is in addition to any other penalties, civil or criminal, provided pursuant to NRS 445A.300 to 445A.730 inclusive.

C.17 PENALTY FOR VIOLATION OF PERMIT CONDITIONS:

C.17.1 NRS 445A.675 provides that any person who violates a General Permit condition is subject to administrative and judicial sanctions as outlined in NRS 445A.690 through 445A.705.

C.18 PERMIT MODIFICATION, SUSPENSION OR REVOCATION:

C.18.1 After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to, the following:

C.18.1.1 Violation of any terms or conditions of this permit;

C.18.1.2 Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts;

C.18.1.3 A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge;

C.18.1.4 A determination that the permitted activity endangers human health or the environment and can only be regulated to acceptable levels by permit modification or termination;

C.18.1.5 There are material and substantial alterations or additions to the permitted facility or activity;

C.18.1.6 The Administrator has received new information;

C.18.1.7 The standards or regulations have changed; or

C.18.1.8 The Administrator has received notification that the permit will be transferred.

C.19 LIABILITY:

C.19.1 Nothing in this General Permit shall be construed to preclude the institution of any legal action or relieve the Permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable Federal, State or local laws, regulations, or ordinances.

C.20 PROPERTY RIGHTS:

C.20.1 The issuance of this General Permit does not convey any property rights, in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State or local laws, regulations or ordinances.

C.21 SEVERABILITY:

C.21.1 The provisions of this General Permit are severable, and if any provision of this Permit, or the application of any provisions of this Permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this Permit, shall not be affected thereby.

C.22 SIGNATURES, CERTIFICATION REQUIRED ON APPLICATION AND REPORTING FORMS:

C.22.1 All applications, reports, or information submitted to the Administrator shall be signed and certified by making the following certification.

"I hereby certify that I am familiar with the information contained in the application and that to the best of my knowledge and ability such information is true, complete, and accurate."

C.22.2 All applications, reports or other information submitted to the Administrator shall be signed by one of the following:

C.22.2.1 A principal executive officer of the corporation (of at least the level of vice president) or his authorized representative who is responsible for the overall operation of the facility from which the discharge described in the application or reporting form originates;

C.22.2.2 A general partner of the partnership;

C.22.2.3 The proprietor of the sole proprietorship; or

C.22.2.4 A principal executive officer, ranking elected official or other authorized employee of the municipal, state or other public facility.

C.23 CHANGES TO AUTHORIZATION:

C.23.1 If an authorization under Section C (Signatures, Certification Required on Application and Reporting Forms) is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Section C (Signatures, Certification Required on Application and Reporting Forms) must be submitted to the Administrator prior to or together with any reports, information, or applications to be signed by an authorized representative.

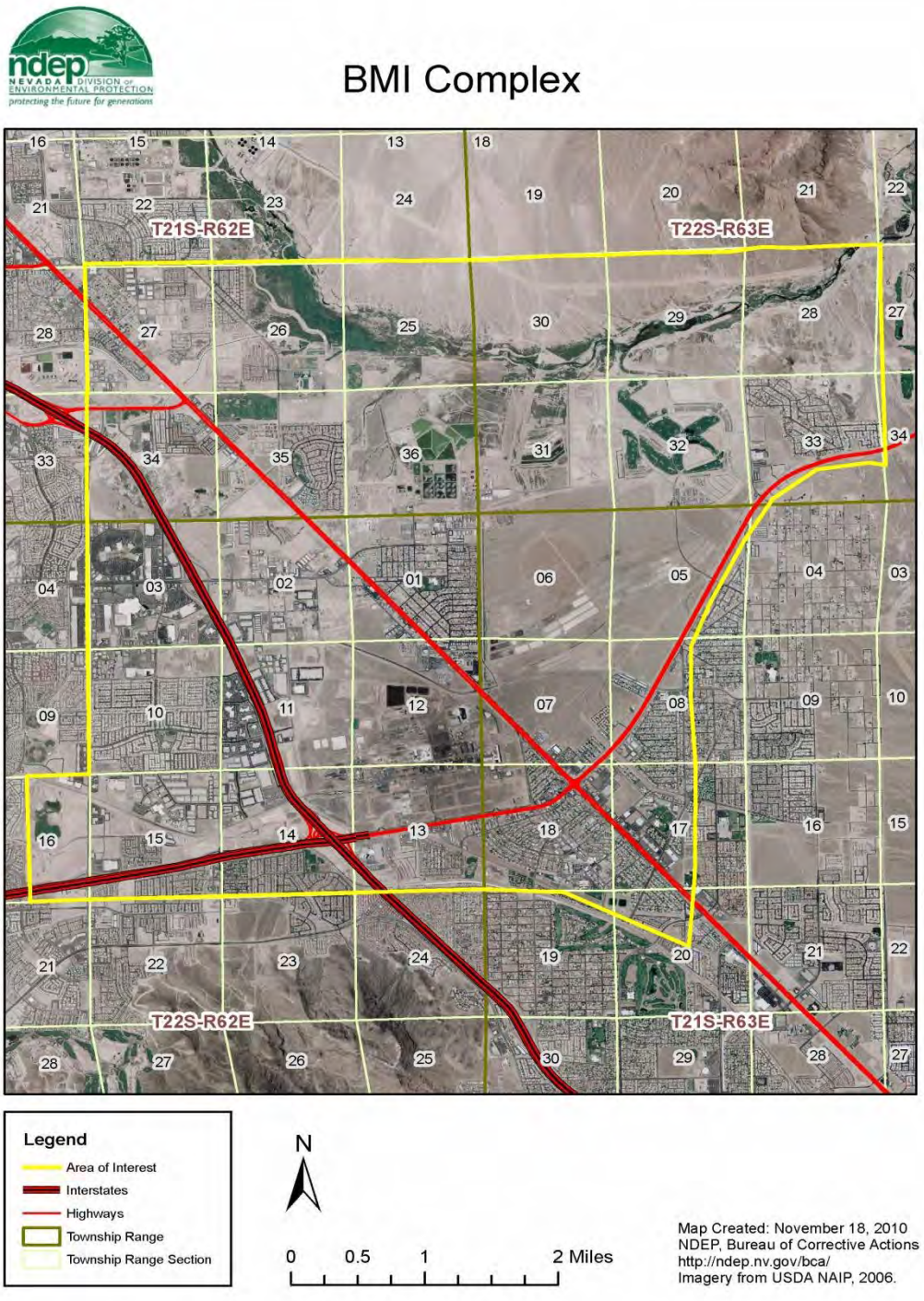
C.24 REAPPLICATION:

C.24.1 If the Permittee desires to continue to discharge, he shall reapply not later than 180 days before this permit expires on the application forms then in use. The renewal application shall be accompanied by the fee required by NAC 445A.268.

C.25 DUTY TO PROVIDE INFORMATION:

C.25.1 The Permittee shall furnish to the Administrator, within a reasonable time, any relevant information which the Administrator may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The Permittee shall also furnish to the Administrator, upon request, copies of records required to be kept by this permit.

Attachment I



APPENDIX F

Human Health Risk Assessment

SCREENING LEVEL HUMAN HEALTH RISK ASSESSMENT FOR RESIDENTIAL INDOOR AIR

MARYLAND SQUARE TETRACHLOROETHENE (PCE) SITE

3661 SOUTH MARYLAND PARKWAY
LAS VEGAS, NEVADA

SUBMITTED TO
NEVADA DIVISION OF ENVIRONMENTAL PROTECTION
BUREAU OF CORRECTIVE ACTIONS
901 SOUTH STEWART STREET, SUITE 4001
CARSON CITY, NEVADA 89701-5249

PREPARED FOR
HERMAN KISHNER TRUST
C/O MR. TOM VANDENBERG, ESQ.
707 WILSHIRE BOULEVARD, 45TH FLOOR
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PREPARED BY

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1230 Columbia Street, Suite 1000
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August 12, 2013

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Acronyms and Abbreviations

µg/L	Micrograms per liter
µg/ m^3	Micrograms per cubic meter
mg/m^3	Milligrams per cubic meter
APTC	Al Phillips the Cleaners
ATSDR	Agency for Toxic Substances and Disease Registry
Broadbent	Broadbent & Associates, Inc.
COPC	Contaminant of potential concern
CSM	Conceptual Site Model
DCE	Dichloroethene
EPA	United States Environmental Protection Agency
EPC	Exposure Point Concentration
HHRA	Human Health Risk Assessment
HI	Hazard Index
HQ	Hazard Quotient
ID	Identification
IRIS	Integrated Risk Information System
IUR	Inhalation Unit Risk
LOAEL	Lowest Observed Adverse Effects Level
MSSC	Maryland Square Shopping Center
NDEP	Nevada Division of Environmental Protection
NOAEL	No Observed Adverse Effects Level
OERR	Office of Emergency and Remedial Response
OSWER	Office of Solid Waste and Emergency Response
PCE	Tetrachloroethene (or perchloroethene)
RAGS	*Risk Assessment Guidance for Superfund*
RBC	Risk-based concentration
RfC	Reference Concentration
RME	Reasonable Maximum Exposure
RSL	Regional Screening Level
SLHHRA	Screening Level Human Health Risk Assessment
SSD	Sub-slab depressurization
TCE	Trichloroethene
Tetra Tech	Tetra Tech EM Inc.
U.S.	United States
VI	Vapor intrusion
VOC	Volatile organic compound

1 INTRODUCTION

The Maryland Square Tetrachloroethene (PCE) Site is east of downtown Las Vegas, Nevada. Shallow groundwater at the Site contains a PCE plume that extends from the location of the former Al Phillips the Cleaners (APTC), in the former Maryland Square Shopping Center (Figure 1), to approximately 6,000 feet east (downgradient), just east of Eastern Avenue (Figure 2). This plume of PCE-contaminated groundwater extends beneath the Paradise Palms residential neighborhood, more than 1,000 feet downgradient from the source area (Figure 2).

PCE is a commercially available solvent/degreaser commonly used by dry cleaners to clean clothes. It is a colorless, nonflammable liquid that does not occur naturally. Historical discharge of PCE at the former dry cleaners was discovered during a due diligence environmental site assessment that was part of a real estate transaction, and was reported on November 29, 2000, via the NDEP spill reporting hotline (NDEP 2012). The date(s) of release of PCE at the former dry cleaners is unknown; release could have occurred anytime during operation of the dry cleaners. The former dry-cleaning business operated from 1969 to 2000.

A series of environmental investigations occurred at the property and off site in downgradient areas from 2000 to 2008. On-site investigations of soil and groundwater beneath the property delineated the extent of PCE-contaminated soil and established the boundary of the contaminated groundwater on and immediately adjacent to the property. Groundwater investigations also occurred off the property to delineate the approximate extent of PCE contamination in the shallow groundwater. A soil-gas study was performed in 2007 to assess whether PCE vapors emanating from contaminated groundwater were present in the subsurface environment.

In July 2005, the PCE plume was reported to extend into the residential neighborhood east of the Boulevard Mall. Additional wells installed in 2006 confirmed presence of PCE at concentrations as high as 2,500 micrograms per liter (µg/L) in portions of the plume underlying the neighborhood. In 2007, NDEP conducted vapor intrusion modeling using U.S. Environmental Protection Agency's (EPA) version of the Johnson-Ettinger model (EPA 2004) and the groundwater data. This modeling indicated potential for intrusion of PCE vapors into overlying houses at concentrations posing greater than a 1 in 1,000 risk level.

Based on results of the vapor intrusion modeling using groundwater data, NDEP directed the responsible party to conduct soil gas sampling to evaluate presence and distribution of PCE vapors in soils overlying the contaminated groundwater plume. Soil gas investigations focused on the known extent of the PCE plume on the east side of the Boulevard Mall and in the neighborhood east of the mall. Data from this soil gas study were used as input for EPA's version of the Johnson-Ettinger model for vapor intrusion (EPA 2004). Results of the modeling indicated potential for unacceptable levels of vapor intrusion into houses overlying the PCE plume. In late August, 2007, NDEP mailed informational packages to more than 140 houses within the residential neighborhood east of the Boulevard Mall. These packages included an offer to sample indoor air within each house in the neighborhood. Most homeowners accepted

the offer, and NDEP eventually sampled 97 houses and two schools between fall 2007 and winter 2007-2008.

Indoor air in 15 of the 97 houses sampled in 2007-2008 had PCE concentrations greater than the NDEP interim-action level of 32 micrograms per cubic meter (µg/m^3) (Broadbent 2010). NDEP offered to install sub-slab depressurization (SSD) systems in all 15 houses; however, one of the homeowners declined the offer. Therefore, in 2008, SSD systems were installed at 14 houses. After SSD system installation, indoor air in the houses was retested to ensure that the PCE concentrations in indoor air were less than the NDEP's interim-action level. If PCE concentrations in indoor air remained above the interim-action level, performance testing was conducted and the SSD system was modified. Subsequent sampling confirmed that all houses with SSD systems exhibited PCE concentrations less than 32 µg/m^3 in indoor air (Broadbent 2010).

On December 27, 2010, the U.S. District Court, District of Nevada, issued a Permanent Injunction requiring, among other matters, that annual indoor air sampling be offered to homeowners with property overlying groundwater containing PCE at concentrations of 100 µg/L or greater (U.S. District Court 2010). Houses that are found to have PCE in indoor at concentrations exceeding the NDEP interim-action level of 32 µg/m^3 are offered mitigation systems to decrease PCE concentrations in indoor air below the interim-action level.

In compliance with the Permanent Injunction, the Herman Kishner Trust (the Trust), which has undertaken the investigation and remediation of the Site, contracted with Tetra Tech EM, Inc. (Tetra Tech) to conduct the indoor air sampling. Tetra Tech prepared the *Work Plan for Mitigation of Indoor Air and Well Water* (Tetra Tech 2011a) and the *Addendum to the Work Plan for Mitigation of Indoor Air and Well Water* (Tetra Tech 2011b), which were approved by NDEP on August 23, 2011. Indoor air sampling was conducted in February and April 2012 (Tetra Tech 2012). This report documents provides the screening level human health risk assessment (SLHHRA) based on the data for samples of indoor air that were collected from residences in 2007-2008 and 2012.

2 SCREENING LEVEL HUMAN HEALTH RISK ASSESSMENT

The primary objective of the SLHHRA is to determine whether site contaminants pose a current or potential risk to human health in the absence of remediation. The SLHHRA helps to evaluate whether further remediation is necessary at the site.

Tetra Tech conducted the SLHHRA for the Maryland Square PCE Site consistent with EPA and state guidance. The primary guidance documents used in preparing the SLHHRA are listed below. This list is not comprehensive, as other EPA and state guidance documents, as well as documents prepared by other organizations, were used as appropriate.

1. *Risk Assessment Guidance for Superfund* (RAGS), *Volume 1: Human Health Evaluation Manual (Part A)* (EPA 1989).
2. RAGS, *Volume I: Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors* (EPA 1991a).
3. *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)* (EPA 2002).
4. *Human Health Toxicity Values in Superfund Risk Assessments* (EPA 2003).
5. RAGS, *Volume 1: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment)* (EPA 2009).

As described in RAGS, the risk assessment proceeded in four basic steps: (1) data evaluation and identification of contaminants of potential concern (COPC), (2) exposure assessment, (3) toxicity assessment, and (4) risk and hazard characterization. In addition, the SLHHRA included a discussion and evaluation of significant sources of uncertainties in the risk assessment process as applied at the Maryland Square PCE Site.

2.1 DATA EVALUATION AND IDENTIFICATION OF COPCs

The SLHHRA is based on the data from indoor air samples collected at houses within the Paradise Palms neighborhood. All chemicals detected in the samples were selected as COPCs.

2.1.1 Data from Samples of Indoor Air

Data from samples of indoor air were available from two separate sampling and analysis efforts at the site:

- 2007-2008 Sampling by Broadbent (Broadbent 2010) on behalf of NDEP
- 2012 Sampling by Tetra Tech (Tetra Tech 2012) on behalf of the Trust.

Results from the indoor air sampling are listed in Table 1.

2007-2008 Indoor Air Sampling

In 2007, NDEP offered indoor air sampling to more than 140 homeowners within the Paradise Palms neighborhood. Most homeowners accepted the offer, and NDEP eventually sampled 97 houses and two schools between fall 2007 and winter 2007-2008.

Of the 97 houses sampled, PCE was:

- Not detected in 55 houses or at either school
- Detected at concentrations below the interim-action level in samples from 27 of the houses
- Detected at concentrations above the interim action level in 15 houses.

NDEP offered to install SSD systems in all 15 houses with PCE concentrations exceeding the interim-action level of 32 µg/m^3. One of the owners declined the offer, and SSD systems were installed at 14 of the 15 houses.

2012 Indoor Air Sampling

Houses were selected for indoor air sampling during February and April 2012 by overlaying the January 2012 groundwater contour map on the Clark County Assessor's Parcel Number maps for the Paradise Palms neighborhood, and identifying parcels that lay within (or partially within) the 100 µg/L contour of the groundwater plume (vapor intrusion [VI] area of concern). Figure 3 (redacted for confidentiality) shows the 100 µg/L groundwater PCE contour on a map with the parcels. Indoor air sampling was offered to any homeowner whose property lay partially or wholly within the 100 µg/L contour.

Of the 103 homeowners sent a notification package, 41 homeowners responded and 32 houses were sampled. Tetra Tech conducted the indoor air sampling in accordance with the *Work Plan for Mitigation of Indoor Air and Well Water* (Tetra Tech 2011a) and the Addendum to the Work Plan for Mitigation of Indoor Air and Well Water (Tetra Tech 2011b). NDEP oversaw the in-home surveys and indoor air sampling. Results of the indoor air sampling are presented in the Indoor Air Sampling Report (Tetra Tech 2012).

Indoor air sampling began with an in-home survey followed by indoor sampling within 1 week. The in-home surveys involved completing a questionnaire with the occupant and conducting a walkthrough of the house prior to sampling to assess any potential sources of volatile organic compounds (VOC). If a potential source was identified, the occupant was asked to remove it from the house 24 hours prior to sampling. If no potential sources of chlorinated solvents were observed during the in-home surveys, Tetra Tech collected a time-integrated sample of indoor air over a 24-hour sampling period. In addition, during each 24-hour sampling period, an outdoor background sample was collected to monitor for any possible VOCs present in the atmosphere. The samples were analyzed for PCE, trichloroethene (TCE), *cis*-1,2-dichloroethene (DCE), *trans*-1,2-DCE, and vinyl chloride. For quality control purposes, duplicate samples were

collected at a rate over 10 percent. The higher of the two duplicate sample results for properties with duplicate samples was used in the SLHHRA.

Of the 32 houses sampled in 2012, PCE was:

- Not detected in one house
- Detected at concentrations below the interim-action level in samples from 28 of the houses (1 of which has an SSD system)
- Detected at concentrations above the interim action level in three houses. (All three owners have agreed to SSD system installation, completion of which is anticipated in mid-2013.)

Trace concentrations of TCE were detected in two houses, and a trace concentration of vinyl chloride was detected in one house. *Cis*-1,2-DCE and *trans*-1,2-DCE were not detected in any of the indoor air samples. A summary of the sample results is in Table 1.

The indoor air concentration in each house is based on a unique set of circumstances for each house related subsurface conditions and building construction. Thus, each house with indoor air sampling results was evaluated as an exposure unit. All properties were evaluated and sorted into one of eight different groups depending on property location, availability of indoor air sample data, and resulting analytical data (see Table 2).

- Group 1 – Seventeen properties have had or will have SSD systems installed. These properties were not evaluated further in the SLHHRA because vapor intrusion to indoor air has been mitigated for these houses. Monitoring of indoor air concentrations will continue in these houses to ensure the mitigation remains successful.
- Group 2 – Thirty-two properties outside the defined 100 µg/L contour for PCE in groundwater were sampled in 2007-2008. PCE was not detected in the property-specific indoor air samples in these 32 houses. These properties–all outside the VI area of concern–were not considered further in the SLHHRA.
- Group 3 – Eleven properties inside the defined 100 µg/L contour for PCE sampled in 2007-2008 had no PCE detected in the property-specific indoor air samples. These properties were eligible for sampling during 2012, but samples were not collected because the homeowners chose not to participate (indoor air sampling was voluntary). These properties were not evaluated further in the SLHHRA because all samples associated with these properties do not have detected concentrations of PCE or other VOCs. These houses are eligible for future sampling. If future sampling occurs, the results will be evaluated and included in future risk assessments.
- Group 4 – Three properties outside the defined 100 µg/L contour for PCE sampled in 2007-2008 had PCE detections in the property-specific indoor air samples. These properties were not sampled during 2012. These properties were evaluated quantitatively in the SLHHRA using the results from the 2007-2008 sampling.
- Group 5 – Twenty properties inside the defined 100 µg/L contour for PCE were sampled during 2007-2008 and 2012. These properties were evaluated quantitatively in the SLHHRA. The higher of the detected concentrations was used to estimate potential risks from indoor air at the site.

- Group 6 – Fourteen properties inside the defined 100 µg/L contour for PCE sampled during 2007-2008 had detectable concentrations of PCE in the property-specific indoor air samples. These properties were not sampled during 2012. These properties were evaluated quantitatively in the SLHHRA using the data from the samples collected in 2007-2008.
- Groups 7 – Eight properties inside the defined 100 µg/L contour for PCE were only sampled in 2012. Detectable concentrations of PCE were found in the property-specific indoor air samples. These properties were evaluated quantitatively in the SLHHRA using the 2012 sampling results.
- Group 8 – Thirty-three properties inside the defined 100 µg/L contour for PCE had no indoor air sampling results because the homeowners chose not to participate (indoor air sampling is voluntary). Potential risks from inhalation of indoor air at these properties were evaluated qualitatively. These houses are eligible for future sampling. If future sampling occurs, the results will be evaluated and included in future risk assessments.

2.1.2 Identification of COPCs

The COPCs for the Maryland Square PCE Site are all chemicals detected in indoor air samples from the houses. Thus, the COPCs evaluated in this SLHHRA are PCE, TCE, and vinyl chloride.

PCE has been used commercially in the United States since the mid-1930s in dry cleaning, textile processing, and metal-cleaning operations. Of these industries, dry cleaners are the single largest users of PCE and widely continue to use the solvent due to its low flammability hazard and ability to dissolve greases, oils, and waxes without damaging fabric quality. Unfortunately, PCE does not degrade quickly in the environment and may remain in high concentrations in the subsurface for decades following a spill. TCE is a breakdown product of PCE. Vinyl chloride is a breakdown product of PCE and TCE.

2.2 EXPOSURE ASSESSMENT

An exposure assessment evaluates the type and magnitude of exposures to a human receptor from COPCs at a site. The exposure setting consists of the physical setting (including natural and man-made features), land uses, and populations living near the site. This information forms the foundation for selecting potential receptors, exposure pathways, and exposure parameters. Each house with detected indoor air sampling results was evaluated as an exposure unit.

An exposure assessment is a multistage process. First, the receptors or individuals at risk are identified. Then, the complete exposure pathways by which these receptors are likely to be exposed are identified. The final step is to quantify the chemical concentrations to which the receptors might be exposed and the intake of COPCs associated with each pathway of exposure.

The following sections identify the potential receptors and exposure pathways evaluated in the SLHHRA. The final step of the exposure assessment, quantification of COPC intake by exposure pathway, was not used in the SLHHRA because the SLHHRA used risk-based screening concentrations and a ratiometric approach to estimate risks (see Section 2.4).

2.2.1 Potential Receptors

The source area for the Maryland Square PCE plume is within a commercial area; however, the PCE-contaminated groundwater extends beneath both commercial and residential areas. Only the residential area overlying the plume of contaminated groundwater was evaluated in this SLHHRA. Thus, the SLHHRA evaluated risks for the residential receptor. These evaluated risks are not applicable to commercial or industrial receptors in other areas of the Site. Generally, risks to commercial or industrial workers are estimated to be lower than risks to residential populations because exposure times are less.

2.2.2 Exposure Pathway Identification

Exposure pathways considered in the SLHHRA are identified through a human health conceptual site model (CSM). The CSM links potential or actual contaminant releases to potential human exposures. Specifically, the CSM identifies (1) potential contaminant sources and mechanisms of release, (2) potential receptors and exposure pathways, and (3) exposure scenarios. Figure 4 shows the human health CSM for the Maryland Square PCE site evaluated in this SLHHRA.

Consistent with RAGS (EPA 1989), the SLHHRA for the Maryland Square PCE Site considered only complete (or potentially complete) exposure pathways. As described in RAGS, an exposure pathway generally consists of four elements: (1) a source and mechanism of chemical release, (2) a retention or transport medium (or media in cases involving media transfer of chemicals), (3) a point of potential human contact with the contaminated medium, and (4) an exposure route (for example, inhalation). A well survey was completed as part of the *Underground Injection Control Permit Application - Form U210* completed as part of the groundwater remediation pilot study (NDEP 2013). The well survey did not locate any domestic water wells in the Paradise Palms neighborhood evaluated in this SLHHRA. Thus, as shown on Figure 4, the only complete exposure pathway expected at residences is inhalation of VOCs entering buildings through vapor intrusion.

In soil and groundwater, PCE (and breakdown products) can move away from contamination sources via migration through spaces between soil particles or through preferential pathways such as utility lines, and reach overlying buildings due to concentration and pressure differences. Soil vapor enters buildings through cracks in slabs or basement floors and walls, and through openings around sump pumps or where pipes and electrical wires go through the foundation. Heating, ventilation, or air-conditioning systems may create a negative pressure within the building that can draw soil vapor into the building. Upon entry of the vapor into the structure, the contaminated gas spreads out in the indoor air and results in potential human exposure to PCE throughout the structure, not just at the level or location of vapor entry. Ventilation of buildings further reduces the concentration in the air. Figure 5 presents a schematic of the vapor intrusion process.

2.3 TOXICITY ASSESSMENT

The toxicity assessment identifies the toxicity factors used to quantify potential adverse effects including both carcinogenic and non-carcinogenic effects on human health associated with potential exposure to site-specific COPCs. The COPC-specific toxicity factors are from EPA's Integrated Risk Information System (IRIS) (EPA 2013). The toxicity and other chemical-specific values used in this SLHHRA are listed in Table 3.

2.3.1 Carcinogenic Toxicity Factors

EPA has labeled PCE as "likely to be carcinogenic in humans by all routes of exposure" (EPA 2013). Carcinogenic toxicity factors known as inhalation unit risk factors (IUR) are used to assess inhalation cancer risk. An IUR is the upper-bound excess lifetime cancer risk estimated to result from continuous exposure to a chemical at a concentration of 1 µg/m^3 in air. Long-term inhalation of PCE poses an increased lifetime risk of developing certain cancers. Cancers associated with exposures include cancers of the esophagus, bladder, and non-Hodgkin's lymphoma. Cancers less clearly associated with exposures include cancers of the cervix, tongue, and lung (EPA 2013).

Following EPA (2005) *Guidelines for Carcinogen Risk Assessment*, TCE is characterized as "carcinogenic to humans" by all routes of exposure. This conclusion is based on convincing evidence of a causal association between TCE exposure in humans and kidney cancer. The human evidence of carcinogenicity from studies of TCE exposure is also strong for non-Hodgkin's lymphoma, as well as liver and biliary tract cancer. The available studies also provide more limited evidence of an association between TCE exposure and other types of cancer, including bladder, esophageal, prostate, cervical, breast, and childhood leukemia.

Carcinogenicity of vinyl chloride in humans has been demonstrated in a number of studies and case reports. In addition to liver cancer, exposure to vinyl chloride also has been linked to an increased risk of lung, brain, hematopoietic, and digestive tract cancers (EPA 2013).

2.3.2 Non-carcinogenic Toxicity Factors

Chronic non-carcinogenic toxicity factors known as inhalation reference concentrations (RfC) are used to assess noncancer hazards. An RfC is an estimate (with uncertainty spanning perhaps an order of magnitude) of a continuous inhalation exposure of a chemical to the human population through inhalation (including sensitive subpopulations) likely to be without risk of deleterious noncancer effects during a lifetime.

Human health effects resulting from inhalation of PCE-contaminated air depend on the concentration of the contaminant in indoor air, and the length and frequency of exposure. Short-term (acute) inhalation exposures to very high concentrations of PCE vapors can cause dizziness, headache, noise and throat irritation, sleepiness, changes in behavior, and nausea. Concentrations of this magnitude (1,500 µg/m^3) are typically limited to occupational exposures in poorly ventilated work areas. Exposures greater than 1,500 µg/m^3 have been associated with reduced scores on color vision tests, and liver and kidney damage among workers at dry

cleaners following occupational exposure. Long-term exposures (greater than 14 days) at concentrations higher than 150 µg/m^3 have been associated with reduced scores on tests for visual perception, reaction time, and attention (EPA 2013).

The main noncancer health effects of concern with TCE are effects on the liver and the central nervous system. Human and animal data indicate that exposure to TCE can also result in toxic effects on a number of other organs and systems, including the kidneys, blood, skin, immune system, reproductive system, and cardiovascular system (EPA 2013).

Vinyl chloride is a central nervous system depressant. Longer-term toxic effects observed in people exposed by inhalation to vinyl chloride include liver toxicity, nerve damage, immune reactions, and, at high levels of exposure, a vascular disorder of the extremities (ATSDR 2006).

2.4 RISK CHARACTERIZATION

Risk characterization calculates an estimate of the cancer risks and noncancer hazards. The risk characterization combines the exposure estimates calculated in the exposure assessment with the toxicity factors for each receptor, COPC, and exposure pathway. Cancer risks and noncancer hazards are calculated following methods described in RAGS (EPA 1989) and summarized below.

Screening-level cancer risks and noncancer hazards from exposure to COPCs in indoor air were estimated using risk-based concentrations (RBC) and the ratiometric (also known as "risk ratio") procedure. Each house with detected indoor air sampling results was evaluated as an exposure unit. Maximum detected concentrations in indoor air at each house were used as exposure point concentrations (EPC), and EPA indoor air RSLs (EPA 2012) were used as RBCs. The maximum detected concentration of each COPC was used as the EPC for houses without indoor air data.

RSLs are health-based concentrations of individual chemicals that correspond to a cancer risk of 1 in 1 million (1E-06) for carcinogens or a hazard quotient (HQ) of 1 for noncarcinogens. RSLs for residential air were used to estimate health risks for exposure to groundwater contamination through VI to indoor air.

Generic RSLs are based on default exposure parameters and factors that represent Reasonable Maximum Exposure (RME) conditions for long-term/chronic exposures, and are based on the methods outlined in RAGS, Supplemental Guidance (EPA 1991a). Table 4 presents the default exposure parameters used in the RSLs.

Exposure time – The time span of building occupancy was assumed to be 24 hours per day for each house, consistent with EPA (2012) default exposure duration for residential exposure.

Exposure frequency – An exposure frequency of 350 days per year (7 days per week times 50 weeks per year) was assumed for each house, consistent with EPA (2012) default exposure duration for residential exposure.

Exposure duration – An exposure duration of 30 years was assumed consistent with EPA (2012) default exposure duration for residential exposure.

Averaging time – The averaging time for estimating cancer risk is the number of hours in a 70-year lifetime (that is, 25,500 days), as recommended by EPA (1989, 2012). The averaging time for addressing noncancer health effects for residents is equal to the exposure duration (in years) times 365 days per year (that is, 10,950 days), as recommended by EPA (1989, 2012).

2.4.1 Cancer RSL Calculation

The RSL for inhalation cancer risk is calculated using the following equation:

$$RSL_c(inhalation) = \frac{TR \times AT_c}{EF \times ED \times ET \times IUR \times CF}$$

where:

RSL_c	=	Cancer-based RSL in µg/m^3 for indoor air
TR	=	Target Cancer Rate (unitless)
AT_c	=	Averaging Time for carcinogenic risk (days)
EF	=	Exposure Frequency (days/year)
ED	=	Exposure Duration (years)
ET	=	Exposure Time (hours/day)
IUR	=	Inhalation Unit Risk, chemical-specific (µg/m^3)$^{-1}$
CF	=	Conversion Factor (1 day/24 hours)

2.4.2 Noncancer RSL Calculation

The RSL for inhalation noncancer hazard is calculated using the following equation:

$$RSL_{nc}(inhalation) = \frac{THQ \times AT_{nc} \times CF_1}{EF \times ED \times ET \times 1/RfC \times CF_2}$$

where:

RSL_{nc}	=	Noncancer-based RSL in µg/m^3 for indoor air
THQ	=	Target Hazard Quotient (unitless)
AT_{nc}	=	Averaging Time for noncarcinogenic hazard (days)
EF	=	Exposure Frequency (days/year)
ED	=	Exposure Duration (years)
ET	=	Exposure Time (hours/day)
RfC	=	Reference Concentration, chemical-specific (milligrams per cubic meter [mg/m^3])
CF_1	=	Conversion Factor (1,000 µg/mg)
CF_2	=	Conversion Factor (1 day/24 hours)

2.4.3 Ratiometric Method for Estimating Cancer Risks

The cancer risk associated with exposure to a single COPC was estimated by comparing the maximum concentration with the cancer RSL using the following equation:

$$Cancer\ Risk_n = (EPC_n/RSL_{c,n}) \times 1E\text{-}06$$

where:

Cancer $risk_n$	=	Cancer risk associated with exposure to a single chemical (unitless)
EPC	=	Exposure Point (maximum) Concentration for indoor air (µg/m^3)
RSL_c	=	Cancer-based RSL for air (µg/m^3)

Individuals may be exposed to more than one COPC at a given site. The total risk from exposure to multiple chemicals was calculated using the following equation:

$$Cancer\ Risk = 1E\text{-}06 \times \{EPC_1/RSL_1 + EP\ C_2/RSL_2 + \ldots EPC_n/RSL_{c,n}\}$$

where:

Cancer Risk	=	Total cancer risk from exposure to all chemicals (unitless)
EPC_n	=	Exposure point concentration (maximum) of chemical *n* for indoor air (µg/m^3)
$RSL_{c,n}$	=	Cancer-based RSL for air for chemical *n* (µg/m^3)

2.4.4 Ratiometric Method for Estimating Noncancer Hazards

The noncancer hazard associated with exposure to a single chemical was estimated by comparing the maximum concentration with the noncancer RSL for each COPC. When calculated for a single chemical, this comparison estimates an HQ that is expressed in the following equation:

$$HQ_n = EPC_n/RSL_{n,n}$$

where:

HQ_n	=	Noncancer hazard quotient associated with exposure to chemical *n* (unitless)
EPC_n	=	Exposure Point (maximum) Concentration of chemical *n* for indoor air (µg/m^3)
$RSL_{n,n}$	=	Noncancer RSL for air for chemical *n* (µg/m^3)

The HQs for all chemicals are summed to evaluate the potential for adverse health effects other than cancer from concurrent exposures to multiple chemicals. This summation yields a hazard index (HI) as follows:

$$HI = \Sigma HQ_n$$

2.4.5 Interpretation of Risk and Hazard Estimates

The estimated cumulative cancer risks are compared with a "risk management range" to aid in the interpretation of results. EPA defined general remedial action goals for sites in the National Oil and Hazardous Substances Pollution Contingency Plan (Title 40 of the *Code of Federal Regulations*, Section 300.430). The goals include a range for residual cancer risk, which is "an excess upper-bound lifetime cancer risk to an individual of between 10^{-4} and 10^{-6}," or 1 in 10,000 (1E-04) to 1E-06.

A subsequent EPA directive provided additional guidance on the role of human health risk assessments in supporting risk management decisions and, in particular, evaluating whether a response action is necessary (EPA 1991b). That guidance states: "Where cumulative carcinogenic risk to an individual based on reasonable maximum exposure for both current and future land use is less than 10^{-4}, and the noncancer hazard quotient is less than 1, action generally is not warranted unless there are adverse environmental impacts." This SLHHRA refers to the cancer risk range between 1E-06 and 1E-04 as the "risk management range." The lower end of the range, 1E-06, is referred to as the "point of departure." Risks that do not exceed the point of departure are considered negligible and do not require action.

An HI less than 1 indicates that adverse noncancer health effects are not expected. If the total HI exceeds 1, further evaluation in the form of a segregation of the HI via a target organ analysis may be performed to assess whether the noncancer HIs are a concern (EPA 1989, 1991b).

2.5 RESULTS OF THE RISK EVALUATION

Health risks were quantitatively estimated for inhalation exposure at 45 houses. Included in the quantitative assessment were 42 houses lacking SSD systems, and situated above the defined 100 µg/L contour for PCE, and at which detectable concentrations of PCE had been found. Three houses not within the defined 100 µg/L contour for PCE, and at which detectable concentrations of PCE had been found, were also evaluated quantitatively. Sampling was offered to any homeowner whose property lay partially or wholly within the 100 µg/L contour; however, 33 houses within the VI area of concern have not undergone air sampling. These 33 properties were evaluated qualitatively.

2.5.1 Estimated Cancer Risks

None of the houses in the quantitative evaluation had an estimated potential cancer risk exceeding the 1E-04 action level. The estimated cancer risk range for the 3 houses with detected results and that are not within the 100 µg/L groundwater PCE plume contour is 8E-07 to 2E-06. The estimated cancer risk range for the 42 houses above the 100 µg/L groundwater PCE plume contour with detected sampling results and that do not have SSD systems is 4E-08 to 5E-06. The highest estimated potential cancer risk was 5E-06. This estimated risk occurred at Broadbent identification (ID) 985. This house was not sampled by Tetra Tech in 2012 (ID 1626) because access was not granted. The measured indoor air concentration of PCE at this

house was 43 µg/m^3, which exceeds the interim action level of 32 µg/m^3 established by NDEP. This house is eligible for installation of an SSD system; however, the homeowner refused the installation. Table 5 presents cancer risk estimates for the 3 houses included in the quantitative risk assessment that are located outside of the 100 µg/L groundwater PCE plume contour. Table 6 presents cancer risk estimates for the 42 houses included in the quantitative risk assessment that are located within the 100 µg/L groundwater PCE plume contour. Table 7 provides a summary of the cancer risk range for the two groups.

At 22 houses, estimated potential cancer risk was within the risk management range (1E-06 to 1E-04). Of the 22 houses, nine had risks equivalent to the low end of the risk management range at 1E-06.

The houses with estimated risks within the risk management range are primarily on Seneca Lane or Maricopa Way. Two of the houses in the risk range are on Ottawa Drive, and two are on Cherokee Lane. One of the houses is at the eastern edge of the VI area of concern on Ottawa Circle. Two of the houses outside the 100 µg/L groundwater PCE contour had estimated cancer risks within the risk management range.

Twenty-three houses included in the quantitative assessment had estimated potential cancer risks of less than 1E-06. Cancer risk from inhalation of PCE-contaminated indoor air is considered negligible at these houses.

2.5.2 Estimated Noncancer Hazards

None of the houses included in the quantitative SLHHRA had an estimated noncancer hazard (HI) exceeding the action level of 1. The estimated noncancer hazard range for the 3 houses with detected results and that are not within the 100 µg/L groundwater PCE plume contour is 0.2 to 0.5. The estimated noncancer hazard range for the 42 houses above the 100 µg/L groundwater PCE plume contour with detected sampling results and that do not have SSD systems is 0.03 to 1. One house, at Broadbent ID 985, had an estimated HI equal to 1. This house had not been sampled by Tetra Tech in 2012 (ID 1626) because access was not granted. The measured indoor air concentration of PCE at this house was 43 µg/m^3, exceeding the interim action level of 32 µg/m^3 established by NDEP. This house is eligible for installation of an SSD system; however, the homeowner refused the installation. Table 5 presents noncancer hazard estimates for the 3 houses included in the quantitative risk assessment located outside of the 100 µg/L groundwater PCE plume contour. Table 6 presents noncancer hazard estimates for the 42 houses included in the quantitative risk assessment that are located within the 100 µg/L groundwater PCE plume contour. Table 7 provides a summary of the noncancer hazard range for the two groups.

At all other houses included in the quantitative SLHHRA, the estimated noncancer hazard (HI) was less than 1; thus, all are below a level of concern for non-cancer inhalation hazards from vapor intrusion of PCE to indoor air.

2.5.3 Qualitative Assessment of Houses without Indoor Air Sample Results

Potential for vapor intrusion is based on many site-specific factors including underground conditions, soil properties, and building properties, as well as activities and habits of residents. In general, houses situated above higher concentrations of PCE in groundwater are more likely to be at risk from vapor intrusion. However, concentrations in indoor air within houses above the PCE plume may not correlate to concentrations in groundwater because vapor migration is not constrained by hydraulic gradients like groundwater, and subsurface conditions may allow for preferential pathways. This unpredictable behavior of contaminants at vapor intrusion sites poses challenges for assessing risk at houses without indoor air data.

At the Maryland Square PCE Site, the highest concentration of PCE in indoor air (110 µg/m^3) was found in a house half-way down Seneca Lane. This house is nearest well MW-25, where PCE concentrations in groundwater have ranged from 640 to 1,300 µg/L (averaging 780 µg/L). In comparison, two houses near well MW-18 contained PCE concentrations of non-detected, 11, 21, and 49 µg/m^3. MW-18 has yielded groundwater samples containing from 930 to 3,500 µg/L (averaging approximately 1,500 µg/L) PCE. Thus, houses overlying the highest concentrations in the groundwater plume did not exhibit the highest concentrations of PCE in indoor air.

Residents/owners of 33 parcels within the VI area of concern have been offered indoor air sampling but, to date, those houses have not undergone sampling because the owners/residents have not consented to that. Assuming the highest detected concentrations would be found in the houses not having undergone indoor air sampling, the estimated cancer risk is 3E-05 and the estimated non-cancer hazard (HI) is 7 (Table 5). This estimated potential cancer risk is within the cancer risk range of 1E-06 to 1E-04, while the estimated non-cancer hazard exceeds the HI=1 threshold.

The uncertainty level associated with assigning indoor air concentrations found at three houses to other houses is very high. Use of these indoor air concentrations assumes subsurface and building conditions responsible for the indoor air concentrations found within the sampled houses apply to the houses not sampled. Moreover, results of sampling at other houses in the area have confirmed that the distribution of PCE concentrations in indoor air does not correlate to the distribution of PCE concentrations in groundwater. Indoor air concentrations above a level of concern are possible in any of the houses above the plume because of the possibility of preferential vapor pathways such as utility conduits, or individual building properties such poor foundation condition or ventilation properties of the house. Indoor air sampling is necessary to quantitatively assess the risk to any individual property above the plume.

3 UNCERTAINTY ASSESSMENT

The risks and hazards calculated as part of the SLHHRA for the Maryland Square PCE Site are subject to various degrees of uncertainty from a variety of sources associated with all the major phases of the human health risk assessment (HHRA) process. The uncertainty assessment identifies and discusses the nature of the uncertainty associated with the most significant sources of site-specific uncertainty.

It should be noted that human health implications related to PCE, or any other type of contaminant exposure, are not entirely based on the concentration and time period of exposure. Individual differences among the exposed population also play a role in the human health response. Individual traits including, but not limited to, differences in age, sex, diet, health status, family history of disease, and personal lifestyle choices can affect individual sensitivity to chemical exposures and the severity of response.

The objectives of the uncertainty analysis, defined by EPA (EPA 1989, 1992), are as follows:

- Provide a summary of those factors that significantly influence the risk results, evaluate their range of variability, and assess the contribution of these factors to underestimation or overestimation of risk.
- Discuss the data underlying the assumptions that most significantly influence risk, to highlight the strengths and weaknesses of the HHRA results.

Virtually every step in the HHRA process requires numerous assumptions, all of which contribute to uncertainty in the risk evaluation. In the absence of empirical or site-specific data, assumptions are developed based on best estimates of data quality, exposure parameters, and dose-response relationships.

To assist in the development of these estimates, EPA provides guidelines and standard default exposure factors to be used in HHRAs (EPA 1989, 1991a). Use of these standard factors is intended to promote consistency among risk assessments where assumptions must be made. However, their usefulness in accurately predicting risk depends on their applicability to the site-specific conditions. It is likely, therefore, that the net effect of all the assumptions yields a conservative estimate of total risk. However, the uncertainty analysis does not change the quantitative risk characterization results presented in Section 2.5.

3.1 UNCERTAINTIES RELATED TO DATA EVALUATION AND COPC SELECTION

The following are some of the uncertainties related to the data evaluation and reduction approaches (Section 2.1) used in this SLHHRA.

For the majority (24) of the houses included in the quantitative risk analysis, a single sample result was used to estimate the risk. Concentrations of chemicals in groundwater may exhibit seasonal variations, and changes in use of heating or air conditioning systems can greatly affect vapor concentration in a house. It is not known whether results from a single sample lead to overestimation or underestimation of actual concentrations in any given house.

Eleven of the houses with non-detected results from the 2007-2008 sampling had detected results when re-sampled in 2012. Two of these detected results exceeded the NDEP interim-action level of 32 µg/m^3. (One house with a detected result in 2007 had a non-detected result in 2012, even though no known mitigation had occurred at the house.) These results illustrate the potential temporal variability of PCE concentrations in a given house. It is not known whether other houses with previously non-detected results that were not re-sampled have also changed. This lack of sampling data may underestimate the risk at a given house if the conditions have changed.

For houses with duplicate or multiple sample results, the data were reduced to the higher of the reported results. This assumption is conservative.

3.2 EXPOSURE ASSESSMENT UNCERTAINTIES

This SLHHRA represents an estimated risk to an RME. RME is defined as the "maximum exposure that is reasonably expected to occur at the site" (EPA 1989). Several significant variables that determine the exposure doses for the RME are based on upper-bound (typically 90th to 95th percentile or greater) estimates. Therefore, where RME assumptions are employed, the calculated exposure dose for any given chemical that results from integration of all these variables represents an upper-bound estimate of the probable exposure dose. Use of these upper-bound exposure parameters, coupled with conservative estimates of toxicity, in turn, yield risk results that represent an upper-bound estimate of the carcinogenic risk and noncarcinogenic HI. Significant site-specific uncertainties associated with the exposure assessment include:

- Concentrations of chemicals in groundwater may exhibit seasonal variations. At this site, indoor air data are used to calculate indoor air EPCs. The actual risk for the inhalation pathway may be slightly underestimated or overestimated due to seasonal variations and ongoing degradation processes.
- For houses with two detected sample results, the higher of the detected results is used as the exposure concentration. The EPC is generally an average concentration, and thus use of the maximum concentration is protective.

3.3 TOXICITY ASSESSMENT UNCERTAINTIES

For a risk to exist there must be significant exposure to the COPCs and the COPCs must be toxic at the predicted exposure levels. Toxicological uncertainties primarily relate to the methodology by which inhalation unit risk and reference doses are developed. In general, the methodology currently used to develop slope factors and reference doses is conservative and likely results in an overestimation of human toxicity (EPA 1989).

3.3.1 Uncertainty in Cancer Toxicity Values

Although evidence suggests some carcinogens may exhibit thresholds, cancer IUR factors are developed assuming no safe level of exposure to any chemical proven or suspected to cause cancer. This approach implies that exposure to even a single molecule of a chemical may be

associated with a finite risk, however small. The assumption is that even if relatively large doses of a contaminant are required to cause cancer in toxicity studies, these exposure doses can be linearly extrapolated downward many orders of magnitude to estimate cancer slope factors for humans. A significant uncertainty regarding the carcinogens is whether the IUR factors accurately reflect the carcinogenic potency of these chemicals at low exposure concentrations. The IUR is used to estimate an upper-bound lifetime probability of an individual developing cancer as a result of exposure to a particular level of a carcinogen. Therefore, the cancer IUR factors developed by EPA are generally conservative and represent the upper-bound limit of the carcinogenic potency of each chemical. The actual risk posed by each chemical is unknown, but is likely to be lower than the calculated risk and may even be as low as zero (EPA 1989). The conclusion is that these toxicity assumptions typically result in an overestimation of carcinogenic risk.

3.3.2 Uncertainty in Noncancer Toxicity Values

In the development of inhalation RfCs, it is assumed that a threshold dose exists below which there is no potential for adverse health effects to the most sensitive individuals in the population. The RfC is typically derived by applying several uncertainty factors of 10 each to a no observed adverse effects level (NOAEL) or a lowest observed adverse effects level (LOAEL) determined from a dose-response study in animals. An additional modifying factor of up to 10, which accounts for a qualitative professional assessment of additional uncertainties in the available toxicity data, also may be applied (EPA 1989). The final degrees of extrapolation for the contaminants detected in indoor air samples ranged from 30 for vinyl chloride to 1,000 for PCE (see Table 3) and, therefore, result in probable overestimates of risk by up to the same degree. In general, the calculated RfC is likely to be overly protective, and its use probably results in a moderate to high overestimation (approximately equates to an order of magnitude) of potential for noncarcinogenic risk.

EPA has medium confidence in the RfC value for PCE. Although EPA's confidence in the evidence of neurotoxicological hazard is high, EPA has medium rather than high confidence in the study estimates on which RfCs were based because those estimates were derived from a LOAEL rather than a NOAEL, and data were insufficient for dose-response modeling. Additionally, the studies focused on occupational subjects and lacked data to characterize potential susceptibility and variability across humans. EPA has medium confidence in the database due to limitations in both the available human and animal databases.

3.4 RISK CHARACTERIZATION UNCERTAINTIES

Risk characterization represents the integration of hazard and exposure information to determine the level of risk. Uncertainty in the risk characterization is a compendium of all the previous uncertainties (relating to data reduction, COPC selection, and the exposure and toxicity assessments). Significant site-specific uncertainties associated with the risk characterization not previously noted in discussion of uncertainty for either the exposure or toxicity assessments include:

- The inhalation risk equations are not adjusted for body weight and possible changes in inhalation rate. In this manner, a direct comparison to lifetime "acceptable" concentrations (reference concentrations) is possible, given adjustment for the fraction of a lifetime for which exposure occurred. Because of scientific limitations, this approach (despite its own inherent uncertainty) was determined to be the most conservative yet accurate approach for the inhalation pathway.
- The exposure assessment used readily available, standardized RME parameters wherever possible, and cited heavily from EPA guidance (EPA 1989, 1991a, 2012). These estimates are expected to conservatively over predict risks for most people.

3.5 UNCERTAINTY SUMMARY

Lack of samples representing potential temporal variations in PCE concentrations within indoor air at the houses represents the largest source of uncertainty in the risk assessment, and potentially underestimates risk to occupants.

Overall, conservative measures were used to address the uncertainties in the SLHHRA; thus, the SLHHRA is expected to overestimate actual risks to receptors within the VI area of concern.

4 SUMMARY AND CONCLUSIONS

None of the houses in the quantitative evaluation had an estimated potential cancer risk exceeding the 1E-04 action level. Twenty-two of the 45 houses evaluated had estimated potential cancer risk within the risk management range (1E-06 to 1E-04); however, none the estimated risks exceeded 5E-06, and nine houses were equivalent to the low end of the range at 1E-06. Twenty-three houses had estimated potential cancer risks of less than 1E-06. Cancer risk from VI to indoor air is considered negligible within these houses.

No houses in the quantitative assessment had an estimated noncancer hazard (HI) exceeding the action level of 1. One house had an HI=1. All other houses within the VI area of concern had an estimated noncancer hazard (HI) less than 1, and thus were below a level of concern for non-cancer hazards from VI to indoor air.

One house (at Broadbent ID 985) had an estimated cancer hazard equal to 5E-06 and an HI equal to 1. This house was not sampled by Tetra Tech in 2012 (ID 1626). The measured indoor air concentration of PCE at this house in 2007-2008 was 43 µg/m^3, exceeding the interim action level of 32 µg/m^3 established by NDEP. This house is eligible for installation of an SSD system; however, the homeowner has refused the installation. Installation of an SSD system would reduce the potential cancer risk and noncancer hazard estimated for this house below a level of concern.

Owners/residents of 33 parcels within the VI area of concern have been offered indoor air sampling but, to date, these houses have not undergone sampling because the owners/residents have not consented. Assuming the highest detected concentrations would be found within those houses, the estimated cancer risk is 3E-05 and the estimated non-cancer hazard (HI) is 7. These estimated values have a very high level of uncertainty. Potential for vapor intrusion is based on many site-specific factors including underground conditions, soil properties, and building properties. In general, houses situated above higher concentrations of PCE in groundwater are more likely to be at risk from vapor intrusion. Indoor air sampling is necessary to quantitatively assess the risk at any individual property above the plume.

Use of a single sample result for estimating risk and lack of samples representing potential temporal variations in PCE concentrations within indoor air at the houses represent the largest sources of uncertainty in the risk assessment.

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TABLES

Table 1: Residential Indoor Air Sampling Results
Maryland Square PCE Site

2007-2008 Broadbent *						2012 Tetra Tech *					
Random ID	PCE Result (µg/m^3)	TCE Result (µg/m^3)	Vinyl Chloride Result (µg/m^3)	cis-1,2-DCE	trans-1,2-DCE	Random ID	PCE Result (µg/m^3)	TCE Result (µg/m^3)	Vinyl Chloride Result (µg/m^3)	cis-1,2-DCE	trans-1,2-DCE
001	31	ND	ND	ND	ND	3045	--	--	--	--	--
003	39	ND	ND	ND	ND	1699	--	--	--	--	--
009	50	ND	ND	ND	ND	4941	--	--	--	--	--
019	ND	ND	ND	ND	ND	4006	--	--	--	--	--
022	ND	ND	ND	ND	ND	--	--	--	--		
027	ND	ND	ND	ND	ND	2498	1.2	ND	ND	ND	ND
029	ND	ND	ND	ND	ND	--	--	--	--		
034	43	ND	ND	ND	ND	3855	--	--	--	--	--
041	ND	ND	ND	ND	ND	--	--	--	--		
042	15	ND	ND	ND	ND	1501	7	ND	ND	ND	ND
045	23	ND	ND	ND	ND	2167	--	--	--	--	--
049	11	ND	ND	ND	ND	3757	--	--	--	--	--
075	9.2	ND	ND	ND	ND	3934	--	--	--	--	--
079	ND	ND	ND	ND	ND	--	--	--	--		
081	ND	ND	ND	ND	ND	--	--	--	--		
086	ND	ND	ND	ND	ND	3787	1.9	ND	ND	ND	ND
100	ND	ND	ND	ND	ND	--	--	--	--		
149	ND	ND	ND	ND	ND	--	--	--	--		
192	7.6	ND	ND	ND	ND	--	--	--	--		
196	10	ND	ND	ND	ND	2301	2.6	ND	ND	ND	ND
218	ND	ND	ND	ND	ND	--	--	--	--		
219	ND	ND	ND	ND	ND	3551	--	--	--	--	--
228	45	ND	ND	ND	ND	2578	--	--	--	--	--
233	ND	ND	ND	ND	ND	4263	0.36	ND	ND	ND	ND
253	8.3	ND	ND	ND	ND	3029	8.3	ND	ND	ND	ND
281	ND	ND	ND	ND	ND	2838	0.63	ND	ND	ND	ND
284	ND	ND	ND	ND	ND	3153	--	--	--	--	--
287	ND	ND	ND	ND	ND	1028	0.44	ND	ND	ND	ND
293	24	ND	ND	ND	ND	4691	29	ND	ND	ND	ND
299	ND	ND	ND	ND	ND	1462	--	--	--	--	--
299	ND	ND	ND	ND	ND	--	--	--	--	--	--
300	ND	ND	ND	ND	ND	--	--	--	--	--	--
309	ND	ND	ND	ND	ND	1557	--	--	--	--	--
316	ND	ND	ND	ND	ND	--	--	--	--	--	--
337	ND	ND	ND	ND	ND	--	--	--	--	--	--
374	ND	ND	ND	ND	ND	--	--	--	--	--	--
382	7.7	ND	ND	ND	ND	2759	5	ND	ND	ND	ND
399	ND	ND	ND	ND	ND	--	--	--	--		
414	26	ND	ND	ND	ND	1602	--	--	--	--	--
418	ND	ND	ND	ND	ND	1106	3.7	ND	ND	ND	ND
421	19	ND	ND	ND	ND	--	--	--	--		
426	ND	ND	ND	ND	ND	4721	5.9	ND	ND	ND	ND
428	8.3	ND	ND	ND	ND	2736	--	--	--	--	--
466	55	ND	ND	ND	ND	3296	--	--	--	--	--
493	ND	ND	ND	ND	ND	1609	--	--	--	--	--
511	9.3	ND	ND	ND	ND	3987	5.3	ND	ND	ND	ND
516	19	ND	ND	ND	ND	1452	--	--	--	--	--
558	32	ND	ND	ND	ND	2251	--	--	--	--	--
598	12	ND	ND	ND	ND	3695	--	--	--	--	--
609	80	9.4	ND	ND	ND	1716	--	--	--	--	--
619	ND	ND	ND	ND	ND	2224	--	--	--	--	--
624	9.6	ND	ND	ND	ND	2681	2.4	0.44	ND	ND	ND
629	21	ND	ND	ND	ND	1567	49	ND	ND	ND	ND
636	5.6	ND	ND	ND	ND	4947	--	--	--	--	--
638	ND	ND	ND	ND	ND	--	--	--	--	--	--
642	ND	ND	ND	ND	ND	--	--	--	--	--	--
657	ND	ND	ND	ND	ND	--	--	--	--	--	--
666	ND	ND	ND	ND	ND	--	--	--	--	--	--
670	66	ND	ND	ND	ND	2504	--	--	--	--	--
671	ND	ND	ND	ND	ND	4523	1.7	ND	ND	ND	ND
676	ND	ND	ND	ND	ND	--	--	--	--	--	--
700	12	ND	ND	ND	ND	1425	--	--	--	--	--
713	ND	ND	ND	ND	ND	3269	--	--	--	--	--
720	55	ND	ND	ND	ND	2514	--	--	--	--	--
722	ND	ND	ND	ND	ND	2124	39	ND	ND	ND	ND
725	ND	ND	ND	ND	ND	--	--	--	--	--	--
735	ND	ND	ND	ND	ND	--	--	--	--	--	--
741	ND	ND	ND	ND	ND	--	--	--	--	--	--
747	ND	ND	ND	ND	ND	--	--	--	--	--	--
748	ND	ND	ND	ND	ND	--	--	--	--	--	--
749	ND	ND	ND	ND	ND	4728	2.1	ND	ND	ND	ND
754	110	ND	ND	ND	ND	2516	--	--	--	--	--
759	ND	ND	ND	ND	ND	--	--	--	--	--	--
764	18	ND	ND	ND	ND	4638	ND	ND	ND	ND	ND

Table 1: Residential Indoor Air Sampling Results
Maryland Square PCE Site

2007-2008 Broadbent *						2012 Tetra Tech *					
Random ID	PCE Result ($\mu g/m^3$)	TCE Result ($\mu g/m^3$)	Vinyl Chloride Result ($\mu g/m^3$)	cis-1,2-DCE	trans-1,2-DCE	Random ID	PCE Result ($\mu g/m^3$)	TCE Result ($\mu g/m^3$)	Vinyl Chloride Result ($\mu g/m^3$)	cis-1,2-DCE	trans-1,2-DCE
773	6.3	ND	ND	ND	ND	4851	--	--	--	--	--
780	ND	ND	ND	ND	ND	4324	--	--	--	--	--
790	ND	ND	ND	ND	ND	2535	--	--	--	--	--
794	76	ND	ND	ND	ND	2792	--	--	--	--	--
804	ND	ND	ND	ND	ND	--	--	--	--	--	--
814	ND	ND	ND	ND	ND	1347	--	--	--	--	--
826	ND	ND	ND	ND	ND	3882	39	ND	ND	ND	ND
855	69	ND	ND	ND	ND	2015	--	--	--	--	--
859	ND	ND	ND	ND	ND	--	--	--	--	--	--
865	39	ND	ND	ND	ND	1643	8.3	ND	ND	ND	ND
877	ND	ND	ND	ND	ND	--	--	--	--	--	--
888	ND	ND	ND	ND	ND	--	--	--	--	--	--
895	ND	ND	ND	ND	ND	--	--	--	--	--	--
910	20	ND	ND	ND	ND	--	--	--	--	--	--
913	27	ND	ND	ND	ND	1211	--	--	--	--	--
923	6.6	ND	ND	ND	ND	1553	7	ND	ND	ND	ND
933	11	ND	ND	ND	ND	1174	--	--	--	--	--
942	7.3	ND	ND	ND	ND	4764	--	--	--	--	--
972	8.2	ND	ND	ND	ND	3253	2.5	ND	ND	ND	ND
976	ND	ND	ND	ND	ND	--	--	--	--	--	--
985	43	ND	ND	ND	ND	1626	--	--	--	--	--
989	ND	ND	ND	ND	ND	--	--	--	--	--	--
990	ND	ND	ND	ND	ND	3313	11	ND	0.075	ND	ND
--	--	--	--	--	--	1011	--	--	--	--	--
--	--	--	--	--	--	1055	--	--	--	--	--
--	--	--	--	--	--	1101	--	--	--	--	--
--	--	--	--	--	--	1121	--	--	--	--	--
--	--	--	--	--	--	1157	--	--	--	--	--
--	--	--	--	--	--	1278	13	ND	ND	ND	ND
--	--	--	--	--	--	1282	--	--	--	--	--
--	--	--	--	--	--	1516	--	--	--	--	--
--	--	--	--	--	--	1531	--	--	--	--	--
--	--	--	--	--	--	1772	--	--	--	--	--
--	--	--	--	--	--	1796	--	--	--	--	--
--	--	--	--	--	--	1798	--	--	--	--	--
--	--	--	--	--	--	2093	4.1	ND	ND	ND	ND
--	--	--	--	--	--	2222	--	--	--	--	--
--	--	--	--	--	--	2312	--	--	--	--	--
--	--	--	--	--	--	2363	--	--	--	--	--
--	--	--	--	--	--	2490	--	--	--	--	--
--	--	--	--	--	--	2529	--	--	--	--	--
--	--	--	--	--	--	2554	--	--	--	--	--
--	--	--	--	--	--	2737	--	--	--	--	--
--	--	--	--	--	--	2880	--	--	--	--	--
--	--	--	--	--	--	3148	--	--	--	--	--
--	--	--	--	--	--	3275	--	--	--	--	--
--	--	--	--	--	--	3330	3.4	ND	ND	ND	ND
--	--	--	--	--	--	3458	--	--	--	--	--
--	--	--	--	--	--	3490	--	--	--	--	--
--	--	--	--	--	--	3534	--	--	--	--	--
--	--	--	--	--	--	3770	5.9	ND	ND	ND	ND
--	--	--	--	--	--	3791	--	--	--	--	--
--	--	--	--	--	--	3939	5.7	ND	ND	ND	ND
--	--	--	--	--	--	4129	2.4	ND	ND	ND	ND
--	--	--	--	--	--	4173	--	--	--	--	--
--	--	--	--	--	--	4363	--	--	--	--	--
--	--	--	--	--	--	4400	--	--	--	--	--
--	--	--	--	--	--	4488	--	--	--	--	--
--	--	--	--	--	--	4765	--	--	--	--	--
--	--	--	--	--	--	4774	11	0.31	ND	ND	ND
--	--	--	--	--	--	4840	--	--	--	--	--
--	--	--	--	--	--	4846	--	--	--	--	--
--	--	--	--	--	--	4878	14	ND	ND	ND	ND
--	--	--	--	--	--	4886	--	--	--	--	--

Table 2: Residential Risk Groups
Maryland Square PCE Site

Not Evaluated Further			Evaluated Quantitatively		
Group	Broadbent Random ID	Tetra Tech Random ID	Group	Broadbent Random ID	Tetra Tech Random ID
1	001	3045	4	192	--
1	003	1699	4	421	--
1	009	4941	4	910	--
1	034	3855	5	027	2498
1	228	2578	5	042	1501
1	466	3296	5	086	3787
1	558	2251	5	196	2301
1	609	1716	5	233	4263
1	629	1567	5	253	3029
1	670	2504	5	281	2838
1	720	2514	5	287	1028
1	722	2124	5	293	4691
1	754	2516	5	382	2759
1	794	2792	5	418	1106
1	826	3882	5	426	4721
1	855	2015	5	511	3987
1	865	1643	5	624	2681
2	022	--	5	671	4523
2	029	--	5	749	4728
2	041	--	5	764	4638
2	079	--	5	923	1553
2	081	--	5	972	3253
2	100	--	5	990	3313
2	149	--	6	045	2167
2	218	--	6	049	3757
2	299	--	6	075	3934
2	300	--	6	414	1602
2	316	--	6	428	2736
2	337	--	6	516	1452
2	374	--	6	598	3695
2	399	--	6	636	4947
2	638	--	6	700	1425
2	642	--	6	773	4851
2	657	--	6	913	1211
2	666	--	6	933	1174
2	676	--	6	942	4764
2	725	--	6	985	1626
2	735	--	7	--	1278
2	741	--	7	--	2093
2	747	--	7	--	3330
2	748	--	7	--	3770
2	759	--	7	--	3939
2	804	--	7	--	4129
2	859	--	7	--	4774
2	877	--	7	--	4878
2	888	--			
2	895	--			
2	976	--			
2	989	--			
3	019	4006			
3	219	3551			
3	229	1462			
3	284	3153			
3	309	1557			
3	493	1609			
3	619	2224			
3	713	3269			
3	780	4324			
3	790	2535			
3	814	1347			

Notes:
-- - not sampled
ID - identification

Table 3: Toxicity and Chemical-specific Information
Maryland Square PCE Site

COPC	CAS No.	IUR $(\mu g/m^3)^{-1}$	Source	Carcinogenic Screening Level TR=1.0E-6 (ug/m^3)	Carcinogenic Classification	RfCi (mg/m^3)	Source	Noncarcinogenic Screening Level HI=1 (ug/m^3)	RFC_i Uncertainty Factor	Target Organ
Tetrachloroethylene	127-18-4	2.60E-07	IRIS	9.4E+00	Likely Carcinogenic to Humans	4.00E-02	IRIS	4.2E+01	1000	Nervous System
Trichloroethylene	79-01-6	4.10E-06	IRIS	4.3E-01	Carcinogenic to Humans	2.00E-03	IRIS	2.1E+00	100	Liver, Kidney, Nervous System
Vinyl Chloride	75-01-4	4.40E-06	IRIS	1.6E-01	Carcinogenic to Humans	1.00E-01	IRIS	1.0E+02	30	Liver

Notes:
$\mu g/m^3$ - microgram per cubic meter
mg/m^3 - milligram per cubic meter
CAS No. - Chemical Abstract Services number
COPC - Chemical of Potential Concern
HI - Hazard Index
IRIS - Integrated Risk Information System
IUR - Inhalation Unit Risk
RfC - Reference Concentration

Table 4: Default Exposure Parameters Used in RSLs
Maryland Square PCE Site

Exposure Parameter		Default Value
ET_r	Exposure time – resident (hours/day)	24
EF_r	Exposure frequency – resident (days/year)	350
ED_r	Exposure duration – resident (years)	30
AT_c	Averaging time – carcinogens (days)	25,550
AT_{nc}	Averaging time – noncarcinogens (days)	10,950

Notes:

days/year - days per year

hours/day - hours per day

Source:

USEPA. 2012. Regional Screening Levels. User Guide.
Available on-line at: http://www.epa.gov/region9/superfund//

Table 5: Estimated Cancer Risk and Noncancer Hazard by Residence for Houses Located Outside the 100 µg/L PCE in Groundwater Contour
Maryland Square PCE Site

Group	COPC	Broadbent 2007-2008		Tetra Tech 2012		Maximum Concentration ($\mu g/m^3$)	Cancer RSL ($\mu g/m^3$)	Non-Cancer RSL ($\mu g/m^3$)	Estimated Cancer Risk	Estimated Noncancer Hazard
		Random ID	COPC Concentration ($\mu g/m^3$)	Random ID	COPC Concentration ($\mu g/m^3$)					
4	PCE	192	7.6	--	--	7.6	9.4	42	8.1E-07	0.2
	TCE		ND		--	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		--	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**8E-07**	**0.2**
4	PCE	421	19	--	--	19	9.4	42	2.0E-06	0.5
	TCE		ND		--	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		--	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**2E-06**	**0.5**
4	PCE	910	20	--	--	20	9.4	42	2.1E-06	0.5
	TCE		ND		--	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		--	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**2E-06**	**0.5**

Notes:
$\mu g/m^3$ - microgram per cubic meter
-- - not sampled
ID - identification
ND - not detected
PCE - Tetrachloroethene
TCE - Trichloroethene

Table 6: Estimated Cancer Risk and Noncancer Hazard by Residence for Houses Located Inside the 100 µg/L PCE in Groundwater Contour
Maryland Square PCE Site

Group	COPC	Broadbent 2007-2008		Tetra Tech 2012		Maximum Concentration ($\mu g/m^3$)	Cancer RSL ($\mu g/m^3$)	Non-Cancer RSL ($\mu g/m^3$)	Estimated Cancer Risk	Estimated Noncancer Hazard
		Random ID	COPC Concentration ($\mu g/m^3$)	Random ID	COPC Concentration ($\mu g/m^3$)					
5	PCE	027	ND	2498	1.2	1.2	9.4	42	1.3E-07	0.03
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**1E-07**	**0.03**
5	PCE	042	15	1501	7	15	9.4	42	1.6E-06	0.4
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**2E-06**	**0.4**
5	PCE	086	ND	3787	1.9	1.9	9.4	42	2.0E-07	0.05
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**2E-07**	**0.05**
5	PCE	196	10	2301	2.6	10	9.4	42	1.1E-06	0.2
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**1E-06**	**0.2**
5	PCE	233	ND	4263	0.36	0.36	9.4	42	3.8E-08	0.009
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**4E-08**	**0.009**
5	PCE	253	8.3	3029	8.3	8.3	9.4	42	8.8E-07	0.2
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**9E-07**	**0.2**
5	PCE	281	ND	2838	0.63	0.63	9.4	42	6.7E-08	0.02
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**7E-08**	**0.02**
5	PCE	287	ND	1028	0.44	0.44	9.4	42	4.7E-08	0.01
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**5E-08**	**0.01**
5	PCE	293	24	4691	29	29	9.4	42	3.1E-06	0.7
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**3E-06**	**0.7**

Table 6: Estimated Cancer Risk and Noncancer Hazard by Residence for Houses Located Inside the 100 µg/L PCE in Groundwater Contour
Maryland Square PCE Site

Group	COPC	Broadbent 2007-2008		Tetra Tech 2012		Maximum Concentration ($\mu g/m^3$)	Cancer RSL ($\mu g/m^3$)	Non-Cancer RSL ($\mu g/m^3$)	Estimated Cancer Risk	Estimated Noncancer Hazard
		Random ID	COPC Concentration ($\mu g/m^3$)	Random ID	COPC Concentration ($\mu g/m^3$)					
5	PCE	382	7.7	2759	5	7.7	9.4	42	8.2E-07	0.2
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**8E-07**	**0.2**
5	PCE	418	ND	1106	3.7	3.7	9.4	42	3.9E-07	0.09
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**4E-07**	**0.09**
5	PCE	426	ND	4721	5.9	5.9	9.4	42	6.3E-07	0.1
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**6E-07**	**0.1**
5	PCE	511	9.3	3987	5.3	9.3	9.4	42	9.9E-07	0.2
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**1E-06**	**0.2**
5	PCE	624	9.6	2681	2.4	9.6	9.4	42	1.0E-06	0.2
	TCE		ND		0.44	0.44	0.43	2.1	1.0E-06	0.2
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**2E-06**	**0.4**
5	PCE	671	ND	4523	1.7	1.7	9.4	42	1.8E-07	0.04
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**2E-07**	**0.04**
5	PCE	749	ND	4728	2.1	2.1	9.4	42	2.2E-07	0.05
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**2E-07**	**0.05**
5	PCE	764	18	4638	ND	18	9.4	42	1.9E-06	0.4
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**2E-06**	**0.4**
5	PCE	923	6.6	1553	7	7	9.4	42	7.4E-07	0.2
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**7E-07**	**0.2**

Table 6: Estimated Cancer Risk and Noncancer Hazard by Residence for Houses Located Inside the 100 µg/L PCE in Groundwater Contour
Maryland Square PCE Site

Group	COPC	Broadbent 2007-2008		Tetra Tech 2012		Maximum Concentration ($\mu g/m^3$)	Cancer RSL ($\mu g/m^3$)	Non-Cancer RSL ($\mu g/m^3$)	Estimated Cancer Risk	Estimated Noncancer Hazard
		Random ID	COPC Concentration ($\mu g/m^3$)	Random ID	COPC Concentration ($\mu g/m^3$)					
5	PCE	972	8.2	3253	2.5	8.2	9.4	42	8.7E-07	0.2
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**9E-07**	**0.2**
5	PCE	990	ND	3313	11	11	9.4	42	1.2E-06	0.3
	TCE		ND		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		0.075	0.075	0.16	100	4.7E-07	0.0008
Cumulative Cancer Risk/Noncancer Hazard									**2E-06**	**0.3**
6	PCE	045	23	2167	--	23	9.4	42	2.4E-06	0.5
	TCE		ND		--	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		--	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**2E-06**	**0.5**
6	PCE	049	11	3757	--	11	9.4	42	1.2E-06	0.3
	TCE		ND		--	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		--	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**1E-06**	**0.3**
6	PCE	075	9.2	3934	--	9.2	9.4	42	9.8E-07	0.2
	TCE		ND		--	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		--	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**1E-06**	**0.2**
6	PCE	414	26	1602	--	26	9.4	42	2.8E-06	0.6
	TCE		ND		--	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		--	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**3E-06**	**0.6**
6	PCE	428	8.3	2736	--	8.3	9.4	42	8.8E-07	0.2
	TCE		ND		--	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		--	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**9E-07**	**0.2**
6	PCE	516	19	1452	--	19	9.4	42	2.0E-06	0.5
	TCE		ND		--	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		--	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**2E-06**	**0.5**
6	PCE	598	12	3695	--	12	9.4	42	1.3E-06	0.3
	TCE		ND		--	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		--	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**1E-06**	**0.3**

Table 6: Estimated Cancer Risk and Noncancer Hazard by Residence for Houses Located Inside the 100 µg/L PCE in Groundwater Contour
Maryland Square PCE Site

Group	COPC	Broadbent 2007-2008		Tetra Tech 2012		Maximum Concentration ($\mu g/m^3$)	Cancer RSL ($\mu g/m^3$)	Non-Cancer RSL ($\mu g/m^3$)	Estimated Cancer Risk	Estimated Noncancer Hazard
		Random ID	COPC Concentration ($\mu g/m^3$)	Random ID	COPC Concentration ($\mu g/m^3$)					
6	PCE	636	5.6	4947	--	5.6	9.4	42	6.0E-07	0.1
	TCE		ND		--	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		--	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**6E-07**	**0.1**
6	PCE	700	12	1425	--	12	9.4	42	1.3E-06	0.3
	TCE		ND		--	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		--	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**1E-06**	**0.3**
6	PCE	773	6.3	4851	--	6.3	9.4	42	6.7E-07	0.2
	TCE		ND		--	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		--	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**7E-07**	**0.2**
6	PCE	913	27	1211	--	27	9.4	42	2.9E-06	0.6
	TCE		ND		--	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		--	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**3E-06**	**0.6**
6	PCE	933	11	1174	--	11	9.4	42	1.2E-06	0.3
	TCE		ND		--	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		--	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**1E-06**	**0.3**
6	PCE	942	7.3	4764	--	7.3	9.4	42	7.8E-07	0.2
	TCE		ND		--	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		--	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**8E-07**	**0.2**
6	PCE	985	43	1626	--	43	9.4	42	4.6E-06	1
	TCE		ND		--	ND	0.43	2.1	--	--
	Vinyl Chloride		ND		--	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**5E-06**	**1**

Table 6: Estimated Cancer Risk and Noncancer Hazard by Residence for Houses Located Inside the 100 µg/L PCE in Groundwater Contour
Maryland Square PCE Site

Group	COPC	Broadbent 2007-2008		Tetra Tech 2012		Maximum Concentration ($\mu g/m^3$)	Cancer RSL ($\mu g/m^3$)	Non-Cancer RSL ($\mu g/m^3$)	Estimated Cancer Risk	Estimated Noncancer Hazard
		Random ID	COPC Concentration ($\mu g/m^3$)	Random ID	COPC Concentration ($\mu g/m^3$)					
7	PCE	--	--	1278	13	13	9.4	42	1.4E-06	0.3
	TCE		--		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		--		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**1E-06**	**0.3**
7	PCE	--	--	2093	4.1	4.1	9.4	42	4.4E-07	0.1
	TCE		--		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		--		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**4E-07**	**0.1**
7	PCE	--	--	3330	3.4	3.4	9.4	42	3.6E-07	0.08
	TCE		--		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		--		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**4E-07**	**0.08**
7	PCE	--	--	3770	5.9	5.9	9.4	42	6.3E-07	0.1
	TCE		--		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		--		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**6E-07**	**0.1**
7	PCE	--	--	3939	5.7	5.7	9.4	42	6.1E-07	0.1
	TCE		--		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		--		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**6E-07**	**0.1**
7	PCE	--	--	4129	2.4	2.4	9.4	42	2.6E-07	0.06
	TCE		--		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		--		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**3E-07**	**0.06**
7	PCE	--	--	4774	11	11	9.4	42	1.2E-06	0.3
	TCE		--		0.31	0.31	0.43	2.1	7.2E-07	0.1
	Vinyl Chloride		--		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**2E-06**	**0.4**
7	PCE	--	--	4878	14	14	9.4	42	1.5E-06	0.3
	TCE		--		ND	ND	0.43	2.1	--	--
	Vinyl Chloride		--		ND	ND	0.16	100	--	--
Cumulative Cancer Risk/Noncancer Hazard									**1E-06**	**0.3**

Table 6: Estimated Cancer Risk and Noncancer Hazard by Residence for Houses Located Inside the 100 µg/L PCE in Groundwater Contour
Maryland Square PCE Site

Group	COPC	Broadbent 2007-2008		Tetra Tech 2012		Maximum Concentration (µg/m^3)	Cancer RSL (µg/m^3)	Non-Cancer RSL (µg/m^3)	Estimated Cancer Risk	Estimated Noncancer Hazard
		Random ID	COPC Concentration (µg/m^3)	Random ID	COPC Concentration (µg/m^3)					
8 *	PCE	754	110	1567	49	110	9.4	42	1.2E-05	2.6
	TCE	609	9.4	2681	0.44	9.4	0.43	2.1	2.2E-05	4.5
	Vinyl Chloride	--	--	3313	0.075	0.075	0.16	100	4.7E-07	0.0008
Cumulative Cancer Risk/Noncancer Hazard									**3E-05**	**7**

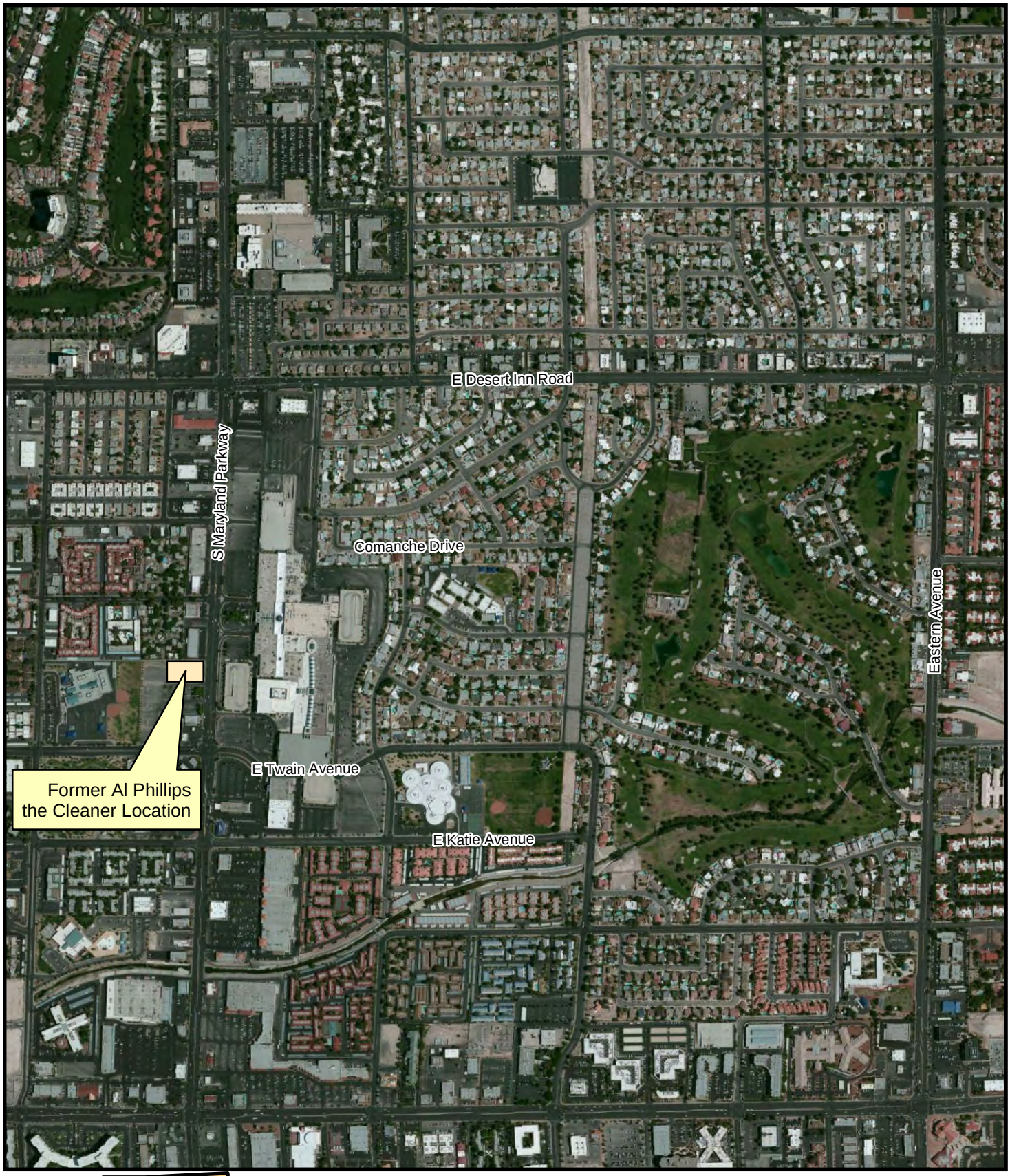
Notes:
* Group 8 houses do not have indoor air sample results. The risk calculations are based on the highest concentrations observed in all indoor air sample results and is applicable to all Group 8 houses.

µg/m^3 - microgram per cubic meter
-- - not sampled
ID - identification
ND - not detected
PCE - Tetrachloroethene
TCE - Trichloroethene

Table 7: Estimated Cancer Risk Range and Noncancer Hazard for Houses Evaluated Quantitatively
Maryland Square PCE Site

	Estimated Cancer Risk Range	Estimated Noncancer Hazard Range
Houses located outside the 100 ug/L Contour	8E-07 - 2E-06	0.2 - 0.5
Houses located within the 100 ug/L Contour	4E-08 - 5E-06	0.03 - 1

FIGURES







0 500 1,000 Feet

Approximate Scale in Feet

MARYLAND SQUARE PCE SITE
3661 South Maryland Parkway
Las Vegas, Nevada

FIGURE 1
Site Map

TETRA TECH

Path: S:\Projects Directory\Private Sector - Other Offices\Maryland Square\PCE Site\Figure 1 Site Map.mxd

115.14° W
115.135° W
115.13° W
115.125° W
115.12° W
36.125° N
36.12° N

S MARYLAND PARKWAY
SOUTH EASTERN AVENUE
E TWAIN AVENUE
E KATIE AVENUE
FLAMINGO WASH
Boulevard Mall
Ruby S. Thompson Elementary School
William E. Orr Middle School
Orr Park
Golf Course

MW-17 350
MW-35 630
MW-12 0.95
MW-34 1000
MW-9 5.6
MW-8 27
MW-1 460
MW-4
MW-14 1700
MW-15 3.5
MW-7 2.0
MW-6 2900
MW-13 1700
MW-5 670
MW-2 680
MW-3 16
MW-10 ND
BM NA
MW-16 ND
MW-11 1.4
MW-21 13
MW-20 850
MW-19 1100
MW-18 1300
MW-22 0.55
MW-24 0.95
MW-23 1100
MW-25 740
MW-26 860
MW-32 790
MW-33 ND
MW-36 150
MW-27 470
PW-1
PW-2
MW-30 50
MW-31 64
MW-37 37
MW-28 0.62
MW-29 ND

Legend

- Production Well Location
- Monitoring Well Location (Sampled 2011)
- Monitoring Well Location (Sampled January 2012)
- Monitoring Well Location (Not Sampled)

2500 ug/L PCE Contour
2000 ug/L PCE Contour
1500 ug/L PCE Contour
1000 ug/L PCE Contour
500 ug/L PCE Contour
100 ug/L PCE Contour
5 ug/L PCE Contour (Dashed Where Inferred)

ug/L Micrograms Per Liter
NA Not Analyzed
ND Not Detected
PCE Tetrachloroethene

Note

PCE contours based on January 2012 data.

N
W E
S

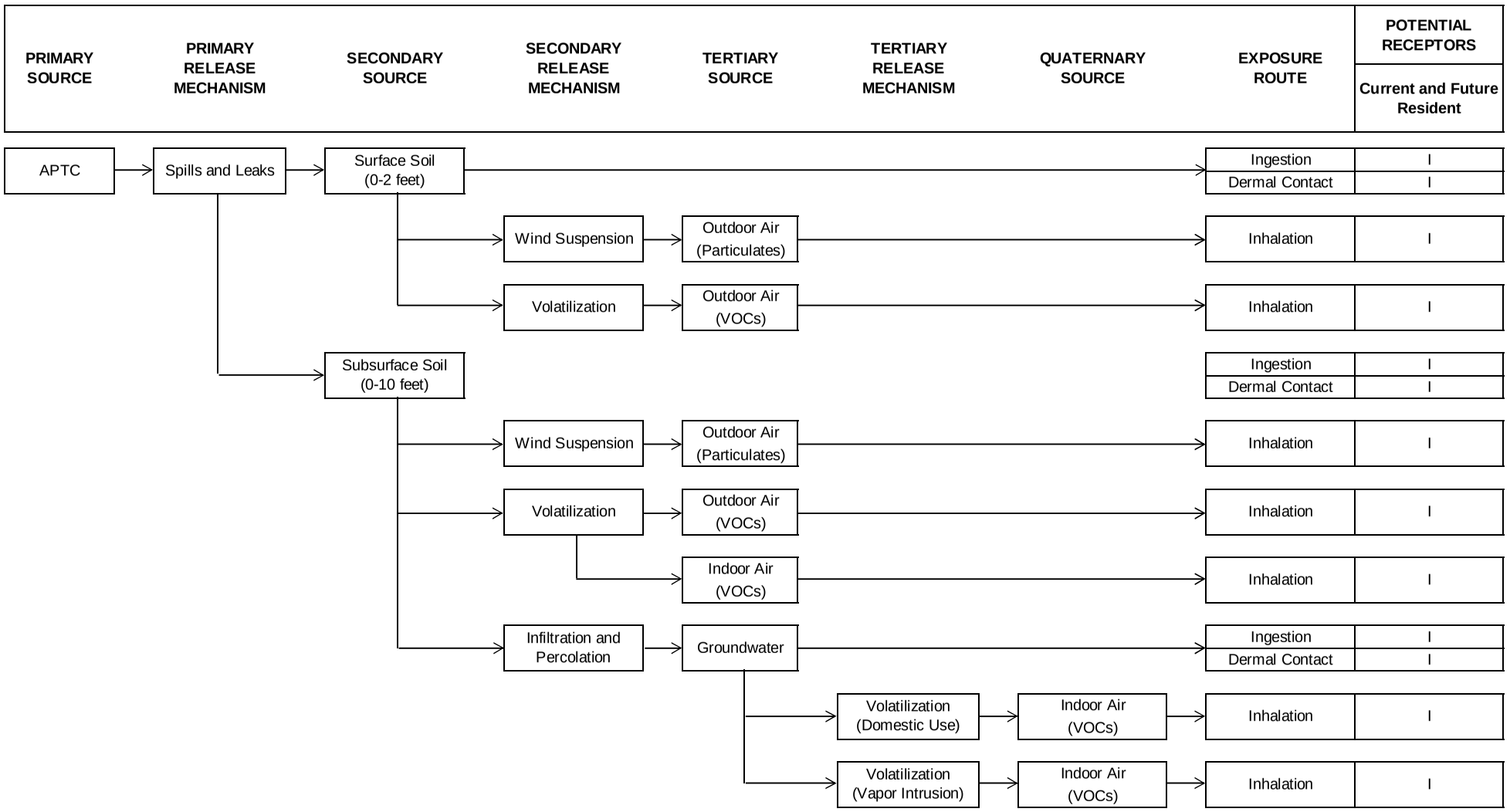
0 250 500 Feet
Approximate Scale in Feet

MARYLAND SQUARE PCE SITE
3661 South Maryland Parkway
Las Vegas, Nevada

FIGURE 2
Maryland Square PCE Plume

TETRA TECH

Path: S:\Projects Directory\Private Sector - Other Offices\Maryland Square\PCE Site\Figure 2 PCE Plume Map.mxd



LEGEND

I	Incomplete or negligible exposure pathway
C	Potentially complete exposure pathway
APTC	Al Phillips the Cleaner
HHRA	Human health risk assessment
VOC	Volatile organic compound

Maryland Square PCE Site
3661 South Maryland Parkway
Las Vegas, Nevada

FIGURE 4
HUMAN HEALTH RISK ASSESSMENT
CONCEPTUAL SITE MODEL

TETRA TECH

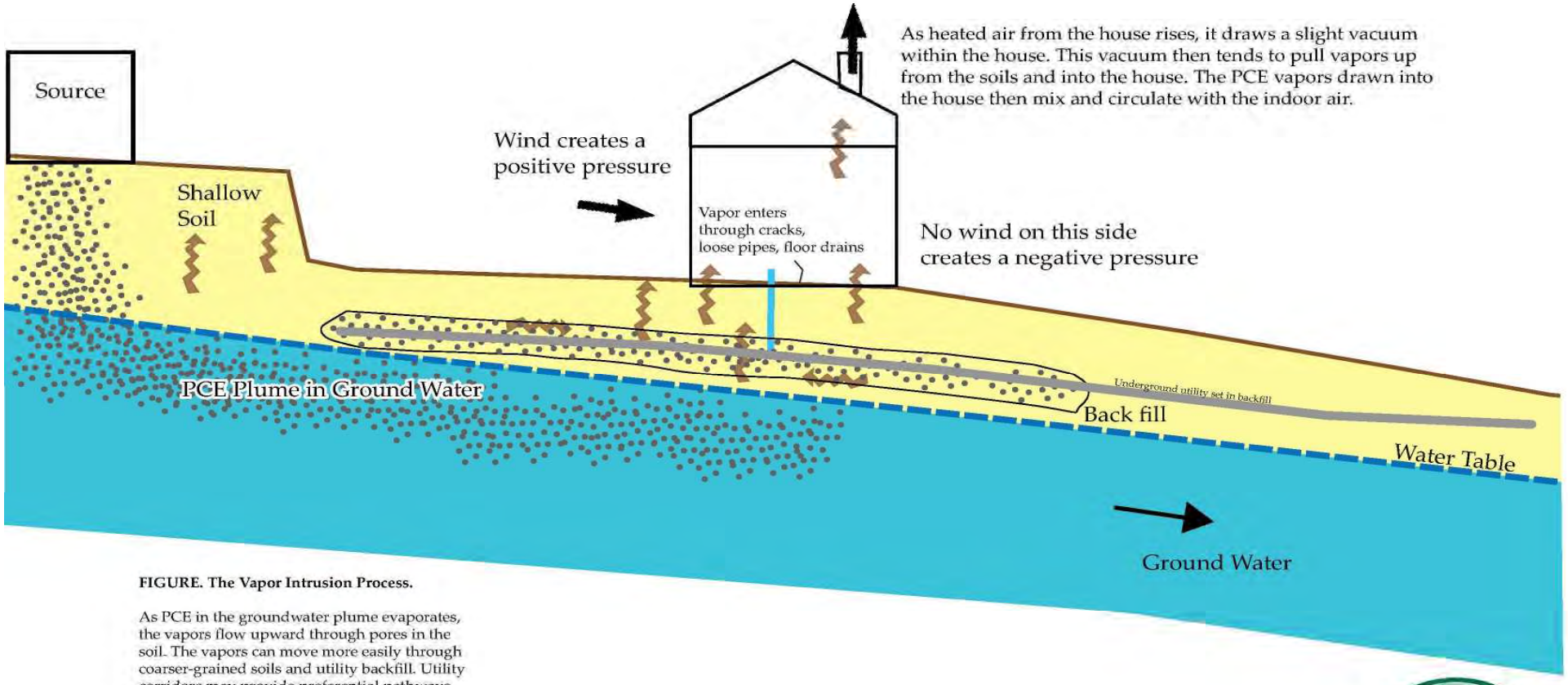


FIGURE. The Vapor Intrusion Process.

As PCE in the groundwater plume evaporates, the vapors flow upward through pores in the soil. The vapors can move more easily through coarser-grained soils and utility backfill. Utility corridors may provide preferential pathways for vapor migration. The vapors can enter into buildings through cracks in the concrete slab or foundation. Vapors may also move along utility lines, such as sewer and water pipes, and enter into the building through gaps in the lines. This process is called "vapor intrusion".

ndep NEVADA DIVISION OF ENVIRONMENTAL PROTECTION
protecting the future for generations

LEGEND

PCE	Tetrachloroethene
NDEP	Nevada Division of Environmental Protection

Source: NDEP 2011

Maryland Square PCE Site
3661 South Maryland Parkway
Las Vegas, Nevada

FIGURE 5
VAPOR INTRUSION PROCESS

TETRA TECH

APPENDIX G

Calculation of Remediation Goals for Groundwater based on the Residential Vapor Intrusion Pathway

CALCULATION OF REMEDIATION GOALS FOR GROUNDWATER BASED ON THE RESIDENTIAL VAPOR INTRUSION PATHWAY

MARYLAND SQUARE TETRACHLOROETHENE (PCE) SITE

3661 SOUTH MARYLAND PARKWAY
LAS VEGAS, NEVADA

SUBMITTED TO
NEVADA DIVISION OF ENVIRONMENTAL PROTECTION
BUREAU OF CORRECTIVE ACTIONS
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August 12, 2013

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Attachment 1 Johnson and Ettinger Model Data Enter Form and Results for Remediation Goal
Attachment 2 Johnson and Ettinger Model Data Enter Form and Results for Sensitivity Analysis

1 INTRODUCTION

Preliminary corrective action objectives (CAO) and preliminary numerical remediation goals protective of human health and the environment were used to guide the evaluation of potential corrective actions for the Site. The preliminary CAOs and numerical remediation goals were established to address site-specific chemicals of concern (COC), affected media, and potential exposure pathways. The following sections present the proposed CAOs and numerical remediation goals for groundwater at the Maryland Square PCE Site (the Site). CAOs and numerical remediation goals become final when the corrective action is selected in the Record of Decision for the Site; however, numerical remediation goals can be modified in the future based on changes to calculated risk values, water quality regulations, or empirical data.

2 CORRECTIVE ACTION OBJECTIVES

The following CAOs address potential risks to human health and the environment, and are consistent with *Nevada Administrative Code* (NAC) 445A.22725:

1. Protect human health by reducing inhalation exposure to PCE and daughter products emanating from groundwater containing PCE concentrations above the remediation goals.
2. Remediate shallow groundwater where PCE concentrations exceed the remediation goal for groundwater.

Intervention to relieve health risk concerns in the residential area is a priority, and an appropriate objective of the corrective action. For this reason, corrective actions focus on interruption of tetrachloroethene (PCE) migration and remediation of groundwater beneath the downgradient residential area. Therefore, the point of compliance for these CAOs and the remediation goals is the area immediately upgradient, or the western border, of the Paradise Palms neighborhood.

Groundwater at the Site is not a source of drinking water due to poor water quality; however, groundwater is considered “waters of the state,” and regulations require “no degradation” of waters of the state. State records show that domestic water supply wells exist east of Eastern Avenue, more than 6,300 feet from the source area. Therefore, an additional CAO applies to domestic wells located east of Eastern Avenue:

- Execute appropriate action to ensure PCE does not exceed water quality standard as defined in NAC 445A22735 in domestic water supply wells.

3 REMEDIATION GOALS FOR GROUNDWATER

PCE is the primary contaminant of concern (COC) at the Maryland Square PCE Site. Two daughter products of PCE, trichloroethene (TCE) and vinyl chloride have also been detected in a few indoor air samples collected from houses within the residential area. The PCE daughter product *cis*-1,2-dichloroethene (DCE) has not been detected in indoor air, but has been detected at low levels in some groundwater samples. However, toxicity values have not been established for *cis*-1,2-DCE; thus, a remediation goal cannot be calculated for *cis*-1,2-DCE. Volatilization of contaminants from the groundwater and subsequent transport of these vapors into indoor spaces represent a potentially complete exposure pathway via inhalation of contaminated indoor air.

Development of a numerical remediation goal involves four steps:

1. Identification of potentially applicable regulatory standards promulgated under NAC 445A.226, et seq., as amended under Adopted Regulation R189-08, that specify health or risk-based numerical values or requirements.
2. Calculation of risk-based concentrations in the absence of promulgated regulatory standards.
3. Identification of laboratory practical quantitation limits (PQL).
4. Comparison of the concentrations identified through the previous steps.

The first step identified potential regulatory standards potentially applicable to a release to groundwater from a property. Groundwater is "waters of the state," (NAC 445A.22725) and Nevada Division of Environmental Protection (NDEP) regulations require "no degradation" of waters of the state. However, Section 14 of Revised Proposed [and adopted] Regulation R189-08, issued by the NDEP Bureau of Corrective Actions, prescribes the criteria required to conclude corrective action activity. These criteria involve the following: source control; interruption or remediation of exposure pathways; and specification of the likely use of groundwater based on groundwater quality characteristics.

NAC 445A.22735 establishes action levels for groundwater—either maximum contaminant levels (MCL) established under the Safe Drinking Water Act (and adopted by reference at NAC 445A.22735(1)(b)), or background concentrations if background levels exceed the MCL. MCLs promulgated under the Safe Drinking Water Act are standards applicable to public water supplies at the point of end use.

The second step in development of remediation goals identifies potential site-specific, risk-based concentrations. NDEP's interim action level of 32 micrograms per cubic meter ($\mu g/m^3$) for PCE in indoor air is a risk-based concentration protective of residential exposure to PCE in indoor air corresponding to a cancer risk level of 1 in ten thousand (1E-04) based on the toxicity values for PCE used prior to February 10, 2012. Risk-based concentrations are typically calculated in the absence of promulgated regulatory requirements for protection of a particular receptor or exposure pathway in a given medium. Risk-based concentrations for groundwater were calculated for groundwater exposure pathways identified as complete or potentially complete in the Screening Level Human Health Risk Assessment (SLHHRA). The only currently complete or potentially complete exposure pathway identified in the

SLHHRA is vapor migration from contaminants in groundwater to indoor air, resulting in inhalation of potentially contaminated indoor air. The only receptor of concern is the resident.

An increased incidence of cancer less than 1 in one million (1E-06) and a noncancer hazard index (HI) of less than 1 are considered protective for long-term exposure to contaminants. These values are also considered the point-of-departure dictating corrective action, and are the bases for Regional Screening Levels (RSL). Calculation of risk-based concentrations in groundwater protective of indoor air concentrations at a target cancer risk of 1E-06 and noncancer HI of 1 are necessary to establish the remediation goals for groundwater at the Site. An indoor air remediation goal for PCE of 9.4 $\mu g/m^3$ is based on 1E-06 carcinogenic risk, and equates to a noncancer HI of 0.22. The indoor air remediation goal applies to properties between the eastern boundary of the Boulevard Mall and Eastern Avenue.

The third step to establish remediation goals is consideration of laboratory PQLs. The PQL is the lowest concentration that can be reliably measured within specified limits of precision and accuracy by individual analytical methods under routine laboratory conditions. Numeric remediation goals cannot be set below the laboratory PQL because concentrations lower than the PQL cannot be reliably measured. If the risk-based concentration is found below the analytical PQL, the PQL will supersede the risk-based concentration as the remediation goal. Laboratory PQLs are low enough to detect PCE, TCE, and vinyl chloride concentrations in groundwater associated with an indoor air inhalation risk level of 1E-06 and non-cancer HI equal to 1; thus, further consideration of PQLs is not necessary.

The final step in remediation goal development compares the values generated by the previous three steps. The groundwater action levels based on consumption or domestic use of groundwater are not appropriate for the shallow groundwater in the residential area west of Eastern Avenue, because shallow groundwater is not used as a domestic water supply in this area. No action levels have been promulgated for contaminant migration from groundwater to indoor air. PQLs for the COCs are not a concern because the commonly available analytical methods can accurately detect concentrations below a 1E-06 risk level. Thus, the lower of the risk-based concentrations associated with a 1E-06 cancer risk level or a noncancer HI equal to 1 are the appropriate remediation goals for the Site and provide the criterion for design and implementation of the corrective action for the Site.

The remediation goals for groundwater at the Maryland Square PCE Site are based on the potential for vapor intrusion into houses above the plume of contaminated groundwater. Thus, risk-based groundwater concentrations protective of indoor concentrations were calculated. The remediation goal requires determination of the contaminant concentrations in groundwater that result in indoor air concentrations from vapor intrusion that are below levels of concern considering conditions at the site. The EPA version of the Johnson and Ettinger (J&E) Model (1991) can estimate risk-based groundwater concentrations based on a user-defined target cancer risk and non-cancer hazard quotients. The EPA version of the J&E model [GW-ADV-Feb04, Version 3.1 (EPA 2004)] was used to calculate the remediation goal for the site.

The calculated remediation goals for the COCs based on inhalation of contaminated indoor air are listed in Table 1. Discussion of the model assumptions, inputs, and uncertainty and sensitivity appears in the following sections.

Table 1 - Remediation Goals for Groundwater between the Boulevard Mall and Eastern Avenue at Maryland Square PCE Site[1]

CAS No.	Chemical	Calculated Remediation Goal for Groundwater based on Vapor Intrusion Pathway (µg/L)[2]	NDEP-Required Remediation Goal for Groundwater based on Vapor Intrusion Pathway (µg/L)[3]
127184	Tetrachloroethene	276	100[4]
79016	Trichloroethene	23	23
75014	Vinyl chloride	5.0	5.0

Notes:

1 Applicable only to residential area between the Boulevard Mall and Eastern Avenue. The point of compliance for the remediation goal for groundwater is the eastern edge of the Boulevard Mall property.

2 Calculated based on site-specific parameters and the Johnson and Ettinger Model.

3 Because of the heterogeneity in subsurface soils, none of the modeled scenarios may accurately represent existing conditions. Therefore, a PCE concentration of 100 µg/L was selected by NDEP as the remediation goal for groundwater (NDEP 2013). This remediation goal is based on the NDEP's experience at other sites in Nevada and is expected to reduce PCE concentrations in indoor air below 9.4 micrograms per cubic meter.

4 If after 5 years of remediation the indoor air remediation goal has been attained but the groundwater remediation goal of 100 µg/L has not yet been attained, the NDEP will consider remediation complete or relaxing the preliminary remediation goal for groundwater based on empirical data.

CAS Chemical Abstracts Service
NDEP Nevada Division of Environmental Protection
µg/L Micrograms per liter

3.1 J&E Model Assumptions

The J&E Model incorporates both convective and diffusive mechanisms for estimating transport of contaminant vapors emanating from groundwater into buildings above the source of contamination. The J&E Model uses a number of assumptions regarding contaminant distribution and occurrence, subsurface characteristics, transport mechanisms, and building construction. Among the J&E Model assumptions are:

- Contamination is homogeneously distributed in the contaminated groundwater.
- Contamination does not undergo chemical or biological transformations between the source and the air.
- Contamination is homogeneously distributed through the indoor air in a house.

3.2 J&E Model Inputs

Inputs to the J&E Model include chemical properties of the contaminant, properties of saturated and unsaturated soils, and structural properties of the building. Current EPA chemical-specific properties and toxicity values (EPA 2012) for the COPCs were used in the model. Site-specific parameters (e.g., soil type, average depth to groundwater, average groundwater temperature) were used if available; otherwise, conservative default parameters were used.

Information from the soil boring for monitoring well MW-18 (Figure 1) was used as the basis for site-specific soil type, average depth to groundwater, and average groundwater temperature. This well was selected because, historically, it has shown the highest PCE concentrations in groundwater underlying the residential area, as well as the shallowest depth to groundwater in the residential area.

The boring log for MW-18 and the Site's geologic cross section are not completely consistent. The cross section (Figure 2) was used for identifying the soil strata because it resulted in more protective assumptions for soil type. The input parameters used in the J&E model to calculate the remediation goals, along with the rationale for selection of the inputs, are presented in Table 2. Attachment 1 provides the J&E Model data enter form and the output from the model.

Table 2 - Remediation Goal J&E Model Input Parameters and Rationale for Selection of Parameter

Parameter Name	Parameter Abbreviation	Value	Units	Rationale	Source
Groundwater temperature	T_S	24.7	°C	Average temperature of groundwater samples collected May 2005 to March 2013.	Cardno 2013
Distance below grade to bottom of enclosed space floor	L_F	15	cm	Default for slab-on-grade construction	EPA 2004
Depth below grade to water table	L_{WT}	367	cm	Average depth to groundwater determined from samples collected May 2005 to March 2013.	Cardno 2013
Thickness of soil stratum A	h^A	203	cm	Thickness of upper layer above estimated capillary fringe of 163 cm. Model requires that Stratum A be less than the distance between the water table and the top of the estimated capillary fringe.	Tetra Tech 2011 and EPA 2004
Thickness of soil stratum B	h^B	164	cm	Thickness of second soil layer between top of capillary fringe (estimated at 163 cm) and top of water table.	Tetra Tech 2011
Soil stratum directly above water table	--	B	--	Stratum B is above water table.	Tetra Tech 2011
SCS soil type directly above water table	--	SI	--	Soil type above water table is silt.	Tetra Tech 2011
Stratum A SCS Soil Type	--	S	--	Sand based on upper layer near MW-18.	Tetra Tech 2011
Stratum A soil dry bulk density	ρ_b^A	1.66	g/cm^3	Default for sand	EPA 2004
Stratum A soil total porosity	n^A	0.375	unitless	Default for sand	EPA 2004
Stratum A soil water-filled porosity	θ_w^A	0.054	cm^3/cm^3	Default for sand	EPA 2004
Stratum B SCS soil type	--	SI	--	Silt based on second layer below asphalt near MW 18.	Tetra Tech 2011
Stratum B soil dry bulk density	ρ_b^B	1.35	g/cm^3	Default for silt	EPA 2004
Stratum B soil total	n^B	0.489	unitless	Default for silt	EPA 2004

Parameter Name	Parameter Abbreviation	Value	Units	Rationale	Source
porosity					
Stratum B soil water-filled porosity	θ_w^B	0.167	cm^3/cm^3	Default for silt	EPA 2004
Enclosed space floor thickness	L_{crack}	10	cm	Default for slab-on-grade construction	EPA 2004
Soil-bldg. pressure differential	ΔP	40	$g/cm\text{-}s^2$	Default	EPA 2004
Enclosed space floor length	L_B	1000	cm	Default	EPA 2004
Enclosed space floor width	W_B	1000	cm	Default	EPA 2004
Enclosed space height	H_B	244	cm	Default for slab-on-grade construction	EPA 2004
Floor-wall seam crack	WB	0.1	cm	Default	EPA 2004
Indoor air exchange rate	ER	0.25	1/hr	Default	EPA 2004
Averaging time for carcinogens	AT_C	70	yrs	Default for lifetime exposure	EPA 1996
Averaging time for non-carcinogens	AT_{NC}	30	yrs	Default	EPA 1996
Exposure duration	ED	30	yrs	Default	EPA 1996
Exposure frequency	EF	350	days/year	Default	EPA 1996
Target risk for carcinogens	TR	1E-06	unitless	Default	
Target hazard quotient for non-carcinogens	THQ	1	unitless	Default	

Notes:

°C	Degrees Celsius
Cardno	Cardno ATC
cm	Centimeter
cm^3/cm^3	Cubic centimeter per cubic centimeter
EPA	United States Environmental Protection Agency
$g/cm\text{-}s^2$	Grams per centimeter per second squared
g/cm^3	Grams per cubic centimeter
hr	Hour
J&E	Johnson and Ettinger
Tetra Tech	Tetra Tech EM Inc.
yrs	Years

Table 3 - Chemical Properties Used in the J&E Model

CAS No.	COPC	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Pure component water solubility, S (mg/L)	Henry's law constant H' (unitless)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)
75014	Vinyl chloride	2.17E+01	1.07E-01	1.20E-05	8.80E+03	1.14E+00	2.78E-02
79016	Trichloroethylene	6.07E+01	6.87E-02	1.02E-05	1.28E+03	4.03E-01	9.85E-03
127184	Tetrachloroethylene	9.49E+01	5.05E-02	9.46E-06	2.06E+02	7.24E-01	1.77E-02
156592	cis-1,2-Dichloroethylene	3.96E+01	8.84E-02	1.13E-05	6.41E+03	1.67E-01	4.08E-03
156605	trans-1,2-Dichloroethylene	3.96E+01	8.76E-02	1.12E-05	4.52E+03	1.67E-01	4.08E-03

Notes:

CAS no.	Chemical Abstract Service Number
COPC	Contaminant of potential concern
cm^3/g	Cubic centimeter per gram
cm^2/s	Square centimeter per second
mg/L	Milligrams per liter
$atm\text{-}m^3/mol$	Atmosphere cubic meter per mole

Source: EPA 2012

3.3 Uncertainties in the Remediation Goal

The primary uncertainty in the J&E Model is the assumption that chemical concentrations in groundwater are not decreased by transport of the chemical to the surface. The J&E Model ignores attenuating factors such as hydrolysis, photolysis, and biological degradation that reduce contaminants' concentrations as these migrate to indoor air. These assumptions are likely valid for this Site. For these reasons, the model serves as a protective screening tool for assessing potential indoor air concentrations and risks.

The J&E Model is not able to account for spatial variability in concentrations of subsurface vapors caused by heterogeneities in the subsurface materials or other factors such as preferential pathways that can result in spatial variability in indoor air concentrations. Uncertainties exist due to the heterogeneous lithology of the geologic deposits across the site. Moreover, the model is not able to adjust for building-specific characteristics or occupants' activities that affect building ventilation, further adding uncertainty associated with temporal variability in indoor air concentrations. These factors could result in the model overestimating or underestimating the actual attenuation factor between the subsurface concentration and the indoor air concentration.

There are also toxicological uncertainties, which primarily relate to the methodology by which inhalation unit risk and reference concentrations are developed. In general, the methodology currently used to develop inhalation unit risk and reference concentrations is conservative and likely results in an

overestimation of human toxicity (EPA 1989). Thus, use of these toxicity values in calculation of the remediation goal for groundwater is also protective.

3.4 Model Sensitivity to Selected Input Parameters

The results of the J&E Model, and in this case the remediation goals for groundwater, vary depending on the input parameters used in the model. The site-specific inputs used to calculate the remediation goal include soil type, depth to groundwater, and groundwater temperature. The input parameters from MW-18 were selected as the site-specific input parameters expected to result in a protective (lower) remediation goal because of this well's historically higher PCE concentrations and shallow groundwater level. Moreover, MW-18 has sand as the soil type adjacent to the building foundation. Building parameters were held constant at default values because site-specific building parameters are not available. Table 3 presents the changes in input parameters and calculated remediation goal for PCE to demonstrate the J&E Model's sensitivity to the range of site-specific input parameters. Attachment 2 provides the J&E Model data entry table and results for the scenarios evaluated.

From the results of the sensitivity analysis it is evident that the soil type is of upmost importance to the calculation of the remediation goal, and dependent upon the soil type used in the model the results can vary significantly. Heterogeneity in the soil type and lithology also create a significant amount of uncertainty in the calculation of the remediation goal.

Table 4 - Sensitivity of Calculated Risk-based Groundwater Concentration to Input Parameters

Scenario	Soil Type	Depth to Ground-water (cm)	Ground-water Temperature (°C)	Soil Moisture (θw) (cm^3/cm^3)	Risk-based Groundwater Concentration (µg/L)	Change in Value
MW-18 averages (Remediation Goal)	Sand/Silt	367	24.7	Sand = 0.054 Silt = 0.167	276	--
MW-18 averages, minimum depth to groundwater	Sand/Silt	266	24.7	Sand = 0.054 Silt = 0.167	274	-1%
MW-18 averages, maximum groundwater temperature	Sand/Silt	367	29.3	Sand = 0.054 Silt = 0.167	221	-20%
MW-18 averages, dry soil conditions	Sand/Silt	367	24.7	Sand = 0.02 Silt = 0.12	275	-1%
MW-18 "worst-case"	Sand/Silt	266	29.3	Sand = 0.02 Silt = 0.12	219	-21%
MW-18 averages, change in soil type	Silt/Silt	367	24.7	Sand = 0.054 Silt = 0.167	317	+15%
MW-25 averages (well closest to highest indoor air concentrations)	Silt/Silt	582	24.0	Sand = 0.054 Silt = 0.167	338	+22%
All MWs within 100 µg/L PCE plume in residential area, averages (except MW-18 soil type)	Sand/Silt	515	24.0	Sand = 0.054 Silt = 0.167	290	+5%
MW-18 averages, assume all sand	Sand	367	24.7	Sand = 0.054 Silt = 0.167	22	-92%
MW-18 averages, assume sandy loam	Sandy Loam	367	24.7	Sand = 0.054 Silt = 0.167	135	-51%
All MWs within 100 µg/L PCE plume in residential area, averages (except loamy sand soil type)	Loamy Sand	515	24.0	Sand = 0.054 Silt = 0.167	58	-79%

Notes:

"worst-case" includes most shallow groundwater depth measured at MW-18, highest groundwater temperature measured at MW-18, and assumption of soil moisture at permanent wilting point.

cm Centimeter
cm^3/cm^3 Cubic centimeter per cubic centimeter
°C Degrees Celsius
µg/L Micrograms per liter
% Percent

3.4.1.1 Depth to Groundwater

Because the J&E Model assumes depth to groundwater remains constant, the most appropriate depth to groundwater is an average value. Depth to groundwater data have been collected at MW-18 over the course of 8 years. The shallowest depth to groundwater in this monitoring well and all residential area wells was observed during the first sampling event. Since that time, depth to groundwater has increased. Inserting the smallest depth to groundwater (8.71 feet—worst case) measured in the residential areas into the model, and keeping everything else constant, resulted in a 1% decrease in the calculated remediation goal to 274 micrograms per liter (µg/L). Thus, depth to groundwater, in the range observed within the residential area, does not greatly affect the calculated risk-based remediation goal.

3.4.1.2 Groundwater Temperature

Input of groundwater temperature for the J&E Model is used to correct the chemical-specific Henry's Law constant. Insertion of the highest groundwater temperature measured in the residential area (29.3 degrees Celsius [°C]—worst case) into the model, and keeping everything else constant, resulted in a remediation goal of 221 µg/L, a 20% percent decrease in the calculated remediation goal. This groundwater temperature input is specified to be an average temperature in the EPA version of the model (EPA 2004). The average groundwater temperature at all wells within the residential area (MW-18, -23, -25, -26, -27, -32, -36, and -39) over the 8 years of data is 24°C, while the average temperature at MW-18 is 24.7°C. Use of the highest groundwater temperature is not representative of long-term site conditions, and is thus not an appropriate value to assess long-term exposure to groundwater contaminants migrating to indoor air.

3.4.1.3 Dry Soil Conditions

Nevada's climate is dry and hot which may result in drier soil conditions than default soil moisture values used in the J&E model. The potential maximum and minimum amounts of moisture held in a soil depends primarily on the soil texture (mix of sand, silt, and clay size particles) and density of the soil, and is a function of the soil's total volume of pore space. Moisture is retained in soils at different tensions or potentials ranging from saturation (essentially all pores are filled with water) to hygroscopic (water molecules adsorbed to soil colloids). To model dry soils using the J&E model, the soil moisture level known as the "permanent wilting point" was used for the sand and silt soil layers. The permanent wilting point is defined as soil moisture content at which a plant cannot remove water from the soil, wilts, and cannot recover. There is soil moisture retained at the permanent wilting point but the soil moisture is held very tightly and is unavailable for use by most plants. Soils at permanent wilting point will appear dusty and dry (UNSW 2007). Use of parameters to represent dry soil conditions results in a remediation goal of 275 µg/L. This value is a 1% percent decrease in the calculated remediation goal.

3.4.1.4 "Worst-case" Conditions

The "worst-case" conditions for vapor intrusion to houses in the Paradise Palms neighborhood includes use of the shallowest depth to groundwater, the highest groundwater temperature measured in the residential and the assumption that the soils are very dry. Use of parameters to represent "worst-case" conditions results in a remediation goal of 219 µg/L. This value is a 21% percent decrease in the

calculated remediation goal. Use of the highest groundwater temperature and shallowest groundwater depth are not representative of long-term site conditions, and thus use of these values to assess long-term exposure to groundwater contaminants migrating to indoor air is not appropriate.

3.4.1.5 Soil Type

The J&E Model assumes that soil is homogeneous in any horizontal plane and that stratigraphy does not influence flow direction (i.e., vapors flow upward). The model allows inclusion of up to three soil layers. Soil properties are very important in calculating the vapor flow from the soil to the building. Soil moisture parameters are calculated by the model based on the soil type selected. Conservative inputs have been estimated or inferred from available data for soil types. Assuming presence of sand in the uppermost soil layer is protective because properties of sand increase likelihood of higher levels of vapor intrusion to a house. Replacing the soil type with silt is potentially supported based upon the MW-18 boring log. Use of silt as the upper soil layer results in a calculated remediation goal of 317 µg/L, a 17% higher value than when sand is used as the soil type.

If soil type is assumed to be all sand to the water table, then the calculated remediation goal is reduced to 22 µg/L (92% lower); and if the soil type is assumed to be sandy loam the remediation goal is reduced to 135 µg/L (51% lower).

3.4.1.6 Use of Site-specific Parameters from MW-25

As a comparison, input parameters from MW-25 were used in the J&E Model to calculate a remediation goal. MW-25 is the monitoring well closest to the highest indoor air concentration measured, and is closer than MW-18 to the majority of houses that exceed the indoor air action level. The soil type at MW-25 is silt from the surface to the groundwater table; the average depth to groundwater at MW-25 is 19 feet; and the average groundwater temperature is 24.0 °C. When based on the site-specific input parameters from MW-25, the calculated remediation goal for PCE is 338 µg/L. This remediation goal is 22% higher (less protective) than the remediation goal calculated using input parameters from MW-18. This result is primarily due to the soil type present at MW-25 versus that at MW-18. Thus, while indoor air concentrations are higher nearer MW-25, the inputs from this monitoring well result in a less protective remediation goal.

3.4.1.7 Use of Average Values from all Monitoring Wells above the 100 µg/L Groundwater Contamination Plume in the Residential Area

Because exposure to the groundwater contaminants migrating to indoor air occurs over many years, average concentrations are the most representative of potential exposures. The 100 µg/L PCE groundwater contour has been used to identify the houses within the area of concern for vapor intrusion. Averaging the depth to groundwater and temperature inputs from all the monitoring wells within the 100 µg/L PCE groundwater contour within the residential area (MW-18, -23, -25, -26, -27, -32, -36, and -39), and using these values in the J&E Model with the soil types/depths from MW-18, results in a remediation goal of 290 µg/L. This value is 5% higher (less protective) than the remediation goal calculated using MW-18 for the site-specific input parameters.

The measured water-filled porosity from sample SVB-09-08, which was collected near MW-18, suggests that the appropriate soil type is loamy sand. If the soil is assumed to be loamy sand to the water table but assuming the average values over all monitoring well, the calculated remediation goal is 58 µg/L, a 79% lower value than when silt and sand are assumed for the soil type.

4 REFERENCES

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FIGURES

Figure 1 Monitoring Well 18 Boring Log

URS

BOREHOLE LOG
MW-18



Al Phillips The Cleaner
Maryland Square Shopping Center
Subsurface Investigation
Las Vegas, Nevada

Project No. 2698724.00005

Date Started:	3/10/05
Date Completed:	3/10/05
Drilling Company:	WDC Exploration
Drilling Method:	Hollow Stem Auger
Sampling Method:	None
Logged By:	Scott Ball

Depth in Feet	Time (0100 hrs)	Sample	Well Material Log	PID/FID (ppm)	Sample Number	USCS/Other	Graphic Log	SOIL DESCRIPTION
0	0834							Asphalt
1–3						ML		0'-3' Gravely SILT: lt. tan
3–7						ML		3'-7' color change to lt. brn
7–15						ML		7'-15' Sandy SILT: lt. tan, sl. moist to v. moist
15–16						Cali che		15'-16' CALICHE: wht, tan, v. hard, v. moist
16–25						ML		16'-27' SILT: brn, v. moist

Well: MW-18
Elev.: 1,962.87



Remarks/Well Information

WELL CONSTRUCTION
Date Compl.: 3/14/05
Comp. Rep: S. Ball

SURFACE COMPLETION
Type: Flush Mount
Vault: Traffic
Diameter: 12"
Seal: Concrete
Depth: 0'-1'

WELL CASING
Material: PVC
Diameter: 4"
Depth: 0'-5'
Joints: flush

WELL SCREEN
Material: PVC
Diameter: 4"
Depth: 5'-25'
Joints: flush
Opening: 0.02" slotted
Cap: expanding

SAND FILTER PACK
Type : Montgomery
Size: 3
Depth: 4'-27'

ANNULUS SEAL
Sand Pack: bentonite
Depth: 3'-4'
Borehole: concrete
Depth: 0'-3'

REMARKS
No sampling was performed
Borehole was drilled an a
Monitor well was installed.

Figure 1 Monitoring Well 18 Boring Log - continued

URS

BOREHOLE LOG
MW-18



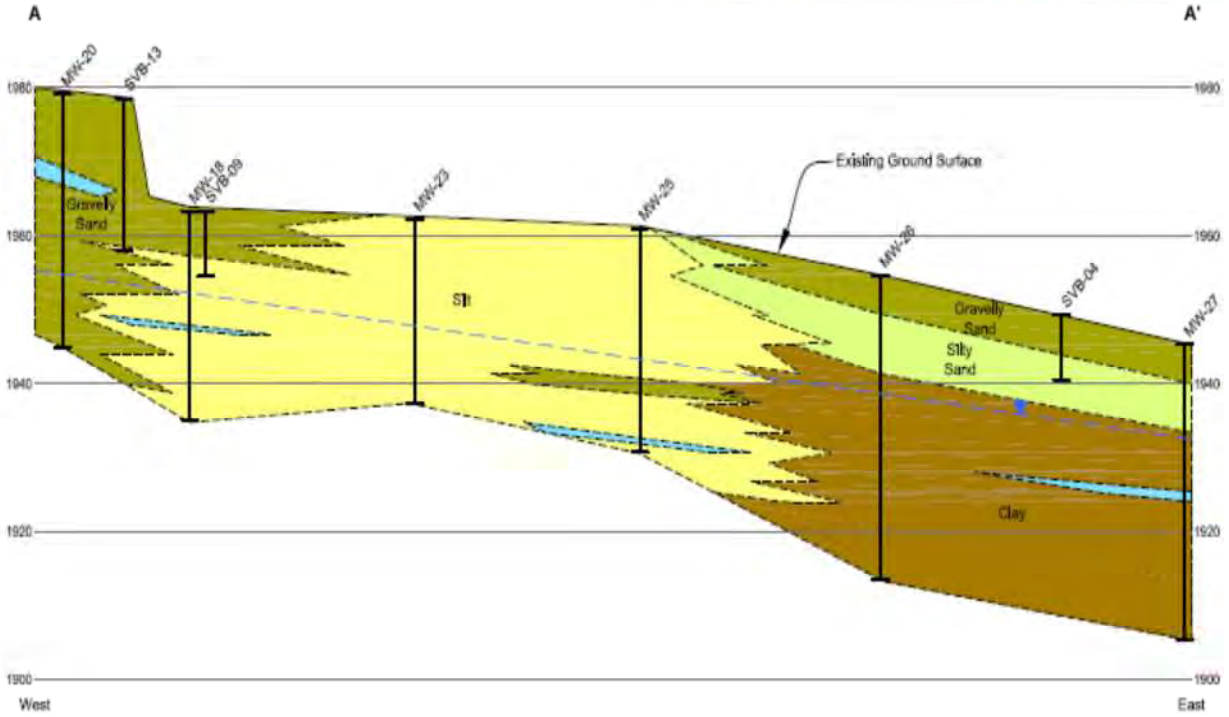
Al Phillips The Cleaner
Maryland Square Shopping Center
Subsurface Investigation
Las Vegas, Nevada

Project No. 2698724.00005

Date Started: 3/10/05
Date Completed: 3/10/05
Drilling Company: WDC Exploration
Drilling Method: Hollow Stem Auger
Sampling Method: None
Logged By: Scott Ball

Depth In Feet	Time (0100 hrs)	Sample	Well Material Log	PID/FID (ppm)	Sample Number	USCS/Other	Graphic Log	SOIL DESCRIPTION	Well: MW-18 Elev.: 1,962.87	Remarks/Well Information
26	118					ML		same as above		
27								Bottom of borehole @ 27' bgs. Groundwater encountered at Approximately 9' bgs.		
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
41										
42										
43										
44										REMARKS
45										
46										
47										
48										
49										
50										
51										





Legend

- Approximate April 2007 Groundwater Surface
- Gravelly Sand
- Caliche
- Silty Sand
- Silt
- Clay

Source: URS 2007

0 100 200
Horizontal Scale in Feet

0 10 20
Vertical Scale in Feet

MARYLAND SQUARE SHOPPING CENTER
3661 South Maryland Parkway
Las Vegas, Nevada

Figure 2
Geologic Cross Section A – A'

TETRA TECH

ATTACHMENT 1

Johnson and Ettinger Model Data Enter Form and Results for Remediation Goal

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES: X

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES:

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
127184		Tetrachloroethylene

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
24.7	15	367	203	164	0	B	SI	S		

MORE ↓

ENTER Stratum A SCS soil type	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
Lookup Soil Parameters				Lookup Soil Parameters				Lookup Soil Parameters			
S	1.66	0.375	0.054	SI	1.35	0.489	0.167	SI	1.35	0.489	0.167

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm-s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	244	0.1	0.25	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (μg/L)	Indoor exposure groundwater conc., noncarcinogen (μg/L)	Risk-based indoor exposure groundwater conc., (μg/L)	Pure component water solubility, S (μg/L)	Final indoor exposure groundwater conc., (μg/L)
2.76E+02	1.23E+03	2.76E+02	2.06E+05	2.76E+02

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)
MESSAGE: The values of Csource and Cbuilding on the INTERCALCS worksheet are based on unity and do not represent actual values.

SCROLL DOWN TO "END"

END

DATA ENTRY SHEET

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES: X

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES:

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
79016		Trichloroethylene

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
24.7	15	367	203	164	0	B	SI	S		

MORE ↓

ENTER Stratum A SCS soil type	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
Lookup Soil Parameters				Lookup Soil Parameters				Lookup Soil Parameters			
S	1.66	0.375	0.054	SI	1.35	0.489	0.167	SI	1.35	0.489	0.167

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm-s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	244	0.1	0.25	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (μg/L)	Indoor exposure groundwater conc., noncarcinogen (μg/L)	Risk-based indoor exposure groundwater conc., (μg/L)	Pure component water solubility, S (μg/L)	Final indoor exposure groundwater conc., (μg/L)
2.30E+01	8.09E+01	2.30E+01	1.28E+06	2.30E+01

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)
MESSAGE: The values of Csource and Cbuilding on the INTERCALCS worksheet are based on unity and do not represent actual values.

SCROLL DOWN TO "END"

END

DATA ENTRY SHEET

GW-ADV Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES: X

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES:

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
75014		Vinyl chloride (chloroethene)

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
24.7	15	367	203	164	0	B	SI	S		

MORE ↓

ENTER Stratum A SCS soil type	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
Lookup Soil Parameters				Lookup Soil Parameters				Lookup Soil Parameters			
S	1.66	0.375	0.054	SI	1.35	0.489	0.167	SI	1.35	0.489	0.167

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	244	0.1	0.25	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (μg/L)	Indoor exposure groundwater conc., noncarcinogen (μg/L)	Risk-based indoor exposure groundwater conc., (μg/L)	Pure component water solubility, S (μg/L)	Final indoor exposure groundwater conc., (μg/L)
4.96E+00	9.35E+02	4.96E+00	8.80E+06	4.96E+00

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)
MESSAGE: The values of Csource and Cbuilding on the INTERCALCS worksheet are based on unity and do not represent actual values.

SCROLL DOWN TO "END"

END

ATTACHMENT 2

Johnson and Ettinger Model Data Enter Form and Results for Sensitivity Analysis

DATA ENTRY SHEET

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES: X

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES:

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
127184		Tetrachloroethylene

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
24.7	15	367	203	164	0	B	SI	SI		

MORE ↓

ENTER Stratum A SCS soil type	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
Lookup Soil Parameters				Lookup Soil Parameters				Lookup Soil Parameters			
SI	1.35	0.489	0.167	SI	1.35	0.489	0.167	SI	1.35	0.489	0.167

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm-s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	244	0.1	0.25	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (μg/L)	Indoor exposure groundwater conc., noncarcinogen (μg/L)	Risk-based indoor exposure groundwater conc., (μg/L)	Pure component water solubility, S (μg/L)	Final indoor exposure groundwater conc., (μg/L)
3.17E+02	1.41E+03	3.17E+02	2.06E+05	3.17E+02

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)
MESSAGE: The values of Csource and Cbuilding on the INTERCALCS worksheet are based on unity and do not represent actual values.

SCROLL DOWN TO "END"

END

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES: X

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES:

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
127184		Tetrachloroethylene

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
24.7	15	265	101	164	0	B	SI	S		

MORE ↓

ENTER Stratum A SCS soil type	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
Lookup Soil Parameters				Lookup Soil Parameters				Lookup Soil Parameters			
S	1.66	0.375	0.054	SI	1.35	0.489	0.167	SI	1.35	0.489	0.167

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm-s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	244	0.1	0.25	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (μg/L)	Indoor exposure groundwater conc., noncarcinogen (μg/L)	Risk-based indoor exposure groundwater conc., (μg/L)	Pure component water solubility, S (μg/L)	Final indoor exposure groundwater conc., (μg/L)
2.74E+02	1.22E+03	2.74E+02	2.06E+05	2.74E+02

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)
MESSAGE: The values of Csource and Cbuilding on the INTERCALCS worksheet are based on unity and do not represent actual values.

SCROLL DOWN TO "END"

END

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES: X

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES:

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
127184		Tetrachloroethylene

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
29.3	15	367	203	164	0	B	SI	S		

MORE ↓

ENTER Stratum A SCS soil type	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
Lookup Soil Parameters				Lookup Soil Parameters				Lookup Soil Parameters			
S	1.66	0.375	0.054	SI	1.35	0.489	0.167	SI	1.35	0.489	0.167

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm-s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	244	0.1	0.25	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (μg/L)	Indoor exposure groundwater conc., noncarcinogen (μg/L)	Risk-based indoor exposure groundwater conc., (μg/L)	Pure component water solubility, S (μg/L)	Final indoor exposure groundwater conc., (μg/L)
2.21E+02	9.87E+02	2.21E+02	2.06E+05	2.21E+02

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)
MESSAGE: The values of Csource and Cbuilding on the INTERCALCS worksheet are based on unity and do not represent actual values.

SCROLL DOWN TO "END"

END

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES: X

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES:

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
127184		Tetrachloroethylene

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
24.0	15	582	582	0	0	A	SI	SI		

MORE ↓

ENTER Stratum A SCS soil type	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
Lookup Soil Parameters				Lookup Soil Parameters				Lookup Soil Parameters			
SI	1.35	0.489	0.167	SI	1.35	0.489	0.167	SI	1.35	0.489	0.167

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm-s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	244	0.1	0.25	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (μg/L)	Indoor exposure groundwater conc., noncarcinogen (μg/L)	Risk-based indoor exposure groundwater conc., (μg/L)	Pure component water solubility, S (μg/L)	Final indoor exposure groundwater conc., (μg/L)
2.42E+02	1.08E+03	2.42E+02	2.00E+05	2.42E+02

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)
MESSAGE: The values of Csource and Cbuilding on the INTERCALCS worksheet are based on unity and do not represent actual values.

SCROLL DOWN TO "END"

END

DATA ENTRY SHEET

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES: X

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES:

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
127184		Tetrachloroethylene

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
24.0	15	515	351	164	0	B	SI	S		

MORE ↓

ENTER Stratum A SCS soil type	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
Lookup Soil Parameters				Lookup Soil Parameters				Lookup Soil Parameters			
S	1.66	0.375	0.054	SI	1.35	0.489	0.167	SI	1.35	0.489	0.167

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm-s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	244	0.1	0.25	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (μg/L)	Indoor exposure groundwater conc., noncarcinogen (μg/L)	Risk-based indoor exposure groundwater conc., (μg/L)	Pure component water solubility, S (μg/L)	Final indoor exposure groundwater conc., (μg/L)
2.90E+02	1.29E+03	2.90E+02	2.06E+05	2.90E+02

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)
MESSAGE: The values of Csource and Cbuilding on the INTERCALCS worksheet are based on unity and do not represent actual values.

SCROLL DOWN TO "END"

END

APPENDIX H

Response to Comments

APPENDIX H

RESPONSES TO COMMENTS FROM THE STATE OF NEVADA DIVISION OF ENVIRONMENTAL PROTECTION ON THE DRAFT CORRECTIVE ACTION REPORT FOR GROUNDWATER, MARYLAND SQUARE PCE SITE, DATED NOVEMBER 30, 2011

The table below contains the responses to comments received from the NDEP on the Draft Corrective Action Report (CAR) for Groundwater (dated June 14, 2013). The comments addressed below were received from NDEP on July 12, 2013, in a letter from Mary Siders, Ph.D., Bureau of Corrective Actions, Nevada Division of Environmental Protection (NDEP). On July 24, 2013, a meeting was held between the NDEP, the Nevada Attorney General, and representatives of the Herman Kishner Trust. From this meeting, it was decided that NDEP's proposed remediation goals would be incorporated into the CAR and that:

1) *"Contingency for groundwater cleanup: If indoor air standards are met while the groundwater remediation goal of 100 micrograms/liter cleanup has not yet been achieved, then the state is agreeable to modifying the groundwater standard upward.*

2) *Pump and Treat: The state is willing to reword the requirement written in the comment letter, to state that P&T must be considered along with other remedial technologies if the ISCO remedy fails to achieve the remediation goals.*

3) *Contingency for indoor air: If the groundwater standard of 100 micrograms/liter is met at the compliance boundary (east edge of mall property), but the indoor air standard is not met within 5 years of implementing the groundwater remedy, the contractor has the option of installing mitigation systems in homes where the IA standard of 9.4 micrograms per cubic meter is not met."* (email from Ms. Carolyn "Lina" Tanner, Esq,.Senior Deputy Attorney General, Office of the Attorney General to Mr. Steve Parsons and Mr. Bob Russell of Procopio, Cory, Hargreaves & Savitch LLP and to Mr Drew Flynn, dated July 25, 2013)

Comment No.	Comment	Response
	General Comments	
1	The NDEP requests that pumping of groundwater be retained as a contingency for hydraulic containment if the ISCO remedy does not succeed in sufficiently reducing concentrations of PCE and TCE in the shallow groundwater. The evaluation of pumping tests indicated that the sustainable pumping rates and well efficiencies are low and the drawdown is limited. NDEP notes that the pumping tests were conducted at a limited number of locations and at shallow depths compared to the dimensions of the plume targeted for remediation in the area of Boulevard Mall at (approximately 500 feet wide and approximately 60 feet bgs). Low yield and drawdown means that wells need to be closely spaced to capture flow, so this is not an ideal remedy at the site. This does not mean that pumping cannot be retained as part of a contingency plan. A pump and treat hydraulic control and disposal options including re-injection or surface water discharge should be included. This will allow this option to be fully considered as part of the Proposed Plan and Record of Decision process.	Accepted. The text in Section 6.0 has been revised.

Comment No.	Comment	Response
2	Risk should be calculated for the maximally exposed individual. The exposure pathway in the residential neighborhood is inhalation of indoor air contaminated with PCE via the process of vapor intrusion. The NDEP notes that, of the homes sampled, the highest concentration of PCE in indoor air was 110 µg/m^3; this indicates that the maximally exposed individual could be exposed to at least as much as·110 µg/m^3PCE in indoor air, if the home has not been sampled and mitigated. (Note: The home with the II0 µg/m^3result had a mitigation system installed in 2008.) That concentration, which may not be the highest in the neighborhood because of the unknown concentrations in the homes not sampled, equates to a carcinogenic risk of 1.2E-05 and a hazard index to 2.6. Please revise the report to reflect that each home is an exposure unit and that empirical data show that indoor air at the site contains from nondetectable to 110 µg/m^3 PCE. The indoor air sample containing 110 µg/m^3 PCE was collected from a home directly adjacent to well MW-25, which (as of March 2013) contained an average concentration of 775 µg/L PCE (n = 28). Assuming a linear relationship between PCE concentrations in groundwater and indoor air, a groundwater remediation goal of 66 µg/L PCE would be needed to achieve 9.4 µg/m3 in indoor air. Please note this relationship in the report, as it applies to uncertainty.	Accepted. Section 4.1.4 has been added to discuss the risk calculated for the maximally exposed individual A linear relationship between concentrations in groundwater and indoor air may be assumed only when those concentrations represent the same timeframe. The average groundwater concentration from 28 events cannot be related to the indoor air concentration from a single event. Discussion of this relationship and uncertainty were not added to the report

Comment No.	Comment	Response
3	The report proposes a remediation standard of 276 µg/L, developed through use of the EPA's spreadsheets for the J&E model. The NDEP ran the J&E model using the parameters specified in Table G-2 of the CAR and was able to reproduce the results, including the 276 µg/L value. The NDEP accepts use of average depth to groundwater and average temperature of groundwater; however the one variable that is poorly constrained is lithology. The NDEP's simulations using site-specific data in the J&E model showed a range of protective concentrations for PCE in groundwater from 22.3 to 146 µg/L, compared to the range of 221 to 338 µg/L presented in the CAR. This significant difference in calculated values highlights the difficulty of using the J&E model to back-calculate a remediation standard for groundwater that is protective of indoor air for the maximally exposed individual. The moisture content of the soil types controls to a large degree, the predicted concentrations. (Note: The NDEP's specific comments on Appendix G address this issue; see Attachment 2). Please discuss in more detail, the issue of uncertainty related to the heterogeneous lithology at the site and how model results are affected. Based on NDEP's simulations and calculations using site-specific data, the NDEP has selected a PCE concentration of **100 µg/L** for groundwater.	Accepted. The remediation goal for groundwater has been revised to 100 µg/L.
	Specific Comments	
1	Section 1.1, second paragraph, first sentence states that "Historical discharge of PCE at the former dry cleaners facility was discovered during a due diligence ESA (NDEP 2012b), and was reported on November 29, 2000, via the NDEP spill reporting hotline." Please cite the source document, which is an August 22, 2000 report by Converse that was received July 25, 2001 by the NDEP. The Converse report is available at http://ndep.nv.gov/pce/record/2001-07-25.pdf	Accepted. The reference has been revised.
2	Section 2.2.3, second-to-last paragraph states that the "…estimates of K are consistent with the results of slug tests conducted in a number of wells, including MW-13, MW-19, and MW-20, as summarized in Section 3.1.3." The NDEP notes that consistency of the pumping tests with the slug tests performed in 2003/2004 (Converse 2004 http://ndep.nv.gov/pce/record/2004-03-26-a.pdf) provides confidence in estimated rate of contaminant transport. No change to the document is requested.	No changes necessary.
3.	Section 2.2.3, last paragraph states that "the advective velocity of dissolved PCE is expected to range from 30 to 70 ft/yr. Section 3.2.1 further discusses groundwater seepage velocity and PCE transport" The NDEP notes there is no Section 3.2.1 in the draft CAR. Please revise the document to reference the correct section.	Accepted. The text has been revised to reference Section 3.2.2.

Comment No.	Comment	Response
4	Section 3.0, first paragraph, first sentence states "…*available on-line at NDEP's website (http://ndep.nv.gov/pce/maryland_reports.htm and http://ndep.nv.gov/pce/refines.)*" The NDEP notes that first link is fine, but the latter is incorrect and it is unclear what link it was supposed to be. Please revise accordingly.	Accepted. The text has been revised.
5	Section 3.2, first paragraph, last sentence states that "However, about midway through the residential neighborhood, probably because of golf course irrigation, the PCE plume broadens, widening along its northern edge to become about 1,000 feet wide by the time the plume reaches the western edge of the golf course. (Figure 3)." The NDEP requests that the report provide data and analysis to support this statement.	Accepted. The reference to golf course irrigation has been removed and the text revised.
6	Section 5.1, first sentence. Please note that "Adopted Regulation R189-08" has been codified. Please change all references to R189-08 to NAC 445A.22725	Accepted. The text has been revised.
7	Section 5.1 discusses CAOs and remediation goals, stating the following CAOs from the CAP: • *Protect human health by reducing inhalation exposure to PCE and daughter products emanating from groundwater containing PCE concentrations above the remediation goals.* • *Remediate shallow groundwater where PCE concentrations exceed the remediation goal for groundwater to protect indoor air.* Section 5.1 continues: "*Groundwater at the site is not a source of drinking water due to poor water quality; however, groundwater is considered "waters of the state," and regulations require "no degradation" of waters of the state. State records show that domestic water supply wells exist east of Eastern Avenue, more than 6,300 feet from the source area, and some of these wells are screened as shallow as 30 ft bgs (NDEP 2012a)…*" and "*The GW CAP, in conjunction with the IA/WW Work Plan, determined that domestic wells within the described plume boundaries should be identified. Therefore, an additional CAO applies:* • ***"Execute appropriate action to ensure PCE does not exceed risk-based standards in domestic water supply wells."*** On this latter bullet, the NDEP notes that the risk-based standard for PCE in groundwater must be the MCL of **5 µg/L**, as dictated by NAC 445A22735. Please revise the text accordingly.	Accepted. The text has been revised.

Comment No.	Comment	Response
8	Section 5.2, last paragraph states that *"An indoor air remediation goal for PCE of 42 µg/m^3 will be used to verify that the groundwater remediation goal is protective of the VI to indoor pathway. This remediation goal is based on a noncancer HI of 1. The indoor air remediation goal applies to houses between the eastern parking lot of Boulevard Mall and Eastern Avenue."* The remediation standard for indoor air needs to be established for a 1.0E-06 carcinogenic risk, which is the "point of departure" and which EPA has determined to be 9.4 µg/m^3 for PCE in residential indoor air. Use of a different value requires establishment of an alternate remediation goal. The NDEP's interim-action goal of 32 µg/m^3 was based on a carcinogenic risk of 1.0E-04, based on EPA's toxicological data that were available in 2007, when the interim-action level was set. The 42 µg/m^3 corresponds to a carcinogenic risk of 4.5E-06 (4.5 excess cancers per million people) and a hazard index of one (EPA, 2012). Please revise the CAR accordingly.	Accepted. The text has been revised.
9	Table 5-1 provides "Remediation Goals to Protect Residential Indoor Air." Please see NDEP comments on Appendix G, Calculation of Remediation Goals for Groundwater and revise the CAR accordingly.	Accepted. The table has been revised.
10	Section 5.3, first and second sentences state that "State records show that domestic wells may exist east of Eastern Avenue. There is potential for some domestic wells to be in hydraulic communication with contaminated shallow groundwater, **but there is currently no evidence of such**." The NDEP notes that there "is no evidence" because the existence and current use of these wells has not been verified and there are no data for water samples from these wells. Please delete the phrase in bold-face font.	Accepted. The text has been deleted.
11	Section 5.3, mid-paragraph (also Table 5-2). "The risk-based remediation goal of 9.7 µg/L of PCE in groundwater was determined based on an increased incidence of cancer less than 1E-06 and a noncancer HI less than 1." The NDEP notes that the MCL is still set at 5.0 µg/L for PCE and **NAC 445A22735(1)(b)** requires that the MCL be used. The remediation goal for PCE in groundwater east to protect downgradient domestic wells is 5.0 µg/L, not 9.7 µg/L. Please revise the CAR accordingly.	Accepted. The text has been revised.
12	Section 6.0, Evaluation of Corrective Action Alternatives. The NDEP acknowledges that the efficiency of the wells is low, and that numerous closely spaced wells would be required to capture groundwater flow across a transect of the plume. However, although pumping has challenges due to the low yield and limited drawdown and radius of influence, this option needs to remain as a contingency option. Please revise the text accordingly.	Accepted. The text in Section 6.0 has been revised."

Comment No.	Comment	Response
13	Section 7.0, Recommended Corrective Action. The second sentence states that "ISCO will be implemented using one or more of the following chemicals: sodium or potassium permanganate, ozone, and/or hydrogen peroxide." The NDEP notes that, as written, this sentence states that permanganate, ozone, or hydrogen peroxide will be used. The current text is incorrect if what is meant is that "(1) sodium or potassium permanganate or (2) ozone with or without hydrogen peroxide, will be used." The NDEP notes a relatively recent publication (Stroo et al, ES&T, May, 2012) that evaluated remedies for chlorinated ethenes and found that "*ISCO is attractive because it provides rapid in situ destruction, but rebound and incomplete treatment have been consistent problems. ISCO has been marginally successful for chloroethene source treatment. Key limitations have been delivery difficulties, frequent concentration rebounds following treatment, and relatively high costs*." NDEP notes that these are important points to consider during remedy selection, design, and performance monitoring, and requests that the CAR be revised to include a description of these limitations.	Accepted. The text has been revised. Accepted. The text has been revised in Table 6.1. It should be noted that significant limitations also apply to groundwater extraction and treatment; these limitations have also been included in Table 6.1.

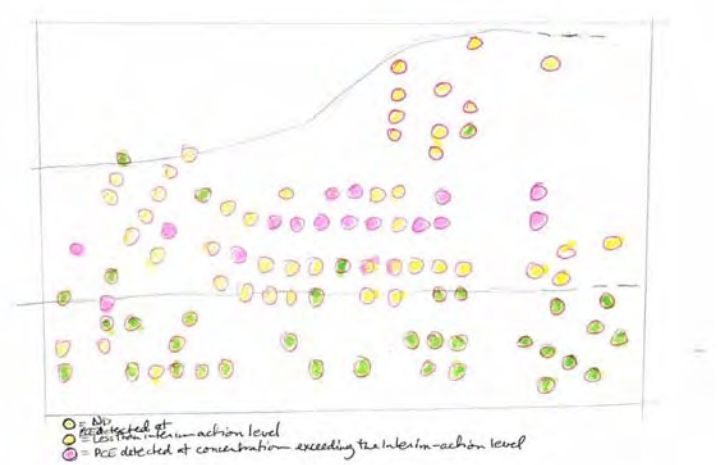
Comment No.	Comment	Response
14	Section 7.3, Compliance Monitoring proposes the following for compliance monitoring: Defines compliance wells as "*monitoring wells within the compliance areas where a COC has been detected above its remediation goal during any of the last four monitoring events*." (Currently, this includes wells MW-18, MW-23, MW-25, MW-26, MW-27, MW-32, MW-38, and MW-39). The NDEP concurs with the listed wells as compliance wells for the remediation standard determined to be sufficiently protective of indoor air, but requests that MW-19 and MW-36 be included. Lists monitoring parameters as "*COCs, dissolved metals, anions, and geochemical field parameters*." The NDEP concurs with the COCs, geochemical field parameters, and any constituents as required by the UIC or other permits. Specifies that "*After corrective action starts, compliance wells will be monitored quarterly for 2 years, semiannually for 2 years, and annually thereafter. Monitoring frequency at a well will not be decreased if concentration of a COC trends upward in that well. Similarly, if concentration of a COC trends upward during annual or semi-annual monitoring, monitoring frequency will be doubled*." The NDEP concurs with the proposed monitoring frequencies and conditions for monitoring. States that "*Indoor air will be monitored as approved by the NDEP under the existing program, and the properties to be monitored will be determined in consultation with the NDEP*." The NDEP concurs with the proposed for monitoring indoor air. NDEP notes that during remedial design, additional data points and process data are likely to be proposed or required as part of monitoring the operational performance of the remedy. The CAR should be revised to briefly describe the need for this additional operational performance monitoring, which is distinct from monitoring achievement of remedial action objectives.	Based on meetings between NDEP, the Nevada Attorney General and representatives of the Herman Kishner Trust, on July 24, 2013, the point of compliance will be the eastern boundary of the Boulevard Mall property. The text and figures have been revised accordingly. Accepted. The text has been revised. No changes necessary. No changes necessary. Section 7.2 describes performance monitoring,
15	Section 7.4, Domestic Water Supply Wells. As noted earlier, **NAC 445A.22735(1)(b)** requires the MCL of 5.0 µg/L be used as the action level.	Accepted. The text has been revised.
16	Section 7.6, Confirmation of Cleanup. States that *"Cleanup will have been achieved when COC concentrations in groundwater and indoor air remain below their remediation goals for four consecutive monitoring events after ISCO stops. Assumedly, ISCO will stop when ozone injection stops, or when the concentration of sodium or potassium permanganate in compliance wells has been below 1 mg/L for 1 year*." The NDEP concurs with this proposal.	No changes necessary.

Comment No.	Comment	Response
17	Section 7.7 Deep Groundwater Protection. "A video survey of irrigation well PW-1 at the Las Vegas National Golf Club revealed damage to the well casing. In its present condition, this well acts as a conduit for contamination of deep groundwater. Therefore, the well owner will be required to repair this well, or plug and abandon it in accordance with NAC 534.427, so that it no longer threatens groundwater quality." The NDEP notes that although **NAC 534.427(3)(b)(5)** states that "The well tends to cause contamination of the groundwater aquifer." Discussions between NDEP and DWR staff have indicated that this statute has not been used as envisioned here, but it seems applicable in the case of golf course irrigation well, PW-1. This use of NAC 534.427(3)(b)(5) is subject to DWR determination and it cannot necessarily be assumed it would apply as stated in the text.	Accepted. The text has been revised.
18.	Section 7.8, Interim Protection of Indoor Air Proposes annual indoor air monitoring and installation of additional SSD systems as needed. NDEP concurs with continuation of annual indoor air sampling and continuation of the SSD systems until concentrations of PCE and TCE in groundwater are reduced such that they no longer pose a threat to residents via the VI pathway. The NDEP also notes that the responsible party must also provide maintenance of the systems.	Accepted. The text has been revised.
19	Section 7.9, Access and Permitting states that access agreements with property owners are needed, as are UIC permits with BWPC and construction/hazardous material permits with Clark County. The NDEP concurs and notes that obtaining such may take considerable time, so access and permits should be requested well in advance of when they are needed.	Noted.
	Comments - Figures	
20	Figure 1. Please find another way to depict this (and fade out the background some). This figure looks like a plume map, so please draw a squared-off box outline rather than the plume-shaped outline now shown. Actually, something like Figure 20 would be more suitable; just draw boxes around "Source and Nonresidential," "Residential VI Compliance," and "Residential Well Compliance" areas.	Accepted. The figure has been revised.
21	Figure 3. Please draw with a 5 µg/L boundary, not a 9.7 µg/L boundary. As noted in the specific comments above, NAC 445A.22735(1)(b) requires that the MCL of 5.0 µg/L be used as the action level. Additionally, the line depicting the remediation goal (276 µg/L proposed in the CAR), may have to be altered, depending on the remediation goal selected.	Accepted. The figure has been revised.
22	Cross Sections, Figures 5, 6, and 7. Just a suggestion, but lithologic information depicted on cross sections is generally easier to follow if there is a "color theme" associated with soil texture. That is, finer-grained materials are shown in shades of greens and blues, whereas sands are shown in shades of yellows and oranges, and coarser (gravels) are shown in shades of pink. The color palette then runs from cool to warmer (finer grained to coarser grained).	Noted.

Comment No.	Comment	Response
23	Figure 7, Cross Section C-C' There seems to be a green color in MW-19D1/D2/D3 that isn't in the key. What does this color mean?	Accepted. The figure has been revised.
24	Figure 19, Groundwater Elevation over Time. Some wells show the annual fluctuation related to golf course irrigation. Please review adequacy of existing data and provide an evaluation of whether drawdown from pumping or infiltration from irrigation is the dominant factor in the fluctuation of the water table.	Based on review of hydrographs for monitoring wells within the golf course it appears that fluctuation of the water table is likely due to drawdown from pumping rather than caused by infiltration from irrigation for the following reasons: (1) the largest amplitude of annual water level fluctuations of up to 7 feet was observed in wells MW-27 and MW-30 closest to the production well PW-1; (2) the highest groundwater elevations were observed in winter months when evapotranspiration is lowest, while the lowest water levels in wells were observed in the fall (at the end of the irrigation season). The shallow groundwater is likely affected by pumping of well PW-1 via a compromised well casing and well seal at shallow depth. It is also likely that most of the irrigation water would not percolate downward as the evaporation is highest during the irrigation season.
Comments - Appendix B - Aquifer testing Report (pg. 158 in pdf)		
25	This section concludes that "within the test areas, PCE migration rate with groundwater is likely to range from 30 to 70 ft/yr" and that "Estimates of hydraulic parameters obtained from the aquifer tests can be used for interpretation of the pilot tests, and for support of groundwater modeling applications and risk assessments." The NDEP concurs with these conclusions.	No changes necessary.
26	The NDEP notes that estimates of hydraulic conductivity from pumping tests conducted for the CAP validate the slug test results (Converse, 2004).	No changes necessary.
27	The NDEP has no additional comments on Appendix B.	No changes necessary.
Comments - Appendix F - Screening Level Human Health Risk Assessment for Residential Indoor Air		

Comment No.	Comment	Response
28	Appendix F, Section 1, Introduction, paragraphs 1 and 2 contain text that the NDEP previously marked for revision in the preliminary draft HHRA. Please go back to those comments and red-lined text and revise this section accordingly. The discussions of liability and who owned what when are not relevant to the risk assessment. *The Maryland Square Tetrachloroethene (PCE) Site is east of downtown Las Vegas, Nevada. Shallow groundwater at the Site contains a PCE plume that extends from the location of the former dry cleaners (Al Phillips the Cleaners), in the former Maryland Square Shopping Center (Figure 1), to approximately 6,000 feet east (downgradient), just east of Eastern Avenue (Figure 2). This plume of PCE-contaminated groundwater extends beneath the Paradise Palms residential neighborhood, more than 1,000 feet downgradient from the source area (Figure 2).*	Accepted. The text has been revised.
29	Appendix F, Section 1, third paragraph, last sentence. Revise to state that "The former dry-cleaning business operated from 1969 to 2000.	Accepted. The text has been revised.
30	Appendix F, Section 1, 4th paragraph. Revise; the soil gas study was **not** performed to delineate the extent of PCE in groundwater. *A series of environmental investigations has taken place at the property and off site in downgradient areas from 2000 to the present. On-site investigations of soil and groundwater beneath the property delineated the extent of PCE-contaminated soil and established the boundary of the contaminated groundwater on and immediately adjacent to the property. Groundwater investigations conducted off the property have delineated the approximate extent of PCE contamination in the shallow groundwater. A soil-gas study was performed in 2007 to assess whether the contaminated groundwater was producing PCE vapors that accumulated in the subsurface environment.*	Accepted. The text has been revised.
31	Appendix F, Section 1, page 2, second complete paragraph states that "*During July and August, 2010, NDEP and the Attorney General worked on drafting an injunction that would satisfy the U.S. District Court.*" This should be rephrased to include the citizen plaintiffs, who initially submitted a proposed injunction on June 30, 2010. This June 30 proposed injunction was rejected by the Court, and the Court sent all parties back to redraft a new proposed injunction. Ultimately, the proposed injunction submitted by the Nevada AG was the version selected and approved by the Court on December 27, 2010.	Accepted. The text has been revised.

Comment No.	Comment	Response
32	Appendix F, Section 2.1.1, Data from Samples of Indoor Air. The classification scheme with 8 groups is very difficult to follow. Please consider preparing a table that simply shows the following: (1) quantitative risk for houses within 100 µg/L contour with detected PCE, (2) quantitative risk for houses outside the 100 µg/L contour with detected PCE, and (3) qualitative risk for houses not sampled, but within the 100 µg/L contour. The table could present the range of estimated risks for each of these three groups. The 8-group analysis may be maintained as is in the detailed analysis, but for management purposes, it would be instructive to have the ranges of risk for the three groups outlined above.	The eight-group analysis is necessary to describe which indoor air sample results were included in the risk assessments and why. Additional text was added to identify the risk range for houses within and outside of the 100 µg/L contour. The qualitative risk assessment assumed that houses without indoor air sampling results had the maximum detected concentration and thus the same estimated risk.
33	Appendix F, Section 2.2.2. The NDEP notes that Figure 4 is essentially a flow chart. An idealized graphic of the CSM for a vapor intrusion site with a plume of contaminated groundwater, and showing source, transport pathway and receptor, is available on NDEP's website at: http://ndep.nv.gov/pce/graphic/vi_process_csm_figure.pdf	Accepted. The vapor intrusion pathway diagram is included in the Appendix as Figure 5.
34	Appendix F, Section 2.4, last paragraph notes that "*the averaging time for addressing noncancer health effects for residents is equal to the exposure duration (in years) times 365 days per year (that is, 10,950 days), as recommended by EPA (1989, 2012).*"	No changes necessary.

Comment No.	Comment	Response
35	Appendix F, Figure 3. The NDEP requests modifying this figure with just the results "floating in space" (i.e., take away street and property boundaries) in order to preserve homeowner privacy (see example sketch below). This figure should ignore which homes have SSD systems and use the highest concentration of PCE detected in indoor air to group data into one of three groups: green = PCE not detected in indoor air; yellow = PCE detected at concentration less than the interim-action level of 32 µg/m3; and pink = PCE detected at concentration exceeding the interim-action level; home mitigation system offered to property owner.  	Figure 3 will be redacted in the report distributed to the public. The suggested groupings were not used in the risk assessment process or results; therefore, the figure has not been created and included in the report.
Editorial Comments		
1	Correct formatting of Table 2-1-1.	Accepted. The table has been revised.

Comment No.	Comment	Response
2	Section 3.0, complete first paragraph, states that "*Elements of the conceptual site model (CSM) have been provided in a series of reports prepared for the site and are available on-line at NDEP's website…These reports develop the CSM based on additional information collected for site geology, hydrogeology, and the vertical delineation of PCE in groundwater throughout the course of this investigation during summer 2012 and winter-spring 2013.*" The reference to "these reports" is vague because it seems to refer to the previous "series of reports," but then switches to "summer 2012 and winter-spring 2013." Additionally, the NDEP's Maryland Square website has contained a figure depicting the VI process, showing source, transport, and exposure within a home. This constitutes a preliminary CSM, with additional information provided in site reports. Also suggest a short definition of a CSM. See suggested text below: *A conceptual site model (CSM) describes the contaminant source, mechanism of transport, and exposure pathway at a contaminated site. A preliminary CSM was developed in the early stages of Maryland Square investigation, and has been periodically refined and updated as more information has been collected. The NDEP's website for the Maryland Square PCE Site provides a simplified figure showing the vapor intrusion process and how chemicals released in one place migrated in groundwater to affect homes more than 1,000 feet from the source area (*http://ndep.nv.gov/pce/graphic/vi_process_csm_figure.pdf *). This CSM figure, as well as previous reports describing details of site investigations are available on-line at NDEP's website (*http://ndep.nv.gov/pce/maryland_reports.htm *). Additional information collected for site geology, hydrogeology, and the vertical delineation of PCE in groundwater throughout the course of the investigations and pilot testing during summer 2012 and winter-spring 2013 are used here to further refine the CSM for the Maryland Square PCE Site.*	Accepted. The text has been revised.
3	Section 3.2, second and third paragraphs. Suggest a subsection, because paragraph 3 does not naturally progress out of paragraph 2. Perhaps the following subsections would help direct the reader's attention: 3.2.1 - History of Groundwater Investigations at the Site 3.2.2 - Migration of the PCE Plume 3.2.3 - Estimate of PCE Mass	Accepted. The text has been revised.
4	Section 4.1.1, first paragraph, first sentence. Take the first sentence and move it to the end of the paragraph. The second sentence is really your topic sentence; it immediately tells the reader the most critical point; that "*None of the houses in the quantitative evaluation had an estimated potential incremental cancer risk exceeding the 1 in 10,000 (1E-04) action level.*"	Accepted. The text has been revised.

Comment No.	Comment	Response
5	Section 4.1.2, first paragraph, first sentence. Take the first sentence and move it to the end of the paragraph. The second sentence is really your topic sentence; it immediately tells the reader the most critical point that "*No houses had an estimated noncancer hazard greater than the action level of 1.*"	Accepted. The text has been revised.
Comments - Appendix G - Screening Level Human Health Risk Assessment for Residential Indoor Air		
1	Appendix G, Section 1.2, bullet 1 states "*…as amended under Adopted Regulation R189-08.*" The NDEP notes that this regulation has been codified; **please update with the correct reference**, **NAC 445A.22725**, (also see NAC 445A.22735 through 22745 for additional information).	Accepted. The reference was corrected.
2	Appendix G, page 2, first paragraph states "*The first step identified potential regulatory standards potentially applicable to a release to groundwater from a property. Groundwater is "waters of the state," (NRS 445A.415) and NDEP asserts that regulations require "no degradation" of waters of the state (NDEP 2011a). However, Section 14 of Revised Proposed [and adopted] Regulation R189-08, issued by the NDEP Bureau of Corrective Actions, prescribes the criteria required to conclude corrective action activity, that relies, in part, on source control; interruption to, or remediation of, exposure pathways; and the likely use of groundwater.*" **Please update with the correct reference**, **NAC 445A.22725**, (also see NAC 445A.22735 through 22745 for additional information). The statute allows an owner/operator to "*submit a written request for exemption from the provisions of subsection 1*" and states that the "*Director **may** grant the request* **if** a number of conditions are fulfilled to the satisfaction of the NDEP.	Accepted. The reference was corrected.
3	Appendix G, Page 2, second paragraph, last sentence states "*An MCL, or other drinking water standard, is not appropriate for the shallow groundwater at the Site because shallow groundwater is not used as a domestic water supply and naturally occurring shallow groundwater quality is so poor it is not a potential source of drinking water.*" The NDEP notes that the Division of Water Resources (DWR) database shows domestic wells located in the downgradient area east of Eastern Avenue. Unless can be demonstrated otherwise, these wells require protection from the migrating plume, at a concentration equivalent to the MCL for PCE (5 µg/L), with Eastern Avenue as the compliance boundary.	Accepted. The MCL was accepted as the remediation goal for domestic wells east of Eastern Avenue.
4	Appendix G, Page 2, third and fourth paragraphs. The text states that excess carcinogenic risk less than 1.0E-06 and a noncancer HI less than 1 is considered "acceptable." **The NDEP concurs**.	No changes necessary.

Comment No.	Comment	Response
5	Appendix G, Section 1.2.1, page 4. Bullets in this section include the following model assumptions: • Contamination is homogeneously distributed in the contaminated groundwater. • Contamination does not undergo chemical or biological transformations between the source and the air. • Contamination is homogeneously distributed through the indoor air in a house. The NDEP notes the following for the Maryland Square PCE Site: • The concentration of PCE in groundwater is likely to be more homogenously distributed than the concentration of PCE in subsurface vapors, but lithologic heterogeneity is high in the subsurface • The chemical conditions at the site are consistent with the assumption that PCE does not undergo chemical or biological transformations between the groundwater and indoor air, because PCE degrades anaerobically. • Most homes in the neighborhood are single-story, slab-on-grade homes. Unless homeowners keep some interior doors closed, the air inside the home should be fairly well-mixed. **Please include in Section 1.2.1, a discussion of how appropriate these assumptions are for the Maryland Square PCE Site.**	Noted. Text was added discussing the uncertainty in the lithology of the site.

Comment No.	Comment	Response
6	Appendix G, Section 1.2.2. The first paragraph states that average depth to groundwater and average groundwater temperature at well MW-18 were used in the J&E model to generate the proposed remediation standard of 276 µg/L for PCE. The third paragraph notes that "*the boring log for MW-18 and geologic cross section for the site are not completely consistent*" and that "*the cross section (Figure 2) was used for identifying the soil strata, because it resulted in more protective assumptions for soil type. The input parameters used in the J&E model to calculate the remediation goals, along with the rationale for selection of the inputs, are provided in Table 2.*" For the proposed remediation of **276 µg/L**, Table 2 shows that an average depth to groundwater of 12 ft bgs was used in the J&E model, along with parameters for a layer of sand and an underlying layer of silt. The NDEP notes that the thickness of the silt layer at the water table is constrained in the model to be at least the thickness of the capillary zone; this results in a lack of flexibility to adjust the thickness of silt layer above the water table to a value less than 164 cm (capillary zone in default table is 163.04 cm for silt). If the same thicknesses of sand and silt are used in the model, but the layers are reversed (i.e., 164 cm silt overlying 203 cm sand), the resulting PCE concentration in groundwater that is protective of indoor air is **24.9 µg/L**. This significant difference highlights the difficulty of using the J&E model to back-calculate a remediation standard for groundwater that is protective of indoor air for the maximally exposed individual. The moisture content of the various soil types controls to a large degree, the predicted concentrations. **Please see following NDEP discussion and calculations that address the issue of remediation standards back-calculated using the J&E model and revise the CAR accordingly**.	No changes necessary.

Comment No.	Comment	Response
7	Appendix G, Section 1.2.3, "Uncertainties in the Remediation Goal," first paragraph states "*The primary uncertainty in the J&E Model is the assumption that chemical concentrations in groundwater are not decreased by transport of the chemical to the surface. The J&E Model ignores attenuating factors, such as hydrolysis, photolysis, and biological degradation that reduce the contaminant concentration migrating to indoor air. For these reasons, the model serves as a protective screening tool for assessing potential indoor air concentrations and risks*" In the case of PCE at the Maryland Square site, these assumptions of the J&E model are likely true at the Maryland Square PCE Site. Site-specific conditions are not conducive to biological degradation and there is no evidence of biological degradation (i.e., only limited amounts of degradation products in some samples). The low levels of TCE detected in some samples may reflect initial impurities in the PCE used for dry cleaning. Additionally, the ATSDR Toxicological profile for PCE states that "*Existing evidence indicates that tetrachloroethylene does not readily transform in water. Mass balance experiments in a sand aquifer showed that the amount of tetrachloroethylene recovered at the end of migration through the aquifer was essentially the same as that added (Roberts et al. 1986). Studies of photolysis and hydrolysis conducted by Chodola et al. (1989) demonstrated that photolysis did not contribute substantially to the transformation of tetrachloroethylene. Chemical hydrolysis appeared to occur only at elevated temperature in a high pH (9.2) environment, and even then, at a very slow rate.*" **Please indicate that the model assumptions are likely correct for the Maryland Square PCE Site, or provide discussion why they are not.**	Accepted.
8	Section 1.2.3 continues, "*In addition, the J&E Model is not able to account for spatial variability in the concentrations of subsurface vapors, caused by* ***heterogeneities in the subsurface materials*** *and other factors such as preferential pathways that can result in spatial variability in indoor air concentrations. Additionally, the" model is not able to adjust for building-specific characteristics or occupants' activities that affect building ventilation, further adding uncertainty associated with temporal variability in indoor air concentrations. These factors could result in the model over- or underestimating the actual attenuation factor between the subsurface concentration and the indoor air concentration.*" The NDEP agrees that there is significant uncertainty that makes predicting the extent of VI in any one home difficult. Building-specific characteristics (homes in the residential neighborhood are semi-custom homes built in the 1960s and 1970s) and occupants' activities may play a larger role in contributing to uncertainty than do hydrolysis, photolysis and biological degradation. **Revise the report to state that large uncertainties exist due to the heterogeneous lithology of the geologic deposits across the site**.	Accepted. The text in Section 3.3 was revised to state that this type of variability is the primary source of uncertainty in the model results.

Comment No.	Comment	Response
9	Appendix G, Section 1.2.4, Table 3. **Table 3** provides the different risk-based concentrations developed using the J&E model, using the parameters provided in Table 2 and modifying one parameter at a time to evaluate model sensitivity to each parameter change. In the sensitivity scenarios presented in Table 3 of the CAR, parameters modified for well MW-18 included depth to groundwater, temperature of groundwater and lithology (changing a silt/sand lithology to 367 cm silt). These modifications altered the risk-based concentration for groundwater from the proposed standard of 276 µg/L, producing a range from **221 to 338 µg/L**, as presented in Table 3 of the CAR. However, other modifications to soil type, as well as geotechnical data from 2007, were not used to develop other scenarios. The NDEP was able to reproduce the numbers for the model output shown in Table 3 of the CAR. However, the NDEP then ran the J&E model for other possible scenarios of soil types, and using site-specific geotechnical data; this produced remediation standards protective of indoor air that ranged from **22.3 to 146 µg/L**. The NDEP notes that the groundwater remediation standard needs to be protective of the maximally exposed individual. Not all homes within the VI area of concern have been sampled, and changes in occupants or occupant behavior, as well as any modifications to the structure or remodeling of the home, may alter the extent of VI at homes that were previously sampled. This means that there could be unacceptable exposure in unsampled homes, which lack mitigation systems. Because of the uncertainty discussed here (and shown in the modified **Table 3** below), a remediation standard of 276 µg/L is not convincingly protective for the maximally exposed individual within the residential neighborhood. The NDEP also looked at the data for the home with the highest detected level of PCE in indoor air (110 µg/m^3) and compared this with data from the adjacent monitoring well, MW-25. The average concentration of PCE in MW-25 is 775 µg/L (n = 28 samples). Assuming a linear relationship, a PCE concentration of 66 µg/L in groundwater would be needed to reduce concentrations in indoor air to 9.4 µg/m^3. Construction of this particular home may be facilitating vapor transport; yet another uncertainty in the J&E modeling The modified version of Table 3 shows the order-of-magnitude range of back-calculated using site data.	Noted. The CAR was revised to include some of the additional scenarios suggested by NDEP and text was added that because of uncertainty regarding input parameters in the J&E Model that 100 µg/L was selected as the remediation goal. .

Table 3. Sensitivity of Calculated Risk-based Groundwater Concentration to Input Parameters

Scenario	Soil Type	Depth to Groundwater (cm)	Groundwater Temperature (°C)	Risk-based Groundwater Concentration (µg/L)	Change in Value
MW-18 averages (Remediation Goal)	203 cm Sand/ 164 cm Silt	367	24.7	**276**	--
MW-18 averages, change in soil type	367 cm Silt/Silt	367	24.7	**317**	+15%
MW-18 averages, minimum depth to groundwater	203 cm Sand/ 164 cm Silt	266	24.7	**274**	-1%
MW-18 averages, maximum groundwater temperature	203 cm Sand/ 164 cm Silt	367	29.3	**221**	-20%
MW-25 averages (well closest to highest indoor air concentrations)	582 cm Silt/Silt	582	24.0	**338**	+22%
All MWs within 100 µg/L PCE plume in residential area, averages (except MW-18 soil type)	351 cm Sand/ 164 cm Silt	515	24.0	**290**	+5%
MW-18 averages, but with soil type as sand/sand	**367 cm Sand/Sand**	**367**	**24.7**	**22.3**	**-92%**
MW-18 averages, but with soil type reversed	**203 cm Silt / 164 cm Sand**	**367**	**24.7**	**24.9**	**-91%**
MW-18 averages, but with soil type reversed, min sand	**349 cm Silt / 18 cm Sand**	**367**	**24.7**	**24.9**	**-91%**
All MWs within 100 µg/L PCE plume in residential area, averages, but 497 cm silt overlying 18 cm sand	**497 cm Silt / 18 cm Sand**	**515**	**24**	**35.8**	**-87%**
MW-18 averages, with all Sandy Loam soil	**367 cm Sandy Loam**	**367**	**24.7**	**135**	**-51%**
All MWs within 100 µg/L PCE plume in residential area, averages, Sandy Loam	**515 cm Sandy Loam**	**515**	**24**	**146**	**-47%**
All MWs within 100 µg/L PCE plume in residential area, averages, Loamy Sand	**515 cm Loamy Sand**	**515**	**24**	**58**	**-79%**
MW-18 averages, using site-specific geotechnical data for SVB-09-08, % soil moisture = 7.9%, = LS soil	**150 cm Clay/ 217 cm Loamy Sand**	**367**	**24.7**	**63**	**-77%**

The NDEP notes that all the risk-based values shown in Table 3 exceed the EPA's VISL of 13 µg/L for PCE in groundwater protective of residential indoor air. Site geotechnical data from ***Off-site Soil Vapor Assessment Report*** (URS, 2007); see: http://ndep.nv.gov/pce/doc/ms_soil_vapor_assessment_report_4-07.pdf

cm – centimeter,°C – degrees Celsius, µg/L – micrograms per liter, % - percent

	NDEP DETERMINATION OF A REMEDIATION STANDARD FOR GROUNDWATER THAT IS PROTECTIVE OF RESIDENTIAL INDOOR AIR The distribution of PCE concentrations in groundwater, soil vapor and indoor air serves to emphasize the degree of unpredictability associated with estimating risk for any individual home at a VI site. The J&E User's Guide (EPA, 2003) states that "Of the soil-dependent properties, the soil moisture parameters clearly are of critical importance for the attenuation value calculations" and that "The soil moisture content has an exponential effect on the rate of vapor diffusion." In fact, Section 1.2.4.1 correctly noted that "Soil moisture parameters are of critical importance for the calculations." The remediation standards back-calculated using the J&E model range from **22.3 to 338 µg/L**, and all can be supported by some form of site data. Acknowledging this range and the uncertainties due to lithology and home-related factors, the NDEP specifies use of **100 µg/L** as the remediation goal for groundwater under the residential neighborhood west of Eastern Avenue.	Accepted. The remediation goal for groundwater has been revised throughout the document

ATTACHMENTS 1 THROUGH 6

PROVIDED ON CD

1 – Bench Scale Reports

2 – Vendor Field and Product Data

3 - Analytical Results

4 - Geotechnical Reports

5 – Cascade Injection Logs

6 – PulseOx O&M Logs

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Carus Remediation Technologies
Remediation Report

01 August 2012

Customer: Tetra Tech, Inc.
1230 Columbia St., Ste. 1000
San Diego, CA 92101

Cc: K. Frasco

Attention: Rob Manriquez

From: L. Mueller

TECH # 12-118

Subject: RemOx® S ISCO Reagent Permanganate Natural Oxidant Demand

Summary
The overall average RemOx® S ISCO reagent permanganate natural oxidant demand (PNOD) at 48 hours for the two soil samples was determined to be 0.40 g/kg. The average demands ranged from 0.22 g/kg to 0.54 g/kg. These values are calculated on a weight as potassium permanganate ($KMnO_4$) per dry weight of soil.

Background
Two soil samples were received from Tetra Tech, Inc. from the MSSC Site project located in Las Vegas, NV on July 24, 2012. The soil sample designations were TTEW201PNOD3059, and TTMW4001PNOD2955. The samples were analyzed for permanganate natural oxidant demand. The measurement of the permanganate natural oxidant demand is used to estimate the concentration of permanganate that will be consumed by the natural reducing agents during a given time period of 48 hours.

Experimental
The samples were analyzed for permanganate natural oxidant demand following ASTM D7262-07 Test Method A. A brief summary is as follows:

To determine the PNOD, the soil was baked at 105°C for 24 hours then allowed to cool to room temperature. The soil was then blended and passed through a U.S. 10 sieve (2 mm). Reactors were loaded with 50 grams of soil and 100 mL of 20 g/L $KMnO_4$ for an initial dose of 40 g/kg $KMnO_4$ on a dry soil weight basis at a 1:2 soil to aqueous reagent ratio. Each soil dose was performed in triplicate. The reaction vessels were inverted once to mix the reagents. Residual permanganate (MnO_4^-) was determined at 48 hours. The demands were calculated on a dry weight basis.

Results
The permanganate demand is the amount of permanganate consumed in a given amount of time. It should be noted that in a soil or groundwater sample, the oxidation of any compound by permanganate is dependent on the initial dose of permanganate and the reaction time available. As the permanganate dose is increased, the reaction rate and oxidant consumption may also

increase. Some compounds that are not typically oxidized by permanganate under low doses can become reactive with permanganate at higher concentrations.
The 48-hour PNOD results can be seen in Table 1 (on a dry soil basis).

Table 1: 48-Hour PNOD *

Soil Sample Identification	Average and Standard Deviation (g/kg)	Replicate 1 (g/kg)	Replicate 2 (g/kg)	Replicate 3 (g/kg)
TTEW201PNOD3059	0.35 ± 0.17	0.29	0.22	0.54
TTMW4001PNOD2955	0.45 ± 0.08	0.52	0.37	0.47
Overall Average	0.40			

*Demands were calculated on a weight $KMnO_4$/dry soil weight basis from an initial dose of 40.0 g/kg $KMnO_4$ initial dose at a 1:2 soil to aqueous solution ratio

Conclusions
For this application the amount of permanganate needed will be dependent on the reaction time allowed. On average, the soil samples had a 48-hour permanganate demand value of 0.40 g/kg. The average demands ranged from 0.22 g/kg to 0.54 g/kg. Generally, remediation sites with a soil demand of less than 20.0 g/kg at the time of interest are favorable for *in situ* chemical oxidation with permanganate (see Table 2 for additional information).

Table 2: Correlation of Permanganate Natural Oxidant Demand Results*

PNOD (g/kg)	**Rank**	Comment
<10	Low	ISCO with MnO_4^- is recommended. Soil contribution to MnO_4^- demand is low.
10-20	Moderate	ISCO with MnO_4^- is recommended. Soil contribution to MnO_4^- demand is moderate. Economics should be considered.
>20	High	ISCO with MnO_4^- is technically feasible. Other technologies may provide lower cost alternatives.

*Dry Weight Basis

RemOx® ISCO reagent is a registered trademark of Carus Corporation

CARUS®

CHAIN OF CUSTODY RECORD

*ITEMS LISTED IN RED MUST BE COMPLETED BY CLIENT

CLIENT* Tetra Tech EM. Inc.	PROJECT NAME MSSC Site	SITE LOCATION Las Vegas	P.O. NUMBER 103P172824.01
ADDRESS 1230 Columbia St. Ste 1000	PHONE NUMBER 619-321-6748	FAX NUMBER 619-525-7186	DATE SHIPPED
CITY STATE ZIP SAN DIEGO, CA 92101	SAMPLER (PLEASE PRINT) (415) 260-5821 V. PRILEPIN		REMOX® ISCO REAGENT ☐ SOLID ☐ LIQUID ☐ EITHER
PROJECT MANAGER Rob MANRIQUEZ	SAMPLER'S SIGNATURE		

ANALYSIS REQUESTED: PNOD Soil Demand ASTM D7262-07

(FOR LAB USE ONLY) TECH # _____ LOGGED BY: _____

SAMPLE DESCRIPTION	DATE COLLECTED	TIME COLLECTED	SAMPLE TYPE SOIL	SAMPLE TYPE GW	SOIL TYPE	# OF CONT	PNOD Soil Demand ASTM D7262-07	REMARKS
TTEW201PNOD3059	7/19/12	17:30	X		GC, CL, ML, SM		X	3 x 8oz glas jars
TTMW4001PNOD2955	7/23/12	17:45	X		SM, CL, GC, ML		X	4 x 8oz glas jars

TURNAROUND TIME REQUESTED (PLEASE CIRCLE) (RUSH IS SUBJECT TO CARUS CORPORATION APPROVAL) (NORMAL) RUSH

SEND RESULTS TO:

ADDITIONAL COMMENTS: e-mail results to chit.christian@tetratech.com; vladimir.prilepin@tetratech.com

RELINQUISHED BY: (SIGNATURE) V. Prilepin	DATE 7/24 TIME 15:20	RECEIVED BY: (SIGNATURE) Rocio Reno	DATE 7/24 TIME 1520	COMMENTS: (FOR LAB USE ONLY)
RELINQUISHED BY: (SIGNATURE)	DATE 7/24 TIME 1800	RECEIVED AT LAB BY: (SIGNATURE)	DATE TIME	SAMPLE(S) RECEIVED ON ICE Y OR N BOTTLES RECEIVED IN GOOD CONDITION Y OR N BOTTLES FILLED WITH ADEQUATE VOLUME Y OR N SAMPLES RECEIVED WITHIN HOLD TIME(S) Y OR N

Ship samples to: Carus Corporation, 1500 8th Street, Bldg 45 – Customer Service Lab, LaSalle, IL 61301

ATTACHMENTS 1 THROUGH 6 PROVIDED ON CD

1 - Bench Scale Reports

2 - Vendor Field and Product Data

3 - Analytical Results

4 - Geotechnical Reports

5 - Cascade Injection Logs

6 - PulseOx O&M Logs

Carus Corporation
Peru, IL U.S.A
Tel + 1 815 223 1500
Fax + 1 815 224 6697

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(Toll free US Only)

ONE COMPANY, ENDLESS SOLUTIONS CARUS CORPORATION

REMOX® S ISCO

RemOx® S ISCO reagent has been specifically manufactured for environmental applications such as remediation of soils and associated groundwater. This product can be used to degrade a variety of contaminants including chlorinated solvents, polyaromatic hydrocarbons, phenolics, organo-pesticides, and substituted aromatics. RemOx S is shipped with a certificate of analysis (COA) to document assay and trace metals.

CHEMICAL/PHYSICAL DATA
Formula $KMnO_4$
Formula Weight 158.0 g/mol
Form Granular Crystalline
Specific Gravity
Solid 2.703 g/cm^3
3% Solution 1.020 g/mL by weight, 20° C / 4° C
Bulk Density Approximately 100 lb/ft^3
Decomposition may start at 150° C / 302° F

DESCRIPTION
Crystals or granules are dark purple with a metallic sheen, sometimes with a dark bronze-like appearance. RemOx S has a sweetish, astringent taste and is odorless.

HANDLING, STORAGE, AND INCOMPATIBILITY
Protect containers against physical damage. When handling RemOx S respirators should be worn to avoid irritation of, or damage to, mucous membranes. Eye protection should also be worn when handling RemOx S as a solid or in solution.

RemOx S is stable and will keep indefinitely if stored in a cool, dry area in closed containers. Concrete floors are preferred to wooden decks. To clean up spills and leaks, follow the steps recommended in the MSDS. Be sure to use goggles, rubber gloves, and respirator when cleaning up a spill or leak.

Avoid contact with acids, peroxides, and all combustible organic or readily oxidizable materials including inorganic oxidizable materials and metal powders. With hydrochloric acid, chlorine gas is liberated. RemOx S is not combustible, but it will support combustion. It may decompose if exposed to intense heat.

Fires may be controlled and extinguished by using large quantities of water. Refer to the MSDS for more information.

SHIPPING
RemOx S is classified by the Hazardous Materials Transportation Board (HMTB) as an oxidizer. It is shipped under Interstate Commerce Commission's (ICC) Tariff 19.

Proper Shipping Name: Potassium Permanganate
(RQ-100/45.4)
Hazard Class: Oxidizer
Identification Number: UN 1490
Label Requirements: Oxidizer
Packaging Requirements: 49 CFR Parts 100 to 199
Sections: 173.152, 173.153, 173.194
Shipping Limitations:
Minimum quantities:
Rail car: See Tariff for destination
Truck: No minimum
Postal regulations:
Information applicable to packaging of oxidizers for shipment by the U.S. Postal Service to domestic and foreign destinations is readily

available from the local postmaster. United Parcel Service accepts 25 lbs as largest unit quantity properly packaged; (consult United Parcel Service). Regulations concerning shipping and packing should be consulted regularly due to frequent changes.

CORROSIVE PROPERTIES

RemOx S is compatible with many metals and synthetic materials. Natural rubbers and fibers are often incompatible. Solution pH and temperature are also important factors. The material must be compatible with either the acid or alkali also being used.

In neutral and alkaline solutions, RemOx S is not corrosive to iron, mild steel, or stainless steel; however, chloride corrosion of metals may be accelerated when an oxidant such as permanganate is present in solution. Plastics such as polypropylene, polyvinyl chloride Type I (PVC I), epoxy resins, fiberglass reinforced plastic (FRP), Penton, Lucite, Viton A, and Hypalon are suitable. Teflon FEP and TFE, and Tefzel ETFE are best. Refer to Material Compatibility Chart.

Aluminum, zinc, copper, lead, and alloys containing these metals may be (slightly) affected by RemOx S solutions. Actual studies should be made under the conditions in which permanganate will be used.

APPLICATIONS

RemOx S is used for soil and groundwater remediation by *in situ* or *ex situ* chemical oxidation and as an active agent in subsurface reactive barriers for treatment of: chlorinated ethenes, phenolic compounds, polyaromatic hydrocarbons, TNT, RDX, HMX, and various pesticides.

Alexander, A Carus Company

Sierra, A Carus Company

© 2013 CARUS CORPORATION

ATTACHMENTS 1 THROUGH 6 PROVIDED ON CD

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6 - PulseOx O&M Logs

January 23, 2013

Rob Manriquez
Tetra Tech
1230 Columbia Street, Suite 1000
San Diego, CA 92101
TEL: (858) 527-8803
FAX:

CA-ELAP No.: 2676
NV Cert. No.: NV-009222007A

Workorder No.: N009334

RE: Maryland Square Shopping Center, 103P172828

Attention: Rob Manriquez

Enclosed are the results for sample(s) received on January 14, 2013 by Advanced Technology Laboratories, Inc. . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

I hereby certify that all laboratory analysis requested were performed by Nevada Division of Environmental Protection-certified laboratory for the parameters and matrices reported herein.

Thank you for the opportunity to service the needs of your company.Please feel free to call me at (702) 307-2659 if I can be of further assistance to your company.

Jose Tenorio Jr.
Laboratory Director

The cover letter and the case narrative are an integral part of this analytical report and cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories - Las Vegas.

CLIENT: Tetra Tech
Project: Maryland Square Shopping Center, 103P172828
Lab Order: N009334

CASE NARRATIVE

SAMPLE RECEIVING/GENERAL COMMENTS:

Samples were received intact with proper chain of custody documentation.

Cooler temperature and sample preservation were verified upon receipt of samples if applicable.

Information on sample receipt conditions including discrepancies can be found in attached Sample Receipt Checklist Form.

Samples were analyzed within method holding time.

Analytical Comments for EPA 8260B:

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) are outside recovery criteria for some analytes for QC samples N009357-001AMS and N009357-001AMSD possibly due to matrix interference. The associated Laboratory Control Sample (LCS) recovery was acceptable.

Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD) recovery biased high for some analytes. Sample results were non-detect (ND) for these analytes therefore reanalysis of the samples was not necessary.

CLIENT: Tetra Tech
Lab Order: N009334
Project: Maryland Square Shopping Center, 103P172828
Lab ID: N009334-001

Client Sample ID: TTMW19D01GW27
Collection Date: 1/12/2013 9:30:00 AM
Matrix: GROUNDWATER

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS5_130115A | QC Batch: P13VW007 | PrepDate: | Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	1/15/2013 11:02 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	1/15/2013 11:02 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	1/15/2013 11:02 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	1/15/2013 11:02 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	1/15/2013 11:02 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	1/15/2013 11:02 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	1/15/2013 11:02 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	1/15/2013 11:02 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	1/15/2013 11:02 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	1/15/2013 11:02 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	1/15/2013 11:02 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	1/15/2013 11:02 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	1/15/2013 11:02 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	1/15/2013 11:02 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	1/15/2013 11:02 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	1/15/2013 11:02 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	1/15/2013 11:02 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	1/15/2013 11:02 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	1/15/2013 11:02 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	1/15/2013 11:02 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	1/15/2013 11:02 PM
2-Chlorotoluene	ND	0.50		µg/L	1	1/15/2013 11:02 PM
4-Chlorotoluene	ND	0.50		µg/L	1	1/15/2013 11:02 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	1/15/2013 11:02 PM
Benzene	ND	0.50		µg/L	1	1/15/2013 11:02 PM
Bromobenzene	ND	0.50		µg/L	1	1/15/2013 11:02 PM
Bromodichloromethane	ND	0.50		µg/L	1	1/15/2013 11:02 PM
Bromoform	ND	0.50		µg/L	1	1/15/2013 11:02 PM
Bromomethane	ND	0.50		µg/L	1	1/15/2013 11:02 PM
Carbon tetrachloride	ND	0.50		µg/L	1	1/15/2013 11:02 PM
Chlorobenzene	ND	0.50		µg/L	1	1/15/2013 11:02 PM
Chloroethane	ND	0.50		µg/L	1	1/15/2013 11:02 PM
Chloroform	2.0	0.50		µg/L	1	1/15/2013 11:02 PM
Chloromethane	ND	0.50		µg/L	1	1/15/2013 11:02 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	1/15/2013 11:02 PM
cis-1,3-Dichloropropene	ND	0.50		µg/L	1	1/15/2013 11:02 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT: Tetra Tech
Lab Order: N009334
Project: Maryland Square Shopping Center, 103P172828
Lab ID: N009334-001

Client Sample ID: TTMW19D01GW27
Collection Date: 1/12/2013 9:30:00 AM
Matrix: GROUNDWATER

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS5_130115A | QC Batch: P13VW007 | PrepDate: | Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Dibromochloromethane	ND	0.50		µg/L	1	1/15/2013 11:02 PM
Dibromomethane	ND	0.50		µg/L	1	1/15/2013 11:02 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	1/15/2013 11:02 PM
Ethylbenzene	ND	0.50		µg/L	1	1/15/2013 11:02 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	1/15/2013 11:02 PM
Isopropylbenzene	ND	0.50		µg/L	1	1/15/2013 11:02 PM
m,p-Xylene	ND	1.0		µg/L	1	1/15/2013 11:02 PM
Methylene chloride	ND	2.0		µg/L	1	1/15/2013 11:02 PM
MTBE	ND	0.50		µg/L	1	1/15/2013 11:02 PM
n-Butylbenzene	ND	0.50		µg/L	1	1/15/2013 11:02 PM
n-Propylbenzene	ND	0.50		µg/L	1	1/15/2013 11:02 PM
Naphthalene	ND	0.50		µg/L	1	1/15/2013 11:02 PM
o-Xylene	ND	0.50		µg/L	1	1/15/2013 11:02 PM
sec-Butylbenzene	ND	0.50		µg/L	1	1/15/2013 11:02 PM
Styrene	ND	0.50		µg/L	1	1/15/2013 11:02 PM
tert-Butylbenzene	ND	0.50		µg/L	1	1/15/2013 11:02 PM
Tetrachloroethene	810	5.0		µg/L	10	1/18/2013 07:50 PM
Toluene	ND	0.50		µg/L	1	1/15/2013 11:02 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	1/15/2013 11:02 PM
Trichloroethene	3.9	0.50		µg/L	1	1/15/2013 11:02 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	1/15/2013 11:02 PM
Vinyl chloride	ND	0.50		µg/L	1	1/15/2013 11:02 PM
Surr: 1,2-Dichloroethane-d4	108	56-120		%REC	1	1/15/2013 11:02 PM
Surr: 1,2-Dichloroethane-d4	101	56-120		%REC	10	1/18/2013 07:50 PM
Surr: 4-Bromofluorobenzene	99.3	80-120		%REC	10	1/18/2013 07:50 PM
Surr: 4-Bromofluorobenzene	100	80-120		%REC	1	1/15/2013 11:02 PM
Surr: Dibromofluoromethane	105	72-120		%REC	1	1/15/2013 11:02 PM
Surr: Dibromofluoromethane	97.1	72-120		%REC	10	1/18/2013 07:50 PM
Surr: Toluene-d8	101	80-123		%REC	10	1/18/2013 07:50 PM
Surr: Toluene-d8	103	80-123		%REC	1	1/15/2013 11:02 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT: Tetra Tech
Lab Order: N009334
Project: Maryland Square Shopping Center, 103P172828
Lab ID: N009334-002

Client Sample ID: TTMW19D02GW36
Collection Date: 1/12/2013 12:25:00 PM
Matrix: GROUNDWATER

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS5_130115A QC Batch: P13VW007 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	1/15/2013 06:15 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	1/15/2013 06:15 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	1/15/2013 06:15 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	1/15/2013 06:15 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	1/15/2013 06:15 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	1/15/2013 06:15 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	1/15/2013 06:15 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	1/15/2013 06:15 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	1/15/2013 06:15 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	1/15/2013 06:15 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	1/15/2013 06:15 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	1/15/2013 06:15 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	1/15/2013 06:15 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	1/15/2013 06:15 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	1/15/2013 06:15 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	1/15/2013 06:15 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	1/15/2013 06:15 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	1/15/2013 06:15 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	1/15/2013 06:15 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	1/15/2013 06:15 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	1/15/2013 06:15 PM
2-Chlorotoluene	ND	0.50		µg/L	1	1/15/2013 06:15 PM
4-Chlorotoluene	ND	0.50		µg/L	1	1/15/2013 06:15 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	1/15/2013 06:15 PM
Benzene	0.65	0.50		µg/L	1	1/15/2013 06:15 PM
Bromobenzene	ND	0.50		µg/L	1	1/15/2013 06:15 PM
Bromodichloromethane	ND	0.50		µg/L	1	1/15/2013 06:15 PM
Bromoform	ND	0.50		µg/L	1	1/15/2013 06:15 PM
Bromomethane	ND	0.50		µg/L	1	1/15/2013 06:15 PM
Carbon tetrachloride	ND	0.50		µg/L	1	1/15/2013 06:15 PM
Chlorobenzene	ND	0.50		µg/L	1	1/15/2013 06:15 PM
Chloroethane	ND	0.50		µg/L	1	1/15/2013 06:15 PM
Chloroform	2.3	0.50		µg/L	1	1/15/2013 06:15 PM
Chloromethane	ND	0.50		µg/L	1	1/15/2013 06:15 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	1/15/2013 06:15 PM
cis-1,3-Dichloropropene	ND	0.50		µg/L	1	1/15/2013 06:15 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT: Tetra Tech
Lab Order: N009334
Project: Maryland Square Shopping Center, 103P172828
Lab ID: N009334-002

Client Sample ID: TTMW19D02GW36
Collection Date: 1/12/2013 12:25:00 PM
Matrix: GROUNDWATER

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS5_130115A | QC Batch: P13VW007 | PrepDate: | Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Dibromochloromethane	ND	0.50		µg/L	1	1/15/2013 06:15 PM
Dibromomethane	ND	0.50		µg/L	1	1/15/2013 06:15 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	1/15/2013 06:15 PM
Ethylbenzene	ND	0.50		µg/L	1	1/15/2013 06:15 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	1/15/2013 06:15 PM
Isopropylbenzene	ND	0.50		µg/L	1	1/15/2013 06:15 PM
m,p-Xylene	ND	1.0		µg/L	1	1/15/2013 06:15 PM
Methylene chloride	ND	2.0		µg/L	1	1/15/2013 06:15 PM
MTBE	ND	0.50		µg/L	1	1/15/2013 06:15 PM
n-Butylbenzene	ND	0.50		µg/L	1	1/15/2013 06:15 PM
n-Propylbenzene	ND	0.50		µg/L	1	1/15/2013 06:15 PM
Naphthalene	ND	0.50		µg/L	1	1/15/2013 06:15 PM
o-Xylene	ND	0.50		µg/L	1	1/15/2013 06:15 PM
sec-Butylbenzene	ND	0.50		µg/L	1	1/15/2013 06:15 PM
Styrene	ND	0.50		µg/L	1	1/15/2013 06:15 PM
tert-Butylbenzene	ND	0.50		µg/L	1	1/15/2013 06:15 PM
Tetrachloroethene	840	5.0		µg/L	10	1/18/2013 08:19 PM
Toluene	1.2	0.50		µg/L	1	1/15/2013 06:15 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	1/15/2013 06:15 PM
Trichloroethene	4.3	0.50		µg/L	1	1/15/2013 06:15 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	1/15/2013 06:15 PM
Vinyl chloride	ND	0.50		µg/L	1	1/15/2013 06:15 PM
Surr: 1,2-Dichloroethane-d4	114	56-120		%REC	1	1/15/2013 06:15 PM
Surr: 1,2-Dichloroethane-d4	97.9	56-120		%REC	10	1/18/2013 08:19 PM
Surr: 4-Bromofluorobenzene	101	80-120		%REC	1	1/15/2013 06:15 PM
Surr: 4-Bromofluorobenzene	96.6	80-120		%REC	10	1/18/2013 08:19 PM
Surr: Dibromofluoromethane	95.6	72-120		%REC	10	1/18/2013 08:19 PM
Surr: Dibromofluoromethane	109	72-120		%REC	1	1/15/2013 06:15 PM
Surr: Toluene-d8	98.2	80-123		%REC	10	1/18/2013 08:19 PM
Surr: Toluene-d8	105	80-123		%REC	1	1/15/2013 06:15 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT: Tetra Tech
Lab Order: N009334
Project: Maryland Square Shopping Center, 103P172828
Lab ID: N009334-003

Client Sample ID: TTMW19D03GW46
Collection Date: 1/12/2013 2:15:00 PM
Matrix: GROUNDWATER

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS5_130115A QC Batch: P13VW007 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	1/15/2013 05:46 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	1/15/2013 05:46 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	1/15/2013 05:46 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	1/15/2013 05:46 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	1/15/2013 05:46 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	1/15/2013 05:46 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	1/15/2013 05:46 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	1/15/2013 05:46 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	1/15/2013 05:46 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	1/15/2013 05:46 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	1/15/2013 05:46 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	1/15/2013 05:46 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	1/15/2013 05:46 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	1/15/2013 05:46 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	1/15/2013 05:46 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	1/15/2013 05:46 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	1/15/2013 05:46 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	1/15/2013 05:46 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	1/15/2013 05:46 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	1/15/2013 05:46 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	1/15/2013 05:46 PM
2-Chlorotoluene	ND	0.50		µg/L	1	1/15/2013 05:46 PM
4-Chlorotoluene	ND	0.50		µg/L	1	1/15/2013 05:46 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	1/15/2013 05:46 PM
Benzene	ND	0.50		µg/L	1	1/15/2013 05:46 PM
Bromobenzene	ND	0.50		µg/L	1	1/15/2013 05:46 PM
Bromodichloromethane	ND	0.50		µg/L	1	1/15/2013 05:46 PM
Bromoform	ND	0.50		µg/L	1	1/15/2013 05:46 PM
Bromomethane	ND	0.50		µg/L	1	1/15/2013 05:46 PM
Carbon tetrachloride	ND	0.50		µg/L	1	1/15/2013 05:46 PM
Chlorobenzene	ND	0.50		µg/L	1	1/15/2013 05:46 PM
Chloroethane	ND	0.50		µg/L	1	1/15/2013 05:46 PM
Chloroform	1.8	0.50		µg/L	1	1/15/2013 05:46 PM
Chloromethane	ND	0.50		µg/L	1	1/15/2013 05:46 PM
cis-1,2-Dichloroethene	0.51	0.50		µg/L	1	1/15/2013 05:46 PM
cis-1,3-Dichloropropene	ND	0.50		µg/L	1	1/15/2013 05:46 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT: Tetra Tech
Lab Order: N009334
Project: Maryland Square Shopping Center, 103P172828
Lab ID: N009334-003

Client Sample ID: TTMW19D03GW46
Collection Date: 1/12/2013 2:15:00 PM
Matrix: GROUNDWATER

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS5_130115A | QC Batch: P13VW007 | PrepDate: | Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Dibromochloromethane	ND	0.50		µg/L	1	1/15/2013 05:46 PM
Dibromomethane	ND	0.50		µg/L	1	1/15/2013 05:46 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	1/15/2013 05:46 PM
Ethylbenzene	ND	0.50		µg/L	1	1/15/2013 05:46 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	1/15/2013 05:46 PM
Isopropylbenzene	ND	0.50		µg/L	1	1/15/2013 05:46 PM
m,p-Xylene	ND	1.0		µg/L	1	1/15/2013 05:46 PM
Methylene chloride	ND	2.0		µg/L	1	1/15/2013 05:46 PM
MTBE	ND	0.50		µg/L	1	1/15/2013 05:46 PM
n-Butylbenzene	ND	0.50		µg/L	1	1/15/2013 05:46 PM
n-Propylbenzene	ND	0.50		µg/L	1	1/15/2013 05:46 PM
Naphthalene	ND	0.50		µg/L	1	1/15/2013 05:46 PM
o-Xylene	ND	0.50		µg/L	1	1/15/2013 05:46 PM
sec-Butylbenzene	ND	0.50		µg/L	1	1/15/2013 05:46 PM
Styrene	ND	0.50		µg/L	1	1/15/2013 05:46 PM
tert-Butylbenzene	ND	0.50		µg/L	1	1/15/2013 05:46 PM
Tetrachloroethene	700	5.0		µg/L	10	1/18/2013 07:21 PM
Toluene	0.56	0.50		µg/L	1	1/15/2013 05:46 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	1/15/2013 05:46 PM
Trichloroethene	2.7	0.50		µg/L	1	1/15/2013 05:46 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	1/15/2013 05:46 PM
Vinyl chloride	ND	0.50		µg/L	1	1/15/2013 05:46 PM
Surr: 1,2-Dichloroethane-d4	102	56-120		%REC	10	1/18/2013 07:21 PM
Surr: 1,2-Dichloroethane-d4	110	56-120		%REC	1	1/15/2013 05:46 PM
Surr: 4-Bromofluorobenzene	99.5	80-120		%REC	10	1/18/2013 07:21 PM
Surr: 4-Bromofluorobenzene	101	80-120		%REC	1	1/15/2013 05:46 PM
Surr: Dibromofluoromethane	108	72-120		%REC	1	1/15/2013 05:46 PM
Surr: Dibromofluoromethane	98.2	72-120		%REC	10	1/18/2013 07:21 PM
Surr: Toluene-d8	101	80-123		%REC	10	1/18/2013 07:21 PM
Surr: Toluene-d8	103	80-123		%REC	1	1/15/2013 05:46 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference
- DO Surrogate Diluted Out
- E Value above quantitation range
- ND Not Detected at the Reporting Limit

Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N009334
Project: Maryland Square Shopping Center, 103P172828
Lab ID: N009334-004

Client Sample ID: MSSC 08
Collection Date: 1/13/2013 11:20:00 AM
Matrix: SOIL

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS1_130118A QC Batch: D13VS001 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
1,1,1-Trichloroethane	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
1,1,2,2-Tetrachloroethane	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
1,1,2-Trichloroethane	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
1,1-Dichloroethane	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
1,1-Dichloroethene	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
1,1-Dichloropropene	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
1,2,3-Trichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
1,2,3-Trichloropropane	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
1,2,4-Trichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
1,2,4-Trimethylbenzene	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
1,2-Dibromo-3-chloropropane	ND	10		µg/Kg	1	1/18/2013 04:14 PM
1,2-Dibromoethane	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
1,2-Dichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
1,2-Dichloroethane	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
1,2-Dichloropropane	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
1,3,5-Trimethylbenzene	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
1,3-Dichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
1,3-Dichloropropane	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
1,4-Dichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
2,2-Dichloropropane	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
2-Chlorotoluene	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
4-Chlorotoluene	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
4-Isopropyltoluene	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
Benzene	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
Bromobenzene	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
Bromodichloromethane	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
Bromoform	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
Bromomethane	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
Carbon tetrachloride	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
Chlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
Chloroethane	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
Chloroform	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
Chloromethane	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
cis-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
cis-1,3-Dichloropropene	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT: Tetra Tech
Lab Order: N009334
Project: Maryland Square Shopping Center, 103P172828
Lab ID: N009334-004

Client Sample ID: MSSC 08
Collection Date: 1/13/2013 11:20:00 AM
Matrix: SOIL

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS1_130118A | QC Batch: D13VS001 | PrepDate: | Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Dibromochloromethane	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
Dibromomethane	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
Dichlorodifluoromethane	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
Ethylbenzene	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
Hexachlorobutadiene	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
Isopropylbenzene	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
m,p-Xylene	ND	10		µg/Kg	1	1/18/2013 04:14 PM
Methylene chloride	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
MTBE	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
n-Butylbenzene	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
n-Propylbenzene	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
Naphthalene	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
o-Xylene	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
sec-Butylbenzene	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
Styrene	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
tert-Butylbenzene	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
Tetrachloroethene	12	5.0		µg/Kg	1	1/18/2013 04:14 PM
Toluene	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
trans-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
Trichloroethene	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
Trichlorofluoromethane	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
Vinyl chloride	ND	5.0		µg/Kg	1	1/18/2013 04:14 PM
Surr: 1,2-Dichloroethane-d4	115	58-125		%REC	1	1/18/2013 04:14 PM
Surr: 4-Bromofluorobenzene	93.8	52-138		%REC	1	1/18/2013 04:14 PM
Surr: Dibromofluoromethane	108	57-121		%REC	1	1/18/2013 04:14 PM
Surr: Toluene-d8	99.3	66-130		%REC	1	1/18/2013 04:14 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Client Sample ID: MSSC 09
Lab Order: N009334
Collection Date: 1/13/2013 2:20:00 PM
Project: Maryland Square Shopping Center, 103P172828
Matrix: SOIL
Lab ID: N009334-005

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
			EPA 8260B			
RunID: MS1_130118A	QC Batch: D13VS001			PrepDate:		Analyst: **QBM**
1,1,1,2-Tetrachloroethane	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
1,1,1-Trichloroethane	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
1,1,2,2-Tetrachloroethane	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
1,1,2-Trichloroethane	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
1,1-Dichloroethane	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
1,1-Dichloroethene	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
1,1-Dichloropropene	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
1,2,3-Trichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
1,2,3-Trichloropropane	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
1,2,4-Trichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
1,2,4-Trimethylbenzene	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
1,2-Dibromo-3-chloropropane	ND	10		µg/Kg	1	1/18/2013 04:37 PM
1,2-Dibromoethane	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
1,2-Dichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
1,2-Dichloroethane	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
1,2-Dichloropropane	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
1,3,5-Trimethylbenzene	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
1,3-Dichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
1,3-Dichloropropane	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
1,4-Dichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
2,2-Dichloropropane	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
2-Chlorotoluene	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
4-Chlorotoluene	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
4-Isopropyltoluene	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
Benzene	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
Bromobenzene	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
Bromodichloromethane	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
Bromoform	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
Bromomethane	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
Carbon tetrachloride	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
Chlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
Chloroethane	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
Chloroform	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
Chloromethane	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
cis-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
cis-1,3-Dichloropropene	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N009334
Project: Maryland Square Shopping Center, 103P172828
Lab ID: N009334-005

Client Sample ID: MSSC 09
Collection Date: 1/13/2013 2:20:00 PM
Matrix: SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
			EPA 8260B			
RunID: MS1_130118A	QC Batch: D13VS001			PrepDate:		Analyst: **QBM**
Dibromochloromethane	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
Dibromomethane	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
Dichlorodifluoromethane	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
Ethylbenzene	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
Hexachlorobutadiene	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
Isopropylbenzene	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
m,p-Xylene	ND	10		µg/Kg	1	1/18/2013 04:37 PM
Methylene chloride	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
MTBE	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
n-Butylbenzene	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
n-Propylbenzene	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
Naphthalene	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
o-Xylene	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
sec-Butylbenzene	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
Styrene	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
tert-Butylbenzene	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
Tetrachloroethene	19	5.0		µg/Kg	1	1/18/2013 04:37 PM
Toluene	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
trans-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
Trichloroethene	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
Trichlorofluoromethane	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
Vinyl chloride	ND	5.0		µg/Kg	1	1/18/2013 04:37 PM
Surr: 1,2-Dichloroethane-d4	105	58-125		%REC	1	1/18/2013 04:37 PM
Surr: 4-Bromofluorobenzene	101	52-138		%REC	1	1/18/2013 04:37 PM
Surr: Dibromofluoromethane	105	57-121		%REC	1	1/18/2013 04:37 PM
Surr: Toluene-d8	102	66-130		%REC	1	1/18/2013 04:37 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Lab Order: N009334
Project: Maryland Square Shopping Center, 103P172828
Lab ID: N009334-006

Client Sample ID: TTMW19D09GW101
Collection Date: 1/14/2013 11:00:00 AM
Matrix: GROUNDWATER

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS5_130115A QC Batch: P13VW007 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	1/15/2013 02:33 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	1/15/2013 02:33 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	1/15/2013 02:33 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	1/15/2013 02:33 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	1/15/2013 02:33 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	1/15/2013 02:33 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	1/15/2013 02:33 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	1/15/2013 02:33 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	1/15/2013 02:33 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	1/15/2013 02:33 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	1/15/2013 02:33 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	1/15/2013 02:33 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	1/15/2013 02:33 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	1/15/2013 02:33 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	1/15/2013 02:33 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	1/15/2013 02:33 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	1/15/2013 02:33 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	1/15/2013 02:33 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	1/15/2013 02:33 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	1/15/2013 02:33 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	1/15/2013 02:33 PM
2-Chlorotoluene	ND	0.50		µg/L	1	1/15/2013 02:33 PM
4-Chlorotoluene	ND	0.50		µg/L	1	1/15/2013 02:33 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	1/15/2013 02:33 PM
Benzene	ND	0.50		µg/L	1	1/15/2013 02:33 PM
Bromobenzene	ND	0.50		µg/L	1	1/15/2013 02:33 PM
Bromodichloromethane	ND	0.50		µg/L	1	1/15/2013 02:33 PM
Bromoform	ND	0.50		µg/L	1	1/15/2013 02:33 PM
Bromomethane	ND	0.50		µg/L	1	1/15/2013 02:33 PM
Carbon tetrachloride	ND	0.50		µg/L	1	1/15/2013 02:33 PM
Chlorobenzene	ND	0.50		µg/L	1	1/15/2013 02:33 PM
Chloroethane	ND	0.50		µg/L	1	1/15/2013 02:33 PM
Chloroform	ND	0.50		µg/L	1	1/15/2013 02:33 PM
Chloromethane	ND	0.50		µg/L	1	1/15/2013 02:33 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	1/15/2013 02:33 PM
cis-1,3-Dichloropropene	ND	0.50		µg/L	1	1/15/2013 02:33 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT: Tetra Tech
Lab Order: N009334
Project: Maryland Square Shopping Center, 103P172828
Lab ID: N009334-006

Client Sample ID: TTMW19D09GW101
Collection Date: 1/14/2013 11:00:00 AM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS5_130115A	QC Batch: P13VW007			PrepDate:		Analyst: **QBM**
Dibromochloromethane	ND	0.50		µg/L	1	1/15/2013 02:33 PM
Dibromomethane	ND	0.50		µg/L	1	1/15/2013 02:33 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	1/15/2013 02:33 PM
Ethylbenzene	ND	0.50		µg/L	1	1/15/2013 02:33 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	1/15/2013 02:33 PM
Isopropylbenzene	ND	0.50		µg/L	1	1/15/2013 02:33 PM
m,p-Xylene	ND	1.0		µg/L	1	1/15/2013 02:33 PM
Methylene chloride	ND	2.0		µg/L	1	1/15/2013 02:33 PM
MTBE	ND	0.50		µg/L	1	1/15/2013 02:33 PM
n-Butylbenzene	ND	0.50		µg/L	1	1/15/2013 02:33 PM
n-Propylbenzene	ND	0.50		µg/L	1	1/15/2013 02:33 PM
Naphthalene	ND	0.50		µg/L	1	1/15/2013 02:33 PM
o-Xylene	ND	0.50		µg/L	1	1/15/2013 02:33 PM
sec-Butylbenzene	ND	0.50		µg/L	1	1/15/2013 02:33 PM
Styrene	ND	0.50		µg/L	1	1/15/2013 02:33 PM
tert-Butylbenzene	ND	0.50		µg/L	1	1/15/2013 02:33 PM
Tetrachloroethene	ND	0.50		µg/L	1	1/15/2013 02:33 PM
Toluene	ND	0.50		µg/L	1	1/15/2013 02:33 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	1/15/2013 02:33 PM
Trichloroethene	ND	0.50		µg/L	1	1/15/2013 02:33 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	1/15/2013 02:33 PM
Vinyl chloride	ND	0.50		µg/L	1	1/15/2013 02:33 PM
Surr: 1,2-Dichloroethane-d4	109	56-120		%REC	1	1/15/2013 02:33 PM
Surr: 4-Bromofluorobenzene	108	80-120		%REC	1	1/15/2013 02:33 PM
Surr: Dibromofluoromethane	104	72-120		%REC	1	1/15/2013 02:33 PM
Surr: Toluene-d8	111	80-123		%REC	1	1/15/2013 02:33 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Client Sample ID: MSSC 10
Lab Order: N009334
Collection Date: 1/14/2013 2:30:00 PM
Project: Maryland Square Shopping Center, 103P172828
Matrix: SOIL
Lab ID: N009334-007

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
			EPA 8260B			
RunID: MS1_130118A	QC Batch: D13VS001			PrepDate:		Analyst: **QBM**
1,1,1,2-Tetrachloroethane	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
1,1,1-Trichloroethane	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
1,1,2,2-Tetrachloroethane	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
1,1,2-Trichloroethane	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
1,1-Dichloroethane	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
1,1-Dichloroethene	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
1,1-Dichloropropene	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
1,2,3-Trichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
1,2,3-Trichloropropane	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
1,2,4-Trichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
1,2,4-Trimethylbenzene	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
1,2-Dibromo-3-chloropropane	ND	10		µg/Kg	1	1/18/2013 05:00 PM
1,2-Dibromoethane	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
1,2-Dichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
1,2-Dichloroethane	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
1,2-Dichloropropane	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
1,3,5-Trimethylbenzene	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
1,3-Dichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
1,3-Dichloropropane	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
1,4-Dichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
2,2-Dichloropropane	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
2-Chlorotoluene	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
4-Chlorotoluene	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
4-Isopropyltoluene	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
Benzene	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
Bromobenzene	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
Bromodichloromethane	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
Bromoform	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
Bromomethane	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
Carbon tetrachloride	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
Chlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
Chloroethane	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
Chloroform	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
Chloromethane	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
cis-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
cis-1,3-Dichloropropene	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT: Tetra Tech
Lab Order: N009334
Project: Maryland Square Shopping Center, 103P172828
Lab ID: N009334-007

Client Sample ID: MSSC 10
Collection Date: 1/14/2013 2:30:00 PM
Matrix: SOIL

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS1_130118A | QC Batch: D13VS001 | PrepDate: | Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Dibromochloromethane	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
Dibromomethane	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
Dichlorodifluoromethane	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
Ethylbenzene	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
Hexachlorobutadiene	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
Isopropylbenzene	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
m,p-Xylene	ND	10		µg/Kg	1	1/18/2013 05:00 PM
Methylene chloride	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
MTBE	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
n-Butylbenzene	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
n-Propylbenzene	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
Naphthalene	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
o-Xylene	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
sec-Butylbenzene	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
Styrene	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
tert-Butylbenzene	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
Tetrachloroethene	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
Toluene	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
trans-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
Trichloroethene	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
Trichlorofluoromethane	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
Vinyl chloride	ND	5.0		µg/Kg	1	1/18/2013 05:00 PM
Surr: 1,2-Dichloroethane-d4	99.5	58-125		%REC	1	1/18/2013 05:00 PM
Surr: 4-Bromofluorobenzene	96.5	52-138		%REC	1	1/18/2013 05:00 PM
Surr: Dibromofluoromethane	97.6	57-121		%REC	1	1/18/2013 05:00 PM
Surr: Toluene-d8	97.6	66-130		%REC	1	1/18/2013 05:00 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Lab Order: N009334
Project: Maryland Square Shopping Center, 103P172828
Lab ID: N009334-008

Client Sample ID: MSSC 11
Collection Date: 1/14/2013 2:10:00 PM
Matrix: SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
			EPA 8260B			
RunID: MS1_130118A	QC Batch: D13VS001			PrepDate:		Analyst: **QBM**
1,1,1,2-Tetrachloroethane	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
1,1,1-Trichloroethane	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
1,1,2,2-Tetrachloroethane	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
1,1,2-Trichloroethane	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
1,1-Dichloroethane	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
1,1-Dichloroethene	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
1,1-Dichloropropene	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
1,2,3-Trichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
1,2,3-Trichloropropane	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
1,2,4-Trichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
1,2,4-Trimethylbenzene	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
1,2-Dibromo-3-chloropropane	ND	10		µg/Kg	1	1/18/2013 05:46 PM
1,2-Dibromoethane	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
1,2-Dichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
1,2-Dichloroethane	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
1,2-Dichloropropane	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
1,3,5-Trimethylbenzene	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
1,3-Dichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
1,3-Dichloropropane	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
1,4-Dichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
2,2-Dichloropropane	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
2-Chlorotoluene	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
4-Chlorotoluene	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
4-Isopropyltoluene	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
Benzene	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
Bromobenzene	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
Bromodichloromethane	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
Bromoform	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
Bromomethane	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
Carbon tetrachloride	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
Chlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
Chloroethane	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
Chloroform	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
Chloromethane	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
cis-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
cis-1,3-Dichloropropene	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N009334
Project: Maryland Square Shopping Center, 103P172828
Lab ID: N009334-008

Client Sample ID: MSSC 11
Collection Date: 1/14/2013 2:10:00 PM
Matrix: SOIL

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS1_130118A | QC Batch: D13VS001 | PrepDate: | Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Dibromochloromethane	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
Dibromomethane	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
Dichlorodifluoromethane	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
Ethylbenzene	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
Hexachlorobutadiene	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
Isopropylbenzene	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
m,p-Xylene	ND	10		µg/Kg	1	1/18/2013 05:46 PM
Methylene chloride	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
MTBE	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
n-Butylbenzene	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
n-Propylbenzene	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
Naphthalene	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
o-Xylene	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
sec-Butylbenzene	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
Styrene	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
tert-Butylbenzene	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
Tetrachloroethene	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
Toluene	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
trans-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
Trichloroethene	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
Trichlorofluoromethane	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
Vinyl chloride	ND	5.0		µg/Kg	1	1/18/2013 05:46 PM
Surr: 1,2-Dichloroethane-d4	108	58-125		%REC	1	1/18/2013 05:46 PM
Surr: 4-Bromofluorobenzene	95.1	52-138		%REC	1	1/18/2013 05:46 PM
Surr: Dibromofluoromethane	102	57-121		%REC	1	1/18/2013 05:46 PM
Surr: Toluene-d8	97.1	66-130		%REC	1	1/18/2013 05:46 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference
- DO Surrogate Diluted Out
- E Value above quantitation range
- ND Not Detected at the Reporting Limit

Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N009334
Project: Maryland Square Shopping Center, 103P172828
Lab ID: N009334-009

Client Sample ID: MSSC 12
Collection Date: 1/14/2013 2:20:00 PM
Matrix: SOIL

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS1_130118A | QC Batch: D13VS001 | PrepDate: | Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
1,1,1-Trichloroethane	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
1,1,2,2-Tetrachloroethane	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
1,1,2-Trichloroethane	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
1,1-Dichloroethane	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
1,1-Dichloroethene	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
1,1-Dichloropropene	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
1,2,3-Trichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
1,2,3-Trichloropropane	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
1,2,4-Trichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
1,2,4-Trimethylbenzene	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
1,2-Dibromo-3-chloropropane	ND	10		µg/Kg	1	1/18/2013 06:09 PM
1,2-Dibromoethane	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
1,2-Dichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
1,2-Dichloroethane	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
1,2-Dichloropropane	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
1,3,5-Trimethylbenzene	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
1,3-Dichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
1,3-Dichloropropane	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
1,4-Dichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
2,2-Dichloropropane	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
2-Chlorotoluene	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
4-Chlorotoluene	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
4-Isopropyltoluene	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
Benzene	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
Bromobenzene	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
Bromodichloromethane	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
Bromoform	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
Bromomethane	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
Carbon tetrachloride	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
Chlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
Chloroethane	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
Chloroform	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
Chloromethane	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
cis-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
cis-1,3-Dichloropropene	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT: Tetra Tech
Lab Order: N009334
Project: Maryland Square Shopping Center, 103P172828
Lab ID: N009334-009

Client Sample ID: MSSC 12
Collection Date: 1/14/2013 2:20:00 PM
Matrix: SOIL

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS1_130118A | QC Batch: D13VS001 | PrepDate: | Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Dibromochloromethane	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
Dibromomethane	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
Dichlorodifluoromethane	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
Ethylbenzene	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
Hexachlorobutadiene	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
Isopropylbenzene	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
m,p-Xylene	ND	10		µg/Kg	1	1/18/2013 06:09 PM
Methylene chloride	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
MTBE	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
n-Butylbenzene	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
n-Propylbenzene	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
Naphthalene	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
o-Xylene	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
sec-Butylbenzene	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
Styrene	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
tert-Butylbenzene	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
Tetrachloroethene	8.0	5.0		µg/Kg	1	1/18/2013 06:09 PM
Toluene	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
trans-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
Trichloroethene	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
Trichlorofluoromethane	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
Vinyl chloride	ND	5.0		µg/Kg	1	1/18/2013 06:09 PM
Surr: 1,2-Dichloroethane-d4	97.8	58-125		%REC	1	1/18/2013 06:09 PM
Surr: 4-Bromofluorobenzene	88.1	52-138		%REC	1	1/18/2013 06:09 PM
Surr: Dibromofluoromethane	94.8	57-121		%REC	1	1/18/2013 06:09 PM
Surr: Toluene-d8	92.4	66-130		%REC	1	1/18/2013 06:09 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT: Tetra Tech
Work Order: N009334
Project: Maryland Square Shopping Center, 103P172828

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID: **D130118LCS** SampType: **LCS** TestCode: **8260_S** Units: **µg/Kg** Prep Date: RunNo: **87193**
Client ID: **LCSS** Batch ID: **D13VS001** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508498**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	36.720	5.0	40.00	0	91.8	76	120				
1,1,1-Trichloroethane	34.220	5.0	40.00	0	85.6	67	120				
1,1,2,2-Tetrachloroethane	39.380	5.0	40.00	0	98.4	79	120				
1,1,2-Trichloroethane	36.460	5.0	40.00	0	91.2	79	120				
1,1-Dichloroethane	33.440	5.0	40.00	0	83.6	80	120				
1,1-Dichloroethene	34.150	5.0	40.00	0	85.4	80	120				
1,1-Dichloropropene	35.650	5.0	40.00	0	89.1	80	120				
1,2,3-Trichlorobenzene	38.620	5.0	40.00	0	96.6	80	125				
1,2,3-Trichloropropane	39.270	5.0	40.00	0	98.2	80	120				
1,2,4-Trichlorobenzene	38.960	5.0	40.00	0	97.4	80	128				
1,2,4-Trimethylbenzene	36.430	5.0	40.00	0	91.1	80	124				
1,2-Dibromo-3-chloropropane	44.340	10	40.00	0	111	67	120				
1,2-Dibromoethane	37.500	5.0	40.00	0	93.8	74	120				
1,2-Dichlorobenzene	37.240	5.0	40.00	0	93.1	80	120				
1,2-Dichloroethane	36.230	5.0	40.00	0	90.6	78	120				
1,2-Dichloropropane	35.750	5.0	40.00	0	89.4	79	120				
1,3,5-Trimethylbenzene	35.790	5.0	40.00	0	89.5	80	124				
1,3-Dichlorobenzene	37.100	5.0	40.00	0	92.8	80	120				
1,3-Dichloropropane	37.510	5.0	40.00	0	93.8	80	120				
1,4-Dichlorobenzene	36.520	5.0	40.00	0	91.3	80	120				
2,2-Dichloropropane	36.640	5.0	40.00	0	91.6	53	120				
2-Chlorotoluene	36.090	5.0	40.00	0	90.2	80	124				
4-Chlorotoluene	36.960	5.0	40.00	0	92.4	80	120				
4-Isopropyltoluene	36.590	5.0	40.00	0	91.5	80	126				
Benzene	35.090	5.0	40.00	0	87.7	80	120				
Bromobenzene	36.580	5.0	40.00	0	91.4	80	120				
Bromodichloromethane	36.220	5.0	40.00	0	90.6	69	120				
Bromoform	39.550	5.0	40.00	0	98.9	66	121				
Bromomethane	37.550	5.0	40.00	0	93.9	67	136				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Tetra Tech
Work Order: N009334
Project: Maryland Square Shopping Center, 103P172828

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID: **D130118LCS** SampType: **LCS** TestCode: **8260_S** Units: **µg/Kg** Prep Date: RunNo: **87193**
Client ID: **LCSS** Batch ID: **D13VS001** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508498**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Carbon tetrachloride	33.600	5.0	40.00	0	84.0	62	120				
Chlorobenzene	36.770	5.0	40.00	0	91.9	80	120				
Chloroethane	38.240	5.0	40.00	0	95.6	70	149				
Chloroform	33.460	5.0	40.00	0	83.6	80	120				
Chloromethane	34.260	5.0	40.00	0	85.7	59	123				
cis-1,2-Dichloroethene	34.440	5.0	40.00	0	86.1	80	120				
cis-1,3-Dichloropropene	37.080	5.0	40.00	0	92.7	73	120				
Dibromochloromethane	37.510	5.0	40.00	0	93.8	71	123				
Dibromomethane	37.870	5.0	40.00	0	94.7	78	120				
Dichlorodifluoromethane	34.660	5.0	40.00	0	86.7	62	120				
Ethylbenzene	35.690	5.0	40.00	0	89.2	80	120				
Hexachlorobutadiene	35.630	5.0	40.00	0	89.1	80	128				
Isopropylbenzene	36.450	5.0	40.00	0	91.1	80	126				
m,p-Xylene	72.560	10	80.00	0	90.7	80	120				
Methylene chloride	32.740	5.0	40.00	0	81.8	69	120				
MTBE	34.360	5.0	40.00	0	85.9	67	120				
n-Butylbenzene	36.720	5.0	40.00	0	91.8	80	135				
n-Propylbenzene	35.020	5.0	40.00	0	87.6	80	127				
Naphthalene	42.000	5.0	40.00	0	105	70	132				
o-Xylene	37.280	5.0	40.00	0	93.2	80	120				
sec-Butylbenzene	35.910	5.0	40.00	0	89.8	80	127				
Styrene	37.660	5.0	40.00	0	94.2	80	120				
tert-Butylbenzene	35.640	5.0	40.00	0	89.1	80	124				
Tetrachloroethene	35.140	5.0	40.00	0	87.9	80	122				
Toluene	34.130	5.0	40.00	0	85.3	80	120				
trans-1,2-Dichloroethene	34.370	5.0	40.00	0	85.9	79	120				
Trichloroethene	34.670	5.0	40.00	0	86.7	80	120				
Trichlorofluoromethane	33.110	5.0	40.00	0	82.8	69	145				
Vinyl chloride	34.010	5.0	40.00	0	85.0	75	122				
Surr: 1,2-Dichloroethane-d4	46.100		50.00		92.2	58	125				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009334
Project: Maryland Square Shopping Center, 103P172828

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID: **D130118LCS** SampType: **LCS** TestCode: **8260_S** Units: **µg/Kg** Prep Date: RunNo: **87193**
Client ID: **LCSS** Batch ID: **D13VS001** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508498**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	47.020		50.00		94.0	52	138				
Surr: Dibromofluoromethane	44.470		50.00		88.9	57	121				
Surr: Toluene-d8	45.500		50.00		91.0	66	130				

Sample ID: **D130118LCSD** SampType: **LCSD** TestCode: **8260_S** Units: **µg/Kg** Prep Date: RunNo: **87193**
Client ID: **LCSS02** Batch ID: **D13VS001** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508499**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	40.100	5.0	40.00	0	100	76	120	36.72	8.80	20	
1,1,1-Trichloroethane	38.080	5.0	40.00	0	95.2	67	120	34.22	10.7	20	
1,1,2,2-Tetrachloroethane	40.580	5.0	40.00	0	101	79	120	39.38	3.00	20	
1,1,2-Trichloroethane	38.550	5.0	40.00	0	96.4	79	120	36.46	5.57	20	
1,1-Dichloroethane	36.620	5.0	40.00	0	91.6	80	120	33.44	9.08	20	
1,1-Dichloroethene	37.800	5.0	40.00	0	94.5	80	120	34.15	10.1	20	
1,1-Dichloropropene	38.970	5.0	40.00	0	97.4	80	120	35.65	8.90	20	
1,2,3-Trichlorobenzene	41.060	5.0	40.00	0	103	80	125	38.62	6.12	20	
1,2,3-Trichloropropane	42.040	5.0	40.00	0	105	80	120	39.27	6.81	20	
1,2,4-Trichlorobenzene	40.020	5.0	40.00	0	100	80	128	38.96	2.68	20	
1,2,4-Trimethylbenzene	38.960	5.0	40.00	0	97.4	80	124	36.43	6.71	20	
1,2-Dibromo-3-chloropropane	46.950	10	40.00	0	117	67	120	44.34	5.72	20	
1,2-Dibromoethane	39.060	5.0	40.00	0	97.6	74	120	37.50	4.08	20	
1,2-Dichlorobenzene	38.600	5.0	40.00	0	96.5	80	120	37.24	3.59	20	
1,2-Dichloroethane	35.680	5.0	40.00	0	89.2	78	120	36.23	1.53	20	
1,2-Dichloropropane	36.530	5.0	40.00	0	91.3	79	120	35.75	2.16	20	
1,3,5-Trimethylbenzene	38.800	5.0	40.00	0	97.0	80	124	35.79	8.07	20	
1,3-Dichlorobenzene	38.890	5.0	40.00	0	97.2	80	120	37.10	4.71	20	
1,3-Dichloropropane	39.160	5.0	40.00	0	97.9	80	120	37.51	4.30	20	
1,4-Dichlorobenzene	38.060	5.0	40.00	0	95.2	80	120	36.52	4.13	20	
2,2-Dichloropropane	40.480	5.0	40.00	0	101	53	120	36.64	9.96	20	
2-Chlorotoluene	38.240	5.0	40.00	0	95.6	80	124	36.09	5.79	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009334
Project: Maryland Square Shopping Center, 103P172828

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID: **D130118LCSD** SampType: **LCSD** TestCode: **8260_S** Units: **µg/Kg** Prep Date: RunNo: **87193**
Client ID: **LCSS02** Batch ID: **D13VS001** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508499**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4-Chlorotoluene	40.350	5.0	40.00	0	101	80	120	36.96	8.77	20	
4-Isopropyltoluene	39.600	5.0	40.00	0	99.0	80	126	36.59	7.90	20	
Benzene	37.030	5.0	40.00	0	92.6	80	120	35.09	5.38	20	
Bromobenzene	38.490	5.0	40.00	0	96.2	80	120	36.58	5.09	20	
Bromodichloromethane	38.600	5.0	40.00	0	96.5	69	120	36.22	6.36	20	
Bromoform	42.130	5.0	40.00	0	105	66	121	39.55	6.32	20	
Bromomethane	40.640	5.0	40.00	0	102	67	136	37.55	7.90	20	
Carbon tetrachloride	35.480	5.0	40.00	0	88.7	62	120	33.60	5.44	20	
Chlorobenzene	39.250	5.0	40.00	0	98.1	80	120	36.77	6.52	20	
Chloroethane	42.820	5.0	40.00	0	107	70	149	38.24	11.3	20	
Chloroform	35.660	5.0	40.00	0	89.2	80	120	33.46	6.37	20	
Chloromethane	37.390	5.0	40.00	0	93.5	59	123	34.26	8.74	20	
cis-1,2-Dichloroethene	37.270	5.0	40.00	0	93.2	80	120	34.44	7.89	20	
cis-1,3-Dichloropropene	39.000	5.0	40.00	0	97.5	73	120	37.08	5.05	20	
Dibromochloromethane	39.890	5.0	40.00	0	99.7	71	123	37.51	6.15	20	
Dibromomethane	38.550	5.0	40.00	0	96.4	78	120	37.87	1.78	20	
Dichlorodifluoromethane	37.540	5.0	40.00	0	93.8	62	120	34.66	7.98	20	
Ethylbenzene	38.880	5.0	40.00	0	97.2	80	120	35.69	8.56	20	
Hexachlorobutadiene	37.090	5.0	40.00	0	92.7	80	128	35.63	4.02	20	
Isopropylbenzene	39.050	5.0	40.00	0	97.6	80	126	36.45	6.89	20	
m,p-Xylene	78.630	10	80.00	0	98.3	80	120	72.56	8.03	20	
Methylene chloride	34.860	5.0	40.00	0	87.2	69	120	32.74	6.27	20	
MTBE	35.510	5.0	40.00	0	88.8	67	120	34.36	3.29	20	
n-Butylbenzene	39.010	5.0	40.00	0	97.5	80	135	36.72	6.05	20	
n-Propylbenzene	39.020	5.0	40.00	0	97.6	80	127	35.02	10.8	20	
Naphthalene	43.520	5.0	40.00	0	109	70	132	42.00	3.55	20	
o-Xylene	40.370	5.0	40.00	0	101	80	120	37.28	7.96	20	
sec-Butylbenzene	38.730	5.0	40.00	0	96.8	80	127	35.91	7.56	20	
Styrene	40.360	5.0	40.00	0	101	80	120	37.66	6.92	20	
tert-Butylbenzene	38.090	5.0	40.00	0	95.2	80	124	35.64	6.65	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009334
Project: Maryland Square Shopping Center, 103P172828

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID: **D130118LCSD** SampType: **LCSD** TestCode: **8260_S** Units: **µg/Kg** Prep Date: RunNo: **87193**
Client ID: **LCSS02** Batch ID: **D13VS001** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508499**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Tetrachloroethene	38.720	5.0	40.00	0	96.8	80	122	35.14	9.69	20	
Toluene	37.530	5.0	40.00	0	93.8	80	120	34.13	9.49	20	
trans-1,2-Dichloroethene	37.210	5.0	40.00	0	93.0	79	120	34.37	7.94	20	
Trichloroethene	36.510	5.0	40.00	0	91.3	80	120	34.67	5.17	20	
Trichlorofluoromethane	36.140	5.0	40.00	0	90.4	69	145	33.11	8.75	20	
Vinyl chloride	37.970	5.0	40.00	0	94.9	75	122	34.01	11.0	20	
Surr: 1,2-Dichloroethane-d4	48.700		50.00		97.4	58	125		0		
Surr: 4-Bromofluorobenzene	50.610		50.00		101	52	138		0		
Surr: Dibromofluoromethane	46.990		50.00		94.0	57	121		0		
Surr: Toluene-d8	48.550		50.00		97.1	66	130		0		

Sample ID: **D130118MB2** SampType: **MBLK** TestCode: **8260_S** Units: **µg/Kg** Prep Date: RunNo: **87193**
Client ID: **PBS** Batch ID: **D13VS001** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508500**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	5.0									
1,1,1-Trichloroethane	ND	5.0									
1,1,2,2-Tetrachloroethane	ND	5.0									
1,1,2-Trichloroethane	ND	5.0									
1,1-Dichloroethane	ND	5.0									
1,1-Dichloroethene	ND	5.0									
1,1-Dichloropropene	ND	5.0									
1,2,3-Trichlorobenzene	ND	5.0									
1,2,3-Trichloropropane	ND	5.0									
1,2,4-Trichlorobenzene	ND	5.0									
1,2,4-Trimethylbenzene	ND	5.0									
1,2-Dibromo-3-chloropropane	ND	10									
1,2-Dibromoethane	ND	5.0									
1,2-Dichlorobenzene	ND	5.0									
1,2-Dichloroethane	ND	5.0									

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009334
Project: Maryland Square Shopping Center, 103P172828

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID: **D130118MB2** SampType: **MBLK** TestCode: **8260_S** Units: **µg/Kg** Prep Date: RunNo: **87193**
Client ID: **PBS** Batch ID: **D13VS001** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508500**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2-Dichloropropane	ND	5.0									
1,3,5-Trimethylbenzene	ND	5.0									
1,3-Dichlorobenzene	ND	5.0									
1,3-Dichloropropane	ND	5.0									
1,4-Dichlorobenzene	ND	5.0									
2,2-Dichloropropane	ND	5.0									
2-Chlorotoluene	ND	5.0									
4-Chlorotoluene	ND	5.0									
4-Isopropyltoluene	ND	5.0									
Benzene	ND	5.0									
Bromobenzene	ND	5.0									
Bromodichloromethane	ND	5.0									
Bromoform	ND	5.0									
Bromomethane	ND	5.0									
Carbon tetrachloride	ND	5.0									
Chlorobenzene	ND	5.0									
Chloroethane	ND	5.0									
Chloroform	ND	5.0									
Chloromethane	ND	5.0									
cis-1,2-Dichloroethene	ND	5.0									
cis-1,3-Dichloropropene	ND	5.0									
Dibromochloromethane	ND	5.0									
Dibromomethane	ND	5.0									
Dichlorodifluoromethane	ND	5.0									
Ethylbenzene	ND	5.0									
Hexachlorobutadiene	ND	5.0									
Isopropylbenzene	ND	5.0									
m,p-Xylene	ND	10									
Methylene chloride	ND	5.0									
MTBE	ND	5.0									

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009334
Project: Maryland Square Shopping Center, 103P172828

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID: **D130118MB2** SampType: **MBLK** TestCode: **8260_S** Units: **µg/Kg** Prep Date: RunNo: **87193**
Client ID: **PBS** Batch ID: **D13VS001** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508500**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
n-Butylbenzene	ND	5.0									
n-Propylbenzene	ND	5.0									
Naphthalene	ND	5.0									
o-Xylene	ND	5.0									
sec-Butylbenzene	ND	5.0									
Styrene	ND	5.0									
tert-Butylbenzene	ND	5.0									
Tetrachloroethene	ND	5.0									
Toluene	ND	5.0									
trans-1,2-Dichloroethene	ND	5.0									
Trichloroethene	ND	5.0									
Trichlorofluoromethane	ND	5.0									
Vinyl chloride	ND	5.0									
Surr: 1,2-Dichloroethane-d4	40.000		50.00		80.0	58	125				
Surr: 4-Bromofluorobenzene	45.410		50.00		90.8	52	138				
Surr: Dibromofluoromethane	40.840		50.00		81.7	57	121				
Surr: Toluene-d8	47.090		50.00		94.2	66	130				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009334
Project: Maryland Square Shopping Center, 103P172828

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130115LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87123**
Client ID: **LCSW** Batch ID: **P13VW007** TestNo: **EPA 8260B** Analysis Date: **1/15/2013** SeqNo: **1506335**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	19.930	0.50	20.00	0	99.7	74	122				
1,1,1-Trichloroethane	19.790	0.50	20.00	0	99.0	65	120				
1,1,2,2-Tetrachloroethane	21.630	0.50	20.00	0	108	80	120				
1,1,2-Trichloroethane	20.690	0.50	20.00	0	103	80	120				
1,1-Dichloroethane	20.010	0.50	20.00	0	100	80	120				
1,1-Dichloroethene	19.010	0.50	20.00	0	95.1	80	120				
1,1-Dichloropropene	20.670	0.50	20.00	0	103	80	120				
1,2,3-Trichlorobenzene	22.700	0.50	20.00	0	114	80	124				
1,2,3-Trichloropropane	21.050	0.50	20.00	0	105	80	120				
1,2,4-Trichlorobenzene	23.340	0.50	20.00	0	117	80	126				
1,2,4-Trimethylbenzene	23.190	0.50	20.00	0	116	80	123				
1,2-Dibromo-3-chloropropane	21.890	1.0	20.00	0	109	70	120				
1,2-Dibromoethane	21.040	0.50	20.00	0	105	80	120				
1,2-Dichlorobenzene	20.570	0.50	20.00	0	103	80	120				
1,2-Dichloroethane	20.230	0.50	20.00	0	101	80	120				
1,2-Dichloropropane	20.940	0.50	20.00	0	105	80	120				
1,3,5-Trimethylbenzene	22.630	0.50	20.00	0	113	80	121				
1,3-Dichlorobenzene	20.500	0.50	20.00	0	103	80	120				
1,3-Dichloropropane	20.910	0.50	20.00	0	105	80	120				
1,4-Dichlorobenzene	19.930	0.50	20.00	0	99.7	80	120				
2,2-Dichloropropane	21.280	0.50	20.00	0	106	54	120				
2-Chlorotoluene	21.350	0.50	20.00	0	107	80	122				
4-Chlorotoluene	21.350	0.50	20.00	0	107	80	120				
4-Isopropyltoluene	22.690	0.50	20.00	0	113	80	122				
Benzene	20.490	0.50	20.00	0	102	80	120				
Bromobenzene	20.470	0.50	20.00	0	102	80	120				
Bromodichloromethane	20.220	0.50	20.00	0	101	70	120				
Bromoform	20.390	0.50	20.00	0	102	66	120				
Bromomethane	18.300	0.50	20.00	0	91.5	48	155				
Carbon tetrachloride	19.440	0.50	20.00	0	97.2	60	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009334
Project: Maryland Square Shopping Center, 103P172828

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130115LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87123**
Client ID: **LCSW** Batch ID: **P13VW007** TestNo: **EPA 8260B** Analysis Date: **1/15/2013** SeqNo: **1506335**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	20.250	0.50	20.00	0	101	80	120				
Chloroethane	18.910	0.50	20.00	0	94.6	62	147				
Chloroform	19.730	0.50	20.00	0	98.6	80	120				
Chloromethane	17.030	0.50	20.00	0	85.2	63	121				
cis-1,2-Dichloroethene	19.830	0.50	20.00	0	99.2	80	120				
cis-1,3-Dichloropropene	21.130	0.50	20.00	0	106	75	120				
Dibromochloromethane	20.300	0.50	20.00	0	102	67	123				
Dibromomethane	20.100	0.50	20.00	0	101	80	120				
Dichlorodifluoromethane	21.190	0.50	20.00	0	106	70	121				
Ethylbenzene	20.650	0.50	20.00	0	103	80	120				
Hexachlorobutadiene	20.730	0.50	20.00	0	104	80	123				
Isopropylbenzene	21.860	0.50	20.00	0	109	80	121				
m,p-Xylene	42.320	1.0	40.00	0	106	80	120				
Methylene chloride	19.280	2.0	20.00	0	96.4	75	120				
MTBE	20.790	0.50	20.00	0	104	70	120				
n-Butylbenzene	22.560	0.50	20.00	0	113	80	129				
n-Propylbenzene	21.840	0.50	20.00	0	109	80	122				
Naphthalene	20.610	0.50	20.00	0	103	73	127				
o-Xylene	21.770	0.50	20.00	0	109	80	120				
sec-Butylbenzene	21.750	0.50	20.00	0	109	80	120				
Styrene	22.320	0.50	20.00	0	112	80	120				
tert-Butylbenzene	21.560	0.50	20.00	0	108	80	120				
Tetrachloroethene	19.540	0.50	20.00	0	97.7	80	121				
Toluene	20.850	0.50	20.00	0	104	80	120				
trans-1,2-Dichloroethene	19.080	0.50	20.00	0	95.4	80	120				
Trichloroethene	19.350	0.50	20.00	0	96.8	80	120				
Trichlorofluoromethane	19.550	0.50	20.00	0	97.8	71	148				
Vinyl chloride	19.700	0.50	20.00	0	98.5	80	120				
Surr: 1,2-Dichloroethane-d4	25.680		25.00		103	56	120				
Surr: 4-Bromofluorobenzene	27.380		25.00		110	80	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009334
Project: Maryland Square Shopping Center, 103P172828

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130115LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87123**
Client ID: **LCSW** Batch ID: **P13VW007** TestNo: **EPA 8260B** Analysis Date: **1/15/2013** SeqNo: **1506335**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Dibromofluoromethane	25.170		25.00		101	72	120				
Surr: Toluene-d8	26.630		25.00		107	80	123				

Sample ID: **P130115MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87123**
Client ID: **PBW** Batch ID: **P13VW007** TestNo: **EPA 8260B** Analysis Date: **1/15/2013** SeqNo: **1506336**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	0.50									
1,1,1-Trichloroethane	ND	0.50									
1,1,2,2-Tetrachloroethane	ND	0.50									
1,1,2-Trichloroethane	ND	0.50									
1,1-Dichloroethane	ND	0.50									
1,1-Dichloroethene	ND	0.50									
1,1-Dichloropropene	ND	0.50									
1,2,3-Trichlorobenzene	ND	0.50									
1,2,3-Trichloropropane	ND	0.50									
1,2,4-Trichlorobenzene	ND	0.50									
1,2,4-Trimethylbenzene	ND	0.50									
1,2-Dibromo-3-chloropropane	ND	1.0									
1,2-Dibromoethane	ND	0.50									
1,2-Dichlorobenzene	ND	0.50									
1,2-Dichloroethane	ND	0.50									
1,2-Dichloropropane	ND	0.50									
1,3,5-Trimethylbenzene	ND	0.50									
1,3-Dichlorobenzene	ND	0.50									
1,3-Dichloropropane	ND	0.50									
1,4-Dichlorobenzene	ND	0.50									
2,2-Dichloropropane	ND	0.50									
2-Chlorotoluene	ND	0.50									
4-Chlorotoluene	ND	0.50									

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009334
Project: Maryland Square Shopping Center, 103P172828

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130115MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87123**
Client ID: **PBW** Batch ID: **P13VW007** TestNo: **EPA 8260B** Analysis Date: **1/15/2013** SeqNo: **1506336**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4-Isopropyltoluene	ND	0.50									
Benzene	ND	0.50									
Bromobenzene	ND	0.50									
Bromodichloromethane	ND	0.50									
Bromoform	ND	0.50									
Bromomethane	ND	0.50									
Carbon tetrachloride	ND	0.50									
Chlorobenzene	ND	0.50									
Chloroethane	ND	0.50									
Chloroform	ND	0.50									
Chloromethane	ND	0.50									
cis-1,2-Dichloroethene	ND	0.50									
cis-1,3-Dichloropropene	ND	0.50									
Dibromochloromethane	ND	0.50									
Dibromomethane	ND	0.50									
Dichlorodifluoromethane	ND	0.50									
Ethylbenzene	ND	0.50									
Hexachlorobutadiene	ND	0.50									
Isopropylbenzene	ND	0.50									
m,p-Xylene	ND	1.0									
Methylene chloride	ND	2.0									
MTBE	ND	0.50									
n-Butylbenzene	ND	0.50									
n-Propylbenzene	ND	0.50									
Naphthalene	ND	0.50									
o-Xylene	ND	0.50									
sec-Butylbenzene	ND	0.50									
Styrene	ND	0.50									
tert-Butylbenzene	ND	0.50									
Tetrachloroethene	ND	0.50									

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009334
Project: Maryland Square Shopping Center, 103P172828

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130115MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87123**
Client ID: **PBW** Batch ID: **P13VW007** TestNo: **EPA 8260B** Analysis Date: **1/15/2013** SeqNo: **1506336**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Toluene	ND	0.50									
trans-1,2-Dichloroethene	ND	0.50									
Trichloroethene	ND	0.50									
Trichlorofluoromethane	ND	0.50									
Vinyl chloride	ND	0.50									
Surr: 1,2-Dichloroethane-d4	27.440		25.00		110	56	120				
Surr: 4-Bromofluorobenzene	26.090		25.00		104	80	120				
Surr: Dibromofluoromethane	27.040		25.00		108	72	120				
Surr: Toluene-d8	25.870		25.00		103	80	123				

Sample ID: **N009357-001AMS** SampType: **MS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87123**
Client ID: **ZZZZZZ** Batch ID: **P13VW007** TestNo: **EPA 8260B** Analysis Date: **1/15/2013** SeqNo: **1506696**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	19.690	0.50	20.00	0	98.4	70	120				
1,1,1-Trichloroethane	19.010	0.50	20.00	0	95.1	68	120				
1,1,2,2-Tetrachloroethane	21.800	0.50	20.00	0	109	69	120				
1,1,2-Trichloroethane	20.840	0.50	20.00	0	104	71	120				
1,1-Dichloroethane	18.930	0.50	20.00	0	94.6	77	120				
1,1-Dichloroethene	19.440	0.50	20.00	0	97.2	80	120				
1,1-Dichloropropene	20.720	0.50	20.00	0	104	80	120				
1,2,3-Trichlorobenzene	16.260	0.50	20.00	0	81.3	80	120				
1,2,3-Trichloropropane	20.420	0.50	20.00	0	102	68	120				
1,2,4-Trichlorobenzene	21.200	0.50	20.00	0	106	80	120				
1,2,4-Trimethylbenzene	21.470	0.50	20.00	0	107	72	131				
1,2-Dibromo-3-chloropropane	22.660	1.0	20.00	0	113	57	120				
1,2-Dibromoethane	21.140	0.50	20.00	0	106	71	120				
1,2-Dichlorobenzene	20.060	0.50	20.00	0	100	80	120				
1,2-Dichloroethane	20.360	0.50	20.00	0	102	72	120				
1,2-Dichloropropane	20.340	0.50	20.00	0	102	76	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009334
Project: Maryland Square Shopping Center, 103P172828

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **N009357-001AMS** SampType: **MS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87123**
Client ID: **ZZZZZZ** Batch ID: **P13VW007** TestNo: **EPA 8260B** Analysis Date: **1/15/2013** SeqNo: **1506696**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,3,5-Trimethylbenzene	20.690	0.50	20.00	0	103	80	125				
1,3-Dichlorobenzene	19.780	0.50	20.00	0	98.9	80	120				
1,3-Dichloropropane	20.750	0.50	20.00	0	104	70	120				
1,4-Dichlorobenzene	19.530	0.50	20.00	0	97.6	80	120				
2,2-Dichloropropane	20.250	0.50	20.00	0	101	58	120				
2-Chlorotoluene	18.590	0.50	20.00	0	93.0	80	128				
4-Chlorotoluene	19.740	0.50	20.00	0	98.7	80	122				
4-Isopropyltoluene	21.080	0.50	20.00	0	105	80	127				
Benzene	20.200	0.50	20.00	0	101	80	120				
Bromobenzene	19.610	0.50	20.00	0	98.0	80	120				
Bromodichloromethane	20.000	0.50	20.00	0	100	64	122				
Bromoform	21.040	0.50	20.00	0	105	60	120				
Bromomethane	17.990	0.50	20.00	0	90.0	69	129				
Carbon tetrachloride	19.560	0.50	20.00	0	97.8	65	120				
Chlorobenzene	19.990	0.50	20.00	0	100	80	120				
Chloroethane	20.210	0.50	20.00	0	101	56	158				
Chloroform	20.250	0.50	20.00	1.210	95.2	76	120				
Chloromethane	19.070	0.50	20.00	0	95.4	59	120				
cis-1,2-Dichloroethene	18.970	0.50	20.00	0	94.8	79	120				
cis-1,3-Dichloropropene	20.810	0.50	20.00	0	104	66	120				
Dibromochloromethane	19.770	0.50	20.00	0	98.8	49	131				
Dibromomethane	20.790	0.50	20.00	0	104	73	120				
Dichlorodifluoromethane	20.000	0.50	20.00	0	100	67	124				
Ethylbenzene	19.770	0.50	20.00	0	98.8	80	120				
Hexachlorobutadiene	18.880	0.50	20.00	0	94.4	80	130				
Isopropylbenzene	20.590	0.50	20.00	0	103	80	128				
m,p-Xylene	41.170	1.0	40.00	0	103	80	123				
Methylene chloride	18.860	2.0	20.00	0	94.3	67	120				
MTBE	20.140	0.50	20.00	0	101	52	120				
n-Butylbenzene	21.000	0.50	20.00	0	105	80	132				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009334
Project: Maryland Square Shopping Center, 103P172828

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **N009357-001AMS** SampType: **MS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87123**
Client ID: **ZZZZZZ** Batch ID: **P13VW007** TestNo: **EPA 8260B** Analysis Date: **1/15/2013** SeqNo: **1506696**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
n-Propylbenzene	20.320	0.50	20.00	0	102	80	130				
Naphthalene	14.700	0.50	20.00	0	73.5	57	120				
o-Xylene	20.620	0.50	20.00	0	103	80	120				
sec-Butylbenzene	20.160	0.50	20.00	0	101	80	128				
Styrene	21.730	0.50	20.00	0	109	50	136				
tert-Butylbenzene	19.980	0.50	20.00	0	99.9	80	125				
Tetrachloroethene	83.530	0.50	20.00	70.44	65.5	70	145				S
Toluene	20.430	0.50	20.00	0	102	80	120				
trans-1,2-Dichloroethene	18.780	0.50	20.00	0	93.9	80	120				
Trichloroethene	19.630	0.50	20.00	0	98.2	80	120				
Trichlorofluoromethane	19.080	0.50	20.00	0	95.4	67	154				
Vinyl chloride	19.940	0.50	20.00	0	99.7	77	120				
Surr: 1,2-Dichloroethane-d4	25.430		25.00		102	56	120				
Surr: 4-Bromofluorobenzene	26.350		25.00		105	80	120				
Surr: Dibromofluoromethane	24.800		25.00		99.2	72	120				
Surr: Toluene-d8	26.660		25.00		107	80	123				

Sample ID: **N009357-001AMSD** SampType: **MSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87123**
Client ID: **ZZZZZZ** Batch ID: **P13VW007** TestNo: **EPA 8260B** Analysis Date: **1/15/2013** SeqNo: **1506697**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	19.520	0.50	20.00	0	97.6	70	120	19.69	0.867	20	
1,1,1-Trichloroethane	19.310	0.50	20.00	0	96.6	68	120	19.01	1.57	20	
1,1,2,2-Tetrachloroethane	22.990	0.50	20.00	0	115	69	120	21.80	5.31	20	
1,1,2-Trichloroethane	20.930	0.50	20.00	0	105	71	120	20.84	0.431	20	
1,1-Dichloroethane	19.890	0.50	20.00	0	99.4	77	120	18.93	4.95	20	
1,1-Dichloroethene	19.600	0.50	20.00	0	98.0	80	120	19.44	0.820	20	
1,1-Dichloropropene	20.260	0.50	20.00	0	101	80	120	20.72	2.24	20	
1,2,3-Trichlorobenzene	21.850	0.50	20.00	0	109	80	120	16.26	29.3	20	R
1,2,3-Trichloropropane	21.910	0.50	20.00	0	110	68	120	20.42	7.04	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009334
Project: Maryland Square Shopping Center, 103P172828

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **N009357-001AMSD** SampType: **MSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87123**
Client ID: **ZZZZZZ** Batch ID: **P13VW007** TestNo: **EPA 8260B** Analysis Date: **1/15/2013** SeqNo: **1506697**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	21.380	0.50	20.00	0	107	80	120	21.20	0.845	20	
1,2,4-Trimethylbenzene	23.090	0.50	20.00	0	115	72	131	21.47	7.27	20	
1,2-Dibromo-3-chloropropane	22.490	1.0	20.00	0	112	57	120	22.66	0.753	20	
1,2-Dibromoethane	21.530	0.50	20.00	0	108	71	120	21.14	1.83	20	
1,2-Dichlorobenzene	20.230	0.50	20.00	0	101	80	120	20.06	0.844	20	
1,2-Dichloroethane	20.410	0.50	20.00	0	102	72	120	20.36	0.245	20	
1,2-Dichloropropane	20.350	0.50	20.00	0	102	76	120	20.34	0.0492	20	
1,3,5-Trimethylbenzene	22.480	0.50	20.00	0	112	80	125	20.69	8.29	20	
1,3-Dichlorobenzene	20.330	0.50	20.00	0	102	80	120	19.78	2.74	20	
1,3-Dichloropropane	20.670	0.50	20.00	0	103	70	120	20.75	0.386	20	
1,4-Dichlorobenzene	19.250	0.50	20.00	0	96.2	80	120	19.53	1.44	20	
2,2-Dichloropropane	20.450	0.50	20.00	0	102	58	120	20.25	0.983	20	
2-Chlorotoluene	20.570	0.50	20.00	0	103	80	128	18.59	10.1	20	
4-Chlorotoluene	20.990	0.50	20.00	0	105	80	122	19.74	6.14	20	
4-Isopropyltoluene	22.180	0.50	20.00	0	111	80	127	21.08	5.09	20	
Benzene	20.150	0.50	20.00	0	101	80	120	20.20	0.248	20	
Bromobenzene	20.220	0.50	20.00	0	101	80	120	19.61	3.06	20	
Bromodichloromethane	20.070	0.50	20.00	0	100	64	122	20.00	0.349	20	
Bromoform	21.140	0.50	20.00	0	106	60	120	21.04	0.474	20	
Bromomethane	18.110	0.50	20.00	0	90.6	69	129	17.99	0.665	20	
Carbon tetrachloride	19.520	0.50	20.00	0	97.6	65	120	19.56	0.205	20	
Chlorobenzene	20.070	0.50	20.00	0	100	80	120	19.99	0.399	20	
Chloroethane	19.350	0.50	20.00	0	96.8	56	158	20.21	4.35	20	
Chloroform	20.530	0.50	20.00	1.210	96.6	76	120	20.25	1.37	20	
Chloromethane	18.680	0.50	20.00	0	93.4	59	120	19.07	2.07	20	
cis-1,2-Dichloroethene	19.580	0.50	20.00	0	97.9	79	120	18.97	3.16	20	
cis-1,3-Dichloropropene	20.590	0.50	20.00	0	103	66	120	20.81	1.06	20	
Dibromochloromethane	20.590	0.50	20.00	0	103	49	131	19.77	4.06	20	
Dibromomethane	20.830	0.50	20.00	0	104	73	120	20.79	0.192	20	
Dichlorodifluoromethane	20.080	0.50	20.00	0	100	67	124	20.00	0.399	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009334
Project: Maryland Square Shopping Center, 103P172828

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **N009357-001AMSD** SampType: **MSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87123**
Client ID: **ZZZZZZ** Batch ID: **P13VW007** TestNo: **EPA 8260B** Analysis Date: **1/15/2013** SeqNo: **1506697**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ethylbenzene	19.970	0.50	20.00	0	99.8	80	120	19.77	1.01	20	
Hexachlorobutadiene	18.640	0.50	20.00	0	93.2	80	130	18.88	1.28	20	
Isopropylbenzene	21.200	0.50	20.00	0	106	80	128	20.59	2.92	20	
m,p-Xylene	41.200	1.0	40.00	0	103	80	123	41.17	0.0728	20	
Methylene chloride	17.760	2.0	20.00	0	88.8	67	120	18.86	6.01	20	
MTBE	20.670	0.50	20.00	0	103	52	120	20.14	2.60	20	
n-Butylbenzene	21.160	0.50	20.00	0	106	80	132	21.00	0.759	20	
n-Propylbenzene	21.380	0.50	20.00	0	107	80	130	20.32	5.08	20	
Naphthalene	20.410	0.50	20.00	0	102	57	120	14.70	32.5	20	R
o-Xylene	20.850	0.50	20.00	0	104	80	120	20.62	1.11	20	
sec-Butylbenzene	21.210	0.50	20.00	0	106	80	128	20.16	5.08	20	
Styrene	22.180	0.50	20.00	0	111	50	136	21.73	2.05	20	
tert-Butylbenzene	21.300	0.50	20.00	0	106	80	125	19.98	6.40	20	
Tetrachloroethene	82.560	0.50	20.00	70.44	60.6	70	145	83.53	1.17	20	S
Toluene	20.130	0.50	20.00	0	101	80	120	20.43	1.48	20	
trans-1,2-Dichloroethene	18.950	0.50	20.00	0	94.8	80	120	18.78	0.901	20	
Trichloroethene	19.460	0.50	20.00	0	97.3	80	120	19.63	0.870	20	
Trichlorofluoromethane	19.770	0.50	20.00	0	98.8	67	154	19.08	3.55	20	
Vinyl chloride	18.890	0.50	20.00	0	94.4	77	120	19.94	5.41	20	
Surr: 1,2-Dichloroethane-d4	25.380		25.00		102	56	120		0		
Surr: 4-Bromofluorobenzene	26.950		25.00		108	80	120		0		
Surr: Dibromofluoromethane	25.470		25.00		102	72	120		0		
Surr: Toluene-d8	26.440		25.00		106	80	123		0		

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009334
Project: Maryland Square Shopping Center, 103P172828

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130118LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87194**
Client ID: **LCSW** Batch ID: **P13VW009** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508519**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	22.220	0.50	20.00	0	111	74	122				
1,1,1-Trichloroethane	18.930	0.50	20.00	0	94.6	65	120				
1,1,2,2-Tetrachloroethane	22.710	0.50	20.00	0	114	80	120				
1,1,2-Trichloroethane	20.890	0.50	20.00	0	104	80	120				
1,1-Dichloroethane	17.410	0.50	20.00	0	87.1	80	120				
1,1-Dichloroethene	18.830	0.50	20.00	0	94.2	80	120				
1,1-Dichloropropene	20.240	0.50	20.00	0	101	80	120				
1,2,3-Trichlorobenzene	27.280	0.50	20.00	0	136	80	124				S
1,2,3-Trichloropropane	21.590	0.50	20.00	0	108	80	120				
1,2,4-Trichlorobenzene	27.730	0.50	20.00	0	139	80	126				S
1,2,4-Trimethylbenzene	24.010	0.50	20.00	0	120	80	123				
1,2-Dibromo-3-chloropropane	28.340	1.0	20.00	0	142	70	120				S
1,2-Dibromoethane	22.410	0.50	20.00	0	112	80	120				
1,2-Dichlorobenzene	22.060	0.50	20.00	0	110	80	120				
1,2-Dichloroethane	20.620	0.50	20.00	0	103	80	120				
1,2-Dichloropropane	18.710	0.50	20.00	0	93.6	80	120				
1,3,5-Trimethylbenzene	23.280	0.50	20.00	0	116	80	121				
1,3-Dichlorobenzene	21.660	0.50	20.00	0	108	80	120				
1,3-Dichloropropane	21.220	0.50	20.00	0	106	80	120				
1,4-Dichlorobenzene	21.290	0.50	20.00	0	106	80	120				
2,2-Dichloropropane	19.930	0.50	20.00	0	99.7	54	120				
2-Chlorotoluene	20.870	0.50	20.00	0	104	80	122				
4-Chlorotoluene	21.050	0.50	20.00	0	105	80	120				
4-Isopropyltoluene	24.260	0.50	20.00	0	121	80	122				
Benzene	19.910	0.50	20.00	0	99.6	80	120				
Bromobenzene	22.280	0.50	20.00	0	111	80	120				
Bromodichloromethane	20.570	0.50	20.00	0	103	70	120				
Bromoform	25.060	0.50	20.00	0	125	66	120				S
Bromomethane	13.690	0.50	20.00	0	68.4	48	155				
Carbon tetrachloride	21.210	0.50	20.00	0	106	60	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009334
Project: Maryland Square Shopping Center, 103P172828

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130118LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87194**
Client ID: **LCSW** Batch ID: **P13VW009** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508519**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	21.510	0.50	20.00	0	108	80	120				
Chloroethane	17.190	0.50	20.00	0	86.0	62	147				
Chloroform	18.480	0.50	20.00	0	92.4	80	120				
Chloromethane	22.340	0.50	20.00	0	112	63	121				
cis-1,2-Dichloroethene	19.070	0.50	20.00	0	95.4	80	120				
cis-1,3-Dichloropropene	20.890	0.50	20.00	0	104	75	120				
Dibromochloromethane	22.540	0.50	20.00	0	113	67	123				
Dibromomethane	20.590	0.50	20.00	0	103	80	120				
Dichlorodifluoromethane	20.080	0.50	20.00	0	100	70	121				
Ethylbenzene	20.740	0.50	20.00	0	104	80	120				
Hexachlorobutadiene	25.490	0.50	20.00	0	127	80	123				S
Isopropylbenzene	22.040	0.50	20.00	0	110	80	121				
m,p-Xylene	43.230	1.0	40.00	0	108	80	120				
Methylene chloride	18.650	2.0	20.00	0	93.3	75	120				
MTBE	20.220	0.50	20.00	0	101	70	120				
n-Butylbenzene	23.010	0.50	20.00	0	115	80	129				
n-Propylbenzene	21.550	0.50	20.00	0	108	80	122				
Naphthalene	24.230	0.50	20.00	0	121	73	127				
o-Xylene	21.650	0.50	20.00	0	108	80	120				
sec-Butylbenzene	22.370	0.50	20.00	0	112	80	120				
Styrene	23.620	0.50	20.00	0	118	80	120				
tert-Butylbenzene	22.750	0.50	20.00	0	114	80	120				
Tetrachloroethene	21.030	0.50	20.00	0	105	80	121				
Toluene	20.870	0.50	20.00	0	104	80	120				
trans-1,2-Dichloroethene	18.700	0.50	20.00	0	93.5	80	120				
Trichloroethene	20.800	0.50	20.00	0	104	80	120				
Trichlorofluoromethane	20.030	0.50	20.00	0	100	71	148				
Vinyl chloride	17.490	0.50	20.00	0	87.5	80	120				
Surr: 1,2-Dichloroethane-d4	24.020		25.00		96.1	56	120				
Surr: 4-Bromofluorobenzene	26.580		25.00		106	80	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009334
Project: Maryland Square Shopping Center, 103P172828

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130118LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87194**
Client ID: **LCSW** Batch ID: **P13VW009** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508519**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Dibromofluoromethane	23.670		25.00		94.7	72	120				
Surr: Toluene-d8	26.230		25.00		105	80	123				

Sample ID: **P130118LCSD** SampType: **LCSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87194**
Client ID: **LCSS02** Batch ID: **P13VW009** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508520**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	21.300	0.50	20.00	0	106	74	122	22.22	4.23	20	
1,1,1-Trichloroethane	18.960	0.50	20.00	0	94.8	65	120	18.93	0.158	20	
1,1,2,2-Tetrachloroethane	21.350	0.50	20.00	0	107	80	120	22.71	6.17	20	
1,1,2-Trichloroethane	20.790	0.50	20.00	0	104	80	120	20.89	0.480	20	
1,1-Dichloroethane	17.210	0.50	20.00	0	86.1	80	120	17.41	1.16	20	
1,1-Dichloroethene	18.990	0.50	20.00	0	95.0	80	120	18.83	0.846	20	
1,1-Dichloropropene	20.080	0.50	20.00	0	100	80	120	20.24	0.794	20	
1,2,3-Trichlorobenzene	26.450	0.50	20.00	0	132	80	124	27.28	3.09	20	S
1,2,3-Trichloropropane	20.390	0.50	20.00	0	102	80	120	21.59	5.72	20	
1,2,4-Trichlorobenzene	26.390	0.50	20.00	0	132	80	126	27.73	4.95	20	S
1,2,4-Trimethylbenzene	23.010	0.50	20.00	0	115	80	123	24.01	4.25	20	
1,2-Dibromo-3-chloropropane	27.230	1.0	20.00	0	136	70	120	28.34	3.99	20	S
1,2-Dibromoethane	21.980	0.50	20.00	0	110	80	120	22.41	1.94	20	
1,2-Dichlorobenzene	20.820	0.50	20.00	0	104	80	120	22.06	5.78	20	
1,2-Dichloroethane	20.420	0.50	20.00	0	102	80	120	20.62	0.975	20	
1,2-Dichloropropane	18.480	0.50	20.00	0	92.4	80	120	18.71	1.24	20	
1,3,5-Trimethylbenzene	22.280	0.50	20.00	0	111	80	121	23.28	4.39	20	
1,3-Dichlorobenzene	20.960	0.50	20.00	0	105	80	120	21.66	3.28	20	
1,3-Dichloropropane	20.330	0.50	20.00	0	102	80	120	21.22	4.28	20	
1,4-Dichlorobenzene	20.450	0.50	20.00	0	102	80	120	21.29	4.02	20	
2,2-Dichloropropane	18.860	0.50	20.00	0	94.3	54	120	19.93	5.52	20	
2-Chlorotoluene	19.960	0.50	20.00	0	99.8	80	122	20.87	4.46	20	
4-Chlorotoluene	20.350	0.50	20.00	0	102	80	120	21.05	3.38	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009334
Project: Maryland Square Shopping Center, 103P172828

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130118LCSD** SampType: **LCSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87194**
Client ID: **LCSS02** Batch ID: **P13VW009** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508520**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4-Isopropyltoluene	23.010	0.50	20.00	0	115	80	122	24.26	5.29	20	
Benzene	19.360	0.50	20.00	0	96.8	80	120	19.91	2.80	20	
Bromobenzene	21.080	0.50	20.00	0	105	80	120	22.28	5.54	20	
Bromodichloromethane	19.940	0.50	20.00	0	99.7	70	120	20.57	3.11	20	
Bromoform	24.310	0.50	20.00	0	122	66	120	25.06	3.04	20	S
Bromomethane	13.060	0.50	20.00	0	65.3	48	155	13.69	4.71	20	
Carbon tetrachloride	20.630	0.50	20.00	0	103	60	120	21.21	2.77	20	
Chlorobenzene	20.800	0.50	20.00	0	104	80	120	21.51	3.36	20	
Chloroethane	17.020	0.50	20.00	0	85.1	62	147	17.19	0.994	20	
Chloroform	18.120	0.50	20.00	0	90.6	80	120	18.48	1.97	20	
Chloromethane	22.690	0.50	20.00	0	113	63	121	22.34	1.55	20	
cis-1,2-Dichloroethene	18.810	0.50	20.00	0	94.1	80	120	19.07	1.37	20	
cis-1,3-Dichloropropene	20.450	0.50	20.00	0	102	75	120	20.89	2.13	20	
Dibromochloromethane	22.200	0.50	20.00	0	111	67	123	22.54	1.52	20	
Dibromomethane	20.440	0.50	20.00	0	102	80	120	20.59	0.731	20	
Dichlorodifluoromethane	20.070	0.50	20.00	0	100	70	121	20.08	0.0498	20	
Ethylbenzene	20.210	0.50	20.00	0	101	80	120	20.74	2.59	20	
Hexachlorobutadiene	24.920	0.50	20.00	0	125	80	123	25.49	2.26	20	S
Isopropylbenzene	21.160	0.50	20.00	0	106	80	121	22.04	4.07	20	
m,p-Xylene	41.930	1.0	40.00	0	105	80	120	43.23	3.05	20	
Methylene chloride	18.520	2.0	20.00	0	92.6	75	120	18.65	0.699	20	
MTBE	20.340	0.50	20.00	0	102	70	120	20.22	0.592	20	
n-Butylbenzene	22.000	0.50	20.00	0	110	80	129	23.01	4.49	20	
n-Propylbenzene	20.590	0.50	20.00	0	103	80	122	21.55	4.56	20	
Naphthalene	23.510	0.50	20.00	0	118	73	127	24.23	3.02	20	
o-Xylene	21.640	0.50	20.00	0	108	80	120	21.65	0.0462	20	
sec-Butylbenzene	21.290	0.50	20.00	0	106	80	120	22.37	4.95	20	
Styrene	22.910	0.50	20.00	0	115	80	120	23.62	3.05	20	
tert-Butylbenzene	21.600	0.50	20.00	0	108	80	120	22.75	5.19	20	
Tetrachloroethene	20.740	0.50	20.00	0	104	80	121	21.03	1.39	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009334
Project: Maryland Square Shopping Center, 103P172828

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130118LCSD** SampType: **LCSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87194**
Client ID: **LCSS02** Batch ID: **P13VW009** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508520**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Toluene	20.510	0.50	20.00	0	103	80	120	20.87	1.74	20	
trans-1,2-Dichloroethene	18.310	0.50	20.00	0	91.6	80	120	18.70	2.11	20	
Trichloroethene	20.610	0.50	20.00	0	103	80	120	20.80	0.918	20	
Trichlorofluoromethane	19.640	0.50	20.00	0	98.2	71	148	20.03	1.97	20	
Vinyl chloride	16.990	0.50	20.00	0	85.0	80	120	17.49	2.90	20	
Surr: 1,2-Dichloroethane-d4	23.640		25.00		94.6	56	120		0		
Surr: 4-Bromofluorobenzene	26.180		25.00		105	80	120		0		
Surr: Dibromofluoromethane	23.190		25.00		92.8	72	120		0		
Surr: Toluene-d8	25.560		25.00		102	80	123		0		

Sample ID: **P130118MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87194**
Client ID: **PBW** Batch ID: **P13VW009** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508521**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	0.50									
1,1,1-Trichloroethane	ND	0.50									
1,1,2,2-Tetrachloroethane	ND	0.50									
1,1,2-Trichloroethane	ND	0.50									
1,1-Dichloroethane	ND	0.50									
1,1-Dichloroethene	ND	0.50									
1,1-Dichloropropene	ND	0.50									
1,2,3-Trichlorobenzene	ND	0.50									
1,2,3-Trichloropropane	ND	0.50									
1,2,4-Trichlorobenzene	ND	0.50									
1,2,4-Trimethylbenzene	ND	0.50									
1,2-Dibromo-3-chloropropane	ND	1.0									
1,2-Dibromoethane	ND	0.50									
1,2-Dichlorobenzene	ND	0.50									
1,2-Dichloroethane	ND	0.50									
1,2-Dichloropropane	ND	0.50									

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009334
Project: Maryland Square Shopping Center, 103P172828

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130118MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87194**
Client ID: **PBW** Batch ID: **P13VW009** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508521**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,3,5-Trimethylbenzene	ND	0.50									
1,3-Dichlorobenzene	ND	0.50									
1,3-Dichloropropane	ND	0.50									
1,4-Dichlorobenzene	ND	0.50									
2,2-Dichloropropane	ND	0.50									
2-Chlorotoluene	ND	0.50									
4-Chlorotoluene	ND	0.50									
4-Isopropyltoluene	ND	0.50									
Benzene	ND	0.50									
Bromobenzene	ND	0.50									
Bromodichloromethane	ND	0.50									
Bromoform	ND	0.50									
Bromomethane	ND	0.50									
Carbon tetrachloride	ND	0.50									
Chlorobenzene	ND	0.50									
Chloroethane	ND	0.50									
Chloroform	ND	0.50									
Chloromethane	ND	0.50									
cis-1,2-Dichloroethene	ND	0.50									
cis-1,3-Dichloropropene	ND	0.50									
Dibromochloromethane	ND	0.50									
Dibromomethane	ND	0.50									
Dichlorodifluoromethane	ND	0.50									
Ethylbenzene	ND	0.50									
Hexachlorobutadiene	ND	0.50									
Isopropylbenzene	ND	0.50									
m,p-Xylene	ND	1.0									
Methylene chloride	ND	2.0									
MTBE	ND	0.50									
n-Butylbenzene	ND	0.50									

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009334
Project: Maryland Square Shopping Center, 103P172828

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130118MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87194**
Client ID: **PBW** Batch ID: **P13VW009** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508521**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
n-Propylbenzene	ND	0.50									
Naphthalene	ND	0.50									
o-Xylene	ND	0.50									
sec-Butylbenzene	ND	0.50									
Styrene	ND	0.50									
tert-Butylbenzene	ND	0.50									
Tetrachloroethene	ND	0.50									
Toluene	ND	0.50									
trans-1,2-Dichloroethene	ND	0.50									
Trichloroethene	ND	0.50									
Trichlorofluoromethane	ND	0.50									
Vinyl chloride	ND	0.50									
Surr: 1,2-Dichloroethane-d4	24.640		25.00		98.6	56	120				
Surr: 4-Bromofluorobenzene	25.520		25.00		102	80	120				
Surr: Dibromofluoromethane	24.340		25.00		97.4	72	120				
Surr: Toluene-d8	24.870		25.00		99.5	80	123				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CHAIN OF CUSTODY RECORD

Pg _____ of _____

Advanced Technology Laboratories INC

3151 W. Post Road
Las Vegas, NV 89118
(702) 307-2659 • Fax (702) 307-2691

FOR LABORATORY USE ONLY:

P.O.#: 103P1728828

Logged By: Geoff Richards Date: 1/14/13

Method of Transport: Client ☐ ATL ☐ CA Overn ☐ FEDEX ☐ Other: _____

Sample Condition Upon Receipt:
1. CHILLED 1.8°C Y☑ N☐ (ICE IR#1) 4. SEALED Y☑ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☑ N☐
3. CONTAINER INTACT Y☑ N☐ 6. PRESERVED Y☐ N☐

Client: Tetra Tech EMI
Address: 1230 Columbia St, Ste 1000
TEL: (619) 321 6745
Attn: Rob Manriquez
City San Diego State CA Zip Code 92101
FAX: (619) 525 7186

Project Name: Mayfield Square Shopping Center Project #: 103P172828

Sampler: I attest to the validity and authenticity of this sample, I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action. (Printed Name) Geoff Richards (Signature) Geoff Richards

Relinquished by: (Signature and Printed Name) Geoff Richards	Date: 1/14/13	Time: 1611	Received by: (Signature and Printed Name) Hagop Sarkis	Date: 1/14/13	Time: 1612
Relinquished by: (Signature and Printed Name) Hagop Sarkis	Date: 1/14/13	Time: 1642	Received by: (Signature and Printed Name)	Date: 1/14/13	Time: 1643
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
Print Name Date
Signature

Send Report To:
Attn: Rob Manriquez
Co: Tetra Tech EM Inc.
Address 1230 Columbia St, Ste 1000
City San Diego State CA Zip 92101

Bill To:
Attn: Same
Co: Same
Address Same
City _____ State _____ Zip _____

Special Instructions/Comments:

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested: 8260B (VOC); 8260B (BTEX), (MTBE); 8015B (GRO); 8015B (DRO); (Motor Oil/ORO); RCRA8 (6010B/7000)

SPECIFY APPROPRIATE MATRIX: SOIL; WATER; GROUND WATER; WASTEWATER

QA/QC: RTNE ☐ CT ☐ SWRCB ☐ Logcode ____ OTHER ____

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8260B (VOC)	8260B (BTEX), (MTBE)	8015B (GRO)	8015B (DRO); (Motor Oil/ORO)	RCRA8 (6010B/7000)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	NU09334-1	TTMWMD01GW27	1/12/13	0930	X						X			E	3	VOA G	HCl	
	-2	TTMW19D02GW36	1/12/13	1225	X						X			E	3	VOA G	HCl	
	-3	TTMW19D03GW46	1/12/13	1415	X						X			E	3	VOA G	HCl	
	-4	MSSC 08	1/13/13	1120	X					X				E	1	J G		
	-5	MSSC 09	1/13/13	1420	X					X				E	1	J G		
	-6	TTMW19D04GW101	1/14/13	1100	X						X			E	3	VOA G	HCl	
	-7	MSSC 10	1/14/13	1138	X					X				E	1	J G		
	-8	MSSC 11	1/14/13	1410	X					X				E	1	J G		
	-9	MSSC 12	1/14/13	1420	X					X				E	1	J G		

• TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: ☐ A= Overnight ≤ 24 hr ☐ B= Emergency Next workday ☐ C= Critical 2 Workdays ☐ D= Urgent 3 Workdays ☐ E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=Hcl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter.

STAR PRINTING 873-1527

Advanced Technology Laboratories, Inc.

Please review the checklist below. Any NO signifies non-compliance. Any non-compliance will be noted and must be understood as having an impact on the quality of the data. All tests will be performed as requested regardless of any compliance issues.

If you have any questions or further instruction, please contact our Project Coordinator at (702) 307-2659.

Cooler Received/Opened On:	1/14/2013	Workorder:	N009334
Rep sample Temp (Deg C):	1.8	IR Gun ID:	1
Temp Blank:	☐ Yes ☑ No		
Carrier name:	ATL		
Last 4 digits of Tracking No.:	NA	Packing Material Used:	None
Cooling process:	☑ Ice ☐ Ice Pack ☐ Dry Ice ☐ Other ☐ None		

Sample Receipt Checklist

1. Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
2. Custody seals intact, signed, dated on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
3. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
4. Chain of custody present?	Yes ☑	No ☐	
5. Sampler's name present in COC?	Yes ☑	No ☐	
6. Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
7. Chain of custody agrees with sample labels?	Yes ☑	No ☐	
8. Samples in proper container/bottle?	Yes ☑	No ☐	
9. Sample containers intact?	Yes ☑	No ☐	
10. Sufficient sample volume for indicated test?	Yes ☑	No ☐	
11. All samples received within holding time?	Yes ☑	No ☐	
12. Temperature of rep sample or Temp Blank within acceptable limit?	Yes ☑	No ☐	NA ☐
13. Water - VOA vials have zero headspace?	Yes ☑	No ☐	NA ☐
14. Water - pH acceptable upon receipt? Example: pH > 12 for (CN,S); pH<2 for Metals	Yes ☐	No ☐	NA ☑
15. Did the bottle labels indicate correct preservatives used?	Yes ☑	No ☐	NA ☐
16. Were there Non-Conformance issues at login?	Yes ☐	No ☐	NA ☑
Was Client notified?	Yes ☐	No ☐	NA ☑

Comments:

Checklist Completed B MBC 1/15/13

Reviewed By:

January 28, 2013

Rob Manriquez
Tetra Tech
1230 Columbia Street, Suite 1000
San Diego, CA 92101
TEL: (858) 527-8803
FAX:

CA-ELAP No.: 2676
NV Cert. No.: NV-009222007A

Workorder No.: N009385

RE: Maryland Square Shopping Center, 103P172828

Attention: Rob Manriquez

Enclosed are the results for sample(s) received on January 17, 2013 by Advanced Technology Laboratories, Inc. . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

I hereby certify that all laboratory analysis requested were performed by Nevada Division of Environmental Protection-certified laboratory for the parameters and matrices reported herein.

Thank you for the opportunity to service the needs of your company.Please feel free to call me at (702) 307-2659 if I can be of further assistance to your company.

Sincerely,

Jose Tenorio Jr.
Laboratory Director

The cover letter and the case narrative are an integral part of this analytical report and cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories - Las Vegas.

CLIENT: Tetra Tech
Project: Maryland Square Shopping Center, 103P172828.
Lab Order: N009385

CASE NARRATIVE

SAMPLE RECEIVING/GENERAL COMMENTS:

Samples were received intact with proper chain of custody documentation.

Cooler temperature and sample preservation were verified upon receipt of samples if applicable.

Information on sample receipt conditions including discrepancies can be found in attached Sample Receipt Checklist Form.

Samples were analyzed within method holding time.

Analytical Comments for EPA 8260B:

Laboratory Control Sample (LCS) recovery biased high for some analytes. Sample results were non-detect (ND) for these analytes therefore reanalysis of the samples was not necessary.

CLIENT:	Tetra Tech	**Client Sample ID:**	TTMW6D02GW32
Lab Order:	N009385	**Collection Date:**	1/16/2013 1:20:00 PM
Project:	Maryland Square Shopping Center, 103P1728	**Matrix:**	GROUNDWATER
Lab ID:	N009385-001A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS5_130118A QC Batch: P13VW009 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	1/18/2013 10:15 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	1/18/2013 10:15 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	1/18/2013 10:15 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	1/18/2013 10:15 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	1/18/2013 10:15 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	1/18/2013 10:15 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	1/18/2013 10:15 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	1/18/2013 10:15 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	1/18/2013 10:15 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	1/18/2013 10:15 PM
1,2,4-Trimethylbenzene	0.91	0.50		µg/L	1	1/18/2013 10:15 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	1/18/2013 10:15 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	1/18/2013 10:15 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	1/18/2013 10:15 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	1/18/2013 10:15 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	1/18/2013 10:15 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	1/18/2013 10:15 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	1/18/2013 10:15 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	1/18/2013 10:15 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	1/18/2013 10:15 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	1/18/2013 10:15 PM
2-Chlorotoluene	ND	0.50		µg/L	1	1/18/2013 10:15 PM
4-Chlorotoluene	ND	0.50		µg/L	1	1/18/2013 10:15 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	1/18/2013 10:15 PM
Benzene	ND	0.50		µg/L	1	1/18/2013 10:15 PM
Bromobenzene	ND	0.50		µg/L	1	1/18/2013 10:15 PM
Bromodichloromethane	ND	0.50		µg/L	1	1/18/2013 10:15 PM
Bromoform	ND	0.50		µg/L	1	1/18/2013 10:15 PM
Bromomethane	ND	0.50		µg/L	1	1/18/2013 10:15 PM
Carbon tetrachloride	ND	0.50		µg/L	1	1/18/2013 10:15 PM
Chlorobenzene	ND	0.50		µg/L	1	1/18/2013 10:15 PM
Chloroethane	ND	0.50		µg/L	1	1/18/2013 10:15 PM
Chloroform	1.7	0.50		µg/L	1	1/18/2013 10:15 PM
Chloromethane	ND	0.50		µg/L	1	1/18/2013 10:15 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	1/18/2013 10:15 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Tetra Tech	**Client Sample ID:**	TTMW6D02GW32
Lab Order:	N009385	**Collection Date:**	1/16/2013 1:20:00 PM
Project:	Maryland Square Shopping Center, 103P1728	**Matrix:**	GROUNDWATER
Lab ID:	N009385-001A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS5_130118A	QC Batch: P13VW009			PrepDate:		Analyst: **QBM**
cis-1,3-Dichloropropene	ND	0.50		µg/L	1	1/18/2013 10:15 PM
Dibromochloromethane	ND	0.50		µg/L	1	1/18/2013 10:15 PM
Dibromomethane	ND	0.50		µg/L	1	1/18/2013 10:15 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	1/18/2013 10:15 PM
Ethylbenzene	ND	0.50		µg/L	1	1/18/2013 10:15 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	1/18/2013 10:15 PM
Isopropylbenzene	ND	0.50		µg/L	1	1/18/2013 10:15 PM
m,p-Xylene	1.2	1.0		µg/L	1	1/18/2013 10:15 PM
Methylene chloride	ND	2.0		µg/L	1	1/18/2013 10:15 PM
MTBE	ND	0.50		µg/L	1	1/18/2013 10:15 PM
n-Butylbenzene	ND	0.50		µg/L	1	1/18/2013 10:15 PM
n-Propylbenzene	ND	0.50		µg/L	1	1/18/2013 10:15 PM
Naphthalene	ND	0.50		µg/L	1	1/18/2013 10:15 PM
o-Xylene	0.93	0.50		µg/L	1	1/18/2013 10:15 PM
sec-Butylbenzene	ND	0.50		µg/L	1	1/18/2013 10:15 PM
Styrene	ND	0.50		µg/L	1	1/18/2013 10:15 PM
tert-Butylbenzene	ND	0.50		µg/L	1	1/18/2013 10:15 PM
Tetrachloroethene	720	10		µg/L	20	1/22/2013 12:42 PM
Toluene	0.84	0.50		µg/L	1	1/18/2013 10:15 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	1/18/2013 10:15 PM
Trichloroethene	2.3	0.50		µg/L	1	1/18/2013 10:15 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	1/18/2013 10:15 PM
Vinyl chloride	ND	0.50		µg/L	1	1/18/2013 10:15 PM
Surr: 1,2-Dichloroethane-d4	101	56-120		%REC	1	1/18/2013 10:15 PM
Surr: 1,2-Dichloroethane-d4	112	56-120		%REC	20	1/22/2013 12:42 PM
Surr: 4-Bromofluorobenzene	102	80-120		%REC	1	1/18/2013 10:15 PM
Surr: 4-Bromofluorobenzene	103	80-120		%REC	20	1/22/2013 12:42 PM
Surr: Dibromofluoromethane	114	72-120		%REC	20	1/22/2013 12:42 PM
Surr: Dibromofluoromethane	96.8	72-120		%REC	1	1/18/2013 10:15 PM
Surr: Toluene-d8	106	80-123		%REC	20	1/22/2013 12:42 PM
Surr: Toluene-d8	101	80-123		%REC	1	1/18/2013 10:15 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	TTMW6D03GW41
Lab Order:	N009385	**Collection Date:**	1/17/2013 8:25:00 AM
Project:	Maryland Square Shopping Center, 103P1728	**Matrix:**	GROUNDWATER
Lab ID:	N009385-002A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS5_130118A QC Batch: P13VW009 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	1/18/2013 09:46 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	1/18/2013 09:46 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	1/18/2013 09:46 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	1/18/2013 09:46 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	1/18/2013 09:46 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	1/18/2013 09:46 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	1/18/2013 09:46 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	1/18/2013 09:46 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	1/18/2013 09:46 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	1/18/2013 09:46 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	1/18/2013 09:46 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	1/18/2013 09:46 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	1/18/2013 09:46 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	1/18/2013 09:46 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	1/18/2013 09:46 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	1/18/2013 09:46 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	1/18/2013 09:46 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	1/18/2013 09:46 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	1/18/2013 09:46 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	1/18/2013 09:46 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	1/18/2013 09:46 PM
2-Chlorotoluene	ND	0.50		µg/L	1	1/18/2013 09:46 PM
4-Chlorotoluene	ND	0.50		µg/L	1	1/18/2013 09:46 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	1/18/2013 09:46 PM
Benzene	ND	0.50		µg/L	1	1/18/2013 09:46 PM
Bromobenzene	ND	0.50		µg/L	1	1/18/2013 09:46 PM
Bromodichloromethane	ND	0.50		µg/L	1	1/18/2013 09:46 PM
Bromoform	ND	0.50		µg/L	1	1/18/2013 09:46 PM
Bromomethane	ND	0.50		µg/L	1	1/18/2013 09:46 PM
Carbon tetrachloride	ND	0.50		µg/L	1	1/18/2013 09:46 PM
Chlorobenzene	ND	0.50		µg/L	1	1/18/2013 09:46 PM
Chloroethane	ND	0.50		µg/L	1	1/18/2013 09:46 PM
Chloroform	1.4	0.50		µg/L	1	1/18/2013 09:46 PM
Chloromethane	ND	0.50		µg/L	1	1/18/2013 09:46 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	1/18/2013 09:46 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Tetra Tech	**Client Sample ID:**	TTMW6D03GW41
Lab Order:	N009385	**Collection Date:**	1/17/2013 8:25:00 AM
Project:	Maryland Square Shopping Center, 103P1728	**Matrix:**	GROUNDWATER
Lab ID:	N009385-002A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS5_130118A	QC Batch: P13VW009			PrepDate:		Analyst: **QBM**
cis-1,3-Dichloropropene	ND	0.50		µg/L	1	1/18/2013 09:46 PM
Dibromochloromethane	ND	0.50		µg/L	1	1/18/2013 09:46 PM
Dibromomethane	ND	0.50		µg/L	1	1/18/2013 09:46 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	1/18/2013 09:46 PM
Ethylbenzene	ND	0.50		µg/L	1	1/18/2013 09:46 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	1/18/2013 09:46 PM
Isopropylbenzene	ND	0.50		µg/L	1	1/18/2013 09:46 PM
m,p-Xylene	ND	1.0		µg/L	1	1/18/2013 09:46 PM
Methylene chloride	ND	2.0		µg/L	1	1/18/2013 09:46 PM
MTBE	ND	0.50		µg/L	1	1/18/2013 09:46 PM
n-Butylbenzene	ND	0.50		µg/L	1	1/18/2013 09:46 PM
n-Propylbenzene	ND	0.50		µg/L	1	1/18/2013 09:46 PM
Naphthalene	ND	0.50		µg/L	1	1/18/2013 09:46 PM
o-Xylene	ND	0.50		µg/L	1	1/18/2013 09:46 PM
sec-Butylbenzene	ND	0.50		µg/L	1	1/18/2013 09:46 PM
Styrene	ND	0.50		µg/L	1	1/18/2013 09:46 PM
tert-Butylbenzene	ND	0.50		µg/L	1	1/18/2013 09:46 PM
Tetrachloroethene	1100	25		µg/L	50	1/22/2013 02:38 PM
Toluene	ND	0.50		µg/L	1	1/18/2013 09:46 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	1/18/2013 09:46 PM
Trichloroethene	3.8	0.50		µg/L	1	1/18/2013 09:46 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	1/18/2013 09:46 PM
Vinyl chloride	ND	0.50		µg/L	1	1/18/2013 09:46 PM
Surr: 1,2-Dichloroethane-d4	99.8	56-120		%REC	1	1/18/2013 09:46 PM
Surr: 1,2-Dichloroethane-d4	112	56-120		%REC	50	1/22/2013 02:38 PM
Surr: 4-Bromofluorobenzene	98.0	80-120		%REC	1	1/18/2013 09:46 PM
Surr: 4-Bromofluorobenzene	101	80-120		%REC	50	1/22/2013 02:38 PM
Surr: Dibromofluoromethane	111	72-120		%REC	50	1/22/2013 02:38 PM
Surr: Dibromofluoromethane	97.2	72-120		%REC	1	1/18/2013 09:46 PM
Surr: Toluene-d8	105	80-123		%REC	50	1/22/2013 02:38 PM
Surr: Toluene-d8	102	80-123		%REC	1	1/18/2013 09:46 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Tetra Tech	**Client Sample ID:**	MSSC 18
Lab Order:	N009385	**Collection Date:**	1/17/2013 10:30:00 AM
Project:	Maryland Square Shopping Center, 103P1728	**Matrix:**	SOIL
Lab ID:	N009385-003A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS1_130118A QC Batch: D13VS001 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
1,1,1-Trichloroethane	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
1,1,2,2-Tetrachloroethane	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
1,1,2-Trichloroethane	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
1,1-Dichloroethane	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
1,1-Dichloroethene	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
1,1-Dichloropropene	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
1,2,3-Trichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
1,2,3-Trichloropropane	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
1,2,4-Trichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
1,2,4-Trimethylbenzene	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
1,2-Dibromo-3-chloropropane	ND	10		µg/Kg	1	1/18/2013 08:59 PM
1,2-Dibromoethane	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
1,2-Dichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
1,2-Dichloroethane	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
1,2-Dichloropropane	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
1,3,5-Trimethylbenzene	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
1,3-Dichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
1,3-Dichloropropane	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
1,4-Dichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
2,2-Dichloropropane	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
2-Chlorotoluene	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
4-Chlorotoluene	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
4-Isopropyltoluene	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
Benzene	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
Bromobenzene	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
Bromodichloromethane	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
Bromoform	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
Bromomethane	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
Carbon tetrachloride	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
Chlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
Chloroethane	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
Chloroform	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
Chloromethane	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
cis-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Tetra Tech	**Client Sample ID:**	MSSC 18
Lab Order:	N009385	**Collection Date:**	1/17/2013 10:30:00 AM
Project:	Maryland Square Shopping Center, 103P1728	**Matrix:**	SOIL
Lab ID:	N009385-003A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
			EPA 8260B			
RunID: MS1_130118A	QC Batch: D13VS001			PrepDate:		Analyst: **QBM**
cis-1,3-Dichloropropene	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
Dibromochloromethane	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
Dibromomethane	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
Dichlorodifluoromethane	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
Ethylbenzene	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
Hexachlorobutadiene	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
Isopropylbenzene	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
m,p-Xylene	ND	10		µg/Kg	1	1/18/2013 08:59 PM
Methylene chloride	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
MTBE	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
n-Butylbenzene	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
n-Propylbenzene	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
Naphthalene	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
o-Xylene	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
sec-Butylbenzene	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
Styrene	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
tert-Butylbenzene	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
Tetrachloroethene	24	5.0		µg/Kg	1	1/18/2013 08:59 PM
Toluene	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
trans-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
Trichloroethene	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
Trichlorofluoromethane	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
Vinyl chloride	ND	5.0		µg/Kg	1	1/18/2013 08:59 PM
Surr: 1,2-Dichloroethane-d4	119	58-125		%REC	1	1/18/2013 08:59 PM
Surr: 4-Bromofluorobenzene	101	52-138		%REC	1	1/18/2013 08:59 PM
Surr: Dibromofluoromethane	111	57-121		%REC	1	1/18/2013 08:59 PM
Surr: Toluene-d8	101	66-130		%REC	1	1/18/2013 08:59 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	MSSC 19
Lab Order:	N009385	**Collection Date:**	1/17/2013 10:35:00 AM
Project:	Maryland Square Shopping Center, 103P1728	**Matrix:**	SOIL
Lab ID:	N009385-004A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS1_130118A QC Batch: D13VS001 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
1,1,1-Trichloroethane	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
1,1,2,2-Tetrachloroethane	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
1,1,2-Trichloroethane	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
1,1-Dichloroethane	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
1,1-Dichloroethene	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
1,1-Dichloropropene	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
1,2,3-Trichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
1,2,3-Trichloropropane	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
1,2,4-Trichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
1,2,4-Trimethylbenzene	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
1,2-Dibromo-3-chloropropane	ND	10		µg/Kg	1	1/18/2013 07:00 PM
1,2-Dibromoethane	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
1,2-Dichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
1,2-Dichloroethane	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
1,2-Dichloropropane	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
1,3,5-Trimethylbenzene	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
1,3-Dichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
1,3-Dichloropropane	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
1,4-Dichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
2,2-Dichloropropane	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
2-Chlorotoluene	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
4-Chlorotoluene	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
4-Isopropyltoluene	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
Benzene	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
Bromobenzene	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
Bromodichloromethane	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
Bromoform	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
Bromomethane	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
Carbon tetrachloride	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
Chlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
Chloroethane	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
Chloroform	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
Chloromethane	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
cis-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Tetra Tech	**Client Sample ID:**	MSSC 19
Lab Order:	N009385	**Collection Date:**	1/17/2013 10:35:00 AM
Project:	Maryland Square Shopping Center, 103P1728	**Matrix:**	SOIL
Lab ID:	N009385-004A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
			EPA 8260B			
RunID: MS1_130118A	QC Batch: D13VS001			PrepDate:		Analyst: **QBM**
cis-1,3-Dichloropropene	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
Dibromochloromethane	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
Dibromomethane	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
Dichlorodifluoromethane	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
Ethylbenzene	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
Hexachlorobutadiene	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
Isopropylbenzene	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
m,p-Xylene	ND	10		µg/Kg	1	1/18/2013 07:00 PM
Methylene chloride	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
MTBE	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
n-Butylbenzene	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
n-Propylbenzene	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
Naphthalene	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
o-Xylene	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
sec-Butylbenzene	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
Styrene	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
tert-Butylbenzene	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
Tetrachloroethene	6.5	5.0		µg/Kg	1	1/18/2013 07:00 PM
Toluene	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
trans-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
Trichloroethene	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
Trichlorofluoromethane	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
Vinyl chloride	ND	5.0		µg/Kg	1	1/18/2013 07:00 PM
Surr: 1,2-Dichloroethane-d4	114	58-125		%REC	1	1/18/2013 07:00 PM
Surr: 4-Bromofluorobenzene	99.6	52-138		%REC	1	1/18/2013 07:00 PM
Surr: Dibromofluoromethane	108	57-121		%REC	1	1/18/2013 07:00 PM
Surr: Toluene-d8	101	66-130		%REC	1	1/18/2013 07:00 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	MSSC 20
Lab Order:	N009385	**Collection Date:**	1/17/2013 10:40:00 AM
Project:	Maryland Square Shopping Center, 103P1728	**Matrix:**	SOIL
Lab ID:	N009385-005A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS1_130118A QC Batch: D13VS001 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
1,1,1-Trichloroethane	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
1,1,2,2-Tetrachloroethane	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
1,1,2-Trichloroethane	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
1,1-Dichloroethane	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
1,1-Dichloroethene	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
1,1-Dichloropropene	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
1,2,3-Trichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
1,2,3-Trichloropropane	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
1,2,4-Trichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
1,2,4-Trimethylbenzene	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
1,2-Dibromo-3-chloropropane	ND	10		µg/Kg	1	1/18/2013 07:23 PM
1,2-Dibromoethane	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
1,2-Dichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
1,2-Dichloroethane	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
1,2-Dichloropropane	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
1,3,5-Trimethylbenzene	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
1,3-Dichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
1,3-Dichloropropane	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
1,4-Dichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
2,2-Dichloropropane	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
2-Chlorotoluene	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
4-Chlorotoluene	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
4-Isopropyltoluene	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
Benzene	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
Bromobenzene	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
Bromodichloromethane	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
Bromoform	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
Bromomethane	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
Carbon tetrachloride	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
Chlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
Chloroethane	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
Chloroform	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
Chloromethane	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
cis-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Tetra Tech	**Client Sample ID:**	MSSC 20
Lab Order:	N009385	**Collection Date:**	1/17/2013 10:40:00 AM
Project:	Maryland Square Shopping Center, 103P1728	**Matrix:**	SOIL
Lab ID:	N009385-005A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130118A	QC Batch: D13VS001			PrepDate:		Analyst: **QBM**
cis-1,3-Dichloropropene	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
Dibromochloromethane	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
Dibromomethane	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
Dichlorodifluoromethane	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
Ethylbenzene	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
Hexachlorobutadiene	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
Isopropylbenzene	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
m,p-Xylene	ND	10		µg/Kg	1	1/18/2013 07:23 PM
Methylene chloride	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
MTBE	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
n-Butylbenzene	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
n-Propylbenzene	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
Naphthalene	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
o-Xylene	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
sec-Butylbenzene	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
Styrene	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
tert-Butylbenzene	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
Tetrachloroethene	38	5.0		µg/Kg	1	1/18/2013 07:23 PM
Toluene	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
trans-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
Trichloroethene	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
Trichlorofluoromethane	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
Vinyl chloride	ND	5.0		µg/Kg	1	1/18/2013 07:23 PM
Surr: 1,2-Dichloroethane-d4	112	58-125		%REC	1	1/18/2013 07:23 PM
Surr: 4-Bromofluorobenzene	101	52-138		%REC	1	1/18/2013 07:23 PM
Surr: Dibromofluoromethane	105	57-121		%REC	1	1/18/2013 07:23 PM
Surr: Toluene-d8	101	66-130		%REC	1	1/18/2013 07:23 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	TTMW6D04GW51
Lab Order:	N009385	**Collection Date:**	1/17/2013 10:40:00 AM
Project:	Maryland Square Shopping Center, 103P1728	**Matrix:**	GROUNDWATER
Lab ID:	N009385-006A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS5_130118A QC Batch: P13VW009 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	1/18/2013 09:17 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	1/18/2013 09:17 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	1/18/2013 09:17 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	1/18/2013 09:17 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	1/18/2013 09:17 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	1/18/2013 09:17 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	1/18/2013 09:17 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	1/18/2013 09:17 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	1/18/2013 09:17 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	1/18/2013 09:17 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	1/18/2013 09:17 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	1/18/2013 09:17 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	1/18/2013 09:17 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	1/18/2013 09:17 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	1/18/2013 09:17 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	1/18/2013 09:17 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	1/18/2013 09:17 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	1/18/2013 09:17 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	1/18/2013 09:17 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	1/18/2013 09:17 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	1/18/2013 09:17 PM
2-Chlorotoluene	ND	0.50		µg/L	1	1/18/2013 09:17 PM
4-Chlorotoluene	ND	0.50		µg/L	1	1/18/2013 09:17 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	1/18/2013 09:17 PM
Benzene	ND	0.50		µg/L	1	1/18/2013 09:17 PM
Bromobenzene	ND	0.50		µg/L	1	1/18/2013 09:17 PM
Bromodichloromethane	ND	0.50		µg/L	1	1/18/2013 09:17 PM
Bromoform	ND	0.50		µg/L	1	1/18/2013 09:17 PM
Bromomethane	ND	0.50		µg/L	1	1/18/2013 09:17 PM
Carbon tetrachloride	ND	0.50		µg/L	1	1/18/2013 09:17 PM
Chlorobenzene	ND	0.50		µg/L	1	1/18/2013 09:17 PM
Chloroethane	ND	0.50		µg/L	1	1/18/2013 09:17 PM
Chloroform	ND	0.50		µg/L	1	1/18/2013 09:17 PM
Chloromethane	0.80	0.50		µg/L	1	1/18/2013 09:17 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	1/18/2013 09:17 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Tetra Tech	**Client Sample ID:**	TTMW6D04GW51
Lab Order:	N009385	**Collection Date:**	1/17/2013 10:40:00 AM
Project:	Maryland Square Shopping Center, 103P1728	**Matrix:**	GROUNDWATER
Lab ID:	N009385-006A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS5_130118A	QC Batch: P13VW009			PrepDate:		Analyst: **QBM**
cis-1,3-Dichloropropene	ND	0.50		µg/L	1	1/18/2013 09:17 PM
Dibromochloromethane	ND	0.50		µg/L	1	1/18/2013 09:17 PM
Dibromomethane	ND	0.50		µg/L	1	1/18/2013 09:17 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	1/18/2013 09:17 PM
Ethylbenzene	ND	0.50		µg/L	1	1/18/2013 09:17 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	1/18/2013 09:17 PM
Isopropylbenzene	ND	0.50		µg/L	1	1/18/2013 09:17 PM
m,p-Xylene	ND	1.0		µg/L	1	1/18/2013 09:17 PM
Methylene chloride	ND	2.0		µg/L	1	1/18/2013 09:17 PM
MTBE	ND	0.50		µg/L	1	1/18/2013 09:17 PM
n-Butylbenzene	ND	0.50		µg/L	1	1/18/2013 09:17 PM
n-Propylbenzene	ND	0.50		µg/L	1	1/18/2013 09:17 PM
Naphthalene	ND	0.50		µg/L	1	1/18/2013 09:17 PM
o-Xylene	ND	0.50		µg/L	1	1/18/2013 09:17 PM
sec-Butylbenzene	ND	0.50		µg/L	1	1/18/2013 09:17 PM
Styrene	ND	0.50		µg/L	1	1/18/2013 09:17 PM
tert-Butylbenzene	ND	0.50		µg/L	1	1/18/2013 09:17 PM
Tetrachloroethene	180	2.5		µg/L	5	1/22/2013 01:11 PM
Toluene	ND	0.50		µg/L	1	1/18/2013 09:17 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	1/18/2013 09:17 PM
Trichloroethene	ND	0.50		µg/L	1	1/18/2013 09:17 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	1/18/2013 09:17 PM
Vinyl chloride	ND	0.50		µg/L	1	1/18/2013 09:17 PM
Surr: 1,2-Dichloroethane-d4	98.1	56-120		%REC	1	1/18/2013 09:17 PM
Surr: 1,2-Dichloroethane-d4	113	56-120		%REC	5	1/22/2013 01:11 PM
Surr: 4-Bromofluorobenzene	97.5	80-120		%REC	1	1/18/2013 09:17 PM
Surr: 4-Bromofluorobenzene	101	80-120		%REC	5	1/22/2013 01:11 PM
Surr: Dibromofluoromethane	115	72-120		%REC	5	1/22/2013 01:11 PM
Surr: Dibromofluoromethane	95.8	72-120		%REC	1	1/18/2013 09:17 PM
Surr: Toluene-d8	104	80-123		%REC	5	1/22/2013 01:11 PM
Surr: Toluene-d8	99.1	80-123		%REC	1	1/18/2013 09:17 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	TTMW6D06GW65
Lab Order:	N009385	**Collection Date:**	1/17/2013 3:20:00 PM
Project:	Maryland Square Shopping Center, 103P1728	**Matrix:**	GROUNDWATER
Lab ID:	N009385-007A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS5_130118A QC Batch: P13VW009 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	1/18/2013 08:48 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	1/18/2013 08:48 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	1/18/2013 08:48 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	1/18/2013 08:48 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	1/18/2013 08:48 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	1/18/2013 08:48 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	1/18/2013 08:48 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	1/18/2013 08:48 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	1/18/2013 08:48 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	1/18/2013 08:48 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	1/18/2013 08:48 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	1/18/2013 08:48 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	1/18/2013 08:48 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	1/18/2013 08:48 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	1/18/2013 08:48 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	1/18/2013 08:48 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	1/18/2013 08:48 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	1/18/2013 08:48 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	1/18/2013 08:48 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	1/18/2013 08:48 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	1/18/2013 08:48 PM
2-Chlorotoluene	ND	0.50		µg/L	1	1/18/2013 08:48 PM
4-Chlorotoluene	ND	0.50		µg/L	1	1/18/2013 08:48 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	1/18/2013 08:48 PM
Benzene	ND	0.50		µg/L	1	1/18/2013 08:48 PM
Bromobenzene	ND	0.50		µg/L	1	1/18/2013 08:48 PM
Bromodichloromethane	ND	0.50		µg/L	1	1/18/2013 08:48 PM
Bromoform	ND	0.50		µg/L	1	1/18/2013 08:48 PM
Bromomethane	ND	0.50		µg/L	1	1/18/2013 08:48 PM
Carbon tetrachloride	ND	0.50		µg/L	1	1/18/2013 08:48 PM
Chlorobenzene	ND	0.50		µg/L	1	1/18/2013 08:48 PM
Chloroethane	ND	0.50		µg/L	1	1/18/2013 08:48 PM
Chloroform	ND	0.50		µg/L	1	1/18/2013 08:48 PM
Chloromethane	ND	0.50		µg/L	1	1/18/2013 08:48 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	1/18/2013 08:48 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	TTMW6D06GW65
Lab Order:	N009385	**Collection Date:**	1/17/2013 3:20:00 PM
Project:	Maryland Square Shopping Center, 103P1728	**Matrix:**	GROUNDWATER
Lab ID:	N009385-007A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS5_130118A	QC Batch: P13VW009			PrepDate:		Analyst: **QBM**
cis-1,3-Dichloropropene	ND	0.50		µg/L	1	1/18/2013 08:48 PM
Dibromochloromethane	ND	0.50		µg/L	1	1/18/2013 08:48 PM
Dibromomethane	ND	0.50		µg/L	1	1/18/2013 08:48 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	1/18/2013 08:48 PM
Ethylbenzene	ND	0.50		µg/L	1	1/18/2013 08:48 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	1/18/2013 08:48 PM
Isopropylbenzene	ND	0.50		µg/L	1	1/18/2013 08:48 PM
m,p-Xylene	ND	1.0		µg/L	1	1/18/2013 08:48 PM
Methylene chloride	ND	2.0		µg/L	1	1/18/2013 08:48 PM
MTBE	ND	0.50		µg/L	1	1/18/2013 08:48 PM
n-Butylbenzene	ND	0.50		µg/L	1	1/18/2013 08:48 PM
n-Propylbenzene	ND	0.50		µg/L	1	1/18/2013 08:48 PM
Naphthalene	ND	0.50		µg/L	1	1/18/2013 08:48 PM
o-Xylene	ND	0.50		µg/L	1	1/18/2013 08:48 PM
sec-Butylbenzene	ND	0.50		µg/L	1	1/18/2013 08:48 PM
Styrene	ND	0.50		µg/L	1	1/18/2013 08:48 PM
tert-Butylbenzene	ND	0.50		µg/L	1	1/18/2013 08:48 PM
Tetrachloroethene	150	5.0		µg/L	10	1/22/2013 11:44 AM
Toluene	ND	0.50		µg/L	1	1/18/2013 08:48 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	1/18/2013 08:48 PM
Trichloroethene	ND	0.50		µg/L	1	1/18/2013 08:48 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	1/18/2013 08:48 PM
Vinyl chloride	ND	0.50		µg/L	1	1/18/2013 08:48 PM
Surr: 1,2-Dichloroethane-d4	99.1	56-120		%REC	1	1/18/2013 08:48 PM
Surr: 1,2-Dichloroethane-d4	111	56-120		%REC	10	1/22/2013 11:44 AM
Surr: 4-Bromofluorobenzene	99.6	80-120		%REC	1	1/18/2013 08:48 PM
Surr: 4-Bromofluorobenzene	102	80-120		%REC	10	1/22/2013 11:44 AM
Surr: Dibromofluoromethane	114	72-120		%REC	10	1/22/2013 11:44 AM
Surr: Dibromofluoromethane	95.5	72-120		%REC	1	1/18/2013 08:48 PM
Surr: Toluene-d8	103	80-123		%REC	10	1/22/2013 11:44 AM
Surr: Toluene-d8	101	80-123		%REC	1	1/18/2013 08:48 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Tetra Tech	**Client Sample ID:**	TTMW19D01SS81
Lab Order:	N009385	**Collection Date:**	1/13/2013 3:00:00 PM
Project:	Maryland Square Shopping Center, 103P1728	**Matrix:**	SOIL
Lab ID:	N009385-008A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS1_130118A QC Batch: D13VS001 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
1,1,1-Trichloroethane	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
1,1,2,2-Tetrachloroethane	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
1,1,2-Trichloroethane	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
1,1-Dichloroethane	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
1,1-Dichloroethene	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
1,1-Dichloropropene	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
1,2,3-Trichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
1,2,3-Trichloropropane	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
1,2,4-Trichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
1,2,4-Trimethylbenzene	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
1,2-Dibromo-3-chloropropane	ND	10		µg/Kg	1	1/18/2013 07:46 PM
1,2-Dibromoethane	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
1,2-Dichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
1,2-Dichloroethane	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
1,2-Dichloropropane	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
1,3,5-Trimethylbenzene	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
1,3-Dichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
1,3-Dichloropropane	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
1,4-Dichlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
2,2-Dichloropropane	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
2-Chlorotoluene	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
4-Chlorotoluene	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
4-Isopropyltoluene	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
Benzene	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
Bromobenzene	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
Bromodichloromethane	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
Bromoform	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
Bromomethane	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
Carbon tetrachloride	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
Chlorobenzene	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
Chloroethane	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
Chloroform	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
Chloromethane	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
cis-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Tetra Tech	**Client Sample ID:**	TTMW19D01SS81
Lab Order:	N009385	**Collection Date:**	1/13/2013 3:00:00 PM
Project:	Maryland Square Shopping Center, 103P1728	**Matrix:**	SOIL
Lab ID:	N009385-008A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130118A	QC Batch: D13VS001			PrepDate:		Analyst: **QBM**
cis-1,3-Dichloropropene	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
Dibromochloromethane	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
Dibromomethane	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
Dichlorodifluoromethane	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
Ethylbenzene	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
Hexachlorobutadiene	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
Isopropylbenzene	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
m,p-Xylene	ND	10		µg/Kg	1	1/18/2013 07:46 PM
Methylene chloride	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
MTBE	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
n-Butylbenzene	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
n-Propylbenzene	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
Naphthalene	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
o-Xylene	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
sec-Butylbenzene	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
Styrene	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
tert-Butylbenzene	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
Tetrachloroethene	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
Toluene	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
trans-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
Trichloroethene	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
Trichlorofluoromethane	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
Vinyl chloride	ND	5.0		µg/Kg	1	1/18/2013 07:46 PM
Surr: 1,2-Dichloroethane-d4	114	58-125		%REC	1	1/18/2013 07:46 PM
Surr: 4-Bromofluorobenzene	96.8	52-138		%REC	1	1/18/2013 07:46 PM
Surr: Dibromofluoromethane	105	57-121		%REC	1	1/18/2013 07:46 PM
Surr: Toluene-d8	98.6	66-130		%REC	1	1/18/2013 07:46 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Work Order: N009385
Project: Maryland Square Shopping Center, 103P172828.

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID: **D130118LCS** SampType: **LCS** TestCode: **8260_S** Units: **µg/Kg** Prep Date: RunNo: **87193**
Client ID: **LCSS** Batch ID: **D13VS001** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508498**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	36.720	5.0	40.00	0	91.8	76	120				
1,1,1-Trichloroethane	34.220	5.0	40.00	0	85.6	67	120				
1,1,2,2-Tetrachloroethane	39.380	5.0	40.00	0	98.4	79	120				
1,1,2-Trichloroethane	36.460	5.0	40.00	0	91.2	79	120				
1,1-Dichloroethane	33.440	5.0	40.00	0	83.6	80	120				
1,1-Dichloroethene	34.150	5.0	40.00	0	85.4	80	120				
1,1-Dichloropropene	35.650	5.0	40.00	0	89.1	80	120				
1,2,3-Trichlorobenzene	38.620	5.0	40.00	0	96.6	80	125				
1,2,3-Trichloropropane	39.270	5.0	40.00	0	98.2	80	120				
1,2,4-Trichlorobenzene	38.960	5.0	40.00	0	97.4	80	128				
1,2,4-Trimethylbenzene	36.430	5.0	40.00	0	91.1	80	124				
1,2-Dibromo-3-chloropropane	44.340	10	40.00	0	111	67	120				
1,2-Dibromoethane	37.500	5.0	40.00	0	93.8	74	120				
1,2-Dichlorobenzene	37.240	5.0	40.00	0	93.1	80	120				
1,2-Dichloroethane	36.230	5.0	40.00	0	90.6	78	120				
1,2-Dichloropropane	35.750	5.0	40.00	0	89.4	79	120				
1,3,5-Trimethylbenzene	35.790	5.0	40.00	0	89.5	80	124				
1,3-Dichlorobenzene	37.100	5.0	40.00	0	92.8	80	120				
1,3-Dichloropropane	37.510	5.0	40.00	0	93.8	80	120				
1,4-Dichlorobenzene	36.520	5.0	40.00	0	91.3	80	120				
2,2-Dichloropropane	36.640	5.0	40.00	0	91.6	53	120				
2-Chlorotoluene	36.090	5.0	40.00	0	90.2	80	124				
4-Chlorotoluene	36.960	5.0	40.00	0	92.4	80	120				
4-Isopropyltoluene	36.590	5.0	40.00	0	91.5	80	126				
Benzene	35.090	5.0	40.00	0	87.7	80	120				
Bromobenzene	36.580	5.0	40.00	0	91.4	80	120				
Bromodichloromethane	36.220	5.0	40.00	0	90.6	69	120				
Bromoform	39.550	5.0	40.00	0	98.9	66	121				
Bromomethane	37.550	5.0	40.00	0	93.9	67	136				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Tetra Tech
Work Order: N009385
Project: Maryland Square Shopping Center, 103P172828.

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID: **D130118LCS** SampType: **LCS** TestCode: **8260_S** Units: **µg/Kg** Prep Date: RunNo: **87193**
Client ID: **LCSS** Batch ID: **D13VS001** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508498**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Carbon tetrachloride	33.600	5.0	40.00	0	84.0	62	120				
Chlorobenzene	36.770	5.0	40.00	0	91.9	80	120				
Chloroethane	38.240	5.0	40.00	0	95.6	70	149				
Chloroform	33.460	5.0	40.00	0	83.6	80	120				
Chloromethane	34.260	5.0	40.00	0	85.7	59	123				
cis-1,2-Dichloroethene	34.440	5.0	40.00	0	86.1	80	120				
cis-1,3-Dichloropropene	37.080	5.0	40.00	0	92.7	73	120				
Dibromochloromethane	37.510	5.0	40.00	0	93.8	71	123				
Dibromomethane	37.870	5.0	40.00	0	94.7	78	120				
Dichlorodifluoromethane	34.660	5.0	40.00	0	86.7	62	120				
Ethylbenzene	35.690	5.0	40.00	0	89.2	80	120				
Hexachlorobutadiene	35.630	5.0	40.00	0	89.1	80	128				
Isopropylbenzene	36.450	5.0	40.00	0	91.1	80	126				
m,p-Xylene	72.560	10	80.00	0	90.7	80	120				
Methylene chloride	32.740	5.0	40.00	0	81.8	69	120				
MTBE	34.360	5.0	40.00	0	85.9	67	120				
n-Butylbenzene	36.720	5.0	40.00	0	91.8	80	135				
n-Propylbenzene	35.020	5.0	40.00	0	87.6	80	127				
Naphthalene	42.000	5.0	40.00	0	105	70	132				
o-Xylene	37.280	5.0	40.00	0	93.2	80	120				
sec-Butylbenzene	35.910	5.0	40.00	0	89.8	80	127				
Styrene	37.660	5.0	40.00	0	94.2	80	120				
tert-Butylbenzene	35.640	5.0	40.00	0	89.1	80	124				
Tetrachloroethene	35.140	5.0	40.00	0	87.9	80	122				
Toluene	34.130	5.0	40.00	0	85.3	80	120				
trans-1,2-Dichloroethene	34.370	5.0	40.00	0	85.9	79	120				
Trichloroethene	34.670	5.0	40.00	0	86.7	80	120				
Trichlorofluoromethane	33.110	5.0	40.00	0	82.8	69	145				
Vinyl chloride	34.010	5.0	40.00	0	85.0	75	122				
Surr: 1,2-Dichloroethane-d4	46.100		50.00		92.2	58	125				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009385
Project: Maryland Square Shopping Center, 103P172828.

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID: **D130118LCS** SampType: **LCS** TestCode: **8260_S** Units: **µg/Kg** Prep Date: RunNo: **87193**
Client ID: **LCSS** Batch ID: **D13VS001** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508498**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	47.020		50.00		94.0	52	138				
Surr: Dibromofluoromethane	44.470		50.00		88.9	57	121				
Surr: Toluene-d8	45.500		50.00		91.0	66	130				

Sample ID: **D130118LCSD** SampType: **LCSD** TestCode: **8260_S** Units: **µg/Kg** Prep Date: RunNo: **87193**
Client ID: **LCSS02** Batch ID: **D13VS001** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508499**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	40.100	5.0	40.00	0	100	76	120	36.72	8.80	20	
1,1,1-Trichloroethane	38.080	5.0	40.00	0	95.2	67	120	34.22	10.7	20	
1,1,2,2-Tetrachloroethane	40.580	5.0	40.00	0	101	79	120	39.38	3.00	20	
1,1,2-Trichloroethane	38.550	5.0	40.00	0	96.4	79	120	36.46	5.57	20	
1,1-Dichloroethane	36.620	5.0	40.00	0	91.6	80	120	33.44	9.08	20	
1,1-Dichloroethene	37.800	5.0	40.00	0	94.5	80	120	34.15	10.1	20	
1,1-Dichloropropene	38.970	5.0	40.00	0	97.4	80	120	35.65	8.90	20	
1,2,3-Trichlorobenzene	41.060	5.0	40.00	0	103	80	125	38.62	6.12	20	
1,2,3-Trichloropropane	42.040	5.0	40.00	0	105	80	120	39.27	6.81	20	
1,2,4-Trichlorobenzene	40.020	5.0	40.00	0	100	80	128	38.96	2.68	20	
1,2,4-Trimethylbenzene	38.960	5.0	40.00	0	97.4	80	124	36.43	6.71	20	
1,2-Dibromo-3-chloropropane	46.950	10	40.00	0	117	67	120	44.34	5.72	20	
1,2-Dibromoethane	39.060	5.0	40.00	0	97.6	74	120	37.50	4.08	20	
1,2-Dichlorobenzene	38.600	5.0	40.00	0	96.5	80	120	37.24	3.59	20	
1,2-Dichloroethane	35.680	5.0	40.00	0	89.2	78	120	36.23	1.53	20	
1,2-Dichloropropane	36.530	5.0	40.00	0	91.3	79	120	35.75	2.16	20	
1,3,5-Trimethylbenzene	38.800	5.0	40.00	0	97.0	80	124	35.79	8.07	20	
1,3-Dichlorobenzene	38.890	5.0	40.00	0	97.2	80	120	37.10	4.71	20	
1,3-Dichloropropane	39.160	5.0	40.00	0	97.9	80	120	37.51	4.30	20	
1,4-Dichlorobenzene	38.060	5.0	40.00	0	95.2	80	120	36.52	4.13	20	
2,2-Dichloropropane	40.480	5.0	40.00	0	101	53	120	36.64	9.96	20	
2-Chlorotoluene	38.240	5.0	40.00	0	95.6	80	124	36.09	5.79	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009385
Project: Maryland Square Shopping Center, 103P172828.

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID: **D130118LCSD** SampType: **LCSD** TestCode: **8260_S** Units: **µg/Kg** Prep Date: RunNo: **87193**
Client ID: **LCSS02** Batch ID: **D13VS001** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508499**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4-Chlorotoluene	40.350	5.0	40.00	0	101	80	120	36.96	8.77	20	
4-Isopropyltoluene	39.600	5.0	40.00	0	99.0	80	126	36.59	7.90	20	
Benzene	37.030	5.0	40.00	0	92.6	80	120	35.09	5.38	20	
Bromobenzene	38.490	5.0	40.00	0	96.2	80	120	36.58	5.09	20	
Bromodichloromethane	38.600	5.0	40.00	0	96.5	69	120	36.22	6.36	20	
Bromoform	42.130	5.0	40.00	0	105	66	121	39.55	6.32	20	
Bromomethane	40.640	5.0	40.00	0	102	67	136	37.55	7.90	20	
Carbon tetrachloride	35.480	5.0	40.00	0	88.7	62	120	33.60	5.44	20	
Chlorobenzene	39.250	5.0	40.00	0	98.1	80	120	36.77	6.52	20	
Chloroethane	42.820	5.0	40.00	0	107	70	149	38.24	11.3	20	
Chloroform	35.660	5.0	40.00	0	89.2	80	120	33.46	6.37	20	
Chloromethane	37.390	5.0	40.00	0	93.5	59	123	34.26	8.74	20	
cis-1,2-Dichloroethene	37.270	5.0	40.00	0	93.2	80	120	34.44	7.89	20	
cis-1,3-Dichloropropene	39.000	5.0	40.00	0	97.5	73	120	37.08	5.05	20	
Dibromochloromethane	39.890	5.0	40.00	0	99.7	71	123	37.51	6.15	20	
Dibromomethane	38.550	5.0	40.00	0	96.4	78	120	37.87	1.78	20	
Dichlorodifluoromethane	37.540	5.0	40.00	0	93.8	62	120	34.66	7.98	20	
Ethylbenzene	38.880	5.0	40.00	0	97.2	80	120	35.69	8.56	20	
Hexachlorobutadiene	37.090	5.0	40.00	0	92.7	80	128	35.63	4.02	20	
Isopropylbenzene	39.050	5.0	40.00	0	97.6	80	126	36.45	6.89	20	
m,p-Xylene	78.630	10	80.00	0	98.3	80	120	72.56	8.03	20	
Methylene chloride	34.860	5.0	40.00	0	87.2	69	120	32.74	6.27	20	
MTBE	35.510	5.0	40.00	0	88.8	67	120	34.36	3.29	20	
n-Butylbenzene	39.010	5.0	40.00	0	97.5	80	135	36.72	6.05	20	
n-Propylbenzene	39.020	5.0	40.00	0	97.6	80	127	35.02	10.8	20	
Naphthalene	43.520	5.0	40.00	0	109	70	132	42.00	3.55	20	
o-Xylene	40.370	5.0	40.00	0	101	80	120	37.28	7.96	20	
sec-Butylbenzene	38.730	5.0	40.00	0	96.8	80	127	35.91	7.56	20	
Styrene	40.360	5.0	40.00	0	101	80	120	37.66	6.92	20	
tert-Butylbenzene	38.090	5.0	40.00	0	95.2	80	124	35.64	6.65	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009385
Project: Maryland Square Shopping Center, 103P172828.

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID: **D130118LCSD** SampType: **LCSD** TestCode: **8260_S** Units: **µg/Kg** Prep Date: RunNo: **87193**
Client ID: **LCSS02** Batch ID: **D13VS001** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508499**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Tetrachloroethene	38.720	5.0	40.00	0	96.8	80	122	35.14	9.69	20	
Toluene	37.530	5.0	40.00	0	93.8	80	120	34.13	9.49	20	
trans-1,2-Dichloroethene	37.210	5.0	40.00	0	93.0	79	120	34.37	7.94	20	
Trichloroethene	36.510	5.0	40.00	0	91.3	80	120	34.67	5.17	20	
Trichlorofluoromethane	36.140	5.0	40.00	0	90.4	69	145	33.11	8.75	20	
Vinyl chloride	37.970	5.0	40.00	0	94.9	75	122	34.01	11.0	20	
Surr: 1,2-Dichloroethane-d4	48.700		50.00		97.4	58	125		0		
Surr: 4-Bromofluorobenzene	50.610		50.00		101	52	138		0		
Surr: Dibromofluoromethane	46.990		50.00		94.0	57	121		0		
Surr: Toluene-d8	48.550		50.00		97.1	66	130		0		

Sample ID: **D130118MB2** SampType: **MBLK** TestCode: **8260_S** Units: **µg/Kg** Prep Date: RunNo: **87193**
Client ID: **PBS** Batch ID: **D13VS001** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508500**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	5.0									
1,1,1-Trichloroethane	ND	5.0									
1,1,2,2-Tetrachloroethane	ND	5.0									
1,1,2-Trichloroethane	ND	5.0									
1,1-Dichloroethane	ND	5.0									
1,1-Dichloroethene	ND	5.0									
1,1-Dichloropropene	ND	5.0									
1,2,3-Trichlorobenzene	ND	5.0									
1,2,3-Trichloropropane	ND	5.0									
1,2,4-Trichlorobenzene	ND	5.0									
1,2,4-Trimethylbenzene	ND	5.0									
1,2-Dibromo-3-chloropropane	ND	10									
1,2-Dibromoethane	ND	5.0									
1,2-Dichlorobenzene	ND	5.0									
1,2-Dichloroethane	ND	5.0									

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009385
Project: Maryland Square Shopping Center, 103P172828.

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID: **D130118MB2** SampType: **MBLK** TestCode: **8260_S** Units: **µg/Kg** Prep Date: RunNo: **87193**
Client ID: **PBS** Batch ID: **D13VS001** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508500**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2-Dichloropropane	ND	5.0									
1,3,5-Trimethylbenzene	ND	5.0									
1,3-Dichlorobenzene	ND	5.0									
1,3-Dichloropropane	ND	5.0									
1,4-Dichlorobenzene	ND	5.0									
2,2-Dichloropropane	ND	5.0									
2-Chlorotoluene	ND	5.0									
4-Chlorotoluene	ND	5.0									
4-Isopropyltoluene	ND	5.0									
Benzene	ND	5.0									
Bromobenzene	ND	5.0									
Bromodichloromethane	ND	5.0									
Bromoform	ND	5.0									
Bromomethane	ND	5.0									
Carbon tetrachloride	ND	5.0									
Chlorobenzene	ND	5.0									
Chloroethane	ND	5.0									
Chloroform	ND	5.0									
Chloromethane	ND	5.0									
cis-1,2-Dichloroethene	ND	5.0									
cis-1,3-Dichloropropene	ND	5.0									
Dibromochloromethane	ND	5.0									
Dibromomethane	ND	5.0									
Dichlorodifluoromethane	ND	5.0									
Ethylbenzene	ND	5.0									
Hexachlorobutadiene	ND	5.0									
Isopropylbenzene	ND	5.0									
m,p-Xylene	ND	10									
Methylene chloride	ND	5.0									
MTBE	ND	5.0									

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009385
Project: Maryland Square Shopping Center, 103P172828.

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID: **D130118MB2** SampType: **MBLK** TestCode: **8260_S** Units: **µg/Kg** Prep Date: RunNo: **87193**
Client ID: **PBS** Batch ID: **D13VS001** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508500**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
n-Butylbenzene	ND	5.0									
n-Propylbenzene	ND	5.0									
Naphthalene	ND	5.0									
o-Xylene	ND	5.0									
sec-Butylbenzene	ND	5.0									
Styrene	ND	5.0									
tert-Butylbenzene	ND	5.0									
Tetrachloroethene	ND	5.0									
Toluene	ND	5.0									
trans-1,2-Dichloroethene	ND	5.0									
Trichloroethene	ND	5.0									
Trichlorofluoromethane	ND	5.0									
Vinyl chloride	ND	5.0									
Surr: 1,2-Dichloroethane-d4	40.000		50.00		80.0	58	125				
Surr: 4-Bromofluorobenzene	45.410		50.00		90.8	52	138				
Surr: Dibromofluoromethane	40.840		50.00		81.7	57	121				
Surr: Toluene-d8	47.090		50.00		94.2	66	130				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009385
Project: Maryland Square Shopping Center, 103P172828.

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130118LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87194**
Client ID: **LCSW** Batch ID: **P13VW009** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508519**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	22.220	0.50	20.00	0	111	74	122				
1,1,1-Trichloroethane	18.930	0.50	20.00	0	94.6	65	120				
1,1,2,2-Tetrachloroethane	22.710	0.50	20.00	0	114	80	120				
1,1,2-Trichloroethane	20.890	0.50	20.00	0	104	80	120				
1,1-Dichloroethane	17.410	0.50	20.00	0	87.1	80	120				
1,1-Dichloroethene	18.830	0.50	20.00	0	94.2	80	120				
1,1-Dichloropropene	20.240	0.50	20.00	0	101	80	120				
1,2,3-Trichlorobenzene	27.280	0.50	20.00	0	136	80	124				S
1,2,3-Trichloropropane	21.590	0.50	20.00	0	108	80	120				
1,2,4-Trichlorobenzene	27.730	0.50	20.00	0	139	80	126				S
1,2,4-Trimethylbenzene	24.010	0.50	20.00	0	120	80	123				
1,2-Dibromo-3-chloropropane	28.340	1.0	20.00	0	142	70	120				S
1,2-Dibromoethane	22.410	0.50	20.00	0	112	80	120				
1,2-Dichlorobenzene	22.060	0.50	20.00	0	110	80	120				
1,2-Dichloroethane	20.620	0.50	20.00	0	103	80	120				
1,2-Dichloropropane	18.710	0.50	20.00	0	93.6	80	120				
1,3,5-Trimethylbenzene	23.280	0.50	20.00	0	116	80	121				
1,3-Dichlorobenzene	21.660	0.50	20.00	0	108	80	120				
1,3-Dichloropropane	21.220	0.50	20.00	0	106	80	120				
1,4-Dichlorobenzene	21.290	0.50	20.00	0	106	80	120				
2,2-Dichloropropane	19.930	0.50	20.00	0	99.7	54	120				
2-Chlorotoluene	20.870	0.50	20.00	0	104	80	122				
4-Chlorotoluene	21.050	0.50	20.00	0	105	80	120				
4-Isopropyltoluene	24.260	0.50	20.00	0	121	80	122				
Benzene	19.910	0.50	20.00	0	99.6	80	120				
Bromobenzene	22.280	0.50	20.00	0	111	80	120				
Bromodichloromethane	20.570	0.50	20.00	0	103	70	120				
Bromoform	25.060	0.50	20.00	0	125	66	120				S
Bromomethane	13.690	0.50	20.00	0	68.4	48	155				
Carbon tetrachloride	21.210	0.50	20.00	0	106	60	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009385
Project: Maryland Square Shopping Center, 103P172828.

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130118LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87194**
Client ID: **LCSW** Batch ID: **P13VW009** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508519**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	21.510	0.50	20.00	0	108	80	120				
Chloroethane	17.190	0.50	20.00	0	86.0	62	147				
Chloroform	18.480	0.50	20.00	0	92.4	80	120				
Chloromethane	22.340	0.50	20.00	0	112	63	121				
cis-1,2-Dichloroethene	19.070	0.50	20.00	0	95.4	80	120				
cis-1,3-Dichloropropene	20.890	0.50	20.00	0	104	75	120				
Dibromochloromethane	22.540	0.50	20.00	0	113	67	123				
Dibromomethane	20.590	0.50	20.00	0	103	80	120				
Dichlorodifluoromethane	20.080	0.50	20.00	0	100	70	121				
Ethylbenzene	20.740	0.50	20.00	0	104	80	120				
Hexachlorobutadiene	25.490	0.50	20.00	0	127	80	123				S
Isopropylbenzene	22.040	0.50	20.00	0	110	80	121				
m,p-Xylene	43.230	1.0	40.00	0	108	80	120				
Methylene chloride	18.650	2.0	20.00	0	93.3	75	120				
MTBE	20.220	0.50	20.00	0	101	70	120				
n-Butylbenzene	23.010	0.50	20.00	0	115	80	129				
n-Propylbenzene	21.550	0.50	20.00	0	108	80	122				
Naphthalene	24.230	0.50	20.00	0	121	73	127				
o-Xylene	21.650	0.50	20.00	0	108	80	120				
sec-Butylbenzene	22.370	0.50	20.00	0	112	80	120				
Styrene	23.620	0.50	20.00	0	118	80	120				
tert-Butylbenzene	22.750	0.50	20.00	0	114	80	120				
Tetrachloroethene	21.030	0.50	20.00	0	105	80	121				
Toluene	20.870	0.50	20.00	0	104	80	120				
trans-1,2-Dichloroethene	18.700	0.50	20.00	0	93.5	80	120				
Trichloroethene	20.800	0.50	20.00	0	104	80	120				
Trichlorofluoromethane	20.030	0.50	20.00	0	100	71	148				
Vinyl chloride	17.490	0.50	20.00	0	87.5	80	120				
Surr: 1,2-Dichloroethane-d4	24.020		25.00		96.1	56	120				
Surr: 4-Bromofluorobenzene	26.580		25.00		106	80	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009385
Project: Maryland Square Shopping Center, 103P172828.

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130118LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87194**
Client ID: **LCSW** Batch ID: **P13VW009** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508519**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Dibromofluoromethane	23.670		25.00		94.7	72	120				
Surr: Toluene-d8	26.230		25.00		105	80	123				

Sample ID: **P130118LCSD** SampType: **LCSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87194**
Client ID: **LCSS02** Batch ID: **P13VW009** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508520**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	21.300	0.50	20.00	0	106	74	122	22.22	4.23	20	
1,1,1-Trichloroethane	18.960	0.50	20.00	0	94.8	65	120	18.93	0.158	20	
1,1,2,2-Tetrachloroethane	21.350	0.50	20.00	0	107	80	120	22.71	6.17	20	
1,1,2-Trichloroethane	20.790	0.50	20.00	0	104	80	120	20.89	0.480	20	
1,1-Dichloroethane	17.210	0.50	20.00	0	86.1	80	120	17.41	1.16	20	
1,1-Dichloroethene	18.990	0.50	20.00	0	95.0	80	120	18.83	0.846	20	
1,1-Dichloropropene	20.080	0.50	20.00	0	100	80	120	20.24	0.794	20	
1,2,3-Trichlorobenzene	26.450	0.50	20.00	0	132	80	124	27.28	3.09	20	S
1,2,3-Trichloropropane	20.390	0.50	20.00	0	102	80	120	21.59	5.72	20	
1,2,4-Trichlorobenzene	26.390	0.50	20.00	0	132	80	126	27.73	4.95	20	S
1,2,4-Trimethylbenzene	23.010	0.50	20.00	0	115	80	123	24.01	4.25	20	
1,2-Dibromo-3-chloropropane	27.230	1.0	20.00	0	136	70	120	28.34	3.99	20	S
1,2-Dibromoethane	21.980	0.50	20.00	0	110	80	120	22.41	1.94	20	
1,2-Dichlorobenzene	20.820	0.50	20.00	0	104	80	120	22.06	5.78	20	
1,2-Dichloroethane	20.420	0.50	20.00	0	102	80	120	20.62	0.975	20	
1,2-Dichloropropane	18.480	0.50	20.00	0	92.4	80	120	18.71	1.24	20	
1,3,5-Trimethylbenzene	22.280	0.50	20.00	0	111	80	121	23.28	4.39	20	
1,3-Dichlorobenzene	20.960	0.50	20.00	0	105	80	120	21.66	3.28	20	
1,3-Dichloropropane	20.330	0.50	20.00	0	102	80	120	21.22	4.28	20	
1,4-Dichlorobenzene	20.450	0.50	20.00	0	102	80	120	21.29	4.02	20	
2,2-Dichloropropane	18.860	0.50	20.00	0	94.3	54	120	19.93	5.52	20	
2-Chlorotoluene	19.960	0.50	20.00	0	99.8	80	122	20.87	4.46	20	
4-Chlorotoluene	20.350	0.50	20.00	0	102	80	120	21.05	3.38	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009385
Project: Maryland Square Shopping Center, 103P172828.

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130118LCSD** SampType: **LCSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87194**
Client ID: **LCSS02** Batch ID: **P13VW009** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508520**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4-Isopropyltoluene	23.010	0.50	20.00	0	115	80	122	24.26	5.29	20	
Benzene	19.360	0.50	20.00	0	96.8	80	120	19.91	2.80	20	
Bromobenzene	21.080	0.50	20.00	0	105	80	120	22.28	5.54	20	
Bromodichloromethane	19.940	0.50	20.00	0	99.7	70	120	20.57	3.11	20	
Bromoform	24.310	0.50	20.00	0	122	66	120	25.06	3.04	20	S
Bromomethane	13.060	0.50	20.00	0	65.3	48	155	13.69	4.71	20	
Carbon tetrachloride	20.630	0.50	20.00	0	103	60	120	21.21	2.77	20	
Chlorobenzene	20.800	0.50	20.00	0	104	80	120	21.51	3.36	20	
Chloroethane	17.020	0.50	20.00	0	85.1	62	147	17.19	0.994	20	
Chloroform	18.120	0.50	20.00	0	90.6	80	120	18.48	1.97	20	
Chloromethane	22.690	0.50	20.00	0	113	63	121	22.34	1.55	20	
cis-1,2-Dichloroethene	18.810	0.50	20.00	0	94.1	80	120	19.07	1.37	20	
cis-1,3-Dichloropropene	20.450	0.50	20.00	0	102	75	120	20.89	2.13	20	
Dibromochloromethane	22.200	0.50	20.00	0	111	67	123	22.54	1.52	20	
Dibromomethane	20.440	0.50	20.00	0	102	80	120	20.59	0.731	20	
Dichlorodifluoromethane	20.070	0.50	20.00	0	100	70	121	20.08	0.0498	20	
Ethylbenzene	20.210	0.50	20.00	0	101	80	120	20.74	2.59	20	
Hexachlorobutadiene	24.920	0.50	20.00	0	125	80	123	25.49	2.26	20	S
Isopropylbenzene	21.160	0.50	20.00	0	106	80	121	22.04	4.07	20	
m,p-Xylene	41.930	1.0	40.00	0	105	80	120	43.23	3.05	20	
Methylene chloride	18.520	2.0	20.00	0	92.6	75	120	18.65	0.699	20	
MTBE	20.340	0.50	20.00	0	102	70	120	20.22	0.592	20	
n-Butylbenzene	22.000	0.50	20.00	0	110	80	129	23.01	4.49	20	
n-Propylbenzene	20.590	0.50	20.00	0	103	80	122	21.55	4.56	20	
Naphthalene	23.510	0.50	20.00	0	118	73	127	24.23	3.02	20	
o-Xylene	21.640	0.50	20.00	0	108	80	120	21.65	0.0462	20	
sec-Butylbenzene	21.290	0.50	20.00	0	106	80	120	22.37	4.95	20	
Styrene	22.910	0.50	20.00	0	115	80	120	23.62	3.05	20	
tert-Butylbenzene	21.600	0.50	20.00	0	108	80	120	22.75	5.19	20	
Tetrachloroethene	20.740	0.50	20.00	0	104	80	121	21.03	1.39	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009385
Project: Maryland Square Shopping Center, 103P172828.

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130118LCSD** SampType: **LCSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87194**
Client ID: **LCSS02** Batch ID: **P13VW009** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508520**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Toluene	20.510	0.50	20.00	0	103	80	120	20.87	1.74	20	
trans-1,2-Dichloroethene	18.310	0.50	20.00	0	91.6	80	120	18.70	2.11	20	
Trichloroethene	20.610	0.50	20.00	0	103	80	120	20.80	0.918	20	
Trichlorofluoromethane	19.640	0.50	20.00	0	98.2	71	148	20.03	1.97	20	
Vinyl chloride	16.990	0.50	20.00	0	85.0	80	120	17.49	2.90	20	
Surr: 1,2-Dichloroethane-d4	23.640		25.00		94.6	56	120		0		
Surr: 4-Bromofluorobenzene	26.180		25.00		105	80	120		0		
Surr: Dibromofluoromethane	23.190		25.00		92.8	72	120		0		
Surr: Toluene-d8	25.560		25.00		102	80	123		0		

Sample ID: **P130118MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87194**
Client ID: **PBW** Batch ID: **P13VW009** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508521**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	0.50									
1,1,1-Trichloroethane	ND	0.50									
1,1,2,2-Tetrachloroethane	ND	0.50									
1,1,2-Trichloroethane	ND	0.50									
1,1-Dichloroethane	ND	0.50									
1,1-Dichloroethene	ND	0.50									
1,1-Dichloropropene	ND	0.50									
1,2,3-Trichlorobenzene	ND	0.50									
1,2,3-Trichloropropane	ND	0.50									
1,2,4-Trichlorobenzene	ND	0.50									
1,2,4-Trimethylbenzene	ND	0.50									
1,2-Dibromo-3-chloropropane	ND	1.0									
1,2-Dibromoethane	ND	0.50									
1,2-Dichlorobenzene	ND	0.50									
1,2-Dichloroethane	ND	0.50									
1,2-Dichloropropane	ND	0.50									

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009385
Project: Maryland Square Shopping Center, 103P172828.

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130118MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87194**
Client ID: **PBW** Batch ID: **P13VW009** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508521**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,3,5-Trimethylbenzene	ND	0.50									
1,3-Dichlorobenzene	ND	0.50									
1,3-Dichloropropane	ND	0.50									
1,4-Dichlorobenzene	ND	0.50									
2,2-Dichloropropane	ND	0.50									
2-Chlorotoluene	ND	0.50									
4-Chlorotoluene	ND	0.50									
4-Isopropyltoluene	ND	0.50									
Benzene	ND	0.50									
Bromobenzene	ND	0.50									
Bromodichloromethane	ND	0.50									
Bromoform	ND	0.50									
Bromomethane	ND	0.50									
Carbon tetrachloride	ND	0.50									
Chlorobenzene	ND	0.50									
Chloroethane	ND	0.50									
Chloroform	ND	0.50									
Chloromethane	ND	0.50									
cis-1,2-Dichloroethene	ND	0.50									
cis-1,3-Dichloropropene	ND	0.50									
Dibromochloromethane	ND	0.50									
Dibromomethane	ND	0.50									
Dichlorodifluoromethane	ND	0.50									
Ethylbenzene	ND	0.50									
Hexachlorobutadiene	ND	0.50									
Isopropylbenzene	ND	0.50									
m,p-Xylene	ND	1.0									
Methylene chloride	ND	2.0									
MTBE	ND	0.50									
n-Butylbenzene	ND	0.50									

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009385
Project: Maryland Square Shopping Center, 103P172828.

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130118MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87194**
Client ID: **PBW** Batch ID: **P13VW009** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508521**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
n-Propylbenzene	ND	0.50									
Naphthalene	ND	0.50									
o-Xylene	ND	0.50									
sec-Butylbenzene	ND	0.50									
Styrene	ND	0.50									
tert-Butylbenzene	ND	0.50									
Tetrachloroethene	ND	0.50									
Toluene	ND	0.50									
trans-1,2-Dichloroethene	ND	0.50									
Trichloroethene	ND	0.50									
Trichlorofluoromethane	ND	0.50									
Vinyl chloride	ND	0.50									
Surr: 1,2-Dichloroethane-d4	24.640		25.00		98.6	56	120				
Surr: 4-Bromofluorobenzene	25.520		25.00		102	80	120				
Surr: Dibromofluoromethane	24.340		25.00		97.4	72	120				
Surr: Toluene-d8	24.870		25.00		99.5	80	123				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009385
Project: Maryland Square Shopping Center, 103P172828.

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P120122LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87289**
Client ID: **LCSW** Batch ID: **P13VW012** TestNo: **EPA 8260B** Analysis Date: **1/22/2013** SeqNo: **1512706**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	19.780	0.50	20.00	0	98.9	80	120				
Ethylbenzene	19.940	0.50	20.00	0	99.7	80	120				
m,p-Xylene	41.250	1.0	40.00	0	103	80	120				
MTBE	18.140	0.50	20.00	0	90.7	70	120				
o-Xylene	20.660	0.50	20.00	0	103	80	120				
Tetrachloroethene	19.450	0.50	20.00	0	97.3	80	121				
Toluene	20.220	0.50	20.00	0	101	80	120				
Surr: 1,2-Dichloroethane-d4	25.470		25.00		102	56	120				
Surr: 4-Bromofluorobenzene	26.540		25.00		106	80	120				
Surr: Dibromofluoromethane	25.910		25.00		104	72	120				
Surr: Toluene-d8	26.290		25.00		105	80	123				

Sample ID: **P120122LCSD** SampType: **LCSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87289**
Client ID: **LCSS02** Batch ID: **P13VW012** TestNo: **EPA 8260B** Analysis Date: **1/22/2013** SeqNo: **1512707**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	18.260	0.50	20.00	0	91.3	80	120	19.78	7.99	20	
Ethylbenzene	17.700	0.50	20.00	0	88.5	80	120	19.94	11.9	20	
m,p-Xylene	37.260	1.0	40.00	0	93.2	80	120	41.25	10.2	20	
MTBE	16.640	0.50	20.00	0	83.2	70	120	18.14	8.63	20	
o-Xylene	18.500	0.50	20.00	0	92.5	80	120	20.66	11.0	20	
Tetrachloroethene	17.600	0.50	20.00	0	88.0	80	121	19.45	9.99	20	
Toluene	18.330	0.50	20.00	0	91.7	80	120	20.22	9.81	20	
Surr: 1,2-Dichloroethane-d4	25.380		25.00		102	56	120		0		
Surr: 4-Bromofluorobenzene	26.500		25.00		106	80	120		0		
Surr: Dibromofluoromethane	26.430		25.00		106	72	120		0		
Surr: Toluene-d8	26.200		25.00		105	80	123		0		

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009385
Project: Maryland Square Shopping Center, 103P172828.

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P120122MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87289**
Client ID: **PBW** Batch ID: **P13VW012** TestNo: **EPA 8260B** Analysis Date: **1/22/2013** SeqNo: **1512708**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ND	0.50									
Ethylbenzene	ND	0.50									
m,p-Xylene	ND	1.0									
MTBE	ND	0.50									
o-Xylene	ND	0.50									
Tetrachloroethene	ND	0.50									
Toluene	ND	0.50									
Surr: 1,2-Dichloroethane-d4	26.010		25.00		104	56	120				
Surr: 4-Bromofluorobenzene	24.820		25.00		99.3	80	120				
Surr: Dibromofluoromethane	26.970		25.00		108	72	120				
Surr: Toluene-d8	25.690		25.00		103	80	123				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CHAIN OF CUSTODY RECORD

Pg _____ of _____

Advanced Technology Laboratories INC
3151 W. Post Road
Las Vegas, NV 89118
(702) 307-2659 • Fax (702) 307-2691

FOR LABORATORY USE ONLY:

P.O.#: 103P172828.01

Logged By: GR Date: 1/17/13

Method of Transport: Client ☐ ATL ☑ CA OverN ☐ FEDEX ☐ Other: _____

Sample Condition Upon Receipt
1. CHILLED 1.9°C Y☑ N☐ 4. SEALED Y☑ N☐
2. HEADSPACE (VOA) Y☐ N☑ 5. # OF SPLS MATCH COC Y☑ N☐
3. CONTAINER INTACT Y☑ N☐ 6. PRESERVED Y☑ N☐

Client: TetraTech EM Inc.	Address: 1230 Columbia St, Ste 1000	TEL: (415) 268-5821
Attn: Rob Manriquez	City San Diego State CA Zip Code 92101	FAX: ( )
Project Name: Maryland Square Shopping Center	Project #: 103P172828.01	Sampler: VLADIMIR PRILEPIN

I attest to the validity and authenticity of this sample, I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action. (Printed Name) (Signature)

Relinquished by: (Signature and Printed Name)	VLADIMIR PRILEPIN	Date: 1/17/13	Time: 16:35	Received by: (Signature and Printed Name)		Date: 1/17/13	Time: 1650
Relinquished by: (Signature and Printed Name)		Date:	Time:	Received by: (Signature and Printed Name)		Date:	Time:
Relinquished by: (Signature and Printed Name)		Date:	Time:	Received by: (Signature and Printed Name)		Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
VLADIMIR PRILEPIN 1/17/13
Print Name Date
Signature

Send Report To:
Attn: Rob Manriquez
Co: Tetra tech EM Inc.
Address 1230 Columbia St Ste 1000
City San Diego State CA Zip 92101

Bill To:
Attn: Same
Co: Same
Address Same
City ____ State ____ Zip ____

Special Instructions/Comments:
Email when results are ready
vladimir.prilepin@tetratech.com

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	Circle or Add Analysis(es) Requested: 8260B (VOC)	8260B (BTEX), (MTBE)	8015B (GRO)	8015B (DRO), (Motor Oil/ORO)	RCRA8 (6010B/7000)	SPECIFY APPROPRIATE MATRIX: SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s): #	Type	PRESERVATION	REMARKS
	N009385-1	~~TTMW6D@2GW32~~ ~~TTMW6D@2GW32~~ w.p.	1/16/13	1320	X						X			E	3	VOA G	HCl	
	-2	TTMW6D@3GW41	1/17/13	0935	X						X			E	3	VOA G	HCl	
	-3	MSSL 18	1/17/13	1030	X					X				E	1	J G	/	
	-4	MSSL 19	1/17/13	1035	X					X				E	1	J G	/	
	-5	MSSL 20	1/17/13	1040	X					X				E	1	J G	/	
	-6	TTMW6D@4GW51	1/17/13	1040	X						X			E	3	VOA G	HCl	
	-7	TTMW6D@6GW65	1/17/13	1520	X						X			E	3	VOA G	HCl	
	-8	TTMW19D@1SS81	1/13/13	1500	X					X				E	1	T	/	

QA/QC: RTNE ☐ CT ☐ SWRCB ☐ Logcode ____ OTHER ____

- TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: ☐ A= Overnight ≤ 24 hr ☐ B= Emergency Next workday ☐ C= Critical 2 Workdays ☐ D= Urgent 3 Workdays ☐ E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=Hcl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter.

STAR PRINTING 873-1527

Advanced Technology Laboratories, Inc.

Please review the checklist below. Any NO signifies non-compliance. Any non-compliance will be noted and must be understood as having an impact on the quality of the data. All tests will be performed as requested regardless of any compliance issues.

If you have any questions or further instruction, please contact our Project Coordinator at (702) 307-2659.

Cooler Received/Opened On:	1/17/2013	Workorder:	N009385
Rep sample Temp (Deg C):	1.9	IR Gun ID:	1
Temp Blank:	☐ Yes ☑ No		
Carrier name:	ATL		
Last 4 digits of Tracking No.:	NA	Packing Material Used:	None
Cooling process:	☑ Ice ☐ Ice Pack ☐ Dry Ice ☐ Other ☐ None		

Sample Receipt Checklist

1. Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
2. Custody seals intact, signed, dated on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
3. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
4. Chain of custody present?	Yes ☑	No ☐	
5. Sampler's name present in COC?	Yes ☑	No ☐	
6. Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
7. Chain of custody agrees with sample labels?	Yes ☑	No ☐	
8. Samples in proper container/bottle?	Yes ☑	No ☐	
9. Sample containers intact?	Yes ☑	No ☐	
10. Sufficient sample volume for indicated test?	Yes ☑	No ☐	
11. All samples received within holding time?	Yes ☑	No ☐	
12. Temperature of rep sample or Temp Blank within acceptable limit?	Yes ☑	No ☐	NA ☐
13. Water - VOA vials have zero headspace?	Yes ☑	No ☐	NA ☐
14. Water - pH acceptable upon receipt? Example: pH > 12 for (CN,S); pH<2 for Metals	Yes ☐	No ☐	NA ☑
15. Did the bottle labels indicate correct preservatives used?	Yes ☑	No ☐	NA ☐
16. Were there Non-Conformance issues at login?	Yes ☐	No ☐	NA ☑
Was Client notified?	Yes ☐	No ☐	NA ☑

Comments:

Checklist Completed B MBC 1/18/13

Reviewed By:

January 18, 2013

Rob Manriquez
Tetra Tech
1771 East Flamingo Rd, Suite A113
Las Vegas, NV 89119

TEL: (702) 383- 6737
FAX: (702) 838-5476

CA-ELAP No.:2676
NV Cert. No.:NV-009222007A

Workorder No.: N009395

RE: Maryland Square Shopping Center, 103P172828

Attention: Rob Manriquez

Enclosed are the results for sample(s) received on January 18, 2013 by Advanced Technology Laboratories, Inc. . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

I hereby certify that all laboratory analysis requested were performed by Nevada Division of Environmental Protection-certified laboratory for the parameters and matrices reported herein.

Thank you for the opportunity to service the needs of your company.Please feel free to call me at (702) 307-2659 if I can be of further assistance to your company.

Sincerely,

for

Jose Tenorio Jr.
Laboratory Director

The cover letter and the case narrative are an integral part of this analytical report and cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories - Las Vegas.

CLIENT: Tetra Tech
Project: Maryland Square Shopping Center, 103P172828.
Lab Order: N009395

CASE NARRATIVE

SAMPLE RECEIVING/GENERAL COMMENTS:

Samples were received intact with proper chain of custody documentation.

Cooler temperature and sample preservation were verified upon receipt of samples if applicable.

Information on sample receipt conditions including discrepancies can be found in attached Sample Receipt Checklist Form.

Samples were analyzed within method holding time.

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT:	Tetra Tech	**Client Sample ID:**	TTMW6D07GW71
Lab Order:	N009395	**Collection Date:**	1/18/2013 8:20:00 AM
Project:	Maryland Square Shopping Center, 103P172828.	**Matrix:**	GROUNDWATER
Lab ID:	N009395-001		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_130118A	QC Batch: P13VW009			PrepDate:		Analyst: **QBM**
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	1/18/2013 02:07 PM
Tetrachloroethene	17	0.50		µg/L	1	1/18/2013 02:07 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	1/18/2013 02:07 PM
Trichloroethene	ND	0.50		µg/L	1	1/18/2013 02:07 PM
Vinyl chloride	ND	0.50		µg/L	1	1/18/2013 02:07 PM
Surr: 1,2-Dichloroethane-d4	98.1	56-120		%REC	1	1/18/2013 02:07 PM
Surr: 4-Bromofluorobenzene	99.0	80-120		%REC	1	1/18/2013 02:07 PM
Surr: Dibromofluoromethane	96.7	72-120		%REC	1	1/18/2013 02:07 PM
Surr: Toluene-d8	102	80-123		%REC	1	1/18/2013 02:07 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Work Order: N009395
Project: Maryland Square Shopping Center, 103P172828

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130118LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87194**
Client ID: **LCSW** Batch ID: **P13VW009** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508519**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	19.070	0.50	20.00	0	95.4	80	120				
Tetrachloroethene	21.030	0.50	20.00	0	105	80	121				
trans-1,2-Dichloroethene	18.700	0.50	20.00	0	93.5	80	120				
Trichloroethene	20.800	0.50	20.00	0	104	80	120				
Vinyl chloride	17.490	0.50	20.00	0	87.5	80	120				
Surr: 1,2-Dichloroethane-d4	24.020		25.00		96.1	56	120				
Surr: 4-Bromofluorobenzene	26.580		25.00		106	80	120				
Surr: Dibromofluoromethane	23.670		25.00		94.7	72	120				
Surr: Toluene-d8	26.230		25.00		105	80	123				

Sample ID: **P130118LCSD** SampType: **LCSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87194**
Client ID: **LCSS02** Batch ID: **P13VW009** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508520**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	18.810	0.50	20.00	0	94.1	80	120	19.07	1.37	20	
Tetrachloroethene	20.740	0.50	20.00	0	104	80	121	21.03	1.39	20	
trans-1,2-Dichloroethene	18.310	0.50	20.00	0	91.6	80	120	18.70	2.11	20	
Trichloroethene	20.610	0.50	20.00	0	103	80	120	20.80	0.918	20	
Vinyl chloride	16.990	0.50	20.00	0	85.0	80	120	17.49	2.90	20	
Surr: 1,2-Dichloroethane-d4	23.640		25.00		94.6	56	120		0		
Surr: 4-Bromofluorobenzene	26.180		25.00		105	80	120		0		
Surr: Dibromofluoromethane	23.190		25.00		92.8	72	120		0		
Surr: Toluene-d8	25.560		25.00		102	80	123		0		

Sample ID: **P130118MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87194**
Client ID: **PBW** Batch ID: **P13VW009** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508521**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc. *3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691*

CLIENT: Tetra Tech
Work Order: N009395
Project: Maryland Square Shopping Center, 103P172828

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130118MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87194**
Client ID: **PBW** Batch ID: **P13VW009** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508521**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	ND	0.50									
Tetrachloroethene	ND	0.50									
trans-1,2-Dichloroethene	ND	0.50									
Trichloroethene	ND	0.50									
Vinyl chloride	ND	0.50									
Surr: 1,2-Dichloroethane-d4	24.640		25.00		98.6	56	120				
Surr: 4-Bromofluorobenzene	25.520		25.00		102	80	120				
Surr: Dibromofluoromethane	24.340		25.00		97.4	72	120				
Surr: Toluene-d8	24.870		25.00		99.5	80	123				

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories INC.
3151-3153 W. Post Rd.
Las Vegas, NV 89118
Tel: (702) 307-2659 • Fax: (702) 307-2691

FOR LABORATORY USE ONLY

P.O. #: 103P172824.01
Logged By: _____ Date: 1/18/13

Method of Transport: Client ☐ ATL ☑ CA OverN ☐ FedEx ☐ Other: _____

Sample Condition Upon Receipt
1. CHILLED 0.8°C Y ☑ N ☐ (ICE WET)
2. HEADSPACE (VOA) Y ☐ N ☑
3. CONTAINER INTACT Y ☑ N ☐
4. SEALED Y ☐ N ☑
5. # OF SPLS MATCH COC Y ☑ N ☐
6. PRESERVED Y ☑ N ☐

Client: Tetra Tech EM Inc. | Address: 1230 Columbia St, Ste 1000 | Tel: 619-321-6748
Attention: Rob Manriquez | City: San Diego | State: CA | Zip Code: 92101 | Fax: 619-525-7186

Project Name: Maryland Square Shopping Center | Project #: 103P172828.01

Sampler: *I attest to the validity and authenticity of this sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action.* (Printed Name) VLADIMIR PRILEPIN (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
VLADIMIR PRILEPIN	1/18/13	9:15		1/18/13	0932
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: VLADIMIR PRILEPIN 1/18/13
Print Name Date
Signature

Send Report To:
Attn: Rob Manriquez
Co: Tetra Tech EM Inc.
Addr: 1230 Columbia St, Ste 1000
City: San Diego State: CA Zip: 92101

Bill To:
Attn: same
Co: same
Addr: same
City: State: Zip:

Special Instructions/Comments:
e-mail when results are ready;
becki.dano@tetratech.com
vladimir.prilepin@tetratech.com
ASAP

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
Sample :$2.00 / sample /mo (after 45 days)
Records: $1 /ATL workorder /mo (after 1 year)

Circle or Add Analysis(es) Requested

SPECIFY APPROPRIATE MATRIX: SOIL | WATER | GROUND WATER | WASTEWATER

QA/QC: RTNE ☐ CT ☐ SWRCB ☐ Logcode_____ OTHER _____

ITEM	LAB USE ONLY: Lab No.	Sample Description: Sample ID / Location	Date	Time	8260B (VOCs) PCE,TCE,cisDCE,V	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	1009395-1	TTMW6D07GW71	1/18/13	8:20	X	A	3	VOA 6	H	

■ TAT starts 8AM the following day if samples received after 3 PM

TAT: ☒ A = Overnight ≤ 24 hrs ☐ B = Emergency Next Workday ☐ C = Critical 2 Workdays ☐ D = Urgent 3 Workdays ☐ E = Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives:
H=HCl N=HNO_3 S=H_2SO_4 C=4°C
Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

Advanced Technology Laboratories, Inc.

Please review the checklist below. Any NO signifies non-compliance. Any non-compliance will be noted and must be understood as having an impact on the quality of the data. All tests will be performed as requested regardless of any compliance issues.

If you have any questions or further instruction, please contact our Project Coordinator at (702) 307-2659.

Cooler Received/Opened On:	1/18/2013	Workorder:	N009395
Rep sample Temp (Deg C):	0.8	IR Gun ID:	1
Temp Blank:	☐ Yes ☑ No		
Carrier name:	ATL		
Last 4 digits of Tracking No.:	n/a	Packing Material Used:	Bubble Wrap
Cooling process:	☑ Ice ☐ Ice Pack ☐ Dry Ice ☐ Other ☐ None		

Sample Receipt Checklist

1. Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
2. Custody seals intact, signed, dated on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
3. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
4. Chain of custody present?	Yes ☑	No ☐	
5. Sampler's name present in COC?	Yes ☑	No ☐	
6. Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
7. Chain of custody agrees with sample labels?	Yes ☑	No ☐	
8. Samples in proper container/bottle?	Yes ☑	No ☐	
9. Sample containers intact?	Yes ☑	No ☐	
10. Sufficient sample volume for indicated test?	Yes ☑	No ☐	
11. All samples received within holding time?	Yes ☑	No ☐	
12. Temperature of rep sample or Temp Blank within acceptable limit?	Yes ☑	No ☐	NA ☐
13. Water - VOA vials have zero headspace?	Yes ☑	No ☐	NA ☐
14. Water - pH acceptable upon receipt? Example: pH > 12 for (CN,S); pH<2 for Metals	Yes ☐	No ☐	NA ☑
15. Did the bottle labels indicate correct preservatives used?	Yes ☑	No ☐	NA ☐
16. Were there Non-Conformance issues at login?	Yes ☐	No ☐	NA ☑
Was Client notified?	Yes ☐	No ☐	NA ☑

Comments:

Checklist Completed By MBC

Reviewed By: NS 1/18/13

January 21, 2013

Rob Manriquez
Tetra Tech
1230 Columbia Street, Suite 1000
San Diego, CA 92101

TEL: (858) 527-8803
FAX:

CA-ELAP No.: 2676
NV Cert. No.: NV-009222007A

Workorder No.: N009402

RE: Maryland Square Shopping Center, 103P172828

Attention: Rob Manriquez

Enclosed are the results for sample(s) received on January 18, 2013 by Advanced Technology Laboratories, Inc. . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

I hereby certify that all laboratory analysis requested were performed by Nevada Division of Environmental Protection-certified laboratory for the parameters and matrices reported herein.

Thank you for the opportunity to service the needs of your company.Please feel free to call me at (702) 307-2659 if I can be of further assistance to your company.

Sincerely,

Jose Tenorio Jr.
Laboratory Director

The cover letter and the case narrative are an integral part of this analytical report and cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories - Las Vegas.

CLIENT: Tetra Tech
Project: Maryland Square Shopping Center, 103P172828.
Lab Order: N009402

CASE NARRATIVE

SAMPLE RECEIVING/GENERAL COMMENTS:

Samples was received intact with proper chain of custody documentation.

Cooler temperature and sample preservation were verified upon receipt of samples if applicable.

Information on sample receipt conditions including discrepancies can be found in attached Sample Receipt Checklist Form.

Sample was analyzed within method holding time.

CLIENT:	Tetra Tech	**Client Sample ID:**	TTMW06D08GW81
Lab Order:	N009402	**Collection Date:**	1/18/2013 1:25:00 PM
Project:	Maryland Square Shopping Center, 103P1728	**Matrix:**	GROUNDWATER
Lab ID:	N009402-001A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS5_130118A	QC Batch: P13VW009			PrepDate:		Analyst: **QBM**
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	1/18/2013 03:36 PM
Tetrachloroethene	0.76	0.50		µg/L	1	1/18/2013 03:36 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	1/18/2013 03:36 PM
Trichloroethene	ND	0.50		µg/L	1	1/18/2013 03:36 PM
Vinyl chloride	ND	0.50		µg/L	1	1/18/2013 03:36 PM
Surr: 1,2-Dichloroethane-d4	99.0	56-120		%REC	1	1/18/2013 03:36 PM
Surr: 4-Bromofluorobenzene	97.6	80-120		%REC	1	1/18/2013 03:36 PM
Surr: Dibromofluoromethane	96.8	72-120		%REC	1	1/18/2013 03:36 PM
Surr: Toluene-d8	97.7	80-123		%REC	1	1/18/2013 03:36 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Work Order: N009402
Project: Maryland Square Shopping Center, 103P172828.

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130118LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87194**
Client ID: **LCSW** Batch ID: **P13VW009** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508519**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	19.070	0.50	20.00	0	95.4	80	120				
Tetrachloroethene	21.030	0.50	20.00	0	105	80	121				
trans-1,2-Dichloroethene	18.700	0.50	20.00	0	93.5	80	120				
Trichloroethene	20.800	0.50	20.00	0	104	80	120				
Vinyl chloride	17.490	0.50	20.00	0	87.5	80	120				
Surr: 1,2-Dichloroethane-d4	24.020		25.00		96.1	56	120				
Surr: 4-Bromofluorobenzene	26.580		25.00		106	80	120				
Surr: Dibromofluoromethane	23.670		25.00		94.7	72	120				
Surr: Toluene-d8	26.230		25.00		105	80	123				

Sample ID: **P130118LCSD** SampType: **LCSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87194**
Client ID: **LCSS02** Batch ID: **P13VW009** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508520**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	18.810	0.50	20.00	0	94.1	80	120	19.07	1.37	20	
Tetrachloroethene	20.740	0.50	20.00	0	104	80	121	21.03	1.39	20	
trans-1,2-Dichloroethene	18.310	0.50	20.00	0	91.6	80	120	18.70	2.11	20	
Trichloroethene	20.610	0.50	20.00	0	103	80	120	20.80	0.918	20	
Vinyl chloride	16.990	0.50	20.00	0	85.0	80	120	17.49	2.90	20	
Surr: 1,2-Dichloroethane-d4	23.640		25.00		94.6	56	120		0		
Surr: 4-Bromofluorobenzene	26.180		25.00		105	80	120		0		
Surr: Dibromofluoromethane	23.190		25.00		92.8	72	120		0		
Surr: Toluene-d8	25.560		25.00		102	80	123		0		

Sample ID: **P130118MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87194**
Client ID: **PBW** Batch ID: **P13VW009** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508521**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009402
Project: Maryland Square Shopping Center, 103P172828.

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130118MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87194**
Client ID: **PBW** Batch ID: **P13VW009** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508521**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	ND	0.50									
Tetrachloroethene	ND	0.50									
trans-1,2-Dichloroethene	ND	0.50									
Trichloroethene	ND	0.50									
Vinyl chloride	ND	0.50									
Surr: 1,2-Dichloroethane-d4	24.640		25.00		98.6	56	120				
Surr: 4-Bromofluorobenzene	25.520		25.00		102	80	120				
Surr: Dibromofluoromethane	24.340		25.00		97.4	72	120				
Surr: Toluene-d8	24.870		25.00		99.5	80	123				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories INC.
3151-3153 W. Post Rd.
Las Vegas, NV 89118
Tel: (702) 307-2659 • Fax: (702) 307-2691

FOR LABORATORY USE ONLY

P.O. #: 103P172828.01
Logged By: _____ Date: 1/18/13

Method of Transport: Client ☐ ATL ☑ CA OverN ☐ FedEx ☐ Other: _____

Sample Condition Upon Receipt:
1. CHILLED 2.8°C Y ☐ N ☐ ICE 12441
2. HEADSPACE (VOA) Y ☐ N ☐
3. CONTAINER INTAC Y ☐ N ☐
4. SEALED Y ☐ N ☐
5. # OF SPLS MATCH COC Y ☐ N ☐
6. PRESERVED Y ☐ N ☐

Client: Tetra Tech EM Inc.	Address: 1230 Columbia St, Ste 1000		Tel: 619-321-6748
Attention: Rob Manriquez	City: San Diego	State: CA Zip Code: 92101	Fax: 619-525-7186

Project Name: Maryland Square Shopping Center
Project #: 103P172828.01
Sampler: *I attest to the validity and authenticity of this sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action.* (Printed Name) VLADIMIR PRILEPIN (Signature)

Relinquished by: (Signature and Printed Name) VLADIMIR PRILEPIN	Date: 1/17/13	Time: 14:10	Received by: (Signature and Printed Name) MO CARTTIN	Date: 1/18/13	Time: 1410
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: VLADIMIR PRILEPIN
Print Name: _____ Date: 1/17/13
Signature: _____

Send Report To:
Attn: Rob Manriquez
Co: Tetra Tech EM Inc.
Addr: 1230 Columbia St, Ste 1000
City: San Diego State: CA Zip: 92101

Bill To:
Attn: same
Co: same
Addr: same
City: State: Zip:

Special Instructions/Comments:
e-mail when results are ready;
becki.dano@tetratech.com
vladimir.prilepin@tetratech.com
lisa.medved@tetratech.com
ASAP

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
Sample :$2.00 / sample /mo (after 45 days)
Records: $1 /ATL workorder /mo (after 1 year)

Circle or Add Analysis(es) Requested

SPECIFY APPROPRIATE MATRIX: SOIL | WATER | GROUND WATER | WASTEWATER

QA/QC: RTNE ☐ CT ☐ SWRCB ☐ Logcode _____ OTHER _____

ITEM	LAB USE ONLY: Lab No.	Sample Description: Sample ID / Location	Date	Time	8260B (VOCs) PCE,TCE,cisDCE,V	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	1007402-1	TTMW06D08GW81	1/18/13	1325	X	A	3	VM 6	H	

■ TAT starts 8AM the following day if samples received after 3 PM

TAT: ☒ A = Overnight ≤ 24 hrs ☐ B = Emergency Next Workday ☐ C = Critical 2 Workdays ☐ D = Urgent 3 Workdays ☐ E = Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

Advanced Technology Laboratories, Inc.

Please review the checklist below. Any NO signifies non-compliance. Any non-compliance will be noted and must be understood as having an impact on the quality of the data. All tests will be performed as requested regardless of any compliance issues.

If you have any questions or further instruction, please contact our Project Coordinator at (702) 307-2659.

Cooler Received/Opened On:	1/18/2013	Workorder:	N009402
Rep sample Temp (Deg C):	2.8	IR Gun ID:	1
Temp Blank:	☐ Yes ☑ No		
Carrier name:	ATL		
Last 4 digits of Tracking No.:	NA	Packing Material Used:	None
Cooling process:	☑ Ice ☐ Ice Pack ☐ Dry Ice ☐ Other ☐ None		

Sample Receipt Checklist

1. Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
2. Custody seals intact, signed, dated on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
3. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
4. Chain of custody present?	Yes ☑	No ☐	
5. Sampler's name present in COC?	Yes ☑	No ☐	
6. Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
7. Chain of custody agrees with sample labels?	Yes ☑	No ☐	
8. Samples in proper container/bottle?	Yes ☑	No ☐	
9. Sample containers intact?	Yes ☑	No ☐	
10. Sufficient sample volume for indicated test?	Yes ☑	No ☐	
11. All samples received within holding time?	Yes ☑	No ☐	
12. Temperature of rep sample or Temp Blank within acceptable limit?	Yes ☑	No ☐	NA ☐
13. Water - VOA vials have zero headspace?	Yes ☑	No ☐	NA ☐
14. Water - pH acceptable upon receipt? Example: pH > 12 for (CN,S); pH<2 for Metals	Yes ☐	No ☐	NA ☑
15. Did the bottle labels indicate correct preservatives used?	Yes ☑	No ☐	NA ☐
16. Were there Non-Conformance issues at login?	Yes ☐	No ☐	NA ☑
Was Client notified?	Yes ☐	No ☐	NA ☑

Comments:

Checklist Completed B MBC 9/19/13

Reviewed By:

January 21, 2013

Rob Manriquez
Tetra Tech
1230 Columbia Street, Suite 1000
San Diego, CA 92101
TEL: (858) 527-8803
FAX:

CA-ELAP No.: 2676
NV Cert. No.: NV-009222007A

Workorder No.: N009407

RE: Maryland Square Shopping Center, 103P172828

Attention: Rob Manriquez

Enclosed are the results for sample(s) received on January 18, 2013 by Advanced Technology Laboratories, Inc. . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

I hereby certify that all laboratory analysis requested were performed by Nevada Division of Environmental Protection-certified laboratory for the parameters and matrices reported herein.

Thank you for the opportunity to service the needs of your company.Please feel free to call me at (702) 307-2659 if I can be of further assistance to your company.

Sincerely,

Jose Tenorio Jr.
Laboratory Director

The cover letter and the case narrative are an integral part of this analytical report and cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories - Las Vegas.

CLIENT: Tetra Tech
Project: Maryland Square Shopping Center, 103P172828.
Lab Order: N009407

CASE NARRATIVE

SAMPLE RECEIVING/GENERAL COMMENTS:

Sample was received intact with proper chain of custody documentation.

Cooler temperature and sample preservation were verified upon receipt of samples if applicable.

Information on sample receipt conditions including discrepancies can be found in attached Sample Receipt Checklist Form.

Sample was analyzed within method holding time.

CLIENT:	Tetra Tech	**Client Sample ID:**	TTMW06D09GW91
Lab Order:	N009407	**Collection Date:**	1/18/2013 4:25:00 PM
Project:	Maryland Square Shopping Center, 103P1728	**Matrix:**	GROUNDWATER
Lab ID:	N009407-001A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS5_130118A	QC Batch: P13VW009			PrepDate:		Analyst: **QBM**
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	1/18/2013 06:52 PM
Tetrachloroethene	ND	0.50		µg/L	1	1/18/2013 06:52 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	1/18/2013 06:52 PM
Trichloroethene	ND	0.50		µg/L	1	1/18/2013 06:52 PM
Vinyl chloride	ND	0.50		µg/L	1	1/18/2013 06:52 PM
Surr: 1,2-Dichloroethane-d4	98.9	56-120		%REC	1	1/18/2013 06:52 PM
Surr: 4-Bromofluorobenzene	99.7	80-120		%REC	1	1/18/2013 06:52 PM
Surr: Dibromofluoromethane	96.7	72-120		%REC	1	1/18/2013 06:52 PM
Surr: Toluene-d8	99.5	80-123		%REC	1	1/18/2013 06:52 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Work Order: N009407
Project: Maryland Square Shopping Center, 103P172828.

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130118LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87194**
Client ID: **LCSW** Batch ID: **P13VW009** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508519**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	19.070	0.50	20.00	0	95.4	80	120				
Tetrachloroethene	21.030	0.50	20.00	0	105	80	121				
trans-1,2-Dichloroethene	18.700	0.50	20.00	0	93.5	80	120				
Trichloroethene	20.800	0.50	20.00	0	104	80	120				
Vinyl chloride	17.490	0.50	20.00	0	87.5	80	120				
Surr: 1,2-Dichloroethane-d4	24.020		25.00		96.1	56	120				
Surr: 4-Bromofluorobenzene	26.580		25.00		106	80	120				
Surr: Dibromofluoromethane	23.670		25.00		94.7	72	120				
Surr: Toluene-d8	26.230		25.00		105	80	123				

Sample ID: **P130118LCSD** SampType: **LCSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87194**
Client ID: **LCSS02** Batch ID: **P13VW009** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508520**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	18.810	0.50	20.00	0	94.1	80	120	19.07	1.37	20	
Tetrachloroethene	20.740	0.50	20.00	0	104	80	121	21.03	1.39	20	
trans-1,2-Dichloroethene	18.310	0.50	20.00	0	91.6	80	120	18.70	2.11	20	
Trichloroethene	20.610	0.50	20.00	0	103	80	120	20.80	0.918	20	
Vinyl chloride	16.990	0.50	20.00	0	85.0	80	120	17.49	2.90	20	
Surr: 1,2-Dichloroethane-d4	23.640		25.00		94.6	56	120		0		
Surr: 4-Bromofluorobenzene	26.180		25.00		105	80	120		0		
Surr: Dibromofluoromethane	23.190		25.00		92.8	72	120		0		
Surr: Toluene-d8	25.560		25.00		102	80	123		0		

Sample ID: **P130118MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87194**
Client ID: **PBW** Batch ID: **P13VW009** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508521**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009407
Project: Maryland Square Shopping Center, 103P172828.

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130118MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87194**
Client ID: **PBW** Batch ID: **P13VW009** TestNo: **EPA 8260B** Analysis Date: **1/18/2013** SeqNo: **1508521**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	ND	0.50									
Tetrachloroethene	ND	0.50									
trans-1,2-Dichloroethene	ND	0.50									
Trichloroethene	ND	0.50									
Vinyl chloride	ND	0.50									
Surr: 1,2-Dichloroethane-d4	24.640		25.00		98.6	56	120				
Surr: 4-Bromofluorobenzene	25.520		25.00		102	80	120				
Surr: Dibromofluoromethane	24.340		25.00		97.4	72	120				
Surr: Toluene-d8	24.870		25.00		99.5	80	123				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

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CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories INC.
3151-3153 W. Post Rd.
Las Vegas, NV 89118
Tel: (702) 307-2659 • Fax: (702) 307-2691

FOR LABORATORY USE ONLY

P.O. #: 103P172828.01
Logged By: _____ Date: 1/18/13

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FedEx ☐ Other: _____

Sample Condition Upon Receipt
1. CHILLED 4.0°C Y ☑ N ☐ 4. SEALED Y ☑ N ☐
ICS 12471
2. HEADSPACE (VOA) Y ☐ N ☑ 5. # OF SPLS MATCH COC Y ☑ N ☐
3. CONTAINER INTAC Y ☑ N ☐ 6. PRESERVED Y ☐ N ☑

Client: Tetra Tech EM Inc.	Address: 1230 Columbia St, Ste 1000	Tel: 619-321-6748
Attention: Rob Manriquez	City: San Diego State: CA Zip Code: 92101	Fax: 619-525-7186

Project Name: Maryland Square Shopping Center
Project #: 103P172828.01
Sampler: *I attest to the validity and authenticity of this sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action.* (Printed Name) VLADIMIR PRILEPIN (Signature)

Relinquished by: (Signature and Printed Name) VLADIMIR PRILEPIN	Date: 1/18/13	Time: 17:30	Received by: (Signature and Printed Name)	Date: 1/18/13	Time: 1732
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: VLADIMIR PRILEPIN 1/18/13
Print Name Date
Signature

Send Report To:
Attn: Rob Manriquez
Co: Tetra Tech EM Inc.
Addr: 1230 Columbia St, Ste 1000
City: San Diego State: CA Zip: 92101

Bill To:
Attn: same
Co: same
Addr: same
City: State: Zip:

Special Instructions/Comments:
e-mail when results are ready;
becki.dano@tetratech.com
vladimir.prilepin@tetratech.com
lisa.medve@tetratech.com
ASAP

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
Sample :$2.00 / sample /mo (after 45 days)
Records: $1 /ATL workorder /mo (after 1 year)

Circle or Add Analysis(es) Requested: 8260B (VOCs) PCE,TCE,cisDCE, V

SPECIFY APPROPRIATE MATRIX: SOIL, WATER, GROUND WATER, WASTEWATER

QA/QC: RTNE ☐ CT ☐ SWRCB ☐ Logcode _____ OTHER _____

ITEM	LAB USE ONLY: Lab No.	Sample Description: Sample ID / Location	Date	Time	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	1000407-1	TT MW06D09 GW 91	1/18/13	16:25	X (8260B); X (WATER); A	3	VW G	H	

■ TAT starts 8AM the following day if samples received after 3 PM

TAT: ☒ A = Overnight ≤ 24 hrs ☐ B = Emergency Next Workday ☐ C = Critical 2 Workdays ☐ D = Urgent 3 Workdays ☐ E = Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl $N=HNO_3$ $S=H_2SO_4$ C=4°C $Z=Zn(AC)_2$ O=NaOH $T=Na_2S_2O_3$

Advanced Technology Laboratories, Inc.

Please review the checklist below. Any NO signifies non-compliance. Any non-compliance will be noted and must be understood as having an impact on the quality of the data. All tests will be performed as requested regardless of any compliance issues.

If you have any questions or further instruction, please contact our Project Coordinator at (702) 307-2659.

Cooler Received/Opened On:	1/18/2013	Workorder:	N009407
Rep sample Temp (Deg C):	4.0	IR Gun ID:	1
Temp Blank:	☐ Yes ☑ No		
Carrier name:	ATL		
Last 4 digits of Tracking No.:	NA	Packing Material Used:	None
Cooling process:	☑ Ice ☐ Ice Pack ☐ Dry Ice ☐ Other ☐ None		

Sample Receipt Checklist

1. Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
2. Custody seals intact, signed, dated on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
3. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
4. Chain of custody present?	Yes ☑	No ☐	
5. Sampler's name present in COC?	Yes ☑	No ☐	
6. Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
7. Chain of custody agrees with sample labels?	Yes ☑	No ☐	
8. Samples in proper container/bottle?	Yes ☑	No ☐	
9. Sample containers intact?	Yes ☑	No ☐	
10. Sufficient sample volume for indicated test?	Yes ☑	No ☐	
11. All samples received within holding time?	Yes ☑	No ☐	
12. Temperature of rep sample or Temp Blank within acceptable limit?	Yes ☑	No ☐	NA ☐
13. Water - VOA vials have zero headspace?	Yes ☑	No ☐	NA ☐
14. Water - pH acceptable upon receipt? Example: pH > 12 for (CN,S); pH<2 for Metals	Yes ☐	No ☐	NA ☑
15. Did the bottle labels indicate correct preservatives used?	Yes ☑	No ☐	NA ☐
16. Were there Non-Conformance issues at login?	Yes ☐	No ☐	NA ☑
Was Client notified?	Yes ☐	No ☐	NA ☑

Comments:

Checklist Completed B MBC 1/21/13

Reviewed By:

January 22, 2013

Rob Manriquez
Tetra Tech
1230 Columbia Street, Suite 1000
San Diego, CA 92101

TEL: (858) 527-8803
FAX:

CA-ELAP No.: 2676
NV Cert. No.: NV-009222007A

Workorder No.: N009411

RE: Maryland Square Shopping Center, 103P172828

Attention: Rob Manriquez

Enclosed are the results for sample(s) received on January 19, 2013 by Advanced Technology Laboratories, Inc. . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

I hereby certify that all laboratory analysis requested were performed by Nevada Division of Environmental Protection-certified laboratory for the parameters and matrices reported herein.

Thank you for the opportunity to service the needs of your company.Please feel free to call me at (702) 307-2659 if I can be of further assistance to your company.

Sincerely,

Jose Tenorio Jr.
Laboratory Director

The cover letter and the case narrative are an integral part of this analytical report and cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories - Las Vegas.

CLIENT: Tetra Tech
Project: Maryland Square Shopping Center, 103P172828.
Lab Order: N009411

CASE NARRATIVE

SAMPLE RECEIVING/GENERAL COMMENTS:

Samples were received intact with proper chain of custody documentation.

Cooler temperature and sample preservation were verified upon receipt of samples if applicable.

Information on sample receipt conditions including discrepancies can be found in attached Sample Receipt Checklist Form.

Samples were analyzed within method holding time.

CLIENT:	Tetra Tech	**Client Sample ID:**	TTMW06D10GW101
Lab Order:	N009411	**Collection Date:**	1/19/2013 8:35:00 AM
Project:	Maryland Square Shopping Center, 103P1728	**Matrix:**	GROUNDWATER
Lab ID:	N009411-001A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS5_130119A	QC Batch: P13VW010			PrepDate:		Analyst: **QBM**
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	1/19/2013 06:15 PM
Tetrachloroethene	ND	0.50		µg/L	1	1/19/2013 06:15 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	1/19/2013 06:15 PM
Trichloroethene	ND	0.50		µg/L	1	1/19/2013 06:15 PM
Vinyl chloride	ND	0.50		µg/L	1	1/19/2013 06:15 PM
Surr: 1,2-Dichloroethane-d4	95.6	56-120		%REC	1	1/19/2013 06:15 PM
Surr: 4-Bromofluorobenzene	94.5	80-120		%REC	1	1/19/2013 06:15 PM
Surr: Dibromofluoromethane	96.0	72-120		%REC	1	1/19/2013 06:15 PM
Surr: Toluene-d8	98.7	80-123		%REC	1	1/19/2013 06:15 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	TTMW06D11GW111
Lab Order:	N009411	**Collection Date:**	1/19/2013 11:35:00 AM
Project:	Maryland Square Shopping Center, 103P1728	**Matrix:**	GROUNDWATER
Lab ID:	N009411-002A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS5_130119A	QC Batch: P13VW010			PrepDate:		Analyst: **QBM**
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	1/19/2013 06:44 PM
Tetrachloroethene	0.52	0.50		µg/L	1	1/19/2013 06:44 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	1/19/2013 06:44 PM
Trichloroethene	ND	0.50		µg/L	1	1/19/2013 06:44 PM
Vinyl chloride	ND	0.50		µg/L	1	1/19/2013 06:44 PM
Surr: 1,2-Dichloroethane-d4	101	56-120		%REC	1	1/19/2013 06:44 PM
Surr: 4-Bromofluorobenzene	101	80-120		%REC	1	1/19/2013 06:44 PM
Surr: Dibromofluoromethane	96.8	72-120		%REC	1	1/19/2013 06:44 PM
Surr: Toluene-d8	101	80-123		%REC	1	1/19/2013 06:44 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	TTMW06D12GW121
Lab Order:	N009411	**Collection Date:**	1/19/2013 3:30:00 PM
Project:	Maryland Square Shopping Center, 103P1728	**Matrix:**	GROUNDWATER
Lab ID:	N009411-003A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS5_130119A	QC Batch: P13VW010			PrepDate:		Analyst: **QBM**
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	1/19/2013 07:13 PM
Tetrachloroethene	ND	0.50		µg/L	1	1/19/2013 07:13 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	1/19/2013 07:13 PM
Trichloroethene	ND	0.50		µg/L	1	1/19/2013 07:13 PM
Vinyl chloride	ND	0.50		µg/L	1	1/19/2013 07:13 PM
Surr: 1,2-Dichloroethane-d4	102	56-120		%REC	1	1/19/2013 07:13 PM
Surr: 4-Bromofluorobenzene	97.2	80-120		%REC	1	1/19/2013 07:13 PM
Surr: Dibromofluoromethane	99.2	72-120		%REC	1	1/19/2013 07:13 PM
Surr: Toluene-d8	101	80-123		%REC	1	1/19/2013 07:13 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Work Order: N009411
Project: Maryland Square Shopping Center, 103P172828.

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130119LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87223**
Client ID: **LCSW** Batch ID: **P13VW010** TestNo: **EPA 8260B** Analysis Date: **1/19/2013** SeqNo: **1509637**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	18.730	0.50	20.00	0	93.6	80	120				
Tetrachloroethene	21.710	0.50	20.00	0	109	80	121				
trans-1,2-Dichloroethene	18.340	0.50	20.00	0	91.7	80	120				
Trichloroethene	20.830	0.50	20.00	0	104	80	120				
Vinyl chloride	17.000	0.50	20.00	0	85.0	80	120				
Surr: 1,2-Dichloroethane-d4	24.020		25.00		96.1	56	120				
Surr: 4-Bromofluorobenzene	26.260		25.00		105	80	120				
Surr: Dibromofluoromethane	22.800		25.00		91.2	72	120				
Surr: Toluene-d8	25.640		25.00		103	80	123				

Sample ID: **P130119MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87223**
Client ID: **PBW** Batch ID: **P13VW010** TestNo: **EPA 8260B** Analysis Date: **1/19/2013** SeqNo: **1509638**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	ND	0.50									
Tetrachloroethene	ND	0.50									
trans-1,2-Dichloroethene	ND	0.50									
Trichloroethene	ND	0.50									
Vinyl chloride	ND	0.50									
Surr: 1,2-Dichloroethane-d4	24.800		25.00		99.2	56	120				
Surr: 4-Bromofluorobenzene	24.200		25.00		96.8	80	120				
Surr: Dibromofluoromethane	24.350		25.00		97.4	72	120				
Surr: Toluene-d8	25.090		25.00		100	80	123				

Sample ID: **N009368-002AMS** SampType: **MS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87223**
Client ID: **ZZZZZZ** Batch ID: **P13VW010** TestNo: **EPA 8260B** Analysis Date: **1/19/2013** SeqNo: **1509640**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009411
Project: Maryland Square Shopping Center, 103P172828.

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **N009368-002AMS** SampType: **MS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87223**
Client ID: **ZZZZZZ** Batch ID: **P13VW010** TestNo: **EPA 8260B** Analysis Date: **1/19/2013** SeqNo: **1509640**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	17.540	0.50	20.00	0	87.7	79	120				
Tetrachloroethene	20.570	0.50	20.00	0	103	70	145				
trans-1,2-Dichloroethene	16.970	0.50	20.00	0	84.8	80	120				
Trichloroethene	20.190	0.50	20.00	0	101	80	120				
Vinyl chloride	17.860	0.50	20.00	0	89.3	77	120				
Surr: 1,2-Dichloroethane-d4	23.470		25.00		93.9	56	120				
Surr: 4-Bromofluorobenzene	25.660		25.00		103	80	120				
Surr: Dibromofluoromethane	23.040		25.00		92.2	72	120				
Surr: Toluene-d8	25.530		25.00		102	80	123				

Sample ID: **N009368-002AMSD** SampType: **MSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87223**
Client ID: **ZZZZZZ** Batch ID: **P13VW010** TestNo: **EPA 8260B** Analysis Date: **1/19/2013** SeqNo: **1509641**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	18.320	0.50	20.00	0	91.6	79	120	17.54	4.35	20	
Tetrachloroethene	21.130	0.50	20.00	0	106	70	145	20.57	2.69	20	
trans-1,2-Dichloroethene	17.620	0.50	20.00	0	88.1	80	120	16.97	3.76	20	
Trichloroethene	20.300	0.50	20.00	0	102	80	120	20.19	0.543	20	
Vinyl chloride	22.470	0.50	20.00	0	112	77	120	17.86	22.9	20	R
Surr: 1,2-Dichloroethane-d4	23.500		25.00		94.0	56	120		0		
Surr: 4-Bromofluorobenzene	24.970		25.00		99.9	80	120		0		
Surr: Dibromofluoromethane	22.900		25.00		91.6	72	120		0		
Surr: Toluene-d8	25.230		25.00		101	80	123		0		

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CHAIN OF CUSTODY RECORD

Page of

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3151-3153 W. Post Rd.
Las Vegas, NV 89118
Tel: (702) 307-2659 • Fax: (702) 307-2691

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P.O. #: 103P172828.01
Logged By: _____ Date: 1/19/13

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FedEx ☐ Other: _____

Sample Condition Upon Receipt
1. CHILLED 5.2°C Y ☐ N ☐ ICE PACK IR#1 | 4. SEALED Y ☐ N ☐
2. HEADSPACE (VOA) Y ☐ N ☐ | 5. # OF SPLS MATCH COC Y ☐ N ☐
3. CONTAINER INTAC Y ☐ N ☐ | 6. PRESERVED Y ☐ N ☐

Client: Tetra Tech EM Inc.
Address: 1230 Columbia St, Ste 1000
Tel: 619-321-6748
Attention: Rob Manriquez
City: San Diego State: CA Zip Code: 92101
Fax: 619-525-7186

Project Name: Maryland Square Shopping Center
Project #: 103P172828.01
Sampler: *I attest to the validity and authenticity of this sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action.*
(Printed Name) VLADIMIR PRILEPIN
(Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
VLADIMIR PRILEPIN	1/19/13	16:00		1/19/13	1603
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: VLADIMIR PRILEPIN 1/19/13
Print Name Date
Signature

Send Report To:
Attn: Rob Manriquez
Co: Tetra Tech EM Inc.
Addr: 1230 Columbia St, Ste 1000
City: San Diego State: CA Zip: 92101

Bill To:
Attn: same
Co: same
Addr: same
City: State: Zip:

Special Instructions/Comments:
e-mail when results are ready;
becki.dano@tetratech.com
vladimir.prilepin@tetratech.com
lisa.medve@tetratech.com
ASAP

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
Sample :$2.00 / sample /mo (after 45 days)
Records: $1 /ATL workorder /mo (after 1 year)

Circle or Add Analysis(es) Requested

SPECIFY APPROPRIATE MATRIX

PRESERVATION

QA/QC: RTNE ☐ CT ☐ SWRCB ☐ Logcode____ OTHER ____

ITEM	LAB USE ONLY: Lab No.	Sample Description: Sample ID / Location	Date	Time	8260B (VOCs) PCE,TCE,cisDCE, V	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	N009411-1	TT MW06D 10 GW 101	1/19/13	8:35	X					A	3	VOA 6	H	
	-2	TT MW06D 11 GW 111	1/19/13	11:35	X					A	3	VOA 6		
	-3	TT MW06D 12 GW 121	1/19/13	15:30	X					A	3	VOA 6		

■ TAT starts 8AM the following day if samples received after 3 PM

TAT: ☒ A = Overnight ≤ 24 hrs ☐ B = Emergency Next Workday ☐ C = Critical 2 Workdays ☐ D = Urgent 3 Workdays ☐ E = Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives:
H=HCl N=HNO_3 S=H_2SO_4 C=4°C
Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

Advanced Technology Laboratories, Inc.

Please review the checklist below. Any NO signifies non-compliance. Any non-compliance will be noted and must be understood as having an impact on the quality of the data. All tests will be performed as requested regardless of any compliance issues.

If you have any questions or further instruction, please contact our Project Coordinator at (702) 307-2659.

Cooler Received/Opened On:	1/19/2013	Workorder:	N009411
Rep sample Temp (Deg C):	5.2	IR Gun ID:	1
Temp Blank:	☐ Yes ☑ No		
Carrier name:	ATL		
Last 4 digits of Tracking No.:	NA	Packing Material Used:	None
Cooling process:	☐ Ice ☑ Ice Pack ☐ Dry Ice ☐ Other ☐ None		

Sample Receipt Checklist

1. Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
2. Custody seals intact, signed, dated on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
3. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
4. Chain of custody present?	Yes ☑	No ☐	
5. Sampler's name present in COC?	Yes ☑	No ☐	
6. Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
7. Chain of custody agrees with sample labels?	Yes ☑	No ☐	
8. Samples in proper container/bottle?	Yes ☑	No ☐	
9. Sample containers intact?	Yes ☑	No ☐	
10. Sufficient sample volume for indicated test?	Yes ☑	No ☐	
11. All samples received within holding time?	Yes ☑	No ☐	
12. Temperature of rep sample or Temp Blank within acceptable limit?	Yes ☑	No ☐	NA ☐
13. Water - VOA vials have zero headspace?	Yes ☑	No ☐	NA ☐
14. Water - pH acceptable upon receipt? Example: pH > 12 for (CN,S); pH<2 for Metals	Yes ☐	No ☐	NA ☑
15. Did the bottle labels indicate correct preservatives used?	Yes ☑	No ☐	NA ☐
16. Were there Non-Conformance issues at login?	Yes ☐	No ☐	NA ☑
Was Client notified?	Yes ☐	No ☐	NA ☑

Comments:

Checklist Completed B MBC 1/21/13

Reviewed By: 1/22/13

January 29, 2013

Rob Manriquez
Tetra Tech
1230 Columbia Street, Suite 1000
San Diego, CA 92101
TEL: (858) 527-8803
FAX:

CA-ELAP No.:2676
NV Cert. No.:NV-009222007A

Workorder No.: N009420

RE: Maryland Square Shopping Center, 103P172828

Attention: Rob Manriquez

Enclosed are the results for sample(s) received on January 22, 2013 by Advanced Technology Laboratories, Inc. . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (702) 307-2659 if I can be of further assistance to your company.

Sincerely,

for Jose Tenorio Jr.
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories - Las Vegas.

CLIENT: Tetra Tech
Project: Maryland Square Shopping Center, 103P172828.
Lab Order: N009420

CASE NARRATIVE

SAMPLE RECEIVING/GENERAL COMMENTS:

Samples were received intact with proper chain of custody documentation.

Cooler temperature and sample preservation were verified upon receipt of samples if applicable.

Information on sample receipt conditions including discrepancies can be found in attached Sample Receipt Checklist Form.

Samples were analyzed within method holding time.

Analytical Comments for EPA 8260B:

Surrogate Dibromofluoromethane recovery was below the laboratory acceptable limit for sample N009420-001. Reanalysis confirms low recovery caused by matrix effect.

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Client Sample ID: MSSC#15
Lab Order: N009420
Collection Date: 1/21/2103 3:40:00 PM
Project: Maryland Square Shopping Center, 103P172828.
Matrix: SOIL
Lab ID: N009420-001

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130123A	QC Batch: D13VS004			PrepDate:		Analyst: **QBM**
cis-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/23/2013 04:55 PM
Tetrachloroethene	ND	5.0		µg/Kg	1	1/23/2013 04:55 PM
trans-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/23/2013 04:55 PM
Trichloroethene	ND	5.0		µg/Kg	1	1/23/2013 04:55 PM
Vinyl chloride	ND	5.0		µg/Kg	1	1/23/2013 04:55 PM
Surr: 1,2-Dichloroethane-d4	111	58-125		%REC	1	1/23/2013 04:55 PM
Surr: 4-Bromofluorobenzene	102	52-138		%REC	1	1/23/2013 04:55 PM
Surr: Dibromofluoromethane	14.8	57-121	S	%REC	1	1/23/2013 04:55 PM
Surr: Toluene-d8	98.6	66-130		%REC	1	1/23/2013 04:55 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

Advanced Technology Laboratories, Inc.

3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT:	Tetra Tech	**Client Sample ID:**	MSSC#22
Lab Order:	N009420	**Collection Date:**	1/19/2103 4:20:00 PM
Project:	Maryland Square Shopping Center, 103P172828.	**Matrix:**	SOIL
Lab ID:	N009420-002		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
			EPA 8260B			
RunID: MS1_130123A	QC Batch: D13VS004			PrepDate:		Analyst: **QBM**
cis-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/23/2013 11:49 AM
Tetrachloroethene	ND	5.0		µg/Kg	1	1/23/2013 11:49 AM
trans-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/23/2013 11:49 AM
Trichloroethene	ND	5.0		µg/Kg	1	1/23/2013 11:49 AM
Vinyl chloride	ND	5.0		µg/Kg	1	1/23/2013 11:49 AM
Surr: 1,2-Dichloroethane-d4	98.9	58-125		%REC	1	1/23/2013 11:49 AM
Surr: 4-Bromofluorobenzene	105	52-138		%REC	1	1/23/2013 11:49 AM
Surr: Dibromofluoromethane	95.2	57-121		%REC	1	1/23/2013 11:49 AM
Surr: Toluene-d8	97.9	66-130		%REC	1	1/23/2013 11:49 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Lab Order: N009420
Project: Maryland Square Shopping Center, 103P172828.
Lab ID: N009420-003

Client Sample ID: MSSC#24
Collection Date: 1/21/2103 12:20:00 PM
Matrix: SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130123A	QC Batch: D13VS004			PrepDate:		Analyst: **QBM**
cis-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/23/2013 02:06 PM
Tetrachloroethene	15	5.0		µg/Kg	1	1/23/2013 02:06 PM
trans-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/23/2013 02:06 PM
Trichloroethene	ND	5.0		µg/Kg	1	1/23/2013 02:06 PM
Vinyl chloride	ND	5.0		µg/Kg	1	1/23/2013 02:06 PM
Surr: 1,2-Dichloroethane-d4	108	58-125		%REC	1	1/23/2013 02:06 PM
Surr: 4-Bromofluorobenzene	100	52-138		%REC	1	1/23/2013 02:06 PM
Surr: Dibromofluoromethane	101	57-121		%REC	1	1/23/2013 02:06 PM
Surr: Toluene-d8	95.3	66-130		%REC	1	1/23/2013 02:06 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N009420
Project: Maryland Square Shopping Center, 103P172828.
Lab ID: N009420-004

Client Sample ID: MSSC#23
Collection Date: 1/21/2103 12:00:00 PM
Matrix: SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130123A	QC Batch: D13VS004			PrepDate:		Analyst: **QBM**
cis-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/23/2013 02:29 PM
Tetrachloroethene	17	5.0		µg/Kg	1	1/23/2013 02:29 PM
trans-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/23/2013 02:29 PM
Trichloroethene	ND	5.0		µg/Kg	1	1/23/2013 02:29 PM
Vinyl chloride	ND	5.0		µg/Kg	1	1/23/2013 02:29 PM
Surr: 1,2-Dichloroethane-d4	119	58-125		%REC	1	1/23/2013 02:29 PM
Surr: 4-Bromofluorobenzene	103	52-138		%REC	1	1/23/2013 02:29 PM
Surr: Dibromofluoromethane	108	57-121		%REC	1	1/23/2013 02:29 PM
Surr: Toluene-d8	98.7	66-130		%REC	1	1/23/2013 02:29 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Lab Order: N009420
Project: Maryland Square Shopping Center, 103P172828.
Lab ID: N009420-005

Client Sample ID: MSSC#21
Collection Date: 1/19/2103 4:20:00 PM
Matrix: SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130123A	QC Batch: D13VS004			PrepDate:		Analyst: **QBM**
cis-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/23/2013 02:52 PM
Tetrachloroethene	13	5.0		µg/Kg	1	1/23/2013 02:52 PM
trans-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/23/2013 02:52 PM
Trichloroethene	ND	5.0		µg/Kg	1	1/23/2013 02:52 PM
Vinyl chloride	ND	5.0		µg/Kg	1	1/23/2013 02:52 PM
Surr: 1,2-Dichloroethane-d4	84.4	58-125		%REC	1	1/23/2013 02:52 PM
Surr: 4-Bromofluorobenzene	91.7	52-138		%REC	1	1/23/2013 02:52 PM
Surr: Dibromofluoromethane	82.6	57-121		%REC	1	1/23/2013 02:52 PM
Surr: Toluene-d8	91.6	66-130		%REC	1	1/23/2013 02:52 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Work Order: N009420
Project: Maryland Square Shopping Center, 103P172828

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID: **D130123LCS** SampType: **LCS** TestCode: **8260_S** Units: **µg/Kg** Prep Date: RunNo: **87310**
Client ID: **LCSS** Batch ID: **D13VS004** TestNo: **EPA 8260B** Analysis Date: **1/23/2013** SeqNo: **1513734**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	39.190	5.0	40.00	0	98.0	80	120				
Tetrachloroethene	36.430	5.0	40.00	0	91.1	80	122				
trans-1,2-Dichloroethene	37.720	5.0	40.00	0	94.3	79	120				
Trichloroethene	37.810	5.0	40.00	0	94.5	80	120				
Vinyl chloride	38.080	5.0	40.00	0	95.2	75	122				
Surr: 1,2-Dichloroethane-d4	50.910		50.00		102	58	125				
Surr: 4-Bromofluorobenzene	51.240		50.00		102	52	138				
Surr: Dibromofluoromethane	49.870		50.00		99.7	57	121				
Surr: Toluene-d8	48.260		50.00		96.5	66	130				

Sample ID: **D130123MB2** SampType: **MBLK** TestCode: **8260_S** Units: **µg/Kg** Prep Date: RunNo: **87310**
Client ID: **PBS** Batch ID: **D13VS004** TestNo: **EPA 8260B** Analysis Date: **1/23/2013** SeqNo: **1513735**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	ND	5.0									
Tetrachloroethene	ND	5.0									
trans-1,2-Dichloroethene	ND	5.0									
Trichloroethene	ND	5.0									
Vinyl chloride	ND	5.0									
Surr: 1,2-Dichloroethane-d4	44.470		50.00		88.9	58	125				
Surr: 4-Bromofluorobenzene	47.780		50.00		95.6	52	138				
Surr: Dibromofluoromethane	43.000		50.00		86.0	57	121				
Surr: Toluene-d8	46.850		50.00		93.7	66	130				

Sample ID: **N009420-002AMS** SampType: **MS** TestCode: **8260_S** Units: **µg/Kg** Prep Date: RunNo: **87310**
Client ID: **ZZZZZZ** Batch ID: **D13VS004** TestNo: **EPA 8260B** Analysis Date: **1/23/2013** SeqNo: **1513747**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits
- Calculations are based on raw values
- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009420
Project: Maryland Square Shopping Center, 103P172828

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID: **N009420-002AMS** SampType: **MS** TestCode: **8260_S** Units: **µg/Kg** Prep Date: RunNo: **87310**
Client ID: **ZZZZZZ** Batch ID: **D13VS004** TestNo: **EPA 8260B** Analysis Date: **1/23/2013** SeqNo: **1513747**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	36.280	5.0	40.00	0	90.7	70	126				
Tetrachloroethene	32.570	5.0	40.00	0	81.4	0	192				
trans-1,2-Dichloroethene	34.950	5.0	40.00	0	87.4	68	125				
Trichloroethene	35.080	5.0	40.00	0	87.7	64	125				
Vinyl chloride	33.660	5.0	40.00	0	84.2	67	126				
Surr: 1,2-Dichloroethane-d4	50.230		50.00		100	58	125				
Surr: 4-Bromofluorobenzene	52.030		50.00		104	52	138				
Surr: Dibromofluoromethane	49.130		50.00		98.3	57	121				
Surr: Toluene-d8	47.120		50.00		94.2	66	130				

Sample ID: **N009420-002AMSD** SampType: **MSD** TestCode: **8260_S** Units: **µg/Kg** Prep Date: RunNo: **87310**
Client ID: **ZZZZZZ** Batch ID: **D13VS004** TestNo: **EPA 8260B** Analysis Date: **1/23/2013** SeqNo: **1513748**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	40.330	5.0	40.00	0	101	70	126	36.28	10.6	20	
Tetrachloroethene	34.700	5.0	40.00	0	86.8	0	192	32.57	6.33	20	
trans-1,2-Dichloroethene	37.430	5.0	40.00	0	93.6	68	125	34.95	6.85	20	
Trichloroethene	38.370	5.0	40.00	0	95.9	64	125	35.08	8.96	20	
Vinyl chloride	36.970	5.0	40.00	0	92.4	67	126	33.66	9.37	20	
Surr: 1,2-Dichloroethane-d4	50.570		50.00		101	58	125		0		
Surr: 4-Bromofluorobenzene	49.830		50.00		99.7	52	138		0		
Surr: Dibromofluoromethane	48.730		50.00		97.5	57	121		0		
Surr: Toluene-d8	46.090		50.00		92.2	66	130		0		

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories INC.
3151-3153 W. Post Rd.
Las Vegas, NV 89118
Tel: (702) 307-2659 • Fax: (702) 307-2691

FOR LABORATORY USE ONLY

P.O. #: 103P172824.01
Logged By: Geoff Richards Date: 1/22/13

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FedEx ☐ Other: ____

Sample Condition Upon Receipt
1. CHILLED 3.2°C (1 pt) Y ☒ N ☐ 4. SEALED Y ☐ N ☐
2. HEADSPACE (VOA) Y ☐ N ☐ 5. # OF SPLS MATCH COC Y ☐ N ☐
3. CONTAINER INTAC Y ☐ N ☐ 6. PRESERVED Y ☐ N ☐

Client: Tetra Tech EM Inc. | Address: 1230 Columbia St, Ste 1000 | Tel: 619-321-6748
Attention: Rob Manriquez | City: San Diego State: CA Zip Code: 92101 | Fax: 619-525-7186

Project Name: Maryland Square Shopping Center | Project #: 103P172828.01

Sampler: *I attest to the validity and authenticity of this sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action.* (Printed Name) Geoff Richards (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Geoff Richards	1/22/13	1025		1/22/13	10:25
	1/22/13	1053		1/22/13	1053

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
Print Name Date
Signature

Send Report To:
Attn: Rob Manriquez
Co: Tetra Tech EM Inc.
Addr: 1230 Columbia St, Ste 1000
City: San Diego State: CA Zip: 92101

Bill To:
Attn: same
Co: same
Addr: same
City: State: Zip:

Special Instructions/Comments:
e-mail when results are ready;
becki.dano@tetratech.com
vladimir.prilepin@tetratech.com

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
Sample :$2.00 / sample /mo (after 45 days)
Records: $1 /ATL workorder /mo (after 1 year)

Circle or Add Analysis(es) Requested: 8260B (VOCs) PCE,TCE,cisDCE,V

SPECIFY APPROPRIATE MATRIX: SOIL | WATER | GROUND WATER | WASTEWATER

PRESERVATION

QA/QC: RTNE ☐ CT ☐ SWRCB ☐ Logcode ____ OTHER ____

ITEM	LAB USE ONLY: Lab No.	Sample Description: Sample ID / Location	Date	Time	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	N00R420-1	MSSC #15	1/21/13	1540	E	1	J	H	
	-2	MSSC #22	1/19/13	1620	E				
	-3	MSSC #24	1/21/13	1220					
	-4	MSSC #23	1/21/13	1200					
	-5	MSSC #21	1/19/13	1620					

■ TAT starts 8AM the following day if samples received after 3 PM

TAT: ☐ A = Overnight ≤ 24 hrs ☐ B = Emergency Next Workday ☐ C = Critical 2 Workdays ☐ D = Urgent 3 Workdays ☐ E = Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl $N=HNO_3$ $S=H_2SO_4$ C=4°C $Z=Zn(AC)_2$ O=NaOH $T=Na_2S_2O_3$

Advanced Technology Laboratories, Inc.

Please review the checklist below. Any NO signifies non-compliance. Any non-compliance will be noted and must be understood as having an impact on the quality of the data. All tests will be performed as requested regardless of any compliance issues.

If you have any questions or further instruction, please contact our Project Coordinator at (702) 307-2659.

Cooler Received/Opened On:	1/22/2013	Workorder:	N009420
Rep sample Temp (Deg C):	3.2	IR Gun ID:	1
Temp Blank:	☐ Yes ☑ No		
Carrier name:	ATL		
Last 4 digits of Tracking No.:	NA	Packing Material Used:	None
Cooling process:	☑ Ice ☐ Ice Pack ☐ Dry Ice ☐ Other ☐ None		

Sample Receipt Checklist

1. Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
2. Custody seals intact, signed, dated on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
3. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
4. Chain of custody present?	Yes ☑	No ☐	
5. Sampler's name present in COC?	Yes ☑	No ☐	
6. Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
7. Chain of custody agrees with sample labels?	Yes ☑	No ☐	
8. Samples in proper container/bottle?	Yes ☑	No ☐	
9. Sample containers intact?	Yes ☑	No ☐	
10. Sufficient sample volume for indicated test?	Yes ☑	No ☐	
11. All samples received within holding time?	Yes ☑	No ☐	
12. Temperature of rep sample or Temp Blank within acceptable limit?	Yes ☑	No ☐	NA ☐
13. Water - VOA vials have zero headspace?	Yes ☐	No ☐	NA ☑
14. Water - pH acceptable upon receipt? Example: pH > 12 for (CN,S); pH<2 for Metals	Yes ☐	No ☐	NA ☑
15. Did the bottle labels indicate correct preservatives used?	Yes ☐	No ☐	NA ☑
16. Were there Non-Conformance issues at login?	Yes ☐	No ☐	NA ☑
Was Client notified?	Yes ☐	No ☐	NA ☑

Comments:

Checklist Completed B MBC 1/22/13

Reviewed By:

February 07, 2013

Rob Manriquez
Tetra Tech
1230 Columbia Street, Suite 1000
San Diego, CA 92101

TEL: (858) 527-8803
FAX:

CA-ELAP No.:2676
NV Cert. No.:NV-009222007A

Workorder No.: N009492

RE: Maryland Square

Attention: Rob Manriquez

Enclosed are the results for sample(s) received on January 30, 2013 by Advanced Technology Laboratories, Inc. . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (702) 307-2659 if I can be of further assistance to your company.

Sincerely,

for Jose Tenorio Jr.
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories - Las Vegas.

CLIENT: Tetra Tech
Project: Maryland Square
Lab Order: N009492

CASE NARRATIVE

SAMPLE RECEIVING/GENERAL COMMENTS:

Samples were received intact with proper chain of custody documentation.

Cooler temperature and sample preservation were verified upon receipt of samples if applicable.

Information on sample receipt conditions including discrepancies can be found in attached Sample Receipt Checklist Form.

Samples were analyzed within method holding time.

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

Advanced Technology Laboratories, Inc.

ANALYTICAL RESULTS

Print Date: *07-Feb-13*

CLIENT:	Tetra Tech	**Client Sample ID:**	012913-GW
Lab Order:	N009492	**Collection Date:**	1/29/2013 12:00:00 PM
Project:	Maryland Square	**Matrix:**	WATER
Lab ID:	N009492-001		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS5_130131A	QC Batch: P13VW019			PrepDate:		Analyst: **QBM**
Tetrachloroethene	62	0.50		µg/L	1	1/31/2013 01:39 PM
Trichloroethene	ND	0.50		µg/L	1	1/31/2013 01:39 PM
Surr: 1,2-Dichloroethane-d4	98.0	56-120		%REC	1	1/31/2013 01:39 PM
Surr: 4-Bromofluorobenzene	101	80-120		%REC	1	1/31/2013 01:39 PM
Surr: Dibromofluoromethane	103	72-120		%REC	1	1/31/2013 01:39 PM
Surr: Toluene-d8	100	80-123		%REC	1	1/31/2013 01:39 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories, Inc.

3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009492
Project: Maryland Square

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130131LCS1** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87443**
Client ID: **LCSW** Batch ID: **P13VW019** TestNo: **EPA 8260B** Analysis Date: **1/31/2013** SeqNo: **1518136**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Tetrachloroethene	18.900	0.50	20.00	0	94.5	80	121				
Trichloroethene	18.250	0.50	20.00	0	91.2	80	120				
Surr: 1,2-Dichloroethane-d4	24.880		25.00		99.5	56	120				
Surr: 4-Bromofluorobenzene	25.690		25.00		103	80	120				
Surr: Dibromofluoromethane	25.120		25.00		100	72	120				
Surr: Toluene-d8	25.270		25.00		101	80	123				

Sample ID: **P130131LCSD** SampType: **LCSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87443**
Client ID: **LCSS02** Batch ID: **P13VW019** TestNo: **EPA 8260B** Analysis Date: **1/31/2013** SeqNo: **1518137**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Tetrachloroethene	19.360	0.50	20.00	0	96.8	80	121	18.90	2.40	20	
Trichloroethene	18.730	0.50	20.00	0	93.6	80	120	18.25	2.60	20	
Surr: 1,2-Dichloroethane-d4	24.470		25.00		97.9	56	120		0		
Surr: 4-Bromofluorobenzene	25.480		25.00		102	80	120		0		
Surr: Dibromofluoromethane	24.580		25.00		98.3	72	120		0		
Surr: Toluene-d8	25.410		25.00		102	80	123		0		

Sample ID: **P130131MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **87443**
Client ID: **PBW** Batch ID: **P13VW019** TestNo: **EPA 8260B** Analysis Date: **1/31/2013** SeqNo: **1518138**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Tetrachloroethene	ND	0.50									
Trichloroethene	ND	0.50									
Surr: 1,2-Dichloroethane-d4	24.750		25.00		99.0	56	120				
Surr: 4-Bromofluorobenzene	24.980		25.00		99.9	80	120				
Surr: Dibromofluoromethane	24.970		25.00		99.9	72	120				
Surr: Toluene-d8	25.200		25.00		101	80	123				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc. *3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691*

CHAIN OF CUSTODY RECORD - PLEASE COMPLETE ALL SHADED AREAS

Page 1 of 1

ADVANCED TECHNOLOGY LABORATORIES
3275 Walnut Ave., Signal Hill, CA 90755
Tel: (562) 989-4045 • Fax: (562) 989-4040

P.O. #: 103017282-8 Quote #:

As the authorized agent of the below named company, I hereby purchase testing services from ATL as dictated below and guarrantee payment in full.

Submitter (Print): BECKI DIANO

Signature:

Submitter - Please complete all SHADED areas and include QUOTE # above to ensure proper invoicing.

Method of Transport
☐ Client ☐ ATL
☐ FedEx ☐ OnTrac
☐ GSO
☐ Other:

FOR LABORATORY USE ONLY

Sample Condition Upon Receipt
1. CHILLED 0.6°C ICE (8#) Y ☐ N ☐
2. HEADSPACE (VOA) Y ☐ N ☐
3. CONTAINER INTACT Y ☐ N ☐
4. SEALED Y ☐ N ☐
5. # OF SPLS MATCH COC Y ☐ N ☐
6. PRESERVED Y ☐ N ☐

Client: Tetra Tech / Rob Manriquez
Address: 1230 Columbia Street #1000
Tel: 619 525 7188
City: San Diego State: CA Zip Code: 92101
Fax:
Project Name: Maryland Square Project #:
Sampler: Becki Diano (Signature)

Relinquished by: (Signature and Printed Name) Date: 1-30-13 Time: 1312
Received by: (Signature and Printed Name) Date: 1/30/13 Time: 1312

Relinquished by: (Signature and Printed Name) Date: Time:
Received by: (Signature and Printed Name) Date: Time:

Relinquished by: (Signature and Printed Name) Date: Time:
Received by: (Signature and Printed Name) Date: Time:

Bill To:
Attn: Rob Manriquez Email: Rob.Manriquez@tetratech.com
Company: Tetra Tech
Address: 1230 Columbia St #1000
City: San Diego State: CA ZIP: 92101

Send Report to:
Same Email:
Company: ←
Address:
City: State: ZIP

Special Instructions/Comments:
email results when ready to
becki.diano@tetratech.com

Samples and Records - Archival & Disposal
Unless otherwise requested by client, all samples and Hard copy records will be disposed Forty-five (45) days after generation of report - electronic copies retained for five (5) years.

Storage Fees (applies when storage is requested):
- Samples: Forty-five (45) Days Complimentary - $2.00 / sample /mo thereafter.
- Hardcopy Reports $17.50 per report.

CIRCLE or Write IN Analyses

CIRCLE APPROPRIATE MATRIX

ITEM	BUSINESS HOURS 8:30 AM TO 5:30 PM Lab No.	Sample ID / Location	Date	Time	8260 - 624 (Volatiles) PCB TCLP	8015B (GRO) / 8021 (BTEX)	TO-15 / TO-14 / TO-3 / RSK-175	8270B - 625 (BNA) / 8310 (PAHs)	8015B (DRO) / 8015B (HC/D)	8081 OrgCl / 8141 OrgPO4 Pest	8082 PCBs	6010B - 200.7 CAM Metals	6010B - 200.7 Metals	6020 - 200.8 - 1640 Metals	7199 - 218.6 (Hex. Chromium)	300 (Anions) / 314 (Perchlorate)	SOIL / SEDIMENT / SLUDGE	SOLIDS / WIPES / FILTERS	WATER - DRINKING / GROUND	WATER - STORM / WASTE	AQUEOUS / LAYERED - OIL	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
1	N009492-1	B12913-GW	1-29-13	1200	X													X					5	3	V	G	HCl
2																											
3																											
4																											
5																											
6																											
7																											
8																											
9																											
10																											

QA/QC
RTNE ☐
CT ☐
Legal ☐
SWRCB ☐ Logcode
OTHER

- Samples Submitted AFTER 3:30 PM, are considered received the following business day at 8:30 AM.

WEEKEND, HOLIDAY, OFF HOURS WORK - ASK for QUOTE

Container Types: 1=Tube; 2=VOA; 3=Liter; 4=Pint; 5=Jar; 6=Tedlar; 7 = Canister

Material: 1=Glass; 2=Plastic; 3=Metal

Preservatives: 1=HCl; 2=HNO3; 3=H2SO4; 4 = 4C; 5=Zn ((Ac)2; 6=NaOH; 7=NA2S2O3

FOR RUSH TCLP / STLC, ADD 2 DAYS TO RESPECTIVE TAT.

Subcon. TAT is 10 - 15 business days; Dioxin and Furans 21 business days.

TAT 0	TAT 1	TAT 2	TAT 3	TAT 4	TAT 5	TAT 10
☐ 300% SURCHARGE SAME BUSINESS DAY IF RCV'D BY 9:00 AM	☐ 100% SURCHARGE NEXT BUSINESS DAY 5:30 PM	☐ 50% SURCHARGE 2ND BUSINESS DAY 5:30 PM	☐ 30% SURCHARGE 3RD BUSINESS DAY 5:30 PM	☐ 20% SURCHARGE 4TH BUSINESS DAY 5:30 PM	☒ NO SURCHARGE 5 -7 BUSINESS DAYS 5:30 PM	☐ 10% DISCOUNT 10th BUSINESS DAY 5:30 PM

Rev. 2010-0325

Advanced Technology Laboratories, Inc.

Please review the checklist below. Any NO signifies non-compliance. Any non-compliance will be noted and must be understood as having an impact on the quality of the data. All tests will be performed as requested regardless of any compliance issues.

If you have any questions or further instruction, please contact our Project Coordinator at (702) 307-2659.

Cooler Received/Opened On:	1/30/2013	Workorder:	N009492
Rep sample Temp (Deg C):	0.6	IR Gun ID:	1
Temp Blank:	☐ Yes ☑ No		
Carrier name:	ATL		
Last 4 digits of Tracking No.:	NA	Packing Material Used:	None
Cooling process:	☑ Ice ☐ Ice Pack ☐ Dry Ice ☐ Other ☐ None		

Sample Receipt Checklist

1. Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
2. Custody seals intact, signed, dated on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
3. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
4. Chain of custody present?	Yes ☑	No ☐	
5. Sampler's name present in COC?	Yes ☑	No ☐	
6. Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
7. Chain of custody agrees with sample labels?	Yes ☑	No ☐	
8. Samples in proper container/bottle?	Yes ☑	No ☐	
9. Sample containers intact?	Yes ☑	No ☐	
10. Sufficient sample volume for indicated test?	Yes ☑	No ☐	
11. All samples received within holding time?	Yes ☑	No ☐	
12. Temperature of rep sample or Temp Blank within acceptable limit?	Yes ☑	No ☐	NA ☐
13. Water - VOA vials have zero headspace?	Yes ☑	No ☐	NA ☐
14. Water - pH acceptable upon receipt? Example: pH > 12 for (CN,S); pH<2 for Metals	Yes ☑	No ☐	NA ☐
15. Did the bottle labels indicate correct preservatives used?	Yes ☑	No ☐	NA ☐
16. Were there Non-Conformance issues at login?	Yes ☐	No ☐	NA ☑
Was Client notified?	Yes ☐	No ☐	NA ☑

Comments:

Checklist Completed B MBC 1/31/13 Reviewed By:

August 01, 2012

Rob Manriquez
Tetra Tech
1771 East Flamingo Rd, Suite A113
Las Vegas, NV 89119

TEL: (702) 383- 6737
FAX: (702) 838-5476

CA-ELAP No.:2676
NV Cert. No.:NV-009222007A

Workorder No.: N008213

RE: Maryland Square, 103P172824.01

Attention: Rob Manriquez

Enclosed are the results for sample(s) received on July 27, 2012 by Advanced Technology Laboratories, Inc. . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (702) 307-2659 if I can be of further assistance to your company.

Sincerely,

for Jose Tenorio Jr.
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories - Las Vegas.

CASE NARRATIVE

SAMPLE RECEIVING/GENERAL COMMENTS:

Samples were received intact with proper chain of custody documentation.

Cooler temperature and sample preservation were verified upon receipt of samples if applicable.

Information on sample receipt conditions including discrepancies can be found in attached Sample Receipt Checklist Form.

Samples were analyzed within method holding time.

Analytical Comments for EPA 8260B_ Soil:

Surrogate 1,2-Dichloroethane-d4 for the Matrix Spike Duplicate (N008213-001AMSD) was above recovery limit possibly due to matrix interference. The other surrogates were recovered within control limit.

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT:	Tetra Tech	**Client Sample ID:**	MW40 #1
Lab Order:	N008213	**Collection Date:**	7/23/2012 2:58:00 PM
Project:	Maryland Square, 103P172824.01	**Matrix:**	SOIL
Lab ID:	N008213-001		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS1_120730A	QC Batch: D12VS042			PrepDate:		Analyst: **KAB**
Tetrachloroethene	ND	5.0		µg/Kg	1	7/30/2012 01:32 PM
Surr: 1,2-Dichloroethane-d4	92.7	58-125		%REC	1	7/30/2012 01:32 PM
Surr: 4-Bromofluorobenzene	94.5	52-138		%REC	1	7/30/2012 01:32 PM
Surr: Dibromofluoromethane	96.4	57-121		%REC	1	7/30/2012 01:32 PM
Surr: Toluene-d8	100	66-130		%REC	1	7/30/2012 01:32 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Tetra Tech	**Client Sample ID:**	EW2 Decon
Lab Order:	N008213	**Collection Date:**	7/22/2012 3:03:00 PM
Project:	Maryland Square, 103P172824.01	**Matrix:**	WATER
Lab ID:	N008213-002		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_120727A	QC Batch: P12VW065			PrepDate:		Analyst: **QBM**
Tetrachloroethene	1.0	0.50		µg/L	1	7/27/2012 03:46 PM
Surr: 1,2-Dichloroethane-d4	96.7	56-120		%REC	1	7/27/2012 03:46 PM
Surr: 4-Bromofluorobenzene	98.7	80-120		%REC	1	7/27/2012 03:46 PM
Surr: Dibromofluoromethane	92.5	72-120		%REC	1	7/27/2012 03:46 PM
Surr: Toluene-d8	100	80-123		%REC	1	7/27/2012 03:46 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	MW40 #2
Lab Order:	N008213	**Collection Date:**	7/24/2012 9:45:00 AM
Project:	Maryland Square, 103P172824.01	**Matrix:**	SOIL
Lab ID:	N008213-003		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS1_120730A	QC Batch: D12VS042			PrepDate:		Analyst: **KAB**
Tetrachloroethene	12	5.0		µg/Kg	1	7/30/2012 01:55 PM
Surr: 1,2-Dichloroethane-d4	90.2	58-125		%REC	1	7/30/2012 01:55 PM
Surr: 4-Bromofluorobenzene	98.1	52-138		%REC	1	7/30/2012 01:55 PM
Surr: Dibromofluoromethane	92.2	57-121		%REC	1	7/30/2012 01:55 PM
Surr: Toluene-d8	100	66-130		%REC	1	7/30/2012 01:55 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	MW40 Decon
Lab Order:	N008213	**Collection Date:**	7/24/2012 3:45:00 PM
Project:	Maryland Square, 103P172824.01	**Matrix:**	WATER
Lab ID:	N008213-004		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_120727A	QC Batch: P12VW065			PrepDate:		Analyst: **QBM**
Tetrachloroethene	ND	0.50		µg/L	1	7/27/2012 04:13 PM
Surr: 1,2-Dichloroethane-d4	101	56-120		%REC	1	7/27/2012 04:13 PM
Surr: 4-Bromofluorobenzene	97.3	80-120		%REC	1	7/27/2012 04:13 PM
Surr: Dibromofluoromethane	94.8	72-120		%REC	1	7/27/2012 04:13 PM
Surr: Toluene-d8	101	80-123		%REC	1	7/27/2012 04:13 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Tetra Tech	**Client Sample ID:**	EW1 #1
Lab Order:	N008213	**Collection Date:**	7/26/2012 2:09:00 AM
Project:	Maryland Square, 103P172824.01	**Matrix:**	SOIL
Lab ID:	N008213-005		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS1_120730A	QC Batch: D12VS042			PrepDate:		Analyst: **KAB**
Tetrachloroethene	ND	5.0		µg/Kg	1	7/30/2012 02:19 PM
Surr: 1,2-Dichloroethane-d4	101	58-125		%REC	1	7/30/2012 02:19 PM
Surr: 4-Bromofluorobenzene	94.1	52-138		%REC	1	7/30/2012 02:19 PM
Surr: Dibromofluoromethane	102	57-121		%REC	1	7/30/2012 02:19 PM
Surr: Toluene-d8	100	66-130		%REC	1	7/30/2012 02:19 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Tetra Tech	**Client Sample ID:**	EW1 #2
Lab Order:	N008213	**Collection Date:**	7/26/2012 6:45:00 AM
Project:	Maryland Square, 103P172824.01	**Matrix:**	SOIL
Lab ID:	N008213-006		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS1_120730A	QC Batch: D12VS042			PrepDate:		Analyst: **KAB**
Tetrachloroethene	ND	5.0		µg/Kg	1	7/30/2012 02:42 PM
Surr: 1,2-Dichloroethane-d4	98.4	58-125		%REC	1	7/30/2012 02:42 PM
Surr: 4-Bromofluorobenzene	95.9	52-138		%REC	1	7/30/2012 02:42 PM
Surr: Dibromofluoromethane	96.8	57-121		%REC	1	7/30/2012 02:42 PM
Surr: Toluene-d8	101	66-130		%REC	1	7/30/2012 02:42 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	EW1 #3
Lab Order:	N008213	**Collection Date:**	7/26/2012 7:35:00 AM
Project:	Maryland Square, 103P172824.01	**Matrix:**	SOIL
Lab ID:	N008213-007		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_120731A	QC Batch: D12VS043			PrepDate:		Analyst: **KAB**
Tetrachloroethene	260	250		µg/Kg	50	7/31/2012 10:35 AM
Surr: 1,2-Dichloroethane-d4	100	58-125		%REC	50	7/31/2012 10:35 AM
Surr: 4-Bromofluorobenzene	105	52-138		%REC	50	7/31/2012 10:35 AM
Surr: Dibromofluoromethane	102	57-121		%REC	50	7/31/2012 10:35 AM
Surr: Toluene-d8	114	66-130		%REC	50	7/31/2012 10:35 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Tetra Tech	**Client Sample ID:**	EW2 Develop
Lab Order:	N008213	**Collection Date:**	7/27/2012 1:55:00 AM
Project:	Maryland Square, 103P172824.01	**Matrix:**	GROUNDWATER
Lab ID:	N008213-008		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_120731A	QC Batch: P12VW067			PrepDate:		Analyst: **QBM**
Tetrachloroethene	410	5.0		µg/L	10	7/31/2012 03:51 PM
Surr: 1,2-Dichloroethane-d4	106	56-120		%REC	10	7/31/2012 03:51 PM
Surr: 1,2-Dichloroethane-d4	98.7	56-120		%REC	1	7/30/2012 06:55 PM
Surr: 4-Bromofluorobenzene	98.2	80-120		%REC	10	7/31/2012 03:51 PM
Surr: 4-Bromofluorobenzene	99.1	80-120		%REC	1	7/30/2012 06:55 PM
Surr: Dibromofluoromethane	101	72-120		%REC	10	7/31/2012 03:51 PM
Surr: Dibromofluoromethane	96.8	72-120		%REC	1	7/30/2012 06:55 PM
Surr: Toluene-d8	103	80-123		%REC	10	7/31/2012 03:51 PM
Surr: Toluene-d8	100	80-123		%REC	1	7/30/2012 06:55 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Tetra Tech	**Client Sample ID:**	EW1 Decon
Lab Order:	N008213	**Collection Date:**	7/27/2012 2:55:00 AM
Project:	Maryland Square, 103P172824.01	**Matrix:**	WATER
Lab ID:	N008213-009		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_120727A	QC Batch: P12VW065			PrepDate:		Analyst: **QBM**
Tetrachloroethene	2.8	0.50		µg/L	1	7/27/2012 04:41 PM
Surr: 1,2-Dichloroethane-d4	96.6	56-120		%REC	1	7/27/2012 04:41 PM
Surr: 4-Bromofluorobenzene	96.8	80-120		%REC	1	7/27/2012 04:41 PM
Surr: Dibromofluoromethane	93.4	72-120		%REC	1	7/27/2012 04:41 PM
Surr: Toluene-d8	101	80-123		%REC	1	7/27/2012 04:41 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Work Order: N008213
Project: Maryland Square, 103P172824.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID: **D120730LCS** SampType: **LCS** TestCode: **8260_S** Units: **µg/Kg** Prep Date: RunNo: **84992**
Client ID: **LCSS** Batch ID: **D12VS042** TestNo: **EPA 8260B** Analysis Date: **7/30/2012** SeqNo: **1422279**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Tetrachloroethene	44.000	5.0	40.00	0	110	80	122				
Surr: 4-Bromofluorobenzene	48.150		50.00		96.3	52	138				
Surr: Dibromofluoromethane	53.100		50.00		106	57	121				
Surr: Toluene-d8	48.970		50.00		97.9	66	130				

Sample ID: **D120730MB2** SampType: **MBLK** TestCode: **8260_S** Units: **µg/Kg** Prep Date: RunNo: **84992**
Client ID: **PBS** Batch ID: **D12VS042** TestNo: **EPA 8260B** Analysis Date: **7/30/2012** SeqNo: **1422281**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Tetrachloroethene	ND	5.0									
Surr: 1,2-Dichloroethane-d4	45.940		50.00		91.9	58	125				
Surr: 4-Bromofluorobenzene	48.900		50.00		97.8	52	138				
Surr: Dibromofluoromethane	49.700		50.00		99.4	57	121				
Surr: Toluene-d8	52.610		50.00		105	66	130				

Sample ID: **N008213-001AMS** SampType: **MS** TestCode: **8260_S** Units: **µg/Kg** Prep Date: RunNo: **84992**
Client ID: **ZZZZZZ** Batch ID: **D12VS042** TestNo: **EPA 8260B** Analysis Date: **7/30/2012** SeqNo: **1422286**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Tetrachloroethene	41.580	5.0	40.00	1.930	99.1	0	192				
Surr: 1,2-Dichloroethane-d4	57.990		50.00		116	58	125				
Surr: 4-Bromofluorobenzene	48.680		50.00		97.4	52	138				
Surr: Dibromofluoromethane	54.200		50.00		108	57	121				
Surr: Toluene-d8	51.250		50.00		103	66	130				

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits
- Calculations are based on raw values
- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Tetra Tech
Work Order: N008213
Project: Maryland Square, 103P172824.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID: **N008213-001AMSD**	SampType: **MSD**	TestCode: **8260_S**	Units: **µg/Kg**	Prep Date:	RunNo: **84992**
Client ID: **ZZZZZZ**	Batch ID: **D12VS042**	TestNo: **EPA 8260B**		Analysis Date: **7/30/2012**	SeqNo: **1422287**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Tetrachloroethene	48.370	5.0	40.00	1.930	116	0	192	41.58	15.1	20	
Surr: 1,2-Dichloroethane-d4	63.390		50.00		127	58	125		0		S
Surr: 4-Bromofluorobenzene	51.220		50.00		102	52	138		0		
Surr: Dibromofluoromethane	56.580		50.00		113	57	121		0		
Surr: Toluene-d8	52.390		50.00		105	66	130		0		

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

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CLIENT: Tetra Tech
Work Order: N008213
Project: Maryland Square, 103P172824.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID: **D120731LCS**	SampType: **LCS**	TestCode: **8260_S**	Units: **µg/Kg**	Prep Date:	RunNo: **84996**
Client ID: **LCSS**	Batch ID: **D12VS043**	TestNo: **EPA 8260B**		Analysis Date: **7/31/2012**	SeqNo: **1422325**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Tetrachloroethene	45.350	5.0	40.00	0	113	80	122				
Surr: 1,2-Dichloroethane-d4	57.080		50.00		114	58	125				
Surr: 4-Bromofluorobenzene	47.870		50.00		95.7	52	138				
Surr: Dibromofluoromethane	53.590		50.00		107	57	121				
Surr: Toluene-d8	47.470		50.00		94.9	66	130				

Sample ID: **D120731LCSD**	SampType: **LCSD**	TestCode: **8260_S**	Units: **µg/Kg**	Prep Date:	RunNo: **84996**
Client ID: **LCSS02**	Batch ID: **D12VS043**	TestNo: **EPA 8260B**		Analysis Date: **7/31/2012**	SeqNo: **1422326**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Tetrachloroethene	43.080	5.0	40.00	0	108	80	122	45.35	5.13	20	
Surr: 1,2-Dichloroethane-d4	54.300		50.00		109	58	125		0		
Surr: 4-Bromofluorobenzene	47.380		50.00		94.8	52	138		0		
Surr: Dibromofluoromethane	50.380		50.00		101	57	121		0		
Surr: Toluene-d8	47.050		50.00		94.1	66	130		0		

Sample ID: **D120731MB2**	SampType: **MBLK**	TestCode: **8260_S**	Units: **µg/Kg**	Prep Date:	RunNo: **84996**
Client ID: **PBS**	Batch ID: **D12VS043**	TestNo: **EPA 8260B**		Analysis Date: **7/31/2012**	SeqNo: **1422327**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Tetrachloroethene	ND	5.0									
Surr: 1,2-Dichloroethane-d4	45.530		50.00		91.1	58	125				
Surr: 4-Bromofluorobenzene	48.590		50.00		97.2	52	138				
Surr: Dibromofluoromethane	48.420		50.00		96.8	57	121				
Surr: Toluene-d8	50.900		50.00		102	66	130				

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits
- Calculations are based on raw values
- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

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CLIENT: Tetra Tech
Work Order: N008213
Project: Maryland Square, 103P172824.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P120727LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **84942**
Client ID: **LCSW** Batch ID: **P12VW065** TestNo: **EPA 8260B** Analysis Date: **7/27/2012** SeqNo: **1420544**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Tetrachloroethene	19.020	0.50	20.00	0	95.1	80	121				
Surr: 1,2-Dichloroethane-d4	23.040		25.00		92.2	56	120				
Surr: 4-Bromofluorobenzene	26.180		25.00		105	80	120				
Surr: Dibromofluoromethane	21.560		25.00		86.2	72	120				
Surr: Toluene-d8	25.560		25.00		102	80	123				

Sample ID: **P120727LCSD** SampType: **LCSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **84942**
Client ID: **LCSS02** Batch ID: **P12VW065** TestNo: **EPA 8260B** Analysis Date: **7/27/2012** SeqNo: **1420545**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Tetrachloroethene	18.820	0.50	20.00	0	94.1	80	121	19.02	1.06	20	
Surr: 1,2-Dichloroethane-d4	22.990		25.00		92.0	56	120		0		
Surr: 4-Bromofluorobenzene	25.300		25.00		101	80	120		0		
Surr: Dibromofluoromethane	21.550		25.00		86.2	72	120		0		
Surr: Toluene-d8	25.890		25.00		104	80	123		0		

Sample ID: **P120727MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **84942**
Client ID: **PBW** Batch ID: **P12VW065** TestNo: **EPA 8260B** Analysis Date: **7/27/2012** SeqNo: **1420546**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Tetrachloroethene	ND	0.50									
Surr: 1,2-Dichloroethane-d4	25.890		25.00		104	56	120				
Surr: 4-Bromofluorobenzene	24.940		25.00		99.8	80	120				
Surr: Dibromofluoromethane	23.890		25.00		95.6	72	120				
Surr: Toluene-d8	26.010		25.00		104	80	123				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

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CLIENT: Tetra Tech
Work Order: N008213
Project: Maryland Square, 103P172824.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **N008204-001AMS** SampType: **MS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **84942**
Client ID: **ZZZZZZ** Batch ID: **P12VW065** TestNo: **EPA 8260B** Analysis Date: **7/27/2012** SeqNo: **1421600**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Tetrachloroethene	18.590	0.50	20.00	0	93.0	70	145				
Surr: 1,2-Dichloroethane-d4	23.290		25.00		93.2	56	120				
Surr: 4-Bromofluorobenzene	25.410		25.00		102	80	120				
Surr: Dibromofluoromethane	21.440		25.00		85.8	72	120				
Surr: Toluene-d8	25.450		25.00		102	80	123				

Sample ID: **N008204-001AMSD** SampType: **MSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **84942**
Client ID: **ZZZZZZ** Batch ID: **P12VW065** TestNo: **EPA 8260B** Analysis Date: **7/27/2012** SeqNo: **1421601**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Tetrachloroethene	18.630	0.50	20.00	0	93.2	70	145	18.59	0.215	20	
Surr: 1,2-Dichloroethane-d4	23.590		25.00		94.4	56	120		0		
Surr: 4-Bromofluorobenzene	26.010		25.00		104	80	120		0		
Surr: Dibromofluoromethane	21.710		25.00		86.8	72	120		0		
Surr: Toluene-d8	25.900		25.00		104	80	123		0		

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

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CLIENT: Tetra Tech
Work Order: N008213
Project: Maryland Square, 103P172824.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P120730LCS**	SampType: **LCS**	TestCode: **8260_WP_LL**	Units: **µg/L**	Prep Date:	RunNo: **84970**
Client ID: **LCSW**	Batch ID: **P12VW066**	TestNo: **EPA 8260B**		Analysis Date: **7/30/2012**	SeqNo: **1421222**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Tetrachloroethene	19.300	0.50	20.00	0	96.5	80	121				
Surr: 1,2-Dichloroethane-d4	23.180		25.00		92.7	56	120				
Surr: 4-Bromofluorobenzene	25.910		25.00		104	80	120				
Surr: Dibromofluoromethane	21.830		25.00		87.3	72	120				
Surr: Toluene-d8	25.760		25.00		103	80	123				

Sample ID: **P120730LCSD**	SampType: **LCSD**	TestCode: **8260_WP_LL**	Units: **µg/L**	Prep Date:	RunNo: **84970**
Client ID: **LCSS02**	Batch ID: **P12VW066**	TestNo: **EPA 8260B**		Analysis Date: **7/30/2012**	SeqNo: **1421223**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Tetrachloroethene	18.800	0.50	20.00	0	94.0	80	121	19.30	2.62	20	
Surr: 1,2-Dichloroethane-d4	22.980		25.00		91.9	56	120		0		
Surr: 4-Bromofluorobenzene	25.980		25.00		104	80	120		0		
Surr: Dibromofluoromethane	22.060		25.00		88.2	72	120		0		
Surr: Toluene-d8	25.550		25.00		102	80	123		0		

Sample ID: **P120730MB3**	SampType: **MBLK**	TestCode: **8260_WP_LL**	Units: **µg/L**	Prep Date:	RunNo: **84970**
Client ID: **PBW**	Batch ID: **P12VW066**	TestNo: **EPA 8260B**		Analysis Date: **7/30/2012**	SeqNo: **1421224**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Tetrachloroethene	ND	0.50									
Surr: 1,2-Dichloroethane-d4	25.440		25.00		102	56	120				
Surr: 4-Bromofluorobenzene	23.850		25.00		95.4	80	120				
Surr: Dibromofluoromethane	24.260		25.00		97.0	72	120				
Surr: Toluene-d8	25.410		25.00		102	80	123				

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

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CLIENT: Tetra Tech
Work Order: N008213
Project: Maryland Square, 103P172824.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P120731LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **84979**
Client ID: **LCSW** Batch ID: **P12VW067** TestNo: **EPA 8260B** Analysis Date: **7/31/2012** SeqNo: **1421717**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Tetrachloroethene	18.910	0.50	20.00	0	94.6	80	121				
Surr: 1,2-Dichloroethane-d4	24.500		25.00		98.0	56	120				
Surr: 4-Bromofluorobenzene	26.100		25.00		104	80	120				
Surr: Dibromofluoromethane	23.430		25.00		93.7	72	120				
Surr: Toluene-d8	25.910		25.00		104	80	123				

Sample ID: **P120731LCSD** SampType: **LCSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **84979**
Client ID: **LCSS02** Batch ID: **P12VW067** TestNo: **EPA 8260B** Analysis Date: **7/31/2012** SeqNo: **1421718**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Tetrachloroethene	19.390	0.50	20.00	0	97.0	80	121	18.91	2.51	20	
Surr: 1,2-Dichloroethane-d4	24.310		25.00		97.2	56	120		0		
Surr: 4-Bromofluorobenzene	25.600		25.00		102	80	120		0		
Surr: Dibromofluoromethane	22.890		25.00		91.6	72	120		0		
Surr: Toluene-d8	25.750		25.00		103	80	123		0		

Sample ID: **P120731MB7** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **84979**
Client ID: **PBW** Batch ID: **P12VW067** TestNo: **EPA 8260B** Analysis Date: **7/31/2012** SeqNo: **1421719**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Tetrachloroethene	ND	0.50									
Surr: 1,2-Dichloroethane-d4	26.910		25.00		108	56	120				
Surr: 4-Bromofluorobenzene	25.010		25.00		100	80	120				
Surr: Dibromofluoromethane	25.560		25.00		102	72	120				
Surr: Toluene-d8	25.460		25.00		102	80	123				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

Soil For Disposal

CHAIN OF CUSTODY RECORD

Pg 1 of

Advanced Technology Laboratories, Inc.
3151-3153 W. Post Rd.
Las Vegas, NV 89118
Tel: (702) 307-2659 • Fax: (702) 307-2691

FOR LABORATORY USE ONLY:

P.O.#: 103P1728240.01
Logged By: B Dano Date: 7/27/12 7/27/12

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other:

Sample Condition Upon Receipt
1. CHILLED 4.2°C Y☑ N☐ (ICE IRH) 4. SEALED Y☑ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☑ N☐
3. CONTAINER INTACT Y☑ N☐ 6. PRESERVED Y☑ N☐

Client: ~~Tetra Tech~~
Attn: Rob Manriquez
Address: 1230 Columbia St Ste 1000
City San Diego State CA Zip Code 92101
TEL: ( )
FAX: ( )

Project Name: Mainland Shipyard Project #: 103P1728240.01
Sampler: I attest to the validity and authenticity of this sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action. (Printed Name) Becki Dano (Signature)

Relinquished by: (Signature and Printed Name) ~~BECKI DANO~~	Date: 7/27/12	Time: 1455	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date: 7/27/12	Time: 1455
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: Becki Dano 7/27 (Print Name / Date) (Signature)

Send Report To:
Attn: Rob Manriquez
Co: TetraTech
Address: 1230 Columbia St Ste 1000
City San Diego State CA Zip 92101

Bill To:
Attn: Same.
Co:
Address
City State Zip

Special Instructions/Comments:
email results when ready
becki.dano@tetratech.com

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested: 8260B (VOC); 8260B (BTEX), (MTBE); 8015B (GRO); 8015B (DRO); (Motor Oil/ORO); RCRA8 (6010B/7000); TCLP

SPECIFY APPROPRIATE MATRIX: SOIL; WATER; GROUND WATER; WASTEWATER

ITEM	LAB USE ONLY: Batch # / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	N00823-1	MW 40 #1	7/23	1458	E	1	J:G	-	
	-2	EW2 Decon	7/23	1503	E	3	V:G	H	
	-3	MW 40 #2	7/24	0955	E	1	J:G	-	
	-4	MW 40 Decon	7/24	1515	E	3	V:G	H	
	-5	EW1 #1	7/26	0200	E	1	J:G	-	
	-6	EW1 #2	7/26	0045	E	1	J:G	-	
	-7	EW1 #3	7/26	0735	E	1	J:G	-	
	-8	EW2 Duplicate	7/27	0155	E	3	V:G	H	
	-9	EW1 Decon	7/27	1255	E	3	V:G	H	

QA/QC: RTNE ☐ CT ☐ SWRCB ☐ Logcode ____ OTHER ____

• TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: ☐ A= Overnight ≤ 24 hr ☐ B= Emergency Next workday ☐ C= Critical 2 Workdays ☐ D= Urgent 3 Workdays ☐ E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=Zn(AC)$_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: White with report, Yellow to folder, Pink to submitter.

Advanced Technology Laboratories, Inc.

Please review the checklist below. Any NO signifies non-compliance. Any non-compliance will be noted and must be understood as having an impact on the quality of the data. All tests will be performed as requested regardless of any compliance issues.

If you have any questions or further instruction, please contact our Project Coordinator at (702) 307-2659.

Cooler Received/Opened On:	7/27/2012	Workorder:	N008213
Rep sample Temp (Deg C):	4.2	IR Gun ID:	1
Temp Blank:	☐ Yes ☑ No		
Carrier name:	ATL		
Last 4 digits of Tracking No.:	na	Packing Material Used:	None
Cooling process:	☑ Ice ☐ Ice Pack ☐ Dry Ice ☐ Other ☐ None		

Sample Receipt Checklist

1. Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
2. Custody seals intact, signed, dated on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
3. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
4. Chain of custody present?	Yes ☑	No ☐	
5. Sampler's name present in COC?	Yes ☑	No ☐	
6. Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
7. Chain of custody agrees with sample labels?	Yes ☑	No ☐	
8. Samples in proper container/bottle?	Yes ☑	No ☐	
9. Sample containers intact?	Yes ☑	No ☐	
10. Sufficient sample volume for indicated test?	Yes ☑	No ☐	
11. All samples received within holding time?	Yes ☑	No ☐	
12. Temperature of rep sample or Temp Blank within acceptable limit?	Yes ☑	No ☐	NA ☐
13. Water - VOA vials have zero headspace?	Yes ☑	No ☐	NA ☐
14. Water - pH acceptable upon receipt? Example: pH > 12 for (CN,S); pH<2 for Metals	Yes ☐	No ☐	NA ☑
15. Did the bottle labels indicate correct preservatives used?	Yes ☑	No ☐	NA ☐
16. Were there Non-Conformance issues at login?	Yes ☐	No ☐	NA ☑
Was Client notified?	Yes ☐	No ☐	NA ☑

Comments:

Checklist Completed B MBC 7/30/12

Reviewed By:

August 01, 2012

Rob Manriquez
Tetra Tech
1771 East Flamingo Rd, Suite A113
Las Vegas, NV 89119

TEL: (702) 383- 6737
FAX: (702) 838-5476

CA-ELAP No.:2676
NV Cert. No.:NV-009222007A

Workorder No.: N008214

RE: Maryland Square, 103P172824.01

Attention: Rob Manriquez

Enclosed are the results for sample(s) received on July 27, 2012 by Advanced Technology Laboratories, Inc. . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (702) 307-2659 if I can be of further assistance to your company.

Sincerely,

for

Jose Tenorio Jr.
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories - Las Vegas.

CLIENT: Tetra Tech
Project: Maryland Square, 103P172824.01
Lab Order: N008214

CASE NARRATIVE

SAMPLE RECEIVING/GENERAL COMMENTS:

Samples were received intact with proper chain of custody documentation.

Cooler temperature and sample preservation were verified upon receipt of samples if applicable.

Information on sample receipt conditions including discrepancies can be found in attached Sample Receipt Checklist Form.

Samples were analyzed within method holding time.

Analytical Comments for EPA 8260B:

Matrix Spike (MS) is outside recovery criteria for cis-1,2-Dichloroethene on QC sample N008204-001AMS possibly due to matrix interference. The associated Laboratory Control Sample (LCS) recovery was acceptable.

Result for Tetrachloroethene on sample N008214-004 was reported even if result was outside the calibration range for there was not enough sample for re-analysis.

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Lab Order: N008214
Project: Maryland Square, 103P172824.01
Lab ID: N008214-001

Client Sample ID: TT-EW1-01-GW30
Collection Date: 7/26/2012 3:25:00 AM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_120727A	QC Batch: P12VW065			PrepDate:		Analyst: **QBM**
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	7/27/2012 05:08 PM
Tetrachloroethene	980	10		µg/L	20	7/30/2012 09:14 PM
Trichloroethene	1.3	0.50		µg/L	1	7/27/2012 05:08 PM
Vinyl chloride	ND	0.50		µg/L	1	7/27/2012 05:08 PM
Surr: 1,2-Dichloroethane-d4	103	56-120		%REC	20	7/30/2012 09:14 PM
Surr: 1,2-Dichloroethane-d4	99.2	56-120		%REC	1	7/27/2012 05:08 PM
Surr: 4-Bromofluorobenzene	99.1	80-120		%REC	20	7/30/2012 09:14 PM
Surr: 4-Bromofluorobenzene	97.1	80-120		%REC	1	7/27/2012 05:08 PM
Surr: Dibromofluoromethane	101	72-120		%REC	20	7/30/2012 09:14 PM
Surr: Dibromofluoromethane	93.5	72-120		%REC	1	7/27/2012 05:08 PM
Surr: Toluene-d8	104	80-123		%REC	20	7/30/2012 09:14 PM
Surr: Toluene-d8	101	80-123		%REC	1	7/27/2012 05:08 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N008214
Project: Maryland Square, 103P172824.01
Lab ID: N008214-002

Client Sample ID: TT-EW1-02-GW35
Collection Date: 7/26/2012 3:55:00 AM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_120727A	QC Batch: P12VW065			PrepDate:		Analyst: **QBM**
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	7/27/2012 06:08 PM
Tetrachloroethene	900	10		µg/L	20	7/30/2012 09:45 PM
Trichloroethene	0.94	0.50		µg/L	1	7/27/2012 06:08 PM
Vinyl chloride	ND	0.50		µg/L	1	7/27/2012 06:08 PM
Surr: 1,2-Dichloroethane-d4	107	56-120		%REC	20	7/30/2012 09:45 PM
Surr: 1,2-Dichloroethane-d4	97.7	56-120		%REC	1	7/27/2012 06:08 PM
Surr: 4-Bromofluorobenzene	101	80-120		%REC	20	7/30/2012 09:45 PM
Surr: 4-Bromofluorobenzene	97.1	80-120		%REC	1	7/27/2012 06:08 PM
Surr: Dibromofluoromethane	103	72-120		%REC	20	7/30/2012 09:45 PM
Surr: Dibromofluoromethane	91.4	72-120		%REC	1	7/27/2012 06:08 PM
Surr: Toluene-d8	103	80-123		%REC	20	7/30/2012 09:45 PM
Surr: Toluene-d8	98.5	80-123		%REC	1	7/27/2012 06:08 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N008214
Project: Maryland Square, 103P172824.01
Lab ID: N008214-003

Client Sample ID: TT-EW1-03-GW45
Collection Date: 7/26/2012 5:00:00 AM
Matrix: GROUNDWATER

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS5_120727A QC Batch: P12VW065 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
cis-1,2-Dichloroethene	2.4	0.50		µg/L	1	7/27/2012 05:35 PM
Tetrachloroethene	7600	50		µg/L	100	7/31/2012 04:29 PM
Trichloroethene	25	0.50		µg/L	1	7/27/2012 05:35 PM
Vinyl chloride	ND	0.50		µg/L	1	7/27/2012 05:35 PM
Surr: 1,2-Dichloroethane-d4	104	56-120		%REC	100	7/31/2012 04:29 PM
Surr: 1,2-Dichloroethane-d4	96.8	56-120		%REC	1	7/27/2012 05:35 PM
Surr: 4-Bromofluorobenzene	98.6	80-120		%REC	100	7/31/2012 04:29 PM
Surr: 4-Bromofluorobenzene	101	80-120		%REC	1	7/27/2012 05:35 PM
Surr: Dibromofluoromethane	100	72-120		%REC	100	7/31/2012 04:29 PM
Surr: Dibromofluoromethane	91.9	72-120		%REC	1	7/27/2012 05:35 PM
Surr: Toluene-d8	102	80-123		%REC	100	7/31/2012 04:29 PM
Surr: Toluene-d8	100	80-123		%REC	1	7/27/2012 05:35 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N008214
Project: Maryland Square, 103P172824.01
Lab ID: N008214-004

Client Sample ID: TT-EW1-04-GW50
Collection Date: 7/26/2012 5:35:00 AM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS5_120730A	QC Batch: P12VW066			PrepDate:		Analyst: **QBM**
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	7/30/2012 07:49 PM
Tetrachloroethene	650	0.50	E	µg/L	1	7/30/2012 07:49 PM
Trichloroethene	2.6	0.50		µg/L	1	7/30/2012 07:49 PM
Vinyl chloride	ND	0.50		µg/L	1	7/30/2012 07:49 PM
Surr: 1,2-Dichloroethane-d4	101	56-120		%REC	1	7/30/2012 07:49 PM
Surr: 4-Bromofluorobenzene	102	80-120		%REC	1	7/30/2012 07:49 PM
Surr: Dibromofluoromethane	99.6	72-120		%REC	1	7/30/2012 07:49 PM
Surr: Toluene-d8	103	80-123		%REC	1	7/30/2012 07:49 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Lab Order: N008214
Project: Maryland Square, 103P172824.01
Lab ID: N008214-005

Client Sample ID: TT-EW1-05-GW55
Collection Date: 7/26/2012 6:35:00 AM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_120727A	QC Batch: P12VW065			PrepDate:		Analyst: **QBM**
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	7/27/2012 06:35 PM
Tetrachloroethene	1700	10		µg/L	20	7/30/2012 10:50 PM
Trichloroethene	4.6	0.50		µg/L	1	7/27/2012 06:35 PM
Vinyl chloride	ND	0.50		µg/L	1	7/27/2012 06:35 PM
Surr: 1,2-Dichloroethane-d4	106	56-120		%REC	20	7/30/2012 10:50 PM
Surr: 1,2-Dichloroethane-d4	100	56-120		%REC	1	7/27/2012 06:35 PM
Surr: 4-Bromofluorobenzene	101	80-120		%REC	20	7/30/2012 10:50 PM
Surr: 4-Bromofluorobenzene	101	80-120		%REC	1	7/27/2012 06:35 PM
Surr: Dibromofluoromethane	103	72-120		%REC	20	7/30/2012 10:50 PM
Surr: Dibromofluoromethane	95.0	72-120		%REC	1	7/27/2012 06:35 PM
Surr: Toluene-d8	104	80-123		%REC	20	7/30/2012 10:50 PM
Surr: Toluene-d8	100	80-123		%REC	1	7/27/2012 06:35 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Work Order: N008214
Project: Maryland Square, 103P172824.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P120727LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **84942**
Client ID: **LCSW** Batch ID: **P12VW065** TestNo: **EPA 8260B** Analysis Date: **7/27/2012** SeqNo: **1420544**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	16.820	0.50	20.00	0	84.1	80	120				
Tetrachloroethene	19.020	0.50	20.00	0	95.1	80	121				
Trichloroethene	18.610	0.50	20.00	0	93.0	80	120				
Vinyl chloride	18.250	0.50	20.00	0	91.2	80	120				
Surr: 1,2-Dichloroethane-d4	23.040		25.00		92.2	56	120				
Surr: 4-Bromofluorobenzene	26.180		25.00		105	80	120				
Surr: Dibromofluoromethane	21.560		25.00		86.2	72	120				
Surr: Toluene-d8	25.560		25.00		102	80	123				

Sample ID: **P120727LCSD** SampType: **LCSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **84942**
Client ID: **LCSS02** Batch ID: **P12VW065** TestNo: **EPA 8260B** Analysis Date: **7/27/2012** SeqNo: **1420545**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	16.230	0.50	20.00	0	81.2	80	120	16.82	3.57	20	
Tetrachloroethene	18.820	0.50	20.00	0	94.1	80	121	19.02	1.06	20	
Trichloroethene	18.540	0.50	20.00	0	92.7	80	120	18.61	0.377	20	
Vinyl chloride	17.960	0.50	20.00	0	89.8	80	120	18.25	1.60	20	
Surr: 1,2-Dichloroethane-d4	22.990		25.00		92.0	56	120		0		
Surr: 4-Bromofluorobenzene	25.300		25.00		101	80	120		0		
Surr: Dibromofluoromethane	21.550		25.00		86.2	72	120		0		
Surr: Toluene-d8	25.890		25.00		104	80	123		0		

Sample ID: **P120727MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **84942**
Client ID: **PBW** Batch ID: **P12VW065** TestNo: **EPA 8260B** Analysis Date: **7/27/2012** SeqNo: **1420546**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	ND	0.50									
Tetrachloroethene	ND	0.50									

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits
- Calculations are based on raw values
- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Tetra Tech
Work Order: N008214
Project: Maryland Square, 103P172824.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P120727MB2**	SampType: **MBLK**	TestCode: **8260_WP_LL**	Units: **µg/L**	Prep Date:	RunNo: **84942**
Client ID: **PBW**	Batch ID: **P12VW065**	TestNo: **EPA 8260B**		Analysis Date: **7/27/2012**	SeqNo: **1420546**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Trichloroethene	ND	0.50									
Vinyl chloride	ND	0.50									
Surr: 1,2-Dichloroethane-d4	25.890		25.00		104	56	120				
Surr: 4-Bromofluorobenzene	24.940		25.00		99.8	80	120				
Surr: Dibromofluoromethane	23.890		25.00		95.6	72	120				
Surr: Toluene-d8	26.010		25.00		104	80	123				

Sample ID: **N008204-001AMS**	SampType: **MS**	TestCode: **8260_WP_LL**	Units: **µg/L**	Prep Date:	RunNo: **84942**
Client ID: **ZZZZZZ**	Batch ID: **P12VW065**	TestNo: **EPA 8260B**		Analysis Date: **7/27/2012**	SeqNo: **1421600**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	15.720	0.50	20.00	0	78.6	79	120				S
Tetrachloroethene	18.590	0.50	20.00	0	93.0	70	145				
Trichloroethene	17.830	0.50	20.00	0	89.2	80	120				
Vinyl chloride	16.570	0.50	20.00	0	82.8	77	120				
Surr: 1,2-Dichloroethane-d4	23.290		25.00		93.2	56	120				
Surr: 4-Bromofluorobenzene	25.410		25.00		102	80	120				
Surr: Dibromofluoromethane	21.440		25.00		85.8	72	120				
Surr: Toluene-d8	25.450		25.00		102	80	123				

Sample ID: **N008204-001AMSD**	SampType: **MSD**	TestCode: **8260_WP_LL**	Units: **µg/L**	Prep Date:	RunNo: **84942**
Client ID: **ZZZZZZ**	Batch ID: **P12VW065**	TestNo: **EPA 8260B**		Analysis Date: **7/27/2012**	SeqNo: **1421601**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	16.120	0.50	20.00	0	80.6	79	120	15.72	2.51	20	
Tetrachloroethene	18.630	0.50	20.00	0	93.2	70	145	18.59	0.215	20	
Trichloroethene	18.440	0.50	20.00	0	92.2	80	120	17.83	3.36	20	
Vinyl chloride	17.120	0.50	20.00	0	85.6	77	120	16.57	3.27	20	
Surr: 1,2-Dichloroethane-d4	23.590		25.00		94.4	56	120		0		
Surr: 4-Bromofluorobenzene	26.010		25.00		104	80	120		0		

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike/Surrogate outside of limits due to matrix interference
- DO Surrogate Diluted Out
- Calculations are based on raw values

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N008214
Project: Maryland Square, 103P172824.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **N008204-001AMSD** SampType: **MSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **84942**
Client ID: **ZZZZZZ** Batch ID: **P12VW065** TestNo: **EPA 8260B** Analysis Date: **7/27/2012** SeqNo: **1421601**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Dibromofluoromethane	21.710		25.00		86.8	72	120		0		
Surr: Toluene-d8	25.900		25.00		104	80	123		0		

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N008214
Project: Maryland Square, 103P172824.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P120730LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **84970**
Client ID: **LCSW** Batch ID: **P12VW066** TestNo: **EPA 8260B** Analysis Date: **7/30/2012** SeqNo: **1421222**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	16.570	0.50	20.00	0	82.8	80	120				
Tetrachloroethene	19.300	0.50	20.00	0	96.5	80	121				
Trichloroethene	18.990	0.50	20.00	0	95.0	80	120				
Vinyl chloride	18.110	0.50	20.00	0	90.6	80	120				
Surr: 1,2-Dichloroethane-d4	23.180		25.00		92.7	56	120				
Surr: 4-Bromofluorobenzene	25.910		25.00		104	80	120				
Surr: Dibromofluoromethane	21.830		25.00		87.3	72	120				
Surr: Toluene-d8	25.760		25.00		103	80	123				

Sample ID: **P120730LCSD** SampType: **LCSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **84970**
Client ID: **LCSS02** Batch ID: **P12VW066** TestNo: **EPA 8260B** Analysis Date: **7/30/2012** SeqNo: **1421223**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	16.460	0.50	20.00	0	82.3	80	120	16.57	0.666	20	
Tetrachloroethene	18.800	0.50	20.00	0	94.0	80	121	19.30	2.62	20	
Trichloroethene	18.690	0.50	20.00	0	93.5	80	120	18.99	1.59	20	
Vinyl chloride	17.630	0.50	20.00	0	88.2	80	120	18.11	2.69	20	
Surr: 1,2-Dichloroethane-d4	22.980		25.00		91.9	56	120		0		
Surr: 4-Bromofluorobenzene	25.980		25.00		104	80	120		0		
Surr: Dibromofluoromethane	22.060		25.00		88.2	72	120		0		
Surr: Toluene-d8	25.550		25.00		102	80	123		0		

Sample ID: **P120730MB3** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **84970**
Client ID: **PBW** Batch ID: **P12VW066** TestNo: **EPA 8260B** Analysis Date: **7/30/2012** SeqNo: **1421224**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	ND	0.50									
Tetrachloroethene	ND	0.50									
Trichloroethene	ND	0.50									
Vinyl chloride	ND	0.50									

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N008214
Project: Maryland Square, 103P172824.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P120730MB3** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **84970**
Client ID: **PBW** Batch ID: **P12VW066** TestNo: **EPA 8260B** Analysis Date: **7/30/2012** SeqNo: **1421224**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 1,2-Dichloroethane-d4	25.440		25.00		102	56	120				
Surr: 4-Bromofluorobenzene	23.850		25.00		95.4	80	120				
Surr: Dibromofluoromethane	24.260		25.00		97.0	72	120				
Surr: Toluene-d8	25.410		25.00		102	80	123				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N008214
Project: Maryland Square, 103P172824.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P120731LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **84979**
Client ID: **LCSW** Batch ID: **P12VW067** TestNo: **EPA 8260B** Analysis Date: **7/31/2012** SeqNo: **1421717**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	17.440	0.50	20.00	0	87.2	80	120				
Tetrachloroethene	18.910	0.50	20.00	0	94.6	80	121				
Trichloroethene	18.870	0.50	20.00	0	94.4	80	120				
Vinyl chloride	18.810	0.50	20.00	0	94.1	80	120				
Surr: 1,2-Dichloroethane-d4	24.500		25.00		98.0	56	120				
Surr: 4-Bromofluorobenzene	26.100		25.00		104	80	120				
Surr: Dibromofluoromethane	23.430		25.00		93.7	72	120				
Surr: Toluene-d8	25.910		25.00		104	80	123				

Sample ID: **P120731LCSD** SampType: **LCSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **84979**
Client ID: **LCSS02** Batch ID: **P12VW067** TestNo: **EPA 8260B** Analysis Date: **7/31/2012** SeqNo: **1421718**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	17.630	0.50	20.00	0	88.2	80	120	17.44	1.08	20	
Tetrachloroethene	19.390	0.50	20.00	0	97.0	80	121	18.91	2.51	20	
Trichloroethene	19.550	0.50	20.00	0	97.8	80	120	18.87	3.54	20	
Vinyl chloride	19.100	0.50	20.00	0	95.5	80	120	18.81	1.53	20	
Surr: 1,2-Dichloroethane-d4	24.310		25.00		97.2	56	120		0		
Surr: 4-Bromofluorobenzene	25.600		25.00		102	80	120		0		
Surr: Dibromofluoromethane	22.890		25.00		91.6	72	120		0		
Surr: Toluene-d8	25.750		25.00		103	80	123		0		

Sample ID: **P120731MB7** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **84979**
Client ID: **PBW** Batch ID: **P12VW067** TestNo: **EPA 8260B** Analysis Date: **7/31/2012** SeqNo: **1421719**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	ND	0.50									
Tetrachloroethene	ND	0.50									
Trichloroethene	ND	0.50									
Vinyl chloride	ND	0.50									

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N008214
Project: Maryland Square, 103P172824.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P120731MB7** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **84979**
Client ID: **PBW** Batch ID: **P12VW067** TestNo: **EPA 8260B** Analysis Date: **7/31/2012** SeqNo: **1421719**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 1,2-Dichloroethane-d4	26.910		25.00		108	56	120				
Surr: 4-Bromofluorobenzene	25.010		25.00		100	80	120				
Surr: Dibromofluoromethane	25.560		25.00		102	72	120				
Surr: Toluene-d8	25.460		25.00		102	80	123				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CHAIN OF CUSTODY RECORD

Page_____ of_____

Advanced Technology Laboratories, Inc.
3151-3153 W. Post Rd.
Las Vegas, NV 89118
Tel:(702) 307-2659•Fax:(702) 307-2691

FOR LABORATORY USE ONLY:

P.O.# 103P172824.01

Logged By: BDano Date: 7/26/12 7/27/12

Method of Transport
Client ☐
ATL INC ☐
FEDEX ☐
Other:_____

Sample Condition Upon Receipt
1. CHILLED 4.2°C Y☒ N☐ IR#1 RE
2. HEADSPACE (VOA) Y☐ N☒
3. CONTAINER INTACT Y☒ N☐
4. SEALED Y☐ N☐
5. # OF SPLS MATCH COC Y☑ N☐
6. PRESERVED Y☐ N☑

Client: Tetra Tech
Attn: Rob Manriquez
Address: 1230 Columbia St Ste 1000
City San Diego State CA Zip Code 92101
TEL:( )
FAX:( )

Project Name: Maryland Square
Project #: 103P172824.01
Sampler: I attest to the validity and authenticity of this sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action. (Printed Name) Becki Dano (Signature)

Relinquished by: (Signature and Printed name) BECKI DANO	Date: 7/27	Time: 1455	Received by: (Signature and Printed name)	Date: 7/27/12	Time: 1455
Relinquished by: (Signature and Printed name)	Date:	Time:	Received by: (Signature and Printed name)	Date:	Time:
Relinquished by: (Signature and Printed name)	Date:	Time:	Received by: (Signature and Printed name)	Date:	Time:

I hereby authorize ATL INC to perform the work indicated below:
Project Mgr/Submitter:
Becki Dano 7/27
Print Name Date
Signature

Send Report To:
Attn: Rob Manriquez
Co: Tetra Tech
Address: 1230 Columbia St, Ste 1000
City San Diego State CA Zip 92101

Bill To:
Attn: Same
Co:
Address:
City_____ State____ Zip____

Special Instructions/Comments:
email results when ready
becki.dano@tetratech.com
Vladimir.prilepin@tetratech.com

Sample/Records-Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $ 2.00 / sample / mo (after 45 days)
- Records : $ 1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested

SPECIFY APPROPRIATE MATRIX

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8260B (VOC) 8260B (BTEX),(MTBE) 8015B (GRO) 8015B (DRO),(Motor Oil/ORO) RCRA8 (6010B/7000)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	N008214-1	TT-EW1-01-GW30	7/26	0325	X		X			E	3	V:G	H	
	-2	TTEW1-02-GW35	7/26	0355	X		X			E	3	V:G	H	
	-3	TT-EW1-03-GW45	7/26	0500	X		X			E	3	V:G	H	
	-4	TT-EW1-04-GW50	7/26	0535	X		X			9	1	V:G	H	Has bubble- analyze anyway
	-5	TTEW1-05-GW55	7/26	0635	X		X			E	3	V:G	H	

QA/QC
RTNE ☐
CT ☐
RWQCB ☐
LEVEL IV____
OTHER_____

•TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: ☐ A= Overnight ≤ 24 hr ☐ B= Emergency Next workday ☐ C= Critical 2 Workdays ☐ D= Urgent 3 Workdays ☐ E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: White with report, Yellow to folder, Pink to submitter

Advanced Technology Laboratories, Inc.

Please review the checklist below. Any NO signifies non-compliance. Any non-compliance will be noted and must be understood as having an impact on the quality of the data. All tests will be performed as requested regardless of any compliance issues.

If you have any questions or further instruction, please contact our Project Coordinator at (702) 307-2659.

Cooler Received/Opened On:	7/27/2012	Workorder:	N008214
Rep sample Temp (Deg C):	4.2	IR Gun ID:	1
Temp Blank:	☐ Yes ☑ No		
Carrier name:	ATL		
Last 4 digits of Tracking No.:	na	Packing Material Used:	None
Cooling process:	☑ Ice ☐ Ice Pack ☐ Dry Ice ☐ Other ☐ None		

Sample Receipt Checklist

1. Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
2. Custody seals intact, signed, dated on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
3. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
4. Chain of custody present?	Yes ☑	No ☐	
5. Sampler's name present in COC?	Yes ☑	No ☐	
6. Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
7. Chain of custody agrees with sample labels?	Yes ☑	No ☐	
8. Samples in proper container/bottle?	Yes ☑	No ☐	
9. Sample containers intact?	Yes ☑	No ☐	
10. Sufficient sample volume for indicated test?	Yes ☐	No ☑	
11. All samples received within holding time?	Yes ☑	No ☐	
12. Temperature of rep sample or Temp Blank within acceptable limit?	Yes ☑	No ☐	NA ☐
13. Water - VOA vials have zero headspace?	Yes ☐	No ☑	NA ☐
14. Water - pH acceptable upon receipt? Example: pH > 12 for (CN,S); pH<2 for Metals	Yes ☐	No ☐	NA ☑
15. Did the bottle labels indicate correct preservatives used?	Yes ☑	No ☐	NA ☐
16. Were there Non-Conformance issues at login?	Yes ☐	No ☐	NA ☑
Was Client notified?	Yes ☐	No ☐	NA ☑

Comments: TT-EW1-04-GW50 has only 1 VOA vial and has bubble.

Checklist Completed B MBC 7/30/12

Reviewed By: 7/31

August 13, 2012

Rob Manriquez
Tetra Tech
1230 Columbia Street, Suite 1000
San Diego, CA 92101

TEL: (858) 527-8803
FAX:

CA-ELAP No.:2676
NV Cert. No.:NV-009222007A

Workorder No.: N008263

RE: Maryland Square, 103P172824.01

Attention: Rob Manriquez

Enclosed are the results for sample(s) received on August 06, 2012 by Advanced Technology Laboratories, Inc. . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (702) 307-2659 if I can be of further assistance to your company.

Sincerely,

for

Jose Tenorio Jr.
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories - Las Vegas.

CLIENT: Tetra Tech
Project: Maryland Square, 103P172824.01
Lab Order: N008263

CASE NARRATIVE

SAMPLE RECEIVING/GENERAL COMMENTS:

Samples were received intact with proper chain of custody documentation.

Cooler temperature and sample preservation were verified upon receipt of samples if applicable.

Information on sample receipt conditions including discrepancies can be found in attached Sample Receipt Checklist Form.

Samples were analyzed within method holding time.

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Lab Order: N008263
Project: Maryland Square, 103P172824.01
Lab ID: N008263-001

Client Sample ID: Develop.Comp EN1/EN2
Collection Date: 7/30/2012 10:00:00 AM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_120810A	QC Batch: P12VW074			PrepDate:		Analyst: **QBM**
Tetrachloroethene	1800	50		µg/L	100	8/10/2012 11:22 PM
Trichloroethene	6.6	0.50		µg/L	1	8/8/2012 09:04 PM
Surr: 1,2-Dichloroethane-d4	102	56-120		%REC	100	8/10/2012 11:22 PM
Surr: 1,2-Dichloroethane-d4	103	56-120		%REC	1	8/8/2012 09:04 PM
Surr: 4-Bromofluorobenzene	105	80-120		%REC	100	8/10/2012 11:22 PM
Surr: 4-Bromofluorobenzene	105	80-120		%REC	1	8/8/2012 09:04 PM
Surr: Dibromofluoromethane	111	72-120		%REC	100	8/10/2012 11:22 PM
Surr: Dibromofluoromethane	109	72-120		%REC	1	8/8/2012 09:04 PM
Surr: Toluene-d8	103	80-123		%REC	100	8/10/2012 11:22 PM
Surr: Toluene-d8	104	80-123		%REC	1	8/8/2012 09:04 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Work Order: N008263
Project: Maryland Square, 103P172824.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P120808LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **85087**
Client ID: **LCSW** Batch ID: **P12VW073** TestNo: **EPA 8260B** Analysis Date: **8/8/2012** SeqNo: **1425445**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Tetrachloroethene	19.570	0.50	20.00	0	97.9	80	121				
Trichloroethene	19.160	0.50	20.00	0	95.8	80	120				
Surr: 1,2-Dichloroethane-d4	24.560		25.00		98.2	56	120				
Surr: 4-Bromofluorobenzene	25.450		25.00		102	80	120				
Surr: Dibromofluoromethane	25.430		25.00		102	72	120				
Surr: Toluene-d8	26.530		25.00		106	80	123				

Sample ID: **P120808LCSD** SampType: **LCSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **85087**
Client ID: **LCSS02** Batch ID: **P12VW073** TestNo: **EPA 8260B** Analysis Date: **8/8/2012** SeqNo: **1425446**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Tetrachloroethene	19.530	0.50	20.00	0	97.6	80	121	19.57	0.205	20	
Trichloroethene	19.610	0.50	20.00	0	98.0	80	120	19.16	2.32	20	
Surr: 1,2-Dichloroethane-d4	24.330		25.00		97.3	56	120		0		
Surr: 4-Bromofluorobenzene	25.660		25.00		103	80	120		0		
Surr: Dibromofluoromethane	25.320		25.00		101	72	120		0		
Surr: Toluene-d8	25.960		25.00		104	80	123		0		

Sample ID: **P120808MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **85087**
Client ID: **PBW** Batch ID: **P12VW073** TestNo: **EPA 8260B** Analysis Date: **8/8/2012** SeqNo: **1425447**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Tetrachloroethene	ND	0.50									
Trichloroethene	ND	0.50									
Surr: 1,2-Dichloroethane-d4	26.650		25.00		107	56	120				
Surr: 4-Bromofluorobenzene	25.440		25.00		102	80	120				
Surr: Dibromofluoromethane	27.680		25.00		111	72	120				
Surr: Toluene-d8	26.410		25.00		106	80	123				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Tetra Tech
Work Order: N008263
Project: Maryland Square, 103P172824.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P120810LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **85109**
Client ID: **LCSW** Batch ID: **P12VW074** TestNo: **EPA 8260B** Analysis Date: **8/10/2012** SeqNo: **1426262**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Tetrachloroethene	18.480	0.50	20.00	0	92.4	80	121				
Trichloroethene	19.390	0.50	20.00	0	97.0	80	120				
Surr: 1,2-Dichloroethane-d4	25.650		25.00		103	56	120				
Surr: 4-Bromofluorobenzene	26.640		25.00		107	80	120				
Surr: Dibromofluoromethane	25.510		25.00		102	72	120				
Surr: Toluene-d8	26.400		25.00		106	80	123				

Sample ID: **P120810LCSD** SampType: **LCSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **85109**
Client ID: **LCSS02** Batch ID: **P12VW074** TestNo: **EPA 8260B** Analysis Date: **8/10/2012** SeqNo: **1426263**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Tetrachloroethene	18.480	0.50	20.00	0	92.4	80	121	18.48	0	20	
Trichloroethene	19.560	0.50	20.00	0	97.8	80	120	19.39	0.873	20	
Surr: 1,2-Dichloroethane-d4	25.300		25.00		101	56	120		0		
Surr: 4-Bromofluorobenzene	26.610		25.00		106	80	120		0		
Surr: Dibromofluoromethane	25.240		25.00		101	72	120		0		
Surr: Toluene-d8	26.460		25.00		106	80	123		0		

Sample ID: **P120810MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **85109**
Client ID: **PBW** Batch ID: **P12VW074** TestNo: **EPA 8260B** Analysis Date: **8/10/2012** SeqNo: **1426264**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Tetrachloroethene	ND	0.50									
Trichloroethene	ND	0.50									
Surr: 1,2-Dichloroethane-d4	27.110		25.00		108	56	120				
Surr: 4-Bromofluorobenzene	25.210		25.00		101	80	120				
Surr: Dibromofluoromethane	26.660		25.00		107	72	120				
Surr: Toluene-d8	25.490		25.00		102	80	123				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
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for Disposal

CHAIN OF CUSTODY RECORD

Pg 1 of 1

Advanced Technology Laboratories, Inc.
3151-3153 W. Post Rd.
Las Vegas, NV 89118
Tel: (702) 307-2659 • Fax: (702) 307-2691

FOR LABORATORY USE ONLY:

P.O.#: 103P172824.01

Logged By: BDano Date: 7/30/12

Method of Transport
Client ☐
ATL ☑
CA OverN ☐
FEDEX ☐
Other: ____

Sample Condition Upon Receipt
1. CHILLED 2.5°C IR#2 Y☒ N☐ 4. SEALED Y☐ N☒
2. HEADSPACE (VOA) Y☐ N☒ 5. # OF SPLS MATCH COC Y☒ N☐
3. CONTAINER INTACT Y☒ N☐ 6. PRESERVED Y☒ N☐

Client: Tetra Tech
Attn: Rob Manrique
Address: 1230 Columbia St Ste 1100
City San Diego State CA Zip Code 92101
TEL: (619) 321 6748
FAX: ( )

Project Name: Maryland Square Project #: 103P172824.01
Sampler: I attest to the validity and authenticity of this sample, I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action. (Printed Name) Becki Dano (Signature)

Relinquished by: (Signature and Printed Name) BECKI DANO	Date: 8-6-12	Time: 1029	Received by: (Signature and Printed Name)	Date: 8/6/12	Time: 10:29
Relinquished by: (Signature and Printed Name)	Date: 8/6/12	Time: 1053	Received by: (Signature and Printed Name)	Date: 8/6/12	Time: 10:53
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
Becki DANO 8-6-12
Print Name Date
Signature

Send Report To:
Attn: Rob Manrique
Co: Tetra Tech
Address 1230 Columbia St, Ste 1100
City San Diego State CA Zip 92101

Bill To:
Attn: Same
Co: ____
Address ____
City ____ State ____ Zip ____

Special Instructions/Comments:
email results when ready
becki.dano@tetratech.com

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	Circle or Add Analysis(es) Requested: 8260B (VOC)	8260B (BTEX), (MTBE)	8015B (GRO)	8015B (DRO), (Motor Oil/ORO)	RCRA8 (6010B/7000)	SPECIFY APPROPRIATE MATRIX: SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	N0082G3-1	Develop. Comp EW1/EW2	7/30	1020	X						X			E	3	VG	H	

QA/QC: RTNE ☐ CT ☐ SWRCB ☐ Logcode ____ OTHER ____

• TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: ☐ A= Overnight ≤ 24 hr ☐ B= Emergency Next workday ☐ C= Critical 2 Workdays ☐ D= Urgent 3 Workdays ☐ E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: White with report, Yellow to folder, Pink to submitter.

Advanced Technology Laboratories, Inc.

Please review the checklist below. Any NO signifies non-compliance. Any non-compliance will be noted and must be understood as having an impact on the quality of the data. All tests will be performed as requested regardless of any compliance issues.

If you have any questions or further instruction, please contact our Project Coordinator at (702) 307-2659.

Cooler Received/Opened On:	8/6/2012	Workorder:	N008263
Rep sample Temp (Deg C):	2.8	IR Gun ID:	2
Temp Blank:	☐ Yes ☑ No		
Carrier name:	ATL		
Last 4 digits of Tracking No.:	na	Packing Material Used:	None
Cooling process:	☑ Ice ☐ Ice Pack ☐ Dry Ice ☐ Other ☐ None		

Sample Receipt Checklist

1. Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
2. Custody seals intact, signed, dated on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
3. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
4. Chain of custody present?	Yes ☑	No ☐	
5. Sampler's name present in COC?	Yes ☑	No ☐	
6. Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
7. Chain of custody agrees with sample labels?	Yes ☑	No ☐	
8. Samples in proper container/bottle?	Yes ☑	No ☐	
9. Sample containers intact?	Yes ☑	No ☐	
10. Sufficient sample volume for indicated test?	Yes ☑	No ☐	
11. All samples received within holding time?	Yes ☑	No ☐	
12. Temperature of rep sample or Temp Blank within acceptable limit?	Yes ☑	No ☐	NA ☐
13. Water - VOA vials have zero headspace?	Yes ☑	No ☐	NA ☐
14. Water - pH acceptable upon receipt? Example: pH > 12 for (CN,S); pH<2 for Metals	Yes ☐	No ☐	NA ☑
15. Did the bottle labels indicate correct preservatives used?	Yes ☑	No ☐	NA ☐
16. Were there Non-Conformance issues at login?	Yes ☐	No ☐	NA ☑
Was Client notified?	Yes ☐	No ☐	NA ☑

Comments:

Checklist Completed By NS 8/6/12

Reviewed By:

August 17, 2012

Rob Manriquez
Tetra Tech
1771 East Flamingo Rd, Suite A113
Las Vegas, NV 89119

TEL: (702) 383- 6737
FAX: (702) 838-5476

CA-ELAP No.:2676
NV Cert. No.:NV-009222007A

Workorder No.: N008315

RE: Maryland Square, 103P172824.01

Attention: Rob Manriquez

Enclosed are the results for sample(s) received on August 13, 2012 by Advanced Technology Laboratories, Inc. . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

I hereby certify that all laboratory analysis requested were performed by Nevada Division of Environmental Protection-certified laboratory for the parameters and matrices reported herein.

Thank you for the opportunity to service the needs of your company.Please feel free to call me at (702) 307-2659 if I can be of further assistance to your company.

Sincerely,

for

Jose Tenorio Jr.
Laboratory Director

The cover letter and the case narrative are an integral part of this analytical report and cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories - Las Vegas.

CLIENT: Tetra Tech
Project: Maryland Square, 103P172824.01
Lab Order: N008315

CASE NARRATIVE

SAMPLE RECEIVING/GENERAL COMMENTS:

Samples were received intact with proper chain of custody documentation.

Cooler temperature and sample preservation were verified upon receipt of samples if applicable.

Information on sample receipt conditions including discrepancies can be found in attached Sample Receipt Checklist Form.

Samples were analyzed within method holding time.

Analytical Comments for EPA 8260B:

Laboratory Control Sample Duplicate (LCSD) recovery biased high for 1,1-Dichloroethene . Sample results were non-detect (ND) for this analyte therefore reanalysis was not necessary.

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CLIENT: Tetra Tech
Lab Order: N008315
Project: Maryland Square, 103P172824.01
Lab ID: N008315-001

Client Sample ID: EN-2 Tank
Collection Date: 8/13/2012 11:40:00 AM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
TOTAL FILTERABLE RESIDUE						
			SM2540C			
RunID: WETCHEM_120814A	QC Batch: 40396			PrepDate: 8/13/2012		Analyst: **KAB**
Total Dissolved Solids (Residue, Filterable)	1600	13		mg/L	1	8/14/2012
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
			EPA 8260B			
RunID: MS5_120816A	QC Batch: P12VW076			PrepDate:		Analyst: **QBM**
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	8/16/2012 06:54 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	8/16/2012 06:54 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	8/16/2012 06:54 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	8/16/2012 06:54 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	8/16/2012 06:54 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	8/16/2012 06:54 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	8/16/2012 06:54 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	8/16/2012 06:54 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	8/16/2012 06:54 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	8/16/2012 06:54 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	8/16/2012 06:54 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	8/16/2012 06:54 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	8/16/2012 06:54 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	8/16/2012 06:54 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	8/16/2012 06:54 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	8/16/2012 06:54 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	8/16/2012 06:54 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	8/16/2012 06:54 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	8/16/2012 06:54 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	8/16/2012 06:54 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	8/16/2012 06:54 PM
2-Chlorotoluene	ND	0.50		µg/L	1	8/16/2012 06:54 PM
4-Chlorotoluene	ND	0.50		µg/L	1	8/16/2012 06:54 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	8/16/2012 06:54 PM
Benzene	ND	0.50		µg/L	1	8/16/2012 06:54 PM
Bromobenzene	ND	0.50		µg/L	1	8/16/2012 06:54 PM
Bromodichloromethane	ND	0.50		µg/L	1	8/16/2012 06:54 PM
Bromoform	ND	0.50		µg/L	1	8/16/2012 06:54 PM
Bromomethane	ND	0.50		µg/L	1	8/16/2012 06:54 PM
Carbon tetrachloride	ND	0.50		µg/L	1	8/16/2012 06:54 PM
Chlorobenzene	ND	0.50		µg/L	1	8/16/2012 06:54 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

Advanced Technology Laboratories, Inc.

ANALYTICAL RESULTS

Print Date: *17-Aug-12*

CLIENT:	Tetra Tech	**Client Sample ID:**	EN-2 Tank
Lab Order:	N008315	**Collection Date:**	8/13/2012 11:40:00 AM
Project:	Maryland Square, 103P172824.01	**Matrix:**	GROUNDWATER
Lab ID:	N008315-001		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_120816A	QC Batch: P12VW076			PrepDate:		Analyst: **QBM**
Chloroethane	ND	0.50		µg/L	1	8/16/2012 06:54 PM
Chloroform	ND	0.50		µg/L	1	8/16/2012 06:54 PM
Chloromethane	ND	0.50		µg/L	1	8/16/2012 06:54 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	8/16/2012 06:54 PM
cis-1,3-Dichloropropene	ND	0.50		µg/L	1	8/16/2012 06:54 PM
Dibromochloromethane	ND	0.50		µg/L	1	8/16/2012 06:54 PM
Dibromomethane	ND	0.50		µg/L	1	8/16/2012 06:54 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	8/16/2012 06:54 PM
Ethylbenzene	ND	0.50		µg/L	1	8/16/2012 06:54 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	8/16/2012 06:54 PM
Isopropylbenzene	ND	0.50		µg/L	1	8/16/2012 06:54 PM
m,p-Xylene	ND	1.0		µg/L	1	8/16/2012 06:54 PM
Methylene chloride	ND	2.0		µg/L	1	8/16/2012 06:54 PM
n-Butylbenzene	ND	0.50		µg/L	1	8/16/2012 06:54 PM
n-Propylbenzene	ND	0.50		µg/L	1	8/16/2012 06:54 PM
Naphthalene	ND	0.50		µg/L	1	8/16/2012 06:54 PM
o-Xylene	ND	0.50		µg/L	1	8/16/2012 06:54 PM
sec-Butylbenzene	ND	0.50		µg/L	1	8/16/2012 06:54 PM
Styrene	ND	0.50		µg/L	1	8/16/2012 06:54 PM
tert-Butylbenzene	ND	0.50		µg/L	1	8/16/2012 06:54 PM
Tetrachloroethene	ND	0.50		µg/L	1	8/16/2012 06:54 PM
Toluene	ND	0.50		µg/L	1	8/16/2012 06:54 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	8/16/2012 06:54 PM
Trichloroethene	ND	0.50		µg/L	1	8/16/2012 06:54 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	8/16/2012 06:54 PM
Vinyl chloride	ND	0.50		µg/L	1	8/16/2012 06:54 PM
Surr: 1,2-Dichloroethane-d4	110	56-120		%REC	1	8/16/2012 06:54 PM
Surr: 4-Bromofluorobenzene	98.2	80-120		%REC	1	8/16/2012 06:54 PM
Surr: Dibromofluoromethane	113	72-120		%REC	1	8/16/2012 06:54 PM
Surr: Toluene-d8	105	80-123		%REC	1	8/16/2012 06:54 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories, Inc.

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CLIENT: Tetra Tech
Lab Order: N008315
Project: Maryland Square, 103P172824.01
Lab ID: N008315-002

Client Sample ID: EN-1 Tank
Collection Date: 8/13/2012 12:15:00 PM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
TOTAL FILTERABLE RESIDUE						
		SM2540C				
RunID: WETCHEM_120814A	QC Batch: 40396			PrepDate: 8/13/2012		Analyst: **KAB**
Total Dissolved Solids (Residue, Filterable)	1100	10		mg/L	1	8/14/2012
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS5_120816A	QC Batch: P12VW076			PrepDate:		Analyst: **QBM**
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	8/16/2012 07:22 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	8/16/2012 07:22 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	8/16/2012 07:22 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	8/16/2012 07:22 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	8/16/2012 07:22 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	8/16/2012 07:22 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	8/16/2012 07:22 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	8/16/2012 07:22 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	8/16/2012 07:22 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	8/16/2012 07:22 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	8/16/2012 07:22 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	8/16/2012 07:22 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	8/16/2012 07:22 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	8/16/2012 07:22 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	8/16/2012 07:22 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	8/16/2012 07:22 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	8/16/2012 07:22 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	8/16/2012 07:22 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	8/16/2012 07:22 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	8/16/2012 07:22 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	8/16/2012 07:22 PM
2-Chlorotoluene	ND	0.50		µg/L	1	8/16/2012 07:22 PM
4-Chlorotoluene	ND	0.50		µg/L	1	8/16/2012 07:22 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	8/16/2012 07:22 PM
Benzene	ND	0.50		µg/L	1	8/16/2012 07:22 PM
Bromobenzene	ND	0.50		µg/L	1	8/16/2012 07:22 PM
Bromodichloromethane	ND	0.50		µg/L	1	8/16/2012 07:22 PM
Bromoform	ND	0.50		µg/L	1	8/16/2012 07:22 PM
Bromomethane	0.51	0.50		µg/L	1	8/16/2012 07:22 PM
Carbon tetrachloride	ND	0.50		µg/L	1	8/16/2012 07:22 PM
Chlorobenzene	ND	0.50		µg/L	1	8/16/2012 07:22 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT: Tetra Tech
Lab Order: N008315
Project: Maryland Square, 103P172824.01
Lab ID: N008315-002

Client Sample ID: EN-1 Tank
Collection Date: 8/13/2012 12:15:00 PM
Matrix: GROUNDWATER

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS5_120816A QC Batch: P12VW076 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Chloroethane	ND	0.50		µg/L	1	8/16/2012 07:22 PM
Chloroform	ND	0.50		µg/L	1	8/16/2012 07:22 PM
Chloromethane	ND	0.50		µg/L	1	8/16/2012 07:22 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	8/16/2012 07:22 PM
cis-1,3-Dichloropropene	ND	0.50		µg/L	1	8/16/2012 07:22 PM
Dibromochloromethane	ND	0.50		µg/L	1	8/16/2012 07:22 PM
Dibromomethane	ND	0.50		µg/L	1	8/16/2012 07:22 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	8/16/2012 07:22 PM
Ethylbenzene	1.2	0.50		µg/L	1	8/16/2012 07:22 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	8/16/2012 07:22 PM
Isopropylbenzene	ND	0.50		µg/L	1	8/16/2012 07:22 PM
m,p-Xylene	1.3	1.0		µg/L	1	8/16/2012 07:22 PM
Methylene chloride	ND	2.0		µg/L	1	8/16/2012 07:22 PM
n-Butylbenzene	ND	0.50		µg/L	1	8/16/2012 07:22 PM
n-Propylbenzene	ND	0.50		µg/L	1	8/16/2012 07:22 PM
Naphthalene	0.56	0.50		µg/L	1	8/16/2012 07:22 PM
o-Xylene	2.2	0.50		µg/L	1	8/16/2012 07:22 PM
sec-Butylbenzene	ND	0.50		µg/L	1	8/16/2012 07:22 PM
Styrene	ND	0.50		µg/L	1	8/16/2012 07:22 PM
tert-Butylbenzene	ND	0.50		µg/L	1	8/16/2012 07:22 PM
Tetrachloroethene	6.0	0.50		µg/L	1	8/16/2012 07:22 PM
Toluene	ND	0.50		µg/L	1	8/16/2012 07:22 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	8/16/2012 07:22 PM
Trichloroethene	ND	0.50		µg/L	1	8/16/2012 07:22 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	8/16/2012 07:22 PM
Vinyl chloride	ND	0.50		µg/L	1	8/16/2012 07:22 PM
Surr: 1,2-Dichloroethane-d4	108	56-120		%REC	1	8/16/2012 07:22 PM
Surr: 4-Bromofluorobenzene	102	80-120		%REC	1	8/16/2012 07:22 PM
Surr: Dibromofluoromethane	109	72-120		%REC	1	8/16/2012 07:22 PM
Surr: Toluene-d8	102	80-123		%REC	1	8/16/2012 07:22 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Work Order: N008315
Project: Maryland Square, 103P172824.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 160.1_2540C_W

Sample ID: **MB-40396**	SampType: **MBLK**	TestCode: **160.1_2540C_**	Units: **mg/L**	Prep Date:	RunNo: **85140**
Client ID: **PBW**	Batch ID: **40396**	TestNo: **SM2540C**		Analysis Date: **8/14/2012**	SeqNo: **1427359**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	ND	10									

Sample ID: **LCS-40396**	SampType: **LCS**	TestCode: **160.1_2540C_**	Units: **mg/L**	Prep Date:	RunNo: **85140**
Client ID: **LCSW**	Batch ID: **40396**	TestNo: **SM2540C**		Analysis Date: **8/14/2012**	SeqNo: **1427360**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	988.000	10	1000	0	98.8	80	120				

Sample ID: **N008306-001E-DUP**	SampType: **DUP**	TestCode: **160.1_2540C_**	Units: **mg/L**	Prep Date: **8/13/2012**	RunNo: **85140**
Client ID: **ZZZZZZ**	Batch ID: **40396**	TestNo: **SM2540C**		Analysis Date: **8/14/2012**	SeqNo: **1427362**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	654.000	10						660.0	0.913	5	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Tetra Tech
Work Order: N008315
Project: Maryland Square, 103P172824.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P120816LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **85164**
Client ID: **LCSW** Batch ID: **P12VW076** TestNo: **EPA 8260B** Analysis Date: **8/16/2012** SeqNo: **1428457**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	18.180	0.50	20.00	0	90.9	74	122				
1,1,1-Trichloroethane	18.620	0.50	20.00	0	93.1	65	120				
1,1,2,2-Tetrachloroethane	19.360	0.50	20.00	0	96.8	80	120				
1,1,2-Trichloroethane	18.270	0.50	20.00	0	91.4	80	120				
1,1-Dichloroethane	18.640	0.50	20.00	0	93.2	80	120				
1,1-Dichloroethene	21.550	0.50	20.00	0	108	80	120				
1,1-Dichloropropene	18.850	0.50	20.00	0	94.3	80	120				
1,2,3-Trichlorobenzene	20.200	0.50	20.00	0	101	80	124				
1,2,3-Trichloropropane	19.550	0.50	20.00	0	97.8	80	120				
1,2,4-Trichlorobenzene	19.460	0.50	20.00	0	97.3	80	126				
1,2,4-Trimethylbenzene	19.980	0.50	20.00	0	99.9	80	123				
1,2-Dibromo-3-chloropropane	19.680	1.0	20.00	0	98.4	70	120				
1,2-Dibromoethane	19.370	0.50	20.00	0	96.9	80	120				
1,2-Dichlorobenzene	19.030	0.50	20.00	0	95.2	80	120				
1,2-Dichloroethane	18.110	0.50	20.00	0	90.6	80	120				
1,2-Dichloropropane	18.380	0.50	20.00	0	91.9	80	120				
1,3,5-Trimethylbenzene	20.500	0.50	20.00	0	103	80	121				
1,3-Dichlorobenzene	19.020	0.50	20.00	0	95.1	80	120				
1,3-Dichloropropane	18.340	0.50	20.00	0	91.7	80	120				
1,4-Dichlorobenzene	18.570	0.50	20.00	0	92.8	80	120				
2,2-Dichloropropane	19.560	0.50	20.00	0	97.8	54	120				
2-Chlorotoluene	19.880	0.50	20.00	0	99.4	80	122				
4-Chlorotoluene	19.760	0.50	20.00	0	98.8	80	120				
4-Isopropyltoluene	20.180	0.50	20.00	0	101	80	122				
Benzene	18.510	0.50	20.00	0	92.6	80	120				
Bromobenzene	19.510	0.50	20.00	0	97.6	80	120				
Bromodichloromethane	18.510	0.50	20.00	0	92.6	70	120				
Bromoform	18.900	0.50	20.00	0	94.5	66	120				
Bromomethane	20.110	0.50	20.00	0	101	48	155				
Carbon tetrachloride	18.590	0.50	20.00	0	93.0	60	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N008315
Project: Maryland Square, 103P172824.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P120816LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **85164**
Client ID: **LCSW** Batch ID: **P12VW076** TestNo: **EPA 8260B** Analysis Date: **8/16/2012** SeqNo: **1428457**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	18.460	0.50	20.00	0	92.3	80	120				
Chloroethane	24.630	0.50	20.00	0	123	62	147				
Chloroform	18.480	0.50	20.00	0	92.4	80	120				
Chloromethane	18.490	0.50	20.00	0	92.5	63	121				
cis-1,2-Dichloroethene	17.930	0.50	20.00	0	89.7	80	120				
cis-1,3-Dichloropropene	19.020	0.50	20.00	0	95.1	75	120				
Dibromochloromethane	18.800	0.50	20.00	0	94.0	67	123				
Dibromomethane	19.940	0.50	20.00	0	99.7	80	120				
Dichlorodifluoromethane	17.770	0.50	20.00	0	88.8	70	121				
Ethylbenzene	18.340	0.50	20.00	0	91.7	80	120				
Hexachlorobutadiene	18.030	0.50	20.00	0	90.2	80	123				
Isopropylbenzene	19.970	0.50	20.00	0	99.8	80	121				
m,p-Xylene	38.020	1.0	40.00	0	95.1	80	120				
Methylene chloride	18.990	2.0	20.00	0	95.0	75	120				
n-Butylbenzene	19.080	0.50	20.00	0	95.4	80	129				
n-Propylbenzene	19.830	0.50	20.00	0	99.2	80	122				
Naphthalene	20.850	0.50	20.00	0	104	73	127				
o-Xylene	19.270	0.50	20.00	0	96.4	80	120				
sec-Butylbenzene	20.000	0.50	20.00	0	100	80	120				
Styrene	19.450	0.50	20.00	0	97.3	80	120				
tert-Butylbenzene	20.470	0.50	20.00	0	102	80	120				
Tetrachloroethene	18.230	0.50	20.00	0	91.2	80	121				
Toluene	19.000	0.50	20.00	0	95.0	80	120				
trans-1,2-Dichloroethene	18.570	0.50	20.00	0	92.8	80	120				
Trichloroethene	18.520	0.50	20.00	0	92.6	80	120				
Trichlorofluoromethane	23.030	0.50	20.00	0	115	71	148				
Vinyl chloride	19.190	0.50	20.00	0	96.0	80	120				
Surr: 1,2-Dichloroethane-d4	25.720		25.00		103	56	120				
Surr: 4-Bromofluorobenzene	26.570		25.00		106	80	120				
Surr: Dibromofluoromethane	25.770		25.00		103	72	120				

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike/Surrogate outside of limits due to matrix interference
- DO Surrogate Diluted Out
- Calculations are based on raw values

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N008315
Project: Maryland Square, 103P172824.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P120816LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **85164**
Client ID: **LCSW** Batch ID: **P12VW076** TestNo: **EPA 8260B** Analysis Date: **8/16/2012** SeqNo: **1428457**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Toluene-d8	26.280		25.00		105	80	123				

Sample ID: **P120816LCSD** SampType: **LCSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **85164**
Client ID: **LCSS02** Batch ID: **P12VW076** TestNo: **EPA 8260B** Analysis Date: **8/16/2012** SeqNo: **1428458**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	19.150	0.50	20.00	0	95.8	74	122	18.18	5.20	20	
1,1,1-Trichloroethane	20.020	0.50	20.00	0	100	65	120	18.62	7.25	20	
1,1,2,2-Tetrachloroethane	21.510	0.50	20.00	0	108	80	120	19.36	10.5	20	
1,1,2-Trichloroethane	19.630	0.50	20.00	0	98.2	80	120	18.27	7.18	20	
1,1-Dichloroethane	20.030	0.50	20.00	0	100	80	120	18.64	7.19	20	
1,1-Dichloroethene	24.160	0.50	20.00	0	121	80	120	21.55	11.4	20	S
1,1-Dichloropropene	20.000	0.50	20.00	0	100	80	120	18.85	5.92	20	
1,2,3-Trichlorobenzene	20.460	0.50	20.00	0	102	80	124	20.20	1.28	20	
1,2,3-Trichloropropane	20.450	0.50	20.00	0	102	80	120	19.55	4.50	20	
1,2,4-Trichlorobenzene	20.600	0.50	20.00	0	103	80	126	19.46	5.69	20	
1,2,4-Trimethylbenzene	21.520	0.50	20.00	0	108	80	123	19.98	7.42	20	
1,2-Dibromo-3-chloropropane	19.930	1.0	20.00	0	99.7	70	120	19.68	1.26	20	
1,2-Dibromoethane	20.410	0.50	20.00	0	102	80	120	19.37	5.23	20	
1,2-Dichlorobenzene	20.370	0.50	20.00	0	102	80	120	19.03	6.80	20	
1,2-Dichloroethane	19.520	0.50	20.00	0	97.6	80	120	18.11	7.49	20	
1,2-Dichloropropane	19.460	0.50	20.00	0	97.3	80	120	18.38	5.71	20	
1,3,5-Trimethylbenzene	21.540	0.50	20.00	0	108	80	121	20.50	4.95	20	
1,3-Dichlorobenzene	19.990	0.50	20.00	0	100	80	120	19.02	4.97	20	
1,3-Dichloropropane	20.080	0.50	20.00	0	100	80	120	18.34	9.06	20	
1,4-Dichlorobenzene	19.730	0.50	20.00	0	98.6	80	120	18.57	6.06	20	
2,2-Dichloropropane	20.000	0.50	20.00	0	100	54	120	19.56	2.22	20	
2-Chlorotoluene	21.100	0.50	20.00	0	106	80	122	19.88	5.95	20	
4-Chlorotoluene	20.860	0.50	20.00	0	104	80	120	19.76	5.42	20	
4-Isopropyltoluene	21.670	0.50	20.00	0	108	80	122	20.18	7.12	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N008315
Project: Maryland Square, 103P172824.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P120816LCSD** SampType: **LCSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **85164**
Client ID: **LCSS02** Batch ID: **P12VW076** TestNo: **EPA 8260B** Analysis Date: **8/16/2012** SeqNo: **1428458**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	20.070	0.50	20.00	0	100	80	120	18.51	8.09	20	
Bromobenzene	20.440	0.50	20.00	0	102	80	120	19.51	4.66	20	
Bromodichloromethane	20.010	0.50	20.00	0	100	70	120	18.51	7.79	20	
Bromoform	20.520	0.50	20.00	0	103	66	120	18.90	8.22	20	
Bromomethane	22.100	0.50	20.00	0	110	48	155	20.11	9.43	20	
Carbon tetrachloride	19.550	0.50	20.00	0	97.8	60	120	18.59	5.03	20	
Chlorobenzene	19.320	0.50	20.00	0	96.6	80	120	18.46	4.55	20	
Chloroethane	26.040	0.50	20.00	0	130	62	147	24.63	5.57	20	
Chloroform	19.750	0.50	20.00	0	98.8	80	120	18.48	6.64	20	
Chloromethane	19.980	0.50	20.00	0	99.9	63	121	18.49	7.75	20	
cis-1,2-Dichloroethene	19.260	0.50	20.00	0	96.3	80	120	17.93	7.15	20	
cis-1,3-Dichloropropene	20.140	0.50	20.00	0	101	75	120	19.02	5.72	20	
Dibromochloromethane	19.950	0.50	20.00	0	99.8	67	123	18.80	5.94	20	
Dibromomethane	20.900	0.50	20.00	0	104	80	120	19.94	4.70	20	
Dichlorodifluoromethane	18.390	0.50	20.00	0	92.0	70	121	17.77	3.43	20	
Ethylbenzene	19.980	0.50	20.00	0	99.9	80	120	18.34	8.56	20	
Hexachlorobutadiene	18.970	0.50	20.00	0	94.8	80	123	18.03	5.08	20	
Isopropylbenzene	21.250	0.50	20.00	0	106	80	121	19.97	6.21	20	
m,p-Xylene	40.510	1.0	40.00	0	101	80	120	38.02	6.34	20	
Methylene chloride	20.210	2.0	20.00	0	101	75	120	18.99	6.22	20	
n-Butylbenzene	20.080	0.50	20.00	0	100	80	129	19.08	5.11	20	
n-Propylbenzene	20.870	0.50	20.00	0	104	80	122	19.83	5.11	20	
Naphthalene	21.810	0.50	20.00	0	109	73	127	20.85	4.50	20	
o-Xylene	20.260	0.50	20.00	0	101	80	120	19.27	5.01	20	
sec-Butylbenzene	21.400	0.50	20.00	0	107	80	120	20.00	6.76	20	
Styrene	20.400	0.50	20.00	0	102	80	120	19.45	4.77	20	
tert-Butylbenzene	21.680	0.50	20.00	0	108	80	120	20.47	5.74	20	
Tetrachloroethene	19.320	0.50	20.00	0	96.6	80	121	18.23	5.81	20	
Toluene	20.350	0.50	20.00	0	102	80	120	19.00	6.86	20	
trans-1,2-Dichloroethene	19.670	0.50	20.00	0	98.4	80	120	18.57	5.75	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N008315
Project: Maryland Square, 103P172824.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P120816LCSD** SampType: **LCSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **85164**
Client ID: **LCSS02** Batch ID: **P12VW076** TestNo: **EPA 8260B** Analysis Date: **8/16/2012** SeqNo: **1428458**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Trichloroethene	19.480	0.50	20.00	0	97.4	80	120	18.52	5.05	20	
Trichlorofluoromethane	24.200	0.50	20.00	0	121	71	148	23.03	4.95	20	
Vinyl chloride	21.260	0.50	20.00	0	106	80	120	19.19	10.2	20	
Surr: 1,2-Dichloroethane-d4	26.440		25.00		106	56	120		0		
Surr: 4-Bromofluorobenzene	26.680		25.00		107	80	120		0		
Surr: Dibromofluoromethane	26.130		25.00		105	72	120		0		
Surr: Toluene-d8	26.390		25.00		106	80	123		0		

Sample ID: **P120816MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **85164**
Client ID: **PBW** Batch ID: **P12VW076** TestNo: **EPA 8260B** Analysis Date: **8/16/2012** SeqNo: **1428459**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	0.50									
1,1,1-Trichloroethane	ND	0.50									
1,1,2,2-Tetrachloroethane	ND	0.50									
1,1,2-Trichloroethane	ND	0.50									
1,1-Dichloroethane	ND	0.50									
1,1-Dichloroethene	ND	0.50									
1,1-Dichloropropene	ND	0.50									
1,2,3-Trichlorobenzene	ND	0.50									
1,2,3-Trichloropropane	ND	0.50									
1,2,4-Trichlorobenzene	ND	0.50									
1,2,4-Trimethylbenzene	ND	0.50									
1,2-Dibromo-3-chloropropane	ND	1.0									
1,2-Dibromoethane	ND	0.50									
1,2-Dichlorobenzene	ND	0.50									
1,2-Dichloroethane	ND	0.50									
1,2-Dichloropropane	ND	0.50									
1,3,5-Trimethylbenzene	ND	0.50									
1,3-Dichlorobenzene	ND	0.50									

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N008315
Project: Maryland Square, 103P172824.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P120816MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **85164**
Client ID: **PBW** Batch ID: **P12VW076** TestNo: **EPA 8260B** Analysis Date: **8/16/2012** SeqNo: **1428459**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,3-Dichloropropane	ND	0.50									
1,4-Dichlorobenzene	ND	0.50									
2,2-Dichloropropane	ND	0.50									
2-Chlorotoluene	ND	0.50									
4-Chlorotoluene	ND	0.50									
4-Isopropyltoluene	ND	0.50									
Benzene	ND	0.50									
Bromobenzene	ND	0.50									
Bromodichloromethane	ND	0.50									
Bromoform	ND	0.50									
Bromomethane	ND	0.50									
Carbon tetrachloride	ND	0.50									
Chlorobenzene	ND	0.50									
Chloroethane	ND	0.50									
Chloroform	ND	0.50									
Chloromethane	ND	0.50									
cis-1,2-Dichloroethene	ND	0.50									
cis-1,3-Dichloropropene	ND	0.50									
Dibromochloromethane	ND	0.50									
Dibromomethane	ND	0.50									
Dichlorodifluoromethane	ND	0.50									
Ethylbenzene	ND	0.50									
Hexachlorobutadiene	ND	0.50									
Isopropylbenzene	ND	0.50									
m,p-Xylene	ND	1.0									
Methylene chloride	0.950	2.0									
n-Butylbenzene	ND	0.50									
n-Propylbenzene	ND	0.50									
Naphthalene	ND	0.50									
o-Xylene	ND	0.50									

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N008315
Project: Maryland Square, 103P172824.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P120816MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **85164**
Client ID: **PBW** Batch ID: **P12VW076** TestNo: **EPA 8260B** Analysis Date: **8/16/2012** SeqNo: **1428459**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
sec-Butylbenzene	ND	0.50									
Styrene	ND	0.50									
tert-Butylbenzene	ND	0.50									
Tetrachloroethene	ND	0.50									
Toluene	ND	0.50									
trans-1,2-Dichloroethene	ND	0.50									
Trichloroethene	ND	0.50									
Trichlorofluoromethane	ND	0.50									
Vinyl chloride	ND	0.50									
Surr: 1,2-Dichloroethane-d4	27.490		25.00		110	56	120				
Surr: 4-Bromofluorobenzene	24.840		25.00		99.4	80	120				
Surr: Dibromofluoromethane	27.920		25.00		112	72	120				
Surr: Toluene-d8	25.640		25.00		103	80	123				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

FRAC TANKS

CHAIN OF CUSTODY RECORD

Pg 1 of 1

Advanced Technology Laboratories, Inc.
3151-3153 W. Post Rd.
Las Vegas, NV 89118
Tel: (702) 307-2659 • Fax: (702) 307-2691

FOR LABORATORY USE ONLY:

P.O.#: 1038172824.01

Logged By: BDano Date: 8-13-12 8/13/12

Method of Transport: Client ☐ ATL ☑ CA OverN ☐ FEDEX ☐ Other:

Sample Condition Upon Receipt
1. CHILLED 8.2° IR#2 ☐ N☐ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐
3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: Tetra Tech
Attn: Rob Manriquez
Address: 1230 Columbia St. Ste 1100
City San Diego State CA Zip Code 92101
TEL: (619) 321 6748
FAX: ( )

Project Name: Mainland Square Project #: 1038172824.01
Sampler: I attest to the validity and authenticity of this sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action. (Printed Name) Becki Dano (Signature)

Relinquished by: (Signature and Printed Name)	Becki DANO	Date: 8/13/12	Time: 1415	Received by: (Signature and Printed Name)		Date: 8/13/12	Time: 1510
Relinquished by: (Signature and Printed Name)	M Galey	Date: 8/13/12	Time: 1550	Received by: (Signature and Printed Name)	MASSARO/TN	Date: 8/13/12	Time: 1500
Relinquished by: (Signature and Printed Name)		Date:	Time:	Received by: (Signature and Printed Name)		Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
BECKI DANO 8.13.12
Print Name Date
Signature

Send Report To:
Attn: Rob Manriquez
Co: Tetra Tech
Address: 1230 Columbia St Ste 1100
City San Diego State CA Zip 92101

Bill To:
Attn: Same
Co:
Address
City State Zip

Special Instructions/Comments:
email when ready
becki.dano@tetratech.com
Rob.manriquez@tetratech.com
lisa.medve@tetratech.com
TAT By Friday 8-17-12

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested

SPECIFY APPROPRIATE MATRIX: SOIL, WATER, GROUND WATER, WASTEWATER

ITEM	LAB USE ONLY: Batch # / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8260B (VOC)	8260B (BTEX), (MTBE)	8015B (GRO)	8015B (DRO), (Motor Oil/ORO)	RCRA8 (8010B/7000)	Lead	TDS	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	N008315-1	EW-2 Tank	8/13	1140	X							E	6	VG	H	
		EW-2 Tank	8/13	1140					X			E	2	LP	-	
	-2	EW-1 Tank	8/13	1215	X							E	6	VG	H	Composite Sample
		EW-1 Tank	8/13	1215					X			E	2	LP	-	

QA/QC: RTNE ☐ CT ☐ SWRCB ☐ Logcode ____ OTHER ____

• TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: ☐ A= Overnight ≤ 24 hr ☐ B= Emergency Next workday ☐ C= Critical 2 Workdays ☐ D= Urgent 3 Workdays ☐ E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: White with report, Yellow to folder, Pink to submitter.

Advanced Technology Laboratories, Inc.

Please review the checklist below. Any NO signifies non-compliance. Any non-compliance will be noted and must be understood as having an impact on the quality of the data. All tests will be performed as requested regardless of any compliance issues.

If you have any questions or further instruction, please contact our Project Coordinator at (702) 307-2659.

Cooler Received/Opened On:	8/13/2012	Workorder:	N008315
Rep sample Temp (Deg C):	3.2	IR Gun ID:	2
Temp Blank:	☐ Yes ☑ No		
Carrier name:	ATL		
Last 4 digits of Tracking No.:	na	Packing Material Used:	None
Cooling process:	☑ Ice ☐ Ice Pack ☐ Dry Ice ☐ Other ☐ None		

Sample Receipt Checklist

1. Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
2. Custody seals intact, signed, dated on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
3. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
4. Chain of custody present?	Yes ☑	No ☐	
5. Sampler's name present in COC?	Yes ☑	No ☐	
6. Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
7. Chain of custody agrees with sample labels?	Yes ☑	No ☐	
8. Samples in proper container/bottle?	Yes ☑	No ☐	
9. Sample containers intact?	Yes ☑	No ☐	
10. Sufficient sample volume for indicated test?	Yes ☑	No ☐	
11. All samples received within holding time?	Yes ☑	No ☐	
12. Temperature of rep sample or Temp Blank within acceptable limit?	Yes ☑	No ☐	NA ☐
13. Water - VOA vials have zero headspace?	Yes ☑	No ☐	NA ☐
14. Water - pH acceptable upon receipt? Example: pH > 12 for (CN,S); pH<2 for Metals	Yes ☐	No ☐	NA ☑
15. Did the bottle labels indicate correct preservatives used?	Yes ☑	No ☐	NA ☐
16. Were there Non-Conformance issues at login?	Yes ☐	No ☐	NA ☑
Was Client notified?	Yes ☑ 8/14/12	No ☐	NA ☑

Comments: See correspondence.

Checklist Completed B MBC 8/14/12

Reviewed By: MS 8/15/2012

CLIENT CORRESPONDENCE LOG

DATE: 8/14/2012 11:22:15 AM

Client Name: -TETRATECH-LV

ATL Workorder No.: N00831

DATE	CONTACT	CALL IN/OUT	ISSUE / PROBLEM	COMMENTS/CORRECTIVE ACTION	INITIAL
8/14/2012 11:21:17	B. Dano	OUT	Compositing the 8260.	Per client, do not composite samples for 8260, just the sample for TDS.	marlonc

August 29, 2012

Lisa Medve
Tetra Tech
1771 East Flamingo Rd, Suite A113
Las Vegas, NV 89119
TEL: (702) 383- 6737
FAX: (702) 838-5476

CA-ELAP No.: 2676
NV Cert. No.: NV-009222007A

Workorder No.: N008395

RE: Maryland Square

Attention: Lisa Medve

Enclosed are the results for sample(s) received on August 28, 2012 by Advanced Technology Laboratories, Inc. . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

I hereby certify that all laboratory analysis requested were performed by Nevada Division of Environmental Protection-certified laboratory for the parameters and matrices reported herein.

Thank you for the opportunity to service the needs of your company.Please feel free to call me at (702) 307-2659 if I can be of further assistance to your company.

Sincerely,

Jose Tenorio Jr.
Laboratory Director

The cover letter and the case narrative are an integral part of this analytical report and cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories - Las Vegas.

CLIENT: Tetra Tech
Project: Maryland Square
Lab Order: N008395

CASE NARRATIVE

SAMPLE RECEIVING/GENERAL COMMENTS:

Sample was received intact with proper chain of custody documentation.

Cooler temperature and sample preservation were verified upon receipt of samples if applicable.

Information on sample receipt conditions including discrepancies can be found in attached Sample Receipt Checklist Form.

Sample was analyzed within method holding time.

Analytical Comments for EPA 8260B:

Laboratory Control Sample (LCS) recovery biased high for 1,2,3-Trichlorobenzene. Sample result was non-detect (ND) for this analyte therefore reanalysis of the sample was not necessary.

CLIENT:	Tetra Tech	**Client Sample ID:**	EW1A
Lab Order:	N008395	**Collection Date:**	8/28/2012 1:28:00 AM
Project:	Maryland Square	**Matrix:**	WATER
Lab ID:	N008395-001A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS5_120829A QC Batch: P12VW085 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	8/29/2012 08:48 AM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	8/29/2012 08:48 AM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	8/29/2012 08:48 AM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	8/29/2012 08:48 AM
1,1-Dichloroethane	ND	0.50		µg/L	1	8/29/2012 08:48 AM
1,1-Dichloroethene	ND	0.50		µg/L	1	8/29/2012 08:48 AM
1,1-Dichloropropene	ND	0.50		µg/L	1	8/29/2012 08:48 AM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	8/29/2012 08:48 AM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	8/29/2012 08:48 AM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	8/29/2012 08:48 AM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	8/29/2012 08:48 AM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	8/29/2012 08:48 AM
1,2-Dibromoethane	ND	0.50		µg/L	1	8/29/2012 08:48 AM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	8/29/2012 08:48 AM
1,2-Dichloroethane	ND	0.50		µg/L	1	8/29/2012 08:48 AM
1,2-Dichloropropane	ND	0.50		µg/L	1	8/29/2012 08:48 AM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	8/29/2012 08:48 AM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	8/29/2012 08:48 AM
1,3-Dichloropropane	ND	0.50		µg/L	1	8/29/2012 08:48 AM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	8/29/2012 08:48 AM
2,2-Dichloropropane	ND	0.50		µg/L	1	8/29/2012 08:48 AM
2-Chlorotoluene	ND	0.50		µg/L	1	8/29/2012 08:48 AM
4-Chlorotoluene	ND	0.50		µg/L	1	8/29/2012 08:48 AM
4-Isopropyltoluene	ND	0.50		µg/L	1	8/29/2012 08:48 AM
Benzene	ND	0.50		µg/L	1	8/29/2012 08:48 AM
Bromobenzene	ND	0.50		µg/L	1	8/29/2012 08:48 AM
Bromodichloromethane	ND	0.50		µg/L	1	8/29/2012 08:48 AM
Bromoform	ND	0.50		µg/L	1	8/29/2012 08:48 AM
Bromomethane	ND	0.50		µg/L	1	8/29/2012 08:48 AM
Carbon tetrachloride	ND	0.50		µg/L	1	8/29/2012 08:48 AM
Chlorobenzene	ND	0.50		µg/L	1	8/29/2012 08:48 AM
Chloroethane	ND	0.50		µg/L	1	8/29/2012 08:48 AM
Chloroform	ND	0.50		µg/L	1	8/29/2012 08:48 AM
Chloromethane	ND	0.50		µg/L	1	8/29/2012 08:48 AM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	8/29/2012 08:48 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Tetra Tech	**Client Sample ID:**	EW1A
Lab Order:	N008395	**Collection Date:**	8/28/2012 1:28:00 AM
Project:	Maryland Square	**Matrix:**	WATER
Lab ID:	N008395-001A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS5_120829A QC Batch: P12VW085 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Dibromochloromethane	ND	0.50		µg/L	1	8/29/2012 08:48 AM
Dibromomethane	ND	0.50		µg/L	1	8/29/2012 08:48 AM
Dichlorodifluoromethane	ND	0.50		µg/L	1	8/29/2012 08:48 AM
Ethylbenzene	ND	0.50		µg/L	1	8/29/2012 08:48 AM
Hexachlorobutadiene	ND	0.50		µg/L	1	8/29/2012 08:48 AM
Isopropylbenzene	ND	0.50		µg/L	1	8/29/2012 08:48 AM
m,p-Xylene	ND	1.0		µg/L	1	8/29/2012 08:48 AM
Methylene chloride	ND	2.0		µg/L	1	8/29/2012 08:48 AM
MTBE	ND	0.50		µg/L	1	8/29/2012 08:48 AM
n-Butylbenzene	ND	0.50		µg/L	1	8/29/2012 08:48 AM
n-Propylbenzene	ND	0.50		µg/L	1	8/29/2012 08:48 AM
Naphthalene	ND	0.50		µg/L	1	8/29/2012 08:48 AM
o-Xylene	ND	0.50		µg/L	1	8/29/2012 08:48 AM
sec-Butylbenzene	ND	0.50		µg/L	1	8/29/2012 08:48 AM
Styrene	ND	0.50		µg/L	1	8/29/2012 08:48 AM
tert-Butylbenzene	ND	0.50		µg/L	1	8/29/2012 08:48 AM
Tetrachloroethene	2.6	0.50		µg/L	1	8/29/2012 08:48 AM
Toluene	ND	0.50		µg/L	1	8/29/2012 08:48 AM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	8/29/2012 08:48 AM
Trichloroethene	ND	0.50		µg/L	1	8/29/2012 08:48 AM
Trichlorofluoromethane	ND	0.50		µg/L	1	8/29/2012 08:48 AM
Vinyl chloride	ND	0.50		µg/L	1	8/29/2012 08:48 AM
Surr: 1,2-Dichloroethane-d4	99.4	56-120		%REC	1	8/29/2012 08:48 AM
Surr: 4-Bromofluorobenzene	99.4	80-120		%REC	1	8/29/2012 08:48 AM
Surr: Dibromofluoromethane	99.6	72-120		%REC	1	8/29/2012 08:48 AM
Surr: Toluene-d8	107	80-123		%REC	1	8/29/2012 08:48 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Work Order: N008395
Project: Maryland Square

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P120829LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **85318**
Client ID: **LCSW** Batch ID: **P12VW085** TestNo: **EPA 8260B** Analysis Date: **8/29/2012** SeqNo: **1434548**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	19.780	0.50	20.00	0	98.9	74	122				
1,1,1-Trichloroethane	18.760	0.50	20.00	0	93.8	65	120				
1,1,2,2-Tetrachloroethane	22.410	0.50	20.00	0	112	80	120				
1,1,2-Trichloroethane	19.440	0.50	20.00	0	97.2	80	120				
1,1-Dichloroethane	19.360	0.50	20.00	0	96.8	80	120				
1,1-Dichloroethene	16.980	0.50	20.00	0	84.9	80	120				
1,1-Dichloropropene	20.960	0.50	20.00	0	105	80	120				
1,2,3-Trichlorobenzene	25.080	0.50	20.00	0	125	80	124				S
1,2,3-Trichloropropane	22.550	0.50	20.00	0	113	80	120				
1,2,4-Trichlorobenzene	23.330	0.50	20.00	0	117	80	126				
1,2,4-Trimethylbenzene	23.570	0.50	20.00	0	118	80	123				
1,2-Dibromo-3-chloropropane	19.810	1.0	20.00	0	99.0	70	120				
1,2-Dibromoethane	18.600	0.50	20.00	0	93.0	80	120				
1,2-Dichlorobenzene	19.950	0.50	20.00	0	99.8	80	120				
1,2-Dichloroethane	20.160	0.50	20.00	0	101	80	120				
1,2-Dichloropropane	17.990	0.50	20.00	0	90.0	80	120				
1,3,5-Trimethylbenzene	23.750	0.50	20.00	0	119	80	121				
1,3-Dichlorobenzene	19.470	0.50	20.00	0	97.4	80	120				
1,3-Dichloropropane	20.640	0.50	20.00	0	103	80	120				
1,4-Dichlorobenzene	19.450	0.50	20.00	0	97.3	80	120				
2,2-Dichloropropane	20.690	0.50	20.00	0	103	54	120				
2-Chlorotoluene	22.580	0.50	20.00	0	113	80	122				
4-Chlorotoluene	22.480	0.50	20.00	0	112	80	120				
4-Isopropyltoluene	23.900	0.50	20.00	0	120	80	122				
Benzene	20.610	0.50	20.00	0	103	80	120				
Bromobenzene	22.490	0.50	20.00	0	112	80	120				
Bromodichloromethane	17.680	0.50	20.00	0	88.4	70	120				
Bromoform	19.050	0.50	20.00	0	95.2	66	120				
Bromomethane	17.490	0.50	20.00	0	87.5	48	155				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Tetra Tech
Work Order: N008395
Project: Maryland Square

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P120829LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **85318**
Client ID: **LCSW** Batch ID: **P12VW085** TestNo: **EPA 8260B** Analysis Date: **8/29/2012** SeqNo: **1434548**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Carbon tetrachloride	21.070	0.50	20.00	0	105	60	120				
Chlorobenzene	20.210	0.50	20.00	0	101	80	120				
Chloroethane	16.350	0.50	20.00	0	81.8	62	147				
Chloroform	18.730	0.50	20.00	0	93.6	80	120				
Chloromethane	14.840	0.50	20.00	0	74.2	63	121				
cis-1,2-Dichloroethene	18.130	0.50	20.00	0	90.7	80	120				
Dibromochloromethane	19.980	0.50	20.00	0	99.9	67	123				
Dibromomethane	19.760	0.50	20.00	0	98.8	80	120				
Dichlorodifluoromethane	17.170	0.50	20.00	0	85.9	70	121				
Ethylbenzene	20.340	0.50	20.00	0	102	80	120				
Hexachlorobutadiene	24.040	0.50	20.00	0	120	80	123				
Isopropylbenzene	21.740	0.50	20.00	0	109	80	121				
m,p-Xylene	42.320	1.0	40.00	0	106	80	120				
Methylene chloride	15.480	2.0	20.00	0	77.4	75	120				
MTBE	17.290	0.50	20.00	0	86.5	70	120				
n-Butylbenzene	20.180	0.50	20.00	0	101	80	129				
n-Propylbenzene	22.570	0.50	20.00	0	113	80	122				
Naphthalene	24.650	0.50	20.00	0	123	73	127				
o-Xylene	21.090	0.50	20.00	0	105	80	120				
sec-Butylbenzene	23.760	0.50	20.00	0	119	80	120				
Styrene	19.750	0.50	20.00	0	98.8	80	120				
tert-Butylbenzene	22.670	0.50	20.00	0	113	80	120				
Tetrachloroethene	19.350	0.50	20.00	0	96.8	80	121				
Toluene	18.860	0.50	20.00	0	94.3	80	120				
trans-1,2-Dichloroethene	17.150	0.50	20.00	0	85.8	80	120				
Trichloroethene	18.690	0.50	20.00	0	93.5	80	120				
Trichlorofluoromethane	16.760	0.50	20.00	0	83.8	71	148				
Vinyl chloride	17.880	0.50	20.00	0	89.4	80	120				
Surr: 1,2-Dichloroethane-d4	23.900		25.00		95.6	56	120				
Surr: 4-Bromofluorobenzene	26.260		25.00		105	80	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N008395
Project: Maryland Square

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P120829LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **85318**
Client ID: **LCSW** Batch ID: **P12VW085** TestNo: **EPA 8260B** Analysis Date: **8/29/2012** SeqNo: **1434548**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Dibromofluoromethane	24.730		25.00		98.9	72	120				
Surr: Toluene-d8	24.310		25.00		97.2	80	123				

Sample ID: **P120829LCSD** SampType: **LCSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **85318**
Client ID: **LCSS02** Batch ID: **P12VW085** TestNo: **EPA 8260B** Analysis Date: **8/29/2012** SeqNo: **1434549**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	20.370	0.50	20.00	0	102	74	122	19.78	2.94	20	
1,1,1-Trichloroethane	21.440	0.50	20.00	0	107	65	120	18.76	13.3	20	
1,1,2,2-Tetrachloroethane	18.510	0.50	20.00	0	92.6	80	120	22.41	19.1	20	
1,1,2-Trichloroethane	19.350	0.50	20.00	0	96.8	80	120	19.44	0.464	20	
1,1-Dichloroethane	20.660	0.50	20.00	0	103	80	120	19.36	6.50	20	
1,1-Dichloroethene	18.820	0.50	20.00	0	94.1	80	120	16.98	10.3	20	
1,1-Dichloropropene	20.370	0.50	20.00	0	102	80	120	20.96	2.86	20	
1,2,3-Trichlorobenzene	23.190	0.50	20.00	0	116	80	124	25.08	7.83	20	
1,2,3-Trichloropropane	18.500	0.50	20.00	0	92.5	80	120	22.55	19.7	20	
1,2,4-Trichlorobenzene	21.600	0.50	20.00	0	108	80	126	23.33	7.70	20	
1,2,4-Trimethylbenzene	20.400	0.50	20.00	0	102	80	123	23.57	14.4	20	
1,2-Dibromo-3-chloropropane	21.230	1.0	20.00	0	106	70	120	19.81	6.92	20	
1,2-Dibromoethane	20.250	0.50	20.00	0	101	80	120	18.60	8.49	20	
1,2-Dichlorobenzene	21.920	0.50	20.00	0	110	80	120	19.95	9.41	20	
1,2-Dichloroethane	18.960	0.50	20.00	0	94.8	80	120	20.16	6.13	20	
1,2-Dichloropropane	21.560	0.50	20.00	0	108	80	120	17.99	18.1	20	
1,3,5-Trimethylbenzene	19.890	0.50	20.00	0	99.4	80	121	23.75	17.7	20	
1,3-Dichlorobenzene	19.980	0.50	20.00	0	99.9	80	120	19.47	2.59	20	
1,3-Dichloropropane	20.520	0.50	20.00	0	103	80	120	20.64	0.583	20	
1,4-Dichlorobenzene	19.620	0.50	20.00	0	98.1	80	120	19.45	0.870	20	
2,2-Dichloropropane	21.680	0.50	20.00	0	108	54	120	20.69	4.67	20	
2-Chlorotoluene	19.010	0.50	20.00	0	95.1	80	122	22.58	17.2	20	
4-Chlorotoluene	19.040	0.50	20.00	0	95.2	80	120	22.48	16.6	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N008395
Project: Maryland Square

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P120829LCSD** SampType: **LCSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **85318**
Client ID: **LCSS02** Batch ID: **P12VW085** TestNo: **EPA 8260B** Analysis Date: **8/29/2012** SeqNo: **1434549**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4-Isopropyltoluene	20.990	0.50	20.00	0	105	80	122	23.90	13.0	20	
Benzene	20.770	0.50	20.00	0	104	80	120	20.61	0.773	20	
Bromobenzene	19.080	0.50	20.00	0	95.4	80	120	22.49	16.4	20	
Bromodichloromethane	20.880	0.50	20.00	0	104	70	120	17.68	16.6	20	
Bromoform	18.070	0.50	20.00	0	90.4	66	120	19.05	5.28	20	
Bromomethane	19.650	0.50	20.00	0	98.2	48	155	17.49	11.6	20	
Carbon tetrachloride	22.490	0.50	20.00	0	112	60	120	21.07	6.52	20	
Chlorobenzene	19.970	0.50	20.00	0	99.8	80	120	20.21	1.19	20	
Chloroethane	18.580	0.50	20.00	0	92.9	62	147	16.35	12.8	20	
Chloroform	20.410	0.50	20.00	0	102	80	120	18.73	8.58	20	
Chloromethane	16.720	0.50	20.00	0	83.6	63	121	14.84	11.9	20	
cis-1,2-Dichloroethene	20.610	0.50	20.00	0	103	80	120	18.13	12.8	20	
Dibromochloromethane	20.430	0.50	20.00	0	102	67	123	19.98	2.23	20	
Dibromomethane	20.880	0.50	20.00	0	104	80	120	19.76	5.51	20	
Dichlorodifluoromethane	20.050	0.50	20.00	0	100	70	121	17.17	15.5	20	
Ethylbenzene	20.100	0.50	20.00	0	101	80	120	20.34	1.19	20	
Hexachlorobutadiene	21.790	0.50	20.00	0	109	80	123	24.04	9.82	20	
Isopropylbenzene	19.020	0.50	20.00	0	95.1	80	121	21.74	13.3	20	
m,p-Xylene	43.280	1.0	40.00	0	108	80	120	42.32	2.24	20	
Methylene chloride	17.610	2.0	20.00	0	88.0	75	120	15.48	12.9	20	
MTBE	20.330	0.50	20.00	0	102	70	120	17.29	16.2	20	
n-Butylbenzene	22.490	0.50	20.00	0	112	80	129	20.18	10.8	20	
n-Propylbenzene	19.250	0.50	20.00	0	96.2	80	122	22.57	15.9	20	
Naphthalene	22.930	0.50	20.00	0	115	73	127	24.65	7.23	20	
o-Xylene	18.680	0.50	20.00	0	93.4	80	120	21.09	12.1	20	
sec-Butylbenzene	20.990	0.50	20.00	0	105	80	120	23.76	12.4	20	
Styrene	19.330	0.50	20.00	0	96.7	80	120	19.75	2.15	20	
tert-Butylbenzene	19.650	0.50	20.00	0	98.2	80	120	22.67	14.3	20	
Tetrachloroethene	18.870	0.50	20.00	0	94.4	80	121	19.35	2.51	20	
Toluene	20.280	0.50	20.00	0	101	80	120	18.86	7.26	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N008395
Project: Maryland Square

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P120829LCSD** SampType: **LCSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **85318**
Client ID: **LCSS02** Batch ID: **P12VW085** TestNo: **EPA 8260B** Analysis Date: **8/29/2012** SeqNo: **1434549**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
trans-1,2-Dichloroethene	20.510	0.50	20.00	0	103	80	120	17.15	17.8	20	
Trichloroethene	19.010	0.50	20.00	0	95.1	80	120	18.69	1.70	20	
Trichlorofluoromethane	19.030	0.50	20.00	0	95.2	71	148	16.76	12.7	20	
Vinyl chloride	20.290	0.50	20.00	0	101	80	120	17.88	12.6	20	
Surr: 1,2-Dichloroethane-d4	22.680		25.00		90.7	56	120		0		
Surr: 4-Bromofluorobenzene	24.640		25.00		98.6	80	120		0		
Surr: Dibromofluoromethane	26.840		25.00		107	72	120		0		
Surr: Toluene-d8	25.900		25.00		104	80	123		0		

Sample ID: **P120829MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **85318**
Client ID: **PBW** Batch ID: **P12VW085** TestNo: **EPA 8260B** Analysis Date: **8/29/2012** SeqNo: **1434550**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	0.50									
1,1,1-Trichloroethane	ND	0.50									
1,1,2,2-Tetrachloroethane	ND	0.50									
1,1,2-Trichloroethane	ND	0.50									
1,1-Dichloroethane	ND	0.50									
1,1-Dichloroethene	ND	0.50									
1,1-Dichloropropene	ND	0.50									
1,2,3-Trichlorobenzene	ND	0.50									
1,2,3-Trichloropropane	ND	0.50									
1,2,4-Trichlorobenzene	ND	0.50									
1,2,4-Trimethylbenzene	ND	0.50									
1,2-Dibromo-3-chloropropane	ND	1.0									
1,2-Dibromoethane	ND	0.50									
1,2-Dichlorobenzene	ND	0.50									
1,2-Dichloroethane	ND	0.50									
1,2-Dichloropropane	ND	0.50									
1,3,5-Trimethylbenzene	ND	0.50									

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N008395
Project: Maryland Square

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P120829MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **85318**
Client ID: **PBW** Batch ID: **P12VW085** TestNo: **EPA 8260B** Analysis Date: **8/29/2012** SeqNo: **1434550**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,3-Dichlorobenzene	ND	0.50									
1,3-Dichloropropane	ND	0.50									
1,4-Dichlorobenzene	ND	0.50									
2,2-Dichloropropane	ND	0.50									
2-Chlorotoluene	ND	0.50									
4-Chlorotoluene	ND	0.50									
4-Isopropyltoluene	ND	0.50									
Benzene	ND	0.50									
Bromobenzene	ND	0.50									
Bromodichloromethane	ND	0.50									
Bromoform	ND	0.50									
Bromomethane	ND	0.50									
Carbon tetrachloride	ND	0.50									
Chlorobenzene	ND	0.50									
Chloroethane	ND	0.50									
Chloroform	ND	0.50									
Chloromethane	ND	0.50									
cis-1,2-Dichloroethene	ND	0.50									
Dibromochloromethane	ND	0.50									
Dibromomethane	ND	0.50									
Dichlorodifluoromethane	ND	0.50									
Ethylbenzene	ND	0.50									
Hexachlorobutadiene	ND	0.50									
Isopropylbenzene	ND	0.50									
m,p-Xylene	ND	1.0									
Methylene chloride	ND	2.0									
MTBE	ND	0.50									
n-Butylbenzene	ND	0.50									
n-Propylbenzene	ND	0.50									
Naphthalene	ND	0.50									

Qualifiers:

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ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
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Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N008395
Project: Maryland Square

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P120829MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **85318**
Client ID: **PBW** Batch ID: **P12VW085** TestNo: **EPA 8260B** Analysis Date: **8/29/2012** SeqNo: **1434550**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
o-Xylene	ND	0.50									
sec-Butylbenzene	ND	0.50									
Styrene	ND	0.50									
tert-Butylbenzene	ND	0.50									
Tetrachloroethene	ND	0.50									
Toluene	ND	0.50									
trans-1,2-Dichloroethene	ND	0.50									
Trichloroethene	ND	0.50									
Trichlorofluoromethane	ND	0.50									
Vinyl chloride	ND	0.50									
Surr: 1,2-Dichloroethane-d4	23.580		25.00		94.3	56	120				
Surr: 4-Bromofluorobenzene	23.750		25.00		95.0	80	120				
Surr: Dibromofluoromethane	24.210		25.00		96.8	72	120				
Surr: Toluene-d8	25.280		25.00		101	80	123				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
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Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CHAIN OF CUSTODY RECORD

Page of

Advanced Technology Laboratories INC.
3151-3153 W. Post Rd.
Las Vegas, NV 89118
Tel: (702) 307-2659 • Fax: (702) 307-2691

FOR LABORATORY USE ONLY

P.O. #:

Logged By: Date: 8/28/12

Method of Transport: Client ☐ ATL ☑ CA OverN ☐ FedEx ☐ Other:

Sample Condition Upon Receipt: 1. CHILLED 5.1°C Y ☐ N ☐ | 2. HEADSPACE (VOA) IR#2 ICE Y ☐ N ☐ | 3. CONTAINER INTACT Y ☐ N ☐ | 4. SEALED Y ☐ N ☐ | 5. # OF SPLS MATCH COC Y ☐ N ☐ | 6. PRESERVED Y ☐ N ☐

Client: Tetra tech
Attention: Lisa Medve
Address:
City: State: Zip Code:
Tel:
Fax:

Project Name: Maryland Square
Project #:
Sampler: *I attest to the validity and authenticity of this sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action.*
(Printed Name) Michael S. Gray
(Signature) Michael S

Relinquished by: (Signature and Printed Name)	Date	Time	Received by: (Signature and Printed Name)	Date	Time
Michael S. Gray Michael Grey	8/28/12	1:33PM	MBCAMPIN	8/28/12	1345

I hereby authorize ATL to perform the work indicated below:
Project Mgr./Submitter: Michael Gray 8/28/12
Print Name Date
Michael S
Signature

Send Report To:
Attn: Lisa Medve
Co: Tetra tech
Addr: 518 17th St Suite 900
City: Denver State: CO Zip: 80202

Bill To:
Attn: SAME
Co:
Addr:
City: State: Zip:

Special Instructions/Comments:
Hold on to other Samples

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample :$2.00 / sample /mo (after 45 days)
- Records: $1 /ATL workorder /mo (after 1 year)

Circle or Add Analysis(es) Requested: 8260B (Volatiles) | 8015M - GRO | 8015B - DRO/ORO

SPECIFY APPROPRIATE MATRIX: SOIL | WATER | GROUND WATER | WASTEWATER

QA/QC: RTNE ☐ CT ☐ SWRCB ☐ Logcode____ OTHER ____

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample ID / Location	Date	Time	TAT	Container(s): #	Type	PRESERVATION	REMARKS
	ND0839G-1	EW1A	8/28/12	1:28	✓			H	

■ TAT starts 8AM the following day if samples received after 3 PM

TAT: ☐ A = Overnight ≤ 24 hrs ☐ B = Emergency Next Workday ☐ C = Critical 2 Workdays ☐ D = Urgent 3 Workdays ☐ E = Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl $N=HNO_3$ $S=H_2SO_4$ C=4°C $Z=Zn(AC)_2$ O=NaOH $T=Na_2S_2O_3$

Advanced Technology Laboratories, Inc.

Please review the checklist below. Any NO signifies non-compliance. Any non-compliance will be noted and must be understood as having an impact on the quality of the data. All tests will be performed as requested regardless of any compliance issues.

If you have any questions or further instruction, please contact our Project Coordinator at (702) 307-2659.

Cooler Received/Opened On: 8/28/2012 Workorder: N008395

Rep sample Temp (Deg C): 5.1 IR Gun ID: 2

Temp Blank: ☐ Yes ☑ No

Carrier name: ATL

Last 4 digits of Tracking No.: na Packing Material Used: None

Cooling process: ☑ Ice ☐ Ice Pack ☐ Dry Ice ☐ Other ☐ None

Sample Receipt Checklist

1. Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
2. Custody seals intact, signed, dated on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
3. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
4. Chain of custody present?	Yes ☑	No ☐	
5. Sampler's name present in COC?	Yes ☑	No ☐	
6. Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
7. Chain of custody agrees with sample labels?	Yes ☑	No ☐	
8. Samples in proper container/bottle?	Yes ☑	No ☐	
9. Sample containers intact?	Yes ☑	No ☐	
10. Sufficient sample volume for indicated test?	Yes ☑	No ☐	
11. All samples received within holding time?	Yes ☑	No ☐	
12. Temperature of rep sample or Temp Blank within acceptable limit?	Yes ☑	No ☐	NA ☐
13. Water - VOA vials have zero headspace?	Yes ☑	No ☐	NA ☐
14. Water - pH acceptable upon receipt? Example: pH > 12 for (CN,S); pH<2 for Metals	Yes ☐	No ☐	NA ☑
15. Did the bottle labels indicate correct preservatives used?	Yes ☑	No ☐	NA ☐
16. Were there Non-Conformance issues at login?	Yes ☐	No ☐	NA ☑
Was Client notified?	Yes ☐	No ☐	NA ☑

Comments:

Checklist Completed By MBC 8/29/12

Reviewed By: 8/29/12

September 12, 2012

Lisa Medve
Tetra Tech
1771 East Flamingo Rd, Suite A113
Las Vegas, NV 89119
TEL: (702) 383- 6737
FAX: (702) 838-5476

CA-ELAP No.:2676
NV Cert. No.:NV-009222007A

Workorder No.: N008395

RE: Maryland Square

Attention: Lisa Medve

Enclosed are the results for sample(s) received on August 28, 2012 by Advanced Technology Laboratories, Inc. . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

This is an addendum report. Please incorporate with documentation previously submitted.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (702) 307-2659 if I can be of further assistance to your company.

Sincerely,

Jose Tenorio Jr.
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories - Las Vegas.

CASE NARRATIVE

Analytical Comments for EPA 6010B:

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) are outside recovery criteria for Calcium possibly due to matrix interference. The associated Laboratory Control Sample (LCS) recovery was acceptable.

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Lab Order: N008395
Project: Maryland Square
Lab ID: N008395-001

Client Sample ID: EW1A
Collection Date: 8/28/2012 1:28:00 PM
Matrix: WATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
AMMONIA-N						
			SM4500-NH3C			
RunID: WETCHEM_120911F QC Batch: 40675				PrepDate: 9/11/2012		Analyst: **KAB**
Nitrogen, Ammonia (As N)	0.48	0.10		mg/L	1	9/11/2012
TOTAL KJELDAHL NITROGEN						
	SM 4500 NORG C		**SM4500-NH3C**			
RunID: WETCHEM_120911G QC Batch: 40674				PrepDate: 9/11/2012		Analyst: **KAB**
Nitrogen, Total Kjeldahl	0.52	0.40		mg/L	1	9/11/2012
TOTAL PHOSPHORUS						
			EPA 365.3			
RunID: WETCHEM_120911C QC Batch: 40635				PrepDate: 9/11/2012		Analyst: **KAB**
Phosphorus, Total (As P)	ND	0.020		mg/L	1	9/11/2012
ANIONS BY ION CHROMATOGRAPHY						
			EPA 300.0			
RunID: IC2_120907A QC Batch: R85504				PrepDate:		Analyst: **QBM**
Fluoride	0.58	0.10		mg/L	1	9/7/2012 04:11 PM
ANIONS BY ION CHROMATOGRAPHY						
			EPA 300.0			
RunID: IC2_120907A QC Batch: R85504				PrepDate:		Analyst: **QBM**
Sulfate	580	100		mg/L	100	9/7/2012 03:48 PM
MERCURY BY COLD VAPOR TECHNIQUE						
			EPA 7470A			
RunID: AA1_120910A QC Batch: 40636				PrepDate: 9/7/2012		Analyst: **CEI**
Mercury	ND	0.20		µg/L	1	9/10/2012
HARDNESS BY CALCULATION						
	EPA 3010A		**SM 2340 B**			
RunID: ICP2_120907B QC Batch: 40637				PrepDate: 9/7/2012		Analyst: **JT**
Hardness, Calcium (As CaCO3)	300	0.50		mg/L	1	9/7/2012 01:58 PM
Hardness, Magnesium (As CaCO3)	250	0.50		mg/L	1	9/7/2012 01:58 PM
Total Hardness (As CaCO3)	550	1.0		mg/L	1	9/7/2012 01:58 PM
ICP METALS						
	EPA 3010A		**EPA 6010B**			
RunID: ICP2_120907B QC Batch: 40637				PrepDate: 9/7/2012		Analyst: **JT**
Antimony	ND	0.010		mg/L	1	9/7/2012 01:58 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
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S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N008395
Project: Maryland Square
Lab ID: N008395-001

Client Sample ID: EW1A
Collection Date: 8/28/2012 1:28:00 PM
Matrix: WATER

ICP METALS

EPA 3010A **EPA 6010B**

RunID: ICP2_120907B QC Batch: 40637 PrepDate: 9/7/2012 Analyst: **JT**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Arsenic	ND	0.010		mg/L	1	9/7/2012 01:58 PM
Barium	0.042	0.0030		mg/L	1	9/7/2012 01:58 PM
Beryllium	ND	0.0030		mg/L	1	9/7/2012 01:58 PM
Boron	1.3	0.10		mg/L	1	9/7/2012 01:58 PM
Cadmium	ND	0.0030		mg/L	1	9/7/2012 01:58 PM
Calcium	120	0.50		mg/L	1	9/7/2012 01:58 PM
Copper	0.0067	0.0050		mg/L	1	9/7/2012 01:58 PM
Iron	0.28	0.10		mg/L	1	9/7/2012 01:58 PM
Lead	ND	0.0050		mg/L	1	9/7/2012 01:58 PM
Magnesium	60	0.10		mg/L	1	9/7/2012 01:58 PM
Manganese	ND	0.50		mg/L	1	9/7/2012 01:58 PM
Molybdenum	0.0060	0.0050		mg/L	1	9/7/2012 01:58 PM
Nickel	ND	0.0050		mg/L	1	9/7/2012 01:58 PM
Selenium	ND	0.010		mg/L	1	9/7/2012 01:58 PM
Silver	ND	0.0030		mg/L	1	9/7/2012 01:58 PM
Thallium	ND	0.015		mg/L	1	9/7/2012 01:58 PM
Zinc	0.061	0.010		mg/L	1	9/7/2012 01:58 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Work Order: N008395
Project: Maryland Square

ANALYTICAL QC SUMMARY REPORT

TestCode: 300_W_F

Sample ID: **MB-R85504_F**	SampType: **MBLK**	TestCode: **300_W_F**	Units: **mg/L**	Prep Date:	RunNo: **85504**
Client ID: **PBW**	Batch ID: **R85504**	TestNo: **EPA 300.0**		Analysis Date: **9/7/2012**	SeqNo: **1440235**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	ND	0.10									

Sample ID: **LCS-R85504_F**	SampType: **LCS**	TestCode: **300_W_F**	Units: **mg/L**	Prep Date:	RunNo: **85504**
Client ID: **LCSW**	Batch ID: **R85504**	TestNo: **EPA 300.0**		Analysis Date: **9/7/2012**	SeqNo: **1440236**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	2.365	0.10	2.500	0	94.6	90	110				

Sample ID: **N008463-001EMS**	SampType: **MS**	TestCode: **300_W_F**	Units: **mg/L**	Prep Date:	RunNo: **85504**
Client ID: **ZZZZZZ**	Batch ID: **R85504**	TestNo: **EPA 300.0**		Analysis Date: **9/7/2012**	SeqNo: **1440240**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	21.780	1.0	25.00	0.4580	85.3	80	120				

Sample ID: **N008463-001EMSD**	SampType: **MSD**	TestCode: **300_W_F**	Units: **mg/L**	Prep Date:	RunNo: **85504**
Client ID: **ZZZZZZ**	Batch ID: **R85504**	TestNo: **EPA 300.0**		Analysis Date: **9/7/2012**	SeqNo: **1440241**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	21.710	1.0	25.00	0.4580	85.0	80	120	21.78	0.322	20	

Sample ID: **N008463-001EDUP**	SampType: **DUP**	TestCode: **300_W_F**	Units: **mg/L**	Prep Date:	RunNo: **85504**
Client ID: **ZZZZZZ**	Batch ID: **R85504**	TestNo: **EPA 300.0**		Analysis Date: **9/7/2012**	SeqNo: **1440243**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	0.458	0.20						0.4580	0	20	

Qualifiers:

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- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits
- Calculations are based on raw values
- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Tetra Tech
Work Order: N008395
Project: Maryland Square

ANALYTICAL QC SUMMARY REPORT

TestCode: 300_W_SO4

Sample ID: **MB-R85504_SO4**	SampType: **MBLK**	TestCode: **300_W_SO4**	Units: **mg/L**	Prep Date:	RunNo: **85504**
Client ID: **PBW**	Batch ID: **R85504**	TestNo: **EPA 300.0**		Analysis Date: **9/7/2012**	SeqNo: **1440268**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	ND	1.0									

Sample ID: **LCS-R85504_SO4**	SampType: **LCS**	TestCode: **300_W_SO4**	Units: **mg/L**	Prep Date:	RunNo: **85504**
Client ID: **LCSW**	Batch ID: **R85504**	TestNo: **EPA 300.0**		Analysis Date: **9/7/2012**	SeqNo: **1440269**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	4.948	1.0	5.000	0	99.0	90	110				

Sample ID: **N008449-001DDUP**	SampType: **DUP**	TestCode: **300_W_SO4**	Units: **mg/L**	Prep Date:	RunNo: **85504**
Client ID: **ZZZZZZ**	Batch ID: **R85504**	TestNo: **EPA 300.0**		Analysis Date: **9/7/2012**	SeqNo: **1440271**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	240.450	50						240.8	0.125	20	

Sample ID: **N008449-001DMS**	SampType: **MS**	TestCode: **300_W_SO4**	Units: **mg/L**	Prep Date:	RunNo: **85504**
Client ID: **ZZZZZZ**	Batch ID: **R85504**	TestNo: **EPA 300.0**		Analysis Date: **9/7/2012**	SeqNo: **1440272**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	489.650	50	250.0	240.8	99.6	80	120				

Sample ID: **N008449-001DMSD**	SampType: **MSD**	TestCode: **300_W_SO4**	Units: **mg/L**	Prep Date:	RunNo: **85504**
Client ID: **ZZZZZZ**	Batch ID: **R85504**	TestNo: **EPA 300.0**		Analysis Date: **9/7/2012**	SeqNo: **1440273**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	485.850	50	250.0	240.8	98.0	80	120	489.6	0.779	20	

Qualifiers:

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- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N008395
Project: Maryland Square

ANALYTICAL QC SUMMARY REPORT

TestCode: 350.2_4500NH3C_W

Sample ID: **LCS-40675**	SampType: **LCS**	TestCode: **350.2_4500N**	Units: **mg/L**	Prep Date: **9/11/2012**	RunNo: **85505**
Client ID: **LCSW**	Batch ID: **40675**	TestNo: **SM4500-NH3**		Analysis Date: **9/11/2012**	SeqNo: **1440288**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia (As N)	1.010	0.10	1.000	0	101	80	120				

Sample ID: **MB-40675**	SampType: **MBLK**	TestCode: **350.2_4500N**	Units: **mg/L**	Prep Date: **9/11/2012**	RunNo: **85505**
Client ID: **PBW**	Batch ID: **40675**	TestNo: **SM4500-NH3**		Analysis Date: **9/11/2012**	SeqNo: **1440289**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia (As N)	ND	0.10									

Sample ID: **N008395-001E-MS**	SampType: **MS**	TestCode: **350.2_4500N**	Units: **mg/L**	Prep Date: **9/11/2012**	RunNo: **85505**
Client ID: **ZZZZZZ**	Batch ID: **40675**	TestNo: **SM4500-NH3**		Analysis Date: **9/11/2012**	SeqNo: **1440291**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia (As N)	2.415	0.10	2.000	0.4840	96.6	80	120				

Sample ID: **N008395-001E-MSD**	SampType: **MSD**	TestCode: **350.2_4500N**	Units: **mg/L**	Prep Date: **9/11/2012**	RunNo: **85505**
Client ID: **ZZZZZZ**	Batch ID: **40675**	TestNo: **SM4500-NH3**		Analysis Date: **9/11/2012**	SeqNo: **1440292**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia (As N)	2.414	0.10	2.000	0.4840	96.5	80	120	2.415	0.0414	20	

Qualifiers:

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CLIENT: Tetra Tech
Work Order: N008395
Project: Maryland Square

ANALYTICAL QC SUMMARY REPORT

TestCode: 351.3_4500NH3C_W

Sample ID: **LCS-40674**	SampType: **LCS**	TestCode: **351.3_4500N**	Units: **mg/L**	Prep Date: **9/11/2012**	RunNo: **85506**
Client ID: **LCSW**	Batch ID: **40674**	TestNo: **SM4500-NH3**	**SM 4500 Nor**	Analysis Date: **9/11/2012**	SeqNo: **1440303**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Total Kjeldahl	1.001	0.40	1.000	0	100	80	120				

Sample ID: **MB-40674**	SampType: **MBLK**	TestCode: **351.3_4500N**	Units: **mg/L**	Prep Date: **9/11/2012**	RunNo: **85506**
Client ID: **PBW**	Batch ID: **40674**	TestNo: **SM4500-NH3**	**SM 4500 Nor**	Analysis Date: **9/11/2012**	SeqNo: **1440304**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Total Kjeldahl	ND	0.40									

Sample ID: **N008461-001D-MS**	SampType: **MS**	TestCode: **351.3_4500N**	Units: **mg/L**	Prep Date: **9/11/2012**	RunNo: **85506**
Client ID: **ZZZZZZ**	Batch ID: **40674**	TestNo: **SM4500-NH3**	**SM 4500 Nor**	Analysis Date: **9/11/2012**	SeqNo: **1440307**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Total Kjeldahl	2.384	0.40	2.000	0.3220	103	70	130				

Sample ID: **N008461-001D-MSD**	SampType: **MSD**	TestCode: **351.3_4500N**	Units: **mg/L**	Prep Date: **9/11/2012**	RunNo: **85506**
Client ID: **ZZZZZZ**	Batch ID: **40674**	TestNo: **SM4500-NH3**	**SM 4500 Nor**	Analysis Date: **9/11/2012**	SeqNo: **1440308**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Total Kjeldahl	2.384	0.40	2.000	0.3220	103	70	130	2.384	0	20	

Qualifiers:

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Calculations are based on raw values

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Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N008395
Project: Maryland Square

ANALYTICAL QC SUMMARY REPORT

TestCode: 365.3_W_T

Sample ID: **LCS-40635**	SampType: **LCS**	TestCode: **365.3_W_T**	Units: **mg/L**	Prep Date: **9/11/2012**	RunNo: **85496**
Client ID: **LCSW**	Batch ID: **40635**	TestNo: **EPA 365.3**		Analysis Date: **9/11/2012**	SeqNo: **1439852**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phosphorus, Total (As P)	0.411	0.020	0.4000	0	103	80	120				

Sample ID: **MB-40635**	SampType: **MBLK**	TestCode: **365.3_W_T**	Units: **mg/L**	Prep Date: **9/11/2012**	RunNo: **85496**
Client ID: **PBW**	Batch ID: **40635**	TestNo: **EPA 365.3**		Analysis Date: **9/11/2012**	SeqNo: **1439853**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phosphorus, Total (As P)	ND	0.020									

Sample ID: **N008395-001E-MS**	SampType: **MS**	TestCode: **365.3_W_T**	Units: **mg/L**	Prep Date: **9/11/2012**	RunNo: **85496**
Client ID: **ZZZZZZ**	Batch ID: **40635**	TestNo: **EPA 365.3**		Analysis Date: **9/11/2012**	SeqNo: **1439855**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phosphorus, Total (As P)	0.410	0.020	0.4000	0	103	80	120				

Sample ID: **N008395-001E-MSD**	SampType: **MSD**	TestCode: **365.3_W_T**	Units: **mg/L**	Prep Date: **9/11/2012**	RunNo: **85496**
Client ID: **ZZZZZZ**	Batch ID: **40635**	TestNo: **EPA 365.3**		Analysis Date: **9/11/2012**	SeqNo: **1439856**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phosphorus, Total (As P)	0.410	0.020	0.4000	0	103	80	120	0.4100	0	20	

Qualifiers:

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CLIENT: Tetra Tech
Work Order: N008395
Project: Maryland Square

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_W

Sample ID: **MB-40637**	SampType: **MBLK**	TestCode: **6010_W**	Units: **mg/L**	Prep Date: **9/7/2012**	RunNo: **85485**
Client ID: **PBW**	Batch ID: **40637**	TestNo: **EPA 6010B**	**EPA 3010A**	Analysis Date: **9/7/2012**	SeqNo: **1439765**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	0.010									
Arsenic	ND	0.010									
Barium	ND	0.0030									
Beryllium	ND	0.0030									
Boron	ND	0.10									
Cadmium	ND	0.0030									
Calcium	ND	0.50									
Copper	ND	0.0050									
Iron	ND	0.10									
Lead	ND	0.0050									
Magnesium	ND	0.10									
Manganese	ND	0.50									
Molybdenum	0.000602	0.0050									
Nickel	ND	0.0050									
Selenium	ND	0.010									
Silver	ND	0.0030									
Thallium	ND	0.015									
Zinc	ND	0.010									

Sample ID: **LCS-40637**	SampType: **LCS**	TestCode: **6010_W**	Units: **mg/L**	Prep Date: **9/7/2012**	RunNo: **85485**
Client ID: **LCSW**	Batch ID: **40637**	TestNo: **EPA 6010B**	**EPA 3010A**	Analysis Date: **9/7/2012**	SeqNo: **1439766**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	0.512	0.010	0.5000	0	102	85	115				
Arsenic	0.495	0.010	0.5000	0	99.1	85	115				
Barium	0.495	0.0030	0.5000	0	99.1	85	115				
Beryllium	0.486	0.0030	0.5000	0	97.3	85	115				
Boron	4.714	0.10	5.000	0	94.3	85	115				
Cadmium	0.487	0.0030	0.5000	0	97.5	85	115				
Calcium	9.655	0.50	10.00	0	96.5	85	115				

Qualifiers:

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DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

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CLIENT: Tetra Tech
Work Order: N008395
Project: Maryland Square

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_W

Sample ID: **LCS-40637**	SampType: **LCS**	TestCode: **6010_W**	Units: **mg/L**	Prep Date: **9/7/2012**	RunNo: **85485**
Client ID: **LCSW**	Batch ID: **40637**	TestNo: **EPA 6010B**	**EPA 3010A**	Analysis Date: **9/7/2012**	SeqNo: **1439766**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	0.491	0.0050	0.5000	0	98.2	85	115				
Iron	9.841	0.10	10.00	0	98.4	85	115				
Lead	0.495	0.0050	0.5000	0	98.9	85	115				
Magnesium	9.624	0.10	10.00	0	96.2	85	115				
Manganese	0.964	0.50	1.000	0	96.4	85	115				
Molybdenum	0.496	0.0050	0.5000	0	99.1	85	115				
Nickel	0.479	0.0050	0.5000	0	95.8	85	115				
Selenium	0.498	0.010	0.5000	0	99.7	85	115				
Silver	0.522	0.0030	0.5000	0	104	85	115				
Thallium	0.496	0.015	0.5000	0	99.2	85	115				
Zinc	0.483	0.010	0.5000	0	96.5	85	115				

Sample ID: **N008445-001B-MS**	SampType: **MS**	TestCode: **6010_W**	Units: **mg/L**	Prep Date: **9/7/2012**	RunNo: **85485**
Client ID: **ZZZZZZ**	Batch ID: **40637**	TestNo: **EPA 6010B**	**EPA 3010A**	Analysis Date: **9/7/2012**	SeqNo: **1439775**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	0.546	0.010	0.5000	0	109	75	125				
Arsenic	0.559	0.010	0.5000	0.01612	108	75	125				
Barium	0.552	0.0030	0.5000	0.04086	102	75	125				
Beryllium	0.513	0.0030	0.5000	0	103	75	125				
Boron	5.417	0.10	5.000	0.2267	104	75	125				
Cadmium	0.513	0.0030	0.5000	0	103	75	125				
Calcium	70.247	0.50	10.00	56.29	140	75	125				S
Copper	0.518	0.0050	0.5000	0.003798	103	75	125				
Iron	9.868	0.10	10.00	0	98.7	75	125				
Lead	0.506	0.0050	0.5000	0	101	75	125				
Magnesium	42.774	0.10	10.00	31.61	112	75	125				
Manganese	1.003	0.50	1.000	0.002338	100	75	125				
Molybdenum	0.518	0.0050	0.5000	0.005880	102	75	125				
Nickel	0.522	0.0050	0.5000	0	104	75	125				

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike/Surrogate outside of limits due to matrix interference
- DO Surrogate Diluted Out
- Calculations are based on raw values

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N008395
Project: Maryland Square

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_W

Sample ID: **N008445-001B-MS** SampType: **MS** TestCode: **6010_W** Units: **mg/L** Prep Date: **9/7/2012** RunNo: **85485**
Client ID: **ZZZZZZ** Batch ID: **40637** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **9/7/2012** SeqNo: **1439775**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Selenium	0.531	0.010	0.5000	0	106	75	125				
Silver	0.535	0.0030	0.5000	0.001205	107	75	125				
Thallium	0.509	0.015	0.5000	0	102	75	125				
Zinc	0.517	0.010	0.5000	0.001796	103	75	125				

Sample ID: **N008445-001B-MSD** SampType: **MSD** TestCode: **6010_W** Units: **mg/L** Prep Date: **9/7/2012** RunNo: **85485**
Client ID: **ZZZZZZ** Batch ID: **40637** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **9/7/2012** SeqNo: **1439776**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	0.549	0.010	0.5000	0	110	75	125	0.5462	0.566	20	
Arsenic	0.561	0.010	0.5000	0.01612	109	75	125	0.5586	0.483	20	
Barium	0.554	0.0030	0.5000	0.04086	103	75	125	0.5523	0.329	20	
Beryllium	0.515	0.0030	0.5000	0	103	75	125	0.5130	0.394	20	
Boron	5.450	0.10	5.000	0.2267	104	75	125	5.417	0.609	20	
Cadmium	0.514	0.0030	0.5000	0	103	75	125	0.5133	0.162	20	
Calcium	71.885	0.50	10.00	56.29	156	75	125	70.25	2.31	20	S
Copper	0.519	0.0050	0.5000	0.003798	103	75	125	0.5185	0.178	20	
Iron	9.866	0.10	10.00	0	98.7	75	125	9.868	0.0170	20	
Lead	0.509	0.0050	0.5000	0	102	75	125	0.5058	0.628	20	
Magnesium	43.647	0.10	10.00	31.61	120	75	125	42.77	2.02	20	
Manganese	1.002	0.50	1.000	0.002338	100	75	125	1.003	0.0876	20	
Molybdenum	0.521	0.0050	0.5000	0.005880	103	75	125	0.5181	0.464	20	
Nickel	0.523	0.0050	0.5000	0	105	75	125	0.5220	0.138	20	
Selenium	0.538	0.010	0.5000	0	108	75	125	0.5308	1.28	20	
Silver	0.536	0.0030	0.5000	0.001205	107	75	125	0.5349	0.199	20	
Thallium	0.515	0.015	0.5000	0	103	75	125	0.5093	1.18	20	
Zinc	0.518	0.010	0.5000	0.001796	103	75	125	0.5174	0.132	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
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CLIENT: Tetra Tech
Work Order: N008395
Project: Maryland Square

ANALYTICAL QC SUMMARY REPORT

TestCode: 7470_W

Sample ID: **LCS-40636**	SampType: **LCS**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **9/7/2012**	RunNo: **85520**
Client ID: **LCSW**	Batch ID: **40636**	TestNo: **EPA 7470A**		Analysis Date: **9/10/2012**	SeqNo: **1441244**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	5.052	0.20	5.000	0	101	85	115				

Sample ID: **MB-40636**	SampType: **MBLK**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **9/7/2012**	RunNo: **85520**
Client ID: **PBW**	Batch ID: **40636**	TestNo: **EPA 7470A**		Analysis Date: **9/10/2012**	SeqNo: **1441245**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.20									

Sample ID: **N008395-001D-MS**	SampType: **MS**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **9/7/2012**	RunNo: **85520**
Client ID: **ZZZZZZ**	Batch ID: **40636**	TestNo: **EPA 7470A**		Analysis Date: **9/10/2012**	SeqNo: **1441247**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	5.254	0.20	5.000	0	105	75	125				

Sample ID: **N008395-001D-MSD**	SampType: **MSD**	TestCode: **7470_W**	Units: **µg/L**	Prep Date: **9/7/2012**	RunNo: **85520**
Client ID: **ZZZZZZ**	Batch ID: **40636**	TestNo: **EPA 7470A**		Analysis Date: **9/10/2012**	SeqNo: **1441248**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	5.251	0.20	5.000	0	105	75	125	5.254	0.0619	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
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Glen S. Gesmundo

From: Medve, Lisa [lisa.medve@tetratech.com]
Sent: Thursday, September 06, 2012 3:02 PM
To: Glen S. Gesmundo
Cc: Michael Gray (mgray@cascadedrilling.com); Manriquez, Rob; Pelham, Tamara
Subject: RE: MSSC data

Yes, please do. We will be arranging for additional sample collection tomorrow. Thanks.

From: Glen S. Gesmundo [mailto:glen@atl-labs.com]
Sent: Thursday, September 06, 2012 4:01 PM
To: Medve, Lisa
Cc: Pelham, Tamara; mgray@cascadedrilling.com; Manriquez, Rob
Subject: RE: MSSC data

The only tests that can be analyzed within holding time from the list are metals and sulfate. Do you still want to proceed?

Thanks,
Glen

From: Medve, Lisa [mailto:lisa.medve@tetratech.com]
Sent: Thursday, September 06, 2012 2:48 PM
To: Glen S. Gesmundo
Cc: Pelham, Tamara; Michael Gray (mgray@cascadedrilling.com); Manriquez, Rob
Subject: RE: MSSC data

Hi Glen,

Are any of these still within the holding time for analysis? If so can you please run them?

Thanks,
LM

From: Medve, Lisa
Sent: Tuesday, August 28, 2012 10:32 AM
To: 'Glen S. Gesmundo'
Cc: Pelham, Tamara; Michael Gray (mgray@cascadedrilling.com); Manriquez, Rob

Advanced Technology Laboratories, Inc. 3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

Subject: RE: MSSC data
Importance: High

Hi Glen

We just spoke on the phone. Can you please let me know what analyses in addition to 8260B we would need to run for the following list of analytes? The NDEP will not give us a final list of what analyses are required until they see our 8260B and TDS data. We'd like to collect bottles for all of the analyses today and hold all of them except for 8260B, which should be run on 1 day TAT. We'll send the results to NDEP tomorrow and see if they will require any of the other analysis be done; if so we will have the samples collected and ready for analysis.

Also can we get the TDS data for samples N008315 by itself (without the VOC data on the same page)?

Total Residual Chlorine[1] – mg/L
Total Dissolved Solids (TDS) – mg/L
Total Suspended Solids (TSS) – mg/L
Total Petroleum Hydrocarbon (TPH) (C6 – C40) – mg/L[5]
Methyl tert-Butyl Ether (MTBE) - µg/L
Total Nitrogen as N – mg/L
Total Phosphorus as P – mg/L
Trichloroethylene (TCE) - µg/L
Tetrachloroethylene (PCE) - µg/L
Benzene - µg/L
Ethyl benzene - µg/L
Toluene - µg/L
Xylene - µg/L
pH – S.U.
Turbidity – NTU2, 3
Barium – mg/L
Fluoride – mg/L
Iron – mg/L
Sulfate – mg/L
Dissolved Oxygen
Molybdenum - mg/L
Antimony
Arsenic
Beryllium
Boron
Cadmium
Calcium
Copper
Lead
Magnesium

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Manganese
Mercury
Nickel
Selenium
Silver
Sulfur
Thallium
Zinc - total recoverable
Fecal Coliform - MPN100 mL
E Coli4 - MPN/100mL
Hardness (expressed as CaCO3) - mg/L

Please call me on my cell phone if you have any questions. Thanks,

Lisa M. Medve, PE | Senior Environmental Engineer
Direct: 303.312.8845 | Main: 303.312.8800 | Mobile: 303.807.3585 | Fax: 303.295.2818 | lisa.medve@tetratech.com
Tetra Tech | 518 17th Street, Suite 900; Denver, CO 80202 | www.tetratech.com

Advanced Technology Laboratories, Inc. 3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

March 20, 2013

Rob Manriquez
Tetra Tech
1230 Columbia Street, Suite 1000
San Diego, CA 92101

TEL: (858) 527-8803
FAX:

CA-ELAP No.:2676
NV Cert. No.:NV-009222007A

Workorder No.: N009791

RE: MSSC, 103P172829

Attention: Rob Manriquez

Enclosed are the results for sample(s) received on March 11, 2013 by Advanced Technology Laboratories, Inc. . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (702) 307-2659 if I can be of further assistance to your company.

Sincerely,

for

Jose Tenorio Jr.
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories - Las Vegas.

CLIENT: Tetra Tech
Project: MSSC, 103P172829
Lab Order: N009791

CASE NARRATIVE

SAMPLE RECEIVING/GENERAL COMMENTS:

Samples were received intact with proper chain of custody documentation.

Cooler temperature and sample preservation were verified upon receipt of samples if applicable.

Information on sample receipt conditions including discrepancies can be found in attached Sample Receipt Checklist Form.

Samples were analyzed within method holding time.

Analytical Comments for EPA 6020_Dissolved:

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) are outside recovery criteria for Chromium and Manganese possibly due to matrix interference. The associated Laboratory Control Sample (LCS) recovery was acceptable.

Analytical Comments for EPA 8260B_Soil:

Dilution was necessary on composited samples N009791-008, N009791-009, N009791-011 and N009791-012 due to matrix.

Analytical Comments for EPA 8260B_Water:

Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD) recovery bias high for 1,2-Dibromo-3-chloropropane and Bromoform . Sample results were non- detect (ND) for these analytes, therefore reanalysis was not necessary.

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT:	Tetra Tech	**Client Sample ID:**	MW-19I
Lab Order:	N009791	**Collection Date:**	3/8/2013 1:25:00 PM
Project:	MSSC, 103P172829	**Matrix:**	GROUNDWATER
Lab ID:	N009791-001		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
PERMANGANATE BY COLORIMETRY				**COLORIMETRIC**		
RunID: WETCHEM_130311B	QC Batch: R87984			PrepDate:		Analyst: **JT**
Permanganate as KMnO4	ND	1.0		mg/L	1	3/11/2013
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_130312B	QC Batch: P13VW039			PrepDate:		Analyst: **QBM**
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/12/2013 03:31 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/12/2013 03:31 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/12/2013 03:31 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/12/2013 03:31 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/12/2013 03:31 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/12/2013 03:31 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/12/2013 03:31 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/12/2013 03:31 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/12/2013 03:31 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/12/2013 03:31 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/12/2013 03:31 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	3/12/2013 03:31 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/12/2013 03:31 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/12/2013 03:31 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/12/2013 03:31 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/12/2013 03:31 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/12/2013 03:31 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/12/2013 03:31 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/12/2013 03:31 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/12/2013 03:31 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/12/2013 03:31 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/12/2013 03:31 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/12/2013 03:31 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/12/2013 03:31 PM
Benzene	ND	0.50		µg/L	1	3/12/2013 03:31 PM
Bromobenzene	ND	0.50		µg/L	1	3/12/2013 03:31 PM
Bromodichloromethane	ND	0.50		µg/L	1	3/12/2013 03:31 PM
Bromoform	ND	0.50		µg/L	1	3/12/2013 03:31 PM
Bromomethane	ND	0.50		µg/L	1	3/12/2013 03:31 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/12/2013 03:31 PM
Chlorobenzene	ND	0.50		µg/L	1	3/12/2013 03:31 PM
Chloroethane	ND	0.50		µg/L	1	3/12/2013 03:31 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Lab Order: N009791
Project: MSSC, 103P172829
Lab ID: N009791-001

Client Sample ID: MW-19I
Collection Date: 3/8/2013 1:25:00 PM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_130312B	QC Batch: P13VW039			PrepDate:		Analyst: **QBM**
Chloroform	2.7	0.50		µg/L	1	3/12/2013 03:31 PM
Chloromethane	ND	0.50		µg/L	1	3/12/2013 03:31 PM
cis-1,2-Dichloroethene	0.74	0.50		µg/L	1	3/12/2013 03:31 PM
Dibromochloromethane	ND	0.50		µg/L	1	3/12/2013 03:31 PM
Dibromomethane	ND	0.50		µg/L	1	3/12/2013 03:31 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/12/2013 03:31 PM
Ethylbenzene	ND	0.50		µg/L	1	3/12/2013 03:31 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/12/2013 03:31 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/12/2013 03:31 PM
m,p-Xylene	ND	1.0		µg/L	1	3/12/2013 03:31 PM
Methylene chloride	ND	2.0		µg/L	1	3/12/2013 03:31 PM
MTBE	ND	0.50		µg/L	1	3/12/2013 03:31 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/12/2013 03:31 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/12/2013 03:31 PM
Naphthalene	ND	0.50		µg/L	1	3/12/2013 03:31 PM
o-Xylene	ND	0.50		µg/L	1	3/12/2013 03:31 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/12/2013 03:31 PM
Styrene	ND	0.50		µg/L	1	3/12/2013 03:31 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/12/2013 03:31 PM
Tetrachloroethene	710	10		µg/L	20	3/13/2013 01:47 PM
Toluene	ND	0.50		µg/L	1	3/12/2013 03:31 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/12/2013 03:31 PM
Trichloroethene	5.2	0.50		µg/L	1	3/12/2013 03:31 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/12/2013 03:31 PM
Vinyl chloride	ND	0.50		µg/L	1	3/12/2013 03:31 PM
Surr: 1,2-Dichloroethane-d4	104	56-120		%REC	1	3/12/2013 03:31 PM
Surr: 1,2-Dichloroethane-d4	106	56-120		%REC	20	3/13/2013 01:47 PM
Surr: 4-Bromofluorobenzene	104	80-120		%REC	1	3/12/2013 03:31 PM
Surr: 4-Bromofluorobenzene	101	80-120		%REC	20	3/13/2013 01:47 PM
Surr: Dibromofluoromethane	101	72-120		%REC	1	3/12/2013 03:31 PM
Surr: Dibromofluoromethane	102	72-120		%REC	20	3/13/2013 01:47 PM
Surr: Toluene-d8	99.7	80-123		%REC	1	3/12/2013 03:31 PM
Surr: Toluene-d8	98.6	80-123		%REC	20	3/13/2013 01:47 PM
ANIONS BY ION CHROMATOGRAPHY				**EPA 300.0**		
RunID: IC2_130314A	QC Batch: R88075			PrepDate:		Analyst: **QBM**

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Tetra Tech	**Client Sample ID:**	MW-19I
Lab Order:	N009791	**Collection Date:**	3/8/2013 1:25:00 PM
Project:	MSSC, 103P172829	**Matrix:**	GROUNDWATER
Lab ID:	N009791-001		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ANIONS BY ION CHROMATOGRAPHY						
			EPA 300.0			
RunID: IC2_130314A	QC Batch: R88075			PrepDate:		Analyst: **QBM**
Chloride	160	25		mg/L	50	3/14/2013 09:40 AM
DISSOLVED METALS BY ICP						
	EPA 3010A			**EPA 6010B**		
RunID: ICP2_130312A	QC Batch: 42416			PrepDate:	3/12/2013	Analyst: **CEI**
Potassium	13	5.0		mg/L	10	3/12/2013 04:12 PM
DISSOLVED METALS BY ICP-MS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130314A	QC Batch: 42424			PrepDate:	3/14/2013	Analyst: **CEI**
Arsenic	2.0	0.10		µg/L	1	3/14/2013 04:19 PM
Chromium	1.6	1.0		µg/L	1	3/14/2013 04:19 PM
Manganese	ND	0.50		µg/L	1	3/14/2013 04:19 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Tetra Tech	**Client Sample ID:**	MW-19D3
Lab Order:	N009791	**Collection Date:**	3/8/2013 3:20:00 PM
Project:	MSSC, 103P172829	**Matrix:**	GROUNDWATER
Lab ID:	N009791-002		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
PERMANGANATE BY COLORIMETRY						
		COLORIMETRIC				
RunID: WETCHEM_130311B	QC Batch: R87984			PrepDate:		Analyst: **JT**
Permanganate as KMnO4	ND	1.0		mg/L	1	3/11/2013
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS5_130313A	QC Batch: P13VW040			PrepDate:		Analyst: **QBM**
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/13/2013 01:18 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/13/2013 01:18 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/13/2013 01:18 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/13/2013 01:18 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/13/2013 01:18 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/13/2013 01:18 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/13/2013 01:18 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/13/2013 01:18 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/13/2013 01:18 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/13/2013 01:18 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/13/2013 01:18 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	3/13/2013 01:18 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/13/2013 01:18 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/13/2013 01:18 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/13/2013 01:18 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/13/2013 01:18 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/13/2013 01:18 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/13/2013 01:18 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/13/2013 01:18 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/13/2013 01:18 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/13/2013 01:18 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/13/2013 01:18 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/13/2013 01:18 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/13/2013 01:18 PM
Benzene	ND	0.50		µg/L	1	3/13/2013 01:18 PM
Bromobenzene	ND	0.50		µg/L	1	3/13/2013 01:18 PM
Bromodichloromethane	ND	0.50		µg/L	1	3/13/2013 01:18 PM
Bromoform	ND	0.50		µg/L	1	3/13/2013 01:18 PM
Bromomethane	ND	0.50		µg/L	1	3/13/2013 01:18 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/13/2013 01:18 PM
Chlorobenzene	ND	0.50		µg/L	1	3/13/2013 01:18 PM
Chloroethane	ND	0.50		µg/L	1	3/13/2013 01:18 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Lab Order: N009791
Project: MSSC, 103P172829
Lab ID: N009791-002

Client Sample ID: MW-19D3
Collection Date: 3/8/2013 3:20:00 PM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_130313A	QC Batch: P13VW040			PrepDate:		Analyst: **QBM**
Chloroform	ND	0.50		µg/L	1	3/13/2013 01:18 PM
Chloromethane	ND	0.50		µg/L	1	3/13/2013 01:18 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	3/13/2013 01:18 PM
Dibromochloromethane	ND	0.50		µg/L	1	3/13/2013 01:18 PM
Dibromomethane	ND	0.50		µg/L	1	3/13/2013 01:18 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/13/2013 01:18 PM
Ethylbenzene	ND	0.50		µg/L	1	3/13/2013 01:18 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/13/2013 01:18 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/13/2013 01:18 PM
m,p-Xylene	ND	1.0		µg/L	1	3/13/2013 01:18 PM
Methylene chloride	ND	2.0		µg/L	1	3/13/2013 01:18 PM
MTBE	ND	0.50		µg/L	1	3/13/2013 01:18 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/13/2013 01:18 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/13/2013 01:18 PM
Naphthalene	ND	0.50		µg/L	1	3/13/2013 01:18 PM
o-Xylene	ND	0.50		µg/L	1	3/13/2013 01:18 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/13/2013 01:18 PM
Styrene	ND	0.50		µg/L	1	3/13/2013 01:18 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/13/2013 01:18 PM
Tetrachloroethene	0.50	0.50		µg/L	1	3/13/2013 01:18 PM
Toluene	ND	0.50		µg/L	1	3/13/2013 01:18 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/13/2013 01:18 PM
Trichloroethene	ND	0.50		µg/L	1	3/13/2013 01:18 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/13/2013 01:18 PM
Vinyl chloride	ND	0.50		µg/L	1	3/13/2013 01:18 PM
Surr: 1,2-Dichloroethane-d4	106	56-120		%REC	1	3/13/2013 01:18 PM
Surr: 4-Bromofluorobenzene	103	80-120		%REC	1	3/13/2013 01:18 PM
Surr: Dibromofluoromethane	101	72-120		%REC	1	3/13/2013 01:18 PM
Surr: Toluene-d8	103	80-123		%REC	1	3/13/2013 01:18 PM
ANIONS BY ION CHROMATOGRAPHY				**EPA 300.0**		
RunID: IC2_130314A	QC Batch: R88075			PrepDate:		Analyst: **QBM**
Chloride	7.8	1.0		mg/L	2	3/14/2013 10:14 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Tetra Tech	**Client Sample ID:**	MW-19D3
Lab Order:	N009791	**Collection Date:**	3/8/2013 3:20:00 PM
Project:	MSSC, 103P172829	**Matrix:**	GROUNDWATER
Lab ID:	N009791-002		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
DISSOLVED METALS BY ICP						
EPA 3010A				**EPA 6010B**		
RunID: ICP2_130312A	QC Batch: 42416			PrepDate:	3/12/2013	Analyst: **CEI**
Potassium	3.4	1.0		mg/L	2	3/12/2013 04:37 PM
DISSOLVED METALS BY ICP-MS						
EPA 3010A				**EPA 6020**		
RunID: ICP7_130314A	QC Batch: 42424			PrepDate:	3/14/2013	Analyst: **CEI**
Arsenic	1.8	0.10		µg/L	1	3/14/2013 04:43 PM
Chromium	2.9	1.0		µg/L	1	3/14/2013 04:43 PM
Manganese	27	0.50		µg/L	1	3/14/2013 04:43 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Lab Order: N009791
Project: MSSC, 103P172829
Lab ID: N009791-003

Client Sample ID: MW-19D2
Collection Date: 3/8/2013 4:10:00 PM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
PERMANGANATE BY COLORIMETRY						
			COLORIMETRIC			
RunID: WETCHEM_130311B	QC Batch: R87984			PrepDate:		Analyst: **JT**
Permanganate as KMnO4	ND	1.0		mg/L	1	3/11/2013
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
			EPA 8260B			
RunID: MS5_130312B	QC Batch: P13VW039			PrepDate:		Analyst: **QBM**
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/12/2013 04:29 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/12/2013 04:29 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/12/2013 04:29 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/12/2013 04:29 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/12/2013 04:29 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/12/2013 04:29 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/12/2013 04:29 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/12/2013 04:29 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/12/2013 04:29 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/12/2013 04:29 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/12/2013 04:29 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	3/12/2013 04:29 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/12/2013 04:29 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/12/2013 04:29 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/12/2013 04:29 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/12/2013 04:29 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/12/2013 04:29 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/12/2013 04:29 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/12/2013 04:29 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/12/2013 04:29 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/12/2013 04:29 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/12/2013 04:29 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/12/2013 04:29 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/12/2013 04:29 PM
Benzene	ND	0.50		µg/L	1	3/12/2013 04:29 PM
Bromobenzene	ND	0.50		µg/L	1	3/12/2013 04:29 PM
Bromodichloromethane	ND	0.50		µg/L	1	3/12/2013 04:29 PM
Bromoform	ND	0.50		µg/L	1	3/12/2013 04:29 PM
Bromomethane	ND	0.50		µg/L	1	3/12/2013 04:29 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/12/2013 04:29 PM
Chlorobenzene	ND	0.50		µg/L	1	3/12/2013 04:29 PM
Chloroethane	ND	0.50		µg/L	1	3/12/2013 04:29 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT: Tetra Tech
Lab Order: N009791
Project: MSSC, 103P172829
Lab ID: N009791-003

Client Sample ID: MW-19D2
Collection Date: 3/8/2013 4:10:00 PM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_130312B	QC Batch: P13VW039			PrepDate:		Analyst: **QBM**
Chloroform	4.8	0.50		µg/L	1	3/12/2013 04:29 PM
Chloromethane	ND	0.50		µg/L	1	3/12/2013 04:29 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	3/12/2013 04:29 PM
Dibromochloromethane	ND	0.50		µg/L	1	3/12/2013 04:29 PM
Dibromomethane	ND	0.50		µg/L	1	3/12/2013 04:29 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/12/2013 04:29 PM
Ethylbenzene	ND	0.50		µg/L	1	3/12/2013 04:29 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/12/2013 04:29 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/12/2013 04:29 PM
m,p-Xylene	ND	1.0		µg/L	1	3/12/2013 04:29 PM
Methylene chloride	ND	2.0		µg/L	1	3/12/2013 04:29 PM
MTBE	ND	0.50		µg/L	1	3/12/2013 04:29 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/12/2013 04:29 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/12/2013 04:29 PM
Naphthalene	ND	0.50		µg/L	1	3/12/2013 04:29 PM
o-Xylene	ND	0.50		µg/L	1	3/12/2013 04:29 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/12/2013 04:29 PM
Styrene	ND	0.50		µg/L	1	3/12/2013 04:29 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/12/2013 04:29 PM
Tetrachloroethene	170	2.5		µg/L	5	3/12/2013 09:31 PM
Toluene	ND	0.50		µg/L	1	3/12/2013 04:29 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/12/2013 04:29 PM
Trichloroethene	1.5	0.50		µg/L	1	3/12/2013 04:29 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/12/2013 04:29 PM
Vinyl chloride	ND	0.50		µg/L	1	3/12/2013 04:29 PM
Surr: 1,2-Dichloroethane-d4	109	56-120		%REC	1	3/12/2013 04:29 PM
Surr: 1,2-Dichloroethane-d4	108	56-120		%REC	5	3/12/2013 09:31 PM
Surr: 4-Bromofluorobenzene	104	80-120		%REC	1	3/12/2013 04:29 PM
Surr: 4-Bromofluorobenzene	103	80-120		%REC	5	3/12/2013 09:31 PM
Surr: Dibromofluoromethane	104	72-120		%REC	5	3/12/2013 09:31 PM
Surr: Dibromofluoromethane	105	72-120		%REC	1	3/12/2013 04:29 PM
Surr: Toluene-d8	102	80-123		%REC	1	3/12/2013 04:29 PM
Surr: Toluene-d8	102	80-123		%REC	5	3/12/2013 09:31 PM
ANIONS BY ION CHROMATOGRAPHY				**EPA 300.0**		
RunID: IC2_130314A	QC Batch: R88075			PrepDate:		Analyst: **QBM**

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N009791
Project: MSSC, 103P172829
Lab ID: N009791-003

Client Sample ID: MW-19D2
Collection Date: 3/8/2013 4:10:00 PM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ANIONS BY ION CHROMATOGRAPHY				**EPA 300.0**		
RunID: IC2_130314A	QC Batch: R88075			PrepDate:		Analyst: **QBM**
Chloride	140	25		mg/L	50	3/14/2013 10:26 AM
DISSOLVED METALS BY ICP	**EPA 3010A**			**EPA 6010B**		
RunID: ICP2_130312A	QC Batch: 42416			PrepDate:	3/12/2013	Analyst: **CEI**
Potassium	11	5.0		mg/L	10	3/12/2013 04:17 PM
DISSOLVED METALS BY ICP-MS	**EPA 3010A**			**EPA 6020**		
RunID: ICP7_130314A	QC Batch: 42424			PrepDate:	3/14/2013	Analyst: **CEI**
Arsenic	1.8	0.10		µg/L	1	3/14/2013 04:49 PM
Chromium	1.3	1.0		µg/L	1	3/14/2013 04:49 PM
Manganese	60	0.50		µg/L	1	3/14/2013 04:49 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N009791
Project: MSSC, 103P172829
Lab ID: N009791-004

Client Sample ID: MW-19D1
Collection Date: 3/8/2013 5:10:00 PM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
PERMANGANATE BY COLORIMETRY						
			COLORIMETRIC			
RunID: WETCHEM_130311B	QC Batch: R87984			PrepDate:		Analyst: **JT**
Permanganate as KMnO4	ND	1.0		mg/L	1	3/11/2013
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
			EPA 8260B			
RunID: MS5_130312B	QC Batch: P13VW039			PrepDate:		Analyst: **QBM**
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/12/2013 04:58 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/12/2013 04:58 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/12/2013 04:58 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/12/2013 04:58 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/12/2013 04:58 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/12/2013 04:58 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/12/2013 04:58 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/12/2013 04:58 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/12/2013 04:58 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/12/2013 04:58 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/12/2013 04:58 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	3/12/2013 04:58 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/12/2013 04:58 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/12/2013 04:58 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/12/2013 04:58 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/12/2013 04:58 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/12/2013 04:58 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/12/2013 04:58 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/12/2013 04:58 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/12/2013 04:58 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/12/2013 04:58 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/12/2013 04:58 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/12/2013 04:58 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/12/2013 04:58 PM
Benzene	ND	0.50		µg/L	1	3/12/2013 04:58 PM
Bromobenzene	ND	0.50		µg/L	1	3/12/2013 04:58 PM
Bromodichloromethane	ND	0.50		µg/L	1	3/12/2013 04:58 PM
Bromoform	ND	0.50		µg/L	1	3/12/2013 04:58 PM
Bromomethane	ND	0.50		µg/L	1	3/12/2013 04:58 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/12/2013 04:58 PM
Chlorobenzene	ND	0.50		µg/L	1	3/12/2013 04:58 PM
Chloroethane	ND	0.50		µg/L	1	3/12/2013 04:58 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N009791
Project: MSSC, 103P172829
Lab ID: N009791-004

Client Sample ID: MW-19D1
Collection Date: 3/8/2013 5:10:00 PM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_130312B	QC Batch: P13VW039			PrepDate:		Analyst: **QBM**
Chloroform	1.5	0.50		µg/L	1	3/12/2013 04:58 PM
Chloromethane	ND	0.50		µg/L	1	3/12/2013 04:58 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	3/12/2013 04:58 PM
Dibromochloromethane	ND	0.50		µg/L	1	3/12/2013 04:58 PM
Dibromomethane	ND	0.50		µg/L	1	3/12/2013 04:58 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/12/2013 04:58 PM
Ethylbenzene	ND	0.50		µg/L	1	3/12/2013 04:58 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/12/2013 04:58 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/12/2013 04:58 PM
m,p-Xylene	ND	1.0		µg/L	1	3/12/2013 04:58 PM
Methylene chloride	ND	2.0		µg/L	1	3/12/2013 04:58 PM
MTBE	ND	0.50		µg/L	1	3/12/2013 04:58 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/12/2013 04:58 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/12/2013 04:58 PM
Naphthalene	ND	0.50		µg/L	1	3/12/2013 04:58 PM
o-Xylene	ND	0.50		µg/L	1	3/12/2013 04:58 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/12/2013 04:58 PM
Styrene	ND	0.50		µg/L	1	3/12/2013 04:58 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/12/2013 04:58 PM
Tetrachloroethene	300	2.5		µg/L	5	3/12/2013 10:00 PM
Toluene	ND	0.50		µg/L	1	3/12/2013 04:58 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/12/2013 04:58 PM
Trichloroethene	2.9	0.50		µg/L	1	3/12/2013 04:58 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/12/2013 04:58 PM
Vinyl chloride	ND	0.50		µg/L	1	3/12/2013 04:58 PM
Surr: 1,2-Dichloroethane-d4	111	56-120		%REC	1	3/12/2013 04:58 PM
Surr: 1,2-Dichloroethane-d4	110	56-120		%REC	5	3/12/2013 10:00 PM
Surr: 4-Bromofluorobenzene	103	80-120		%REC	1	3/12/2013 04:58 PM
Surr: 4-Bromofluorobenzene	103	80-120		%REC	5	3/12/2013 10:00 PM
Surr: Dibromofluoromethane	105	72-120		%REC	5	3/12/2013 10:00 PM
Surr: Dibromofluoromethane	107	72-120		%REC	1	3/12/2013 04:58 PM
Surr: Toluene-d8	101	80-123		%REC	1	3/12/2013 04:58 PM
Surr: Toluene-d8	99.6	80-123		%REC	5	3/12/2013 10:00 PM
ANIONS BY ION CHROMATOGRAPHY				**EPA 300.0**		
RunID: IC2_130314A	QC Batch: R88075			PrepDate:		Analyst: **QBM**

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT:	Tetra Tech	**Client Sample ID:**	MW-19D1
Lab Order:	N009791	**Collection Date:**	3/8/2013 5:10:00 PM
Project:	MSSC, 103P172829	**Matrix:**	GROUNDWATER
Lab ID:	N009791-004		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ANIONS BY ION CHROMATOGRAPHY						
			EPA 300.0			
RunID: IC2_130314A	QC Batch: R88075			PrepDate:		Analyst: **QBM**
Chloride	82	10		mg/L	20	3/14/2013 10:49 AM
DISSOLVED METALS BY ICP						
	EPA 3010A			**EPA 6010B**		
RunID: ICP2_130312A	QC Batch: 42416			PrepDate:	3/12/2013	Analyst: **CEI**
Potassium	9.1	5.0		mg/L	10	3/12/2013 04:19 PM
DISSOLVED METALS BY ICP-MS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130314A	QC Batch: 42424			PrepDate:	3/14/2013	Analyst: **CEI**
Arsenic	2.2	0.10		µg/L	1	3/14/2013 04:55 PM
Chromium	2.8	1.0		µg/L	1	3/14/2013 04:55 PM
Manganese	41	0.50		µg/L	1	3/14/2013 04:55 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N009791
Project: MSSC, 103P172829
Lab ID: N009791-005

Client Sample ID: MW-19
Collection Date: 3/8/2013 6:00:00 PM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
PERMANGANATE BY COLORIMETRY						
			COLORIMETRIC			
RunID: WETCHEM_130311B	QC Batch: R87984			PrepDate:		Analyst: **JT**
Permanganate as KMnO4	ND	1.0		mg/L	1	3/11/2013
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
			EPA 8260B			
RunID: MS5_130312B	QC Batch: P13VW039			PrepDate:		Analyst: **QBM**
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/12/2013 05:27 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/12/2013 05:27 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/12/2013 05:27 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/12/2013 05:27 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/12/2013 05:27 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/12/2013 05:27 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/12/2013 05:27 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/12/2013 05:27 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/12/2013 05:27 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/12/2013 05:27 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/12/2013 05:27 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	3/12/2013 05:27 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/12/2013 05:27 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/12/2013 05:27 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/12/2013 05:27 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/12/2013 05:27 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/12/2013 05:27 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/12/2013 05:27 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/12/2013 05:27 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/12/2013 05:27 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/12/2013 05:27 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/12/2013 05:27 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/12/2013 05:27 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/12/2013 05:27 PM
Benzene	ND	0.50		µg/L	1	3/12/2013 05:27 PM
Bromobenzene	ND	0.50		µg/L	1	3/12/2013 05:27 PM
Bromodichloromethane	ND	0.50		µg/L	1	3/12/2013 05:27 PM
Bromoform	ND	0.50		µg/L	1	3/12/2013 05:27 PM
Bromomethane	ND	0.50		µg/L	1	3/12/2013 05:27 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/12/2013 05:27 PM
Chlorobenzene	ND	0.50		µg/L	1	3/12/2013 05:27 PM
Chloroethane	ND	0.50		µg/L	1	3/12/2013 05:27 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT: Tetra Tech
Lab Order: N009791
Project: MSSC, 103P172829
Lab ID: N009791-005

Client Sample ID: MW-19
Collection Date: 3/8/2013 6:00:00 PM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_130312B	QC Batch: P13VW039			PrepDate:		Analyst: **QBM**
Chloroform	1.7	0.50		µg/L	1	3/12/2013 05:27 PM
Chloromethane	ND	0.50		µg/L	1	3/12/2013 05:27 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	3/12/2013 05:27 PM
Dibromochloromethane	ND	0.50		µg/L	1	3/12/2013 05:27 PM
Dibromomethane	ND	0.50		µg/L	1	3/12/2013 05:27 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/12/2013 05:27 PM
Ethylbenzene	ND	0.50		µg/L	1	3/12/2013 05:27 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/12/2013 05:27 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/12/2013 05:27 PM
m,p-Xylene	ND	1.0		µg/L	1	3/12/2013 05:27 PM
Methylene chloride	ND	2.0		µg/L	1	3/12/2013 05:27 PM
MTBE	ND	0.50		µg/L	1	3/12/2013 05:27 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/12/2013 05:27 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/12/2013 05:27 PM
Naphthalene	ND	0.50		µg/L	1	3/12/2013 05:27 PM
o-Xylene	ND	0.50		µg/L	1	3/12/2013 05:27 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/12/2013 05:27 PM
Styrene	ND	0.50		µg/L	1	3/12/2013 05:27 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/12/2013 05:27 PM
Tetrachloroethene	520	5.0		µg/L	10	3/13/2013 02:16 PM
Toluene	ND	0.50		µg/L	1	3/12/2013 05:27 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/12/2013 05:27 PM
Trichloroethene	3.2	0.50		µg/L	1	3/12/2013 05:27 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/12/2013 05:27 PM
Vinyl chloride	ND	0.50		µg/L	1	3/12/2013 05:27 PM
Surr: 1,2-Dichloroethane-d4	110	56-120		%REC	1	3/12/2013 05:27 PM
Surr: 1,2-Dichloroethane-d4	107	56-120		%REC	10	3/13/2013 02:16 PM
Surr: 4-Bromofluorobenzene	106	80-120		%REC	1	3/12/2013 05:27 PM
Surr: 4-Bromofluorobenzene	105	80-120		%REC	10	3/13/2013 02:16 PM
Surr: Dibromofluoromethane	103	72-120		%REC	10	3/13/2013 02:16 PM
Surr: Dibromofluoromethane	102	72-120		%REC	1	3/12/2013 05:27 PM
Surr: Toluene-d8	100	80-123		%REC	1	3/12/2013 05:27 PM
Surr: Toluene-d8	99.9	80-123		%REC	10	3/13/2013 02:16 PM
ANIONS BY ION CHROMATOGRAPHY				**EPA 300.0**		
RunID: IC2_130314A	QC Batch: R88075			PrepDate:		Analyst: **QBM**

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Tetra Tech	**Client Sample ID:**	MW-19
Lab Order:	N009791	**Collection Date:**	3/8/2013 6:00:00 PM
Project:	MSSC, 103P172829	**Matrix:**	GROUNDWATER
Lab ID:	N009791-005		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ANIONS BY ION CHROMATOGRAPHY						
			EPA 300.0			
RunID: IC2_130314A	QC Batch: R88075			PrepDate:		Analyst: **QBM**
Chloride	190	25		mg/L	50	3/14/2013 11:01 AM
DISSOLVED METALS BY ICP						
	EPA 3010A			**EPA 6010B**		
RunID: ICP2_130312A	QC Batch: 42416			PrepDate:	3/12/2013	Analyst: **CEI**
Potassium	25	5.0		mg/L	10	3/12/2013 04:22 PM
DISSOLVED METALS BY ICP-MS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130314A	QC Batch: 42424			PrepDate:	3/14/2013	Analyst: **CEI**
Arsenic	7.4	0.50		µg/L	5	3/14/2013 03:22 PM
Chromium	17	5.0		µg/L	5	3/14/2013 03:22 PM
Manganese	170	2.5		µg/L	5	3/14/2013 03:22 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N009791
Project: MSSC, 103P172829
Lab ID: N009791-006

Client Sample ID: Decon
Collection Date: 3/7/2013 12:10:00 PM
Matrix: WATER

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS5_130312B QC Batch: P13VW039 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/12/2013 07:51 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/12/2013 07:51 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/12/2013 07:51 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/12/2013 07:51 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/12/2013 07:51 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/12/2013 07:51 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/12/2013 07:51 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/12/2013 07:51 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/12/2013 07:51 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/12/2013 07:51 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/12/2013 07:51 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	3/12/2013 07:51 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/12/2013 07:51 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/12/2013 07:51 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/12/2013 07:51 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/12/2013 07:51 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/12/2013 07:51 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/12/2013 07:51 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/12/2013 07:51 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/12/2013 07:51 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/12/2013 07:51 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/12/2013 07:51 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/12/2013 07:51 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/12/2013 07:51 PM
Benzene	ND	0.50		µg/L	1	3/12/2013 07:51 PM
Bromobenzene	ND	0.50		µg/L	1	3/12/2013 07:51 PM
Bromodichloromethane	ND	0.50		µg/L	1	3/12/2013 07:51 PM
Bromoform	ND	0.50		µg/L	1	3/12/2013 07:51 PM
Bromomethane	ND	0.50		µg/L	1	3/12/2013 07:51 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/12/2013 07:51 PM
Chlorobenzene	ND	0.50		µg/L	1	3/12/2013 07:51 PM
Chloroethane	ND	0.50		µg/L	1	3/12/2013 07:51 PM
Chloroform	ND	0.50		µg/L	1	3/12/2013 07:51 PM
Chloromethane	ND	0.50		µg/L	1	3/12/2013 07:51 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	3/12/2013 07:51 PM
Dibromochloromethane	ND	0.50		µg/L	1	3/12/2013 07:51 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT: Tetra Tech
Lab Order: N009791
Project: MSSC, 103P172829
Lab ID: N009791-006

Client Sample ID: Decon
Collection Date: 3/7/2013 12:10:00 PM
Matrix: WATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_130312B	QC Batch: P13VW039			PrepDate:		Analyst: **QBM**
Dibromomethane	ND	0.50		µg/L	1	3/12/2013 07:51 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/12/2013 07:51 PM
Ethylbenzene	ND	0.50		µg/L	1	3/12/2013 07:51 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/12/2013 07:51 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/12/2013 07:51 PM
m,p-Xylene	ND	1.0		µg/L	1	3/12/2013 07:51 PM
Methylene chloride	ND	2.0		µg/L	1	3/12/2013 07:51 PM
MTBE	ND	0.50		µg/L	1	3/12/2013 07:51 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/12/2013 07:51 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/12/2013 07:51 PM
Naphthalene	ND	0.50		µg/L	1	3/12/2013 07:51 PM
o-Xylene	ND	0.50		µg/L	1	3/12/2013 07:51 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/12/2013 07:51 PM
Styrene	ND	0.50		µg/L	1	3/12/2013 07:51 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/12/2013 07:51 PM
Tetrachloroethene	3.8	0.50		µg/L	1	3/12/2013 07:51 PM
Toluene	ND	0.50		µg/L	1	3/12/2013 07:51 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/12/2013 07:51 PM
Trichloroethene	ND	0.50		µg/L	1	3/12/2013 07:51 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/12/2013 07:51 PM
Vinyl chloride	ND	0.50		µg/L	1	3/12/2013 07:51 PM
Surr: 1,2-Dichloroethane-d4	110	56-120		%REC	1	3/12/2013 07:51 PM
Surr: 4-Bromofluorobenzene	102	80-120		%REC	1	3/12/2013 07:51 PM
Surr: Dibromofluoromethane	106	72-120		%REC	1	3/12/2013 07:51 PM
Surr: Toluene-d8	102	80-123		%REC	1	3/12/2013 07:51 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Lab Order: N009791
Project: MSSC, 103P172829
Lab ID: N009791-007

Client Sample ID: TtPIP01GWS1
Collection Date: 3/6/2013 1:40:00 PM
Matrix: GROUNDWATER

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS5_130312B QC Batch: P13VW039 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/12/2013 08:33 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/12/2013 08:33 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/12/2013 08:33 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/12/2013 08:33 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/12/2013 08:33 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/12/2013 08:33 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/12/2013 08:33 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/12/2013 08:33 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/12/2013 08:33 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/12/2013 08:33 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/12/2013 08:33 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	3/12/2013 08:33 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/12/2013 08:33 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/12/2013 08:33 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/12/2013 08:33 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/12/2013 08:33 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/12/2013 08:33 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/12/2013 08:33 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/12/2013 08:33 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/12/2013 08:33 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/12/2013 08:33 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/12/2013 08:33 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/12/2013 08:33 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/12/2013 08:33 PM
Benzene	ND	0.50		µg/L	1	3/12/2013 08:33 PM
Bromobenzene	ND	0.50		µg/L	1	3/12/2013 08:33 PM
Bromodichloromethane	ND	0.50		µg/L	1	3/12/2013 08:33 PM
Bromoform	ND	0.50		µg/L	1	3/12/2013 08:33 PM
Bromomethane	ND	0.50		µg/L	1	3/12/2013 08:33 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/12/2013 08:33 PM
Chlorobenzene	ND	0.50		µg/L	1	3/12/2013 08:33 PM
Chloroethane	ND	0.50		µg/L	1	3/12/2013 08:33 PM
Chloroform	3.0	0.50		µg/L	1	3/12/2013 08:33 PM
Chloromethane	ND	0.50		µg/L	1	3/12/2013 08:33 PM
cis-1,2-Dichloroethene	0.67	0.50		µg/L	1	3/12/2013 08:33 PM
Dibromochloromethane	ND	0.50		µg/L	1	3/12/2013 08:33 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT: Tetra Tech
Lab Order: N009791
Project: MSSC, 103P172829
Lab ID: N009791-007

Client Sample ID: TtPIP01GWS1
Collection Date: 3/6/2013 1:40:00 PM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_130312B	QC Batch: P13VW039			PrepDate:		Analyst: **QBM**
Dibromomethane	ND	0.50		µg/L	1	3/12/2013 08:33 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/12/2013 08:33 PM
Ethylbenzene	ND	0.50		µg/L	1	3/12/2013 08:33 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/12/2013 08:33 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/12/2013 08:33 PM
m,p-Xylene	ND	1.0		µg/L	1	3/12/2013 08:33 PM
Methylene chloride	ND	2.0		µg/L	1	3/12/2013 08:33 PM
MTBE	ND	0.50		µg/L	1	3/12/2013 08:33 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/12/2013 08:33 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/12/2013 08:33 PM
Naphthalene	ND	0.50		µg/L	1	3/12/2013 08:33 PM
o-Xylene	ND	0.50		µg/L	1	3/12/2013 08:33 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/12/2013 08:33 PM
Styrene	ND	0.50		µg/L	1	3/12/2013 08:33 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/12/2013 08:33 PM
Tetrachloroethene	990	10		µg/L	20	3/13/2013 02:44 PM
Toluene	ND	0.50		µg/L	1	3/12/2013 08:33 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/12/2013 08:33 PM
Trichloroethene	5.3	0.50		µg/L	1	3/12/2013 08:33 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/12/2013 08:33 PM
Vinyl chloride	ND	0.50		µg/L	1	3/12/2013 08:33 PM
Surr: 1,2-Dichloroethane-d4	106	56-120		%REC	1	3/12/2013 08:33 PM
Surr: 1,2-Dichloroethane-d4	110	56-120		%REC	20	3/13/2013 02:44 PM
Surr: 4-Bromofluorobenzene	104	80-120		%REC	20	3/13/2013 02:44 PM
Surr: 4-Bromofluorobenzene	103	80-120		%REC	1	3/12/2013 08:33 PM
Surr: Dibromofluoromethane	103	72-120		%REC	1	3/12/2013 08:33 PM
Surr: Dibromofluoromethane	107	72-120		%REC	20	3/13/2013 02:44 PM
Surr: Toluene-d8	99.6	80-123		%REC	20	3/13/2013 02:44 PM
Surr: Toluene-d8	99.4	80-123		%REC	1	3/12/2013 08:33 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Tetra Tech	**Client Sample ID:**	VM1-030613 Composite
Lab Order:	N009791	**Collection Date:**	3/6/2013 11:30:00 AM
Project:	MSSC, 103P172829	**Matrix:**	SOIL
Lab ID:	N009791-008		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130313A	QC Batch: D13VS020			PrepDate:		Analyst: **QBM**
Tetrachloroethene	ND	250		µg/Kg	50	3/13/2013 05:00 PM
Trichloroethene	ND	250		µg/Kg	50	3/13/2013 05:00 PM
Surr: 1,2-Dichloroethane-d4	99.2	58-125		%REC	50	3/13/2013 05:00 PM
Surr: 4-Bromofluorobenzene	91.6	52-138		%REC	50	3/13/2013 05:00 PM
Surr: Dibromofluoromethane	96.7	57-121		%REC	50	3/13/2013 05:00 PM
Surr: Toluene-d8	104	66-130		%REC	50	3/13/2013 05:00 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N009791
Project: MSSC, 103P172829
Lab ID: N009791-009

Client Sample ID: VM2-030613 Composite
Collection Date: 3/6/2013 1:00:00 PM
Matrix: SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130313A	QC Batch: D13VS020			PrepDate:		Analyst: **QBM**
Tetrachloroethene	ND	250		µg/Kg	50	3/13/2013 06:16 PM
Trichloroethene	ND	250		µg/Kg	50	3/13/2013 06:16 PM
Surr: 1,2-Dichloroethane-d4	118	58-125		%REC	50	3/13/2013 06:16 PM
Surr: 4-Bromofluorobenzene	102	52-138		%REC	50	3/13/2013 06:16 PM
Surr: Dibromofluoromethane	113	57-121		%REC	50	3/13/2013 06:16 PM
Surr: Toluene-d8	118	66-130		%REC	50	3/13/2013 06:16 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	SVE1030713
Lab Order:	N009791	**Collection Date:**	3/7/2013 10:30:00 AM
Project:	MSSC, 103P172829	**Matrix:**	SOIL
Lab ID:	N009791-010		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130313A	QC Batch: D13VS020			PrepDate:		Analyst: **QBM**
Tetrachloroethene	ND	5.0		µg/Kg	1	3/13/2013 04:37 PM
Trichloroethene	ND	5.0		µg/Kg	1	3/13/2013 04:37 PM
Surr: 1,2-Dichloroethane-d4	101	58-125		%REC	1	3/13/2013 04:37 PM
Surr: 4-Bromofluorobenzene	93.0	52-138		%REC	1	3/13/2013 04:37 PM
Surr: Dibromofluoromethane	103	57-121		%REC	1	3/13/2013 04:37 PM
Surr: Toluene-d8	104	66-130		%REC	1	3/13/2013 04:37 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	AK-030613 Composite
Lab Order:	N009791	**Collection Date:**	3/6/2013 2:50:00 PM
Project:	MSSC, 103P172829	**Matrix:**	SOIL
Lab ID:	N009791-011		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130313A	QC Batch: D13VS020			PrepDate:		Analyst: **QBM**
Tetrachloroethene	ND	250		µg/Kg	50	3/13/2013 05:23 PM
Trichloroethene	ND	250		µg/Kg	50	3/13/2013 05:23 PM
Surr: 1,2-Dichloroethane-d4	103	58-125		%REC	50	3/13/2013 05:23 PM
Surr: 4-Bromofluorobenzene	98.0	52-138		%REC	50	3/13/2013 05:23 PM
Surr: Dibromofluoromethane	102	57-121		%REC	50	3/13/2013 05:23 PM
Surr: Toluene-d8	108	66-130		%REC	50	3/13/2013 05:23 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Tetra Tech	**Client Sample ID:**	PIP030613 Composite
Lab Order:	N009791	**Collection Date:**	3/6/2013 4:10:00 PM
Project:	MSSC, 103P172829	**Matrix:**	SOIL
Lab ID:	N009791-012		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
			EPA 8260B			
RunID: MS1_130313A	QC Batch: D13VS020			PrepDate:		Analyst: **QBM**
Tetrachloroethene	ND	250		µg/Kg	50	3/13/2013 05:53 PM
Trichloroethene	ND	250		µg/Kg	50	3/13/2013 05:53 PM
Surr: 1,2-Dichloroethane-d4	98.4	58-125		%REC	50	3/13/2013 05:53 PM
Surr: 4-Bromofluorobenzene	90.9	52-138		%REC	50	3/13/2013 05:53 PM
Surr: Dibromofluoromethane	95.3	57-121		%REC	50	3/13/2013 05:53 PM
Surr: Toluene-d8	105	66-130		%REC	50	3/13/2013 05:53 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Work Order: N009791
Project: MSSC, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 300_W_CL

Sample ID: **MB-R88075_CL**	SampType: **MBLK**	TestCode: **300_W_CL**	Units: **mg/L**	Prep Date:			RunNo: **88075**			
Client ID: **PBW**	Batch ID: **R88075**	TestNo: **EPA 300.0**		Analysis Date: **3/14/2013**			SeqNo: **1541138**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	ND	0.50									

Sample ID: **LCS-R88075_CL**	SampType: **LCS**	TestCode: **300_W_CL**	Units: **mg/L**	Prep Date:			RunNo: **88075**			
Client ID: **LCSW**	Batch ID: **R88075**	TestNo: **EPA 300.0**		Analysis Date: **3/14/2013**			SeqNo: **1541139**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	2.573	0.50	2.500	0	103	90	110				

Sample ID: **N009791-001CMS**	SampType: **MS**	TestCode: **300_W_CL**	Units: **mg/L**	Prep Date:			RunNo: **88075**			
Client ID: **ZZZZZZ**	Batch ID: **R88075**	TestNo: **EPA 300.0**		Analysis Date: **3/14/2013**			SeqNo: **1541141**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	288.100	25	125.0	160.5	102	80	120				

Sample ID: **N009791-001CMSD**	SampType: **MSD**	TestCode: **300_W_CL**	Units: **mg/L**	Prep Date:			RunNo: **88075**			
Client ID: **ZZZZZZ**	Batch ID: **R88075**	TestNo: **EPA 300.0**		Analysis Date: **3/14/2013**			SeqNo: **1541142**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	286.550	25	125.0	160.5	101	80	120	288.1	0.539	20	

Sample ID: **N009791-003CDUP**	SampType: **DUP**	TestCode: **300_W_CL**	Units: **mg/L**	Prep Date:			RunNo: **88075**			
Client ID: **ZZZZZZ**	Batch ID: **R88075**	TestNo: **EPA 300.0**		Analysis Date: **3/14/2013**			SeqNo: **1541145**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	139.250	25						138.6	0.432	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Tetra Tech
Work Order: N009791
Project: MSSC, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_WD

Sample ID: **MB-42416**	SampType: **MBLK**	TestCode: **6010_WD**	Units: **mg/L**	Prep Date: **3/12/2013**	RunNo: **88035**
Client ID: **PBW**	Batch ID: **42416**	TestNo: **EPA 6010B**	**EPA 3010A**	Analysis Date: **3/12/2013**	SeqNo: **1539403**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Potassium	ND	0.50									

Sample ID: **LCS-42416**	SampType: **LCS**	TestCode: **6010_WD**	Units: **mg/L**	Prep Date: **3/12/2013**	RunNo: **88035**
Client ID: **LCSW**	Batch ID: **42416**	TestNo: **EPA 6010B**	**EPA 3010A**	Analysis Date: **3/12/2013**	SeqNo: **1539404**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Potassium	2.346	0.50	2.500	0	93.8	85	115				

Sample ID: **N009791-001C-MS**	SampType: **MS**	TestCode: **6010_WD**	Units: **mg/L**	Prep Date: **3/12/2013**	RunNo: **88035**
Client ID: **ZZZZZZ**	Batch ID: **42416**	TestNo: **EPA 6010B**	**EPA 3010A**	Analysis Date: **3/12/2013**	SeqNo: **1539414**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Potassium	18.367	5.0	5.000	12.90	109	75	125				

Sample ID: **N009791-001C-MSD**	SampType: **MSD**	TestCode: **6010_WD**	Units: **mg/L**	Prep Date: **3/12/2013**	RunNo: **88035**
Client ID: **ZZZZZZ**	Batch ID: **42416**	TestNo: **EPA 6010B**	**EPA 3010A**	Analysis Date: **3/12/2013**	SeqNo: **1539415**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Potassium	18.588	5.0	5.000	12.90	114	75	125	18.37	1.19	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
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- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009791
Project: MSSC, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 6020_DIS

Sample ID: **MB-42424**	SampType: **MBLK**	TestCode: **6020_DIS**	Units: **µg/L**	Prep Date: **3/14/2013**	RunNo: **88061**
Client ID: **PBW**	Batch ID: **42424**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **3/14/2013**	SeqNo: **1540522**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.10									
Chromium	ND	1.0									
Manganese	ND	0.50									

Sample ID: **LCS-42424**	SampType: **LCS**	TestCode: **6020_DIS**	Units: **µg/L**	Prep Date: **3/14/2013**	RunNo: **88061**
Client ID: **LCSW**	Batch ID: **42424**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **3/14/2013**	SeqNo: **1540523**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	9.854	0.10	10.00	0	98.5	85	115				
Chromium	9.302	1.0	10.00	0	93.0	85	115				
Manganese	94.256	0.50	100.0	0	94.3	85	115				

Sample ID: **N009791-001B-MS**	SampType: **MS**	TestCode: **6020_DIS**	Units: **µg/L**	Prep Date: **3/14/2013**	RunNo: **88061**
Client ID: **ZZZZZZ**	Batch ID: **42424**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **3/14/2013**	SeqNo: **1541102**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	12.577	0.10	10.00	2.041	105	75	125				
Chromium	8.359	1.0	10.00	1.600	67.6	75	125				S
Manganese	68.709	0.50	100.0	0	68.7	75	125				S

Sample ID: **N009791-001B-MSD**	SampType: **MSD**	TestCode: **6020_DIS**	Units: **µg/L**	Prep Date: **3/14/2013**	RunNo: **88061**
Client ID: **ZZZZZZ**	Batch ID: **42424**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **3/14/2013**	SeqNo: **1541103**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	12.318	0.10	10.00	2.041	103	75	125	12.58	2.08	20	
Chromium	8.465	1.0	10.00	1.600	68.6	75	125	8.359	1.27	20	S
Manganese	67.998	0.50	100.0	0	68.0	75	125	68.71	1.04	20	S

Qualifiers:

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- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits
- Calculations are based on raw values
- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009791
Project: MSSC, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID: **D130313LCS** SampType: **LCS** TestCode: **8260_S** Units: **µg/Kg** Prep Date: RunNo: **88103**
Client ID: **LCSS** Batch ID: **D13VS020** TestNo: **EPA 8260B** Analysis Date: **3/13/2013** SeqNo: **1541998**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	35.070	5.0	40.00	0	87.7	76	120				
1,1,1-Trichloroethane	36.040	5.0	40.00	0	90.1	67	120				
1,1,2,2-Tetrachloroethane	40.570	5.0	40.00	0	101	79	120				
1,1,2-Trichloroethane	38.630	5.0	40.00	0	96.6	79	120				
1,1-Dichloroethane	38.350	5.0	40.00	0	95.9	80	120				
1,1-Dichloroethene	40.250	5.0	40.00	0	101	80	120				
1,1-Dichloropropene	36.550	5.0	40.00	0	91.4	80	120				
1,2,3-Trichlorobenzene	38.160	5.0	40.00	0	95.4	80	125				
1,2,3-Trichloropropane	40.690	5.0	40.00	0	102	80	120				
1,2,4-Trichlorobenzene	39.140	5.0	40.00	0	97.9	80	128				
1,2,4-Trimethylbenzene	38.360	5.0	40.00	0	95.9	80	124				
1,2-Dibromo-3-chloropropane	35.110	10	40.00	0	87.8	67	120				
1,2-Dibromoethane	37.400	5.0	40.00	0	93.5	74	120				
1,2-Dichlorobenzene	38.270	5.0	40.00	0	95.7	80	120				
1,2-Dichloroethane	38.450	5.0	40.00	0	96.1	78	120				
1,2-Dichloropropane	38.920	5.0	40.00	0	97.3	79	120				
1,3,5-Trimethylbenzene	38.460	5.0	40.00	0	96.2	80	124				
1,3-Dichlorobenzene	38.420	5.0	40.00	0	96.0	80	120				
1,3-Dichloropropane	38.170	5.0	40.00	0	95.4	80	120				
1,4-Dichlorobenzene	38.760	5.0	40.00	0	96.9	80	120				
2,2-Dichloropropane	28.910	5.0	40.00	0	72.3	53	120				
2-Chlorotoluene	38.770	5.0	40.00	0	96.9	80	124				
4-Chlorotoluene	38.490	5.0	40.00	0	96.2	80	120				
4-Isopropyltoluene	38.520	5.0	40.00	0	96.3	80	126				
Benzene	37.950	5.0	40.00	0	94.9	80	120				
Bromobenzene	39.100	5.0	40.00	0	97.8	80	120				
Bromodichloromethane	37.330	5.0	40.00	0	93.3	69	120				
Bromoform	36.210	5.0	40.00	0	90.5	66	121				
Bromomethane	40.330	5.0	40.00	0	101	67	136				
Carbon tetrachloride	32.410	5.0	40.00	0	81.0	62	120				

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike/Surrogate outside of limits due to matrix interference
- DO Surrogate Diluted Out
- Calculations are based on raw values

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009791
Project: MSSC, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID: **D130313LCS**	SampType: **LCS**	TestCode: **8260_S**	Units: **µg/Kg**	Prep Date:	RunNo: **88103**
Client ID: **LCSS**	Batch ID: **D13VS020**	TestNo: **EPA 8260B**		Analysis Date: **3/13/2013**	SeqNo: **1541998**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	37.800	5.0	40.00	0	94.5	80	120				
Chloroethane	40.610	5.0	40.00	0	102	70	149				
Chloroform	37.320	5.0	40.00	0	93.3	80	120				
Chloromethane	39.430	5.0	40.00	0	98.6	59	123				
cis-1,2-Dichloroethene	37.520	5.0	40.00	0	93.8	80	120				
Dibromochloromethane	38.170	5.0	40.00	0	95.4	71	123				
Dibromomethane	38.780	5.0	40.00	0	97.0	78	120				
Dichlorodifluoromethane	38.380	5.0	40.00	0	96.0	62	120				
Ethylbenzene	37.340	5.0	40.00	0	93.4	80	120				
Hexachlorobutadiene	39.090	5.0	40.00	0	97.7	80	128				
Isopropylbenzene	39.170	5.0	40.00	0	97.9	80	126				
m,p-Xylene	74.280	10	80.00	0	92.8	80	120				
Methylene chloride	34.630	5.0	40.00	0	86.6	69	120				
MTBE	32.490	5.0	40.00	0	81.2	67	120				
n-Butylbenzene	38.010	5.0	40.00	0	95.0	80	135				
n-Propylbenzene	38.480	5.0	40.00	0	96.2	80	127				
Naphthalene	38.970	5.0	40.00	0	97.4	70	132				
o-Xylene	37.320	5.0	40.00	0	93.3	80	120				
sec-Butylbenzene	38.510	5.0	40.00	0	96.3	80	127				
Styrene	37.640	5.0	40.00	0	94.1	80	120				
tert-Butylbenzene	38.710	5.0	40.00	0	96.8	80	124				
Tetrachloroethene	37.490	5.0	40.00	0	93.7	80	122				
Toluene	37.530	5.0	40.00	0	93.8	80	120				
trans-1,2-Dichloroethene	38.860	5.0	40.00	0	97.2	79	120				
Trichloroethene	37.380	5.0	40.00	0	93.5	80	120				
Trichlorofluoromethane	39.100	5.0	40.00	0	97.8	69	145				
Vinyl chloride	39.650	5.0	40.00	0	99.1	75	122				
Surr: 1,2-Dichloroethane-d4	44.450		50.00		88.9	58	125				
Surr: 4-Bromofluorobenzene	49.480		50.00		99.0	52	138				
Surr: Dibromofluoromethane	45.070		50.00		90.1	57	121				

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike/Surrogate outside of limits due to matrix interference
- DO Surrogate Diluted Out
- Calculations are based on raw values

Advanced Technology Laboratories, Inc.
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CLIENT: Tetra Tech
Work Order: N009791
Project: MSSC, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID: **D130313LCS**	SampType: **LCS**	TestCode: **8260_S**	Units: **µg/Kg**	Prep Date:	RunNo: **88103**
Client ID: **LCSS**	Batch ID: **D13VS020**	TestNo: **EPA 8260B**		Analysis Date: **3/13/2013**	SeqNo: **1541998**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Toluene-d8	45.170		50.00		90.3	66	130				

Sample ID: **D130313LCSD**	SampType: **LCSD**	TestCode: **8260_S**	Units: **µg/Kg**	Prep Date:	RunNo: **88103**
Client ID: **LCSS02**	Batch ID: **D13VS020**	TestNo: **EPA 8260B**		Analysis Date: **3/13/2013**	SeqNo: **1541999**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	33.840	5.0	40.00	0	84.6	76	120	35.07	3.57	20	
1,1,1-Trichloroethane	33.560	5.0	40.00	0	83.9	67	120	36.04	7.13	20	
1,1,2,2-Tetrachloroethane	43.340	5.0	40.00	0	108	79	120	40.57	6.60	20	
1,1,2-Trichloroethane	38.650	5.0	40.00	0	96.6	79	120	38.63	0.0518	20	
1,1-Dichloroethane	36.190	5.0	40.00	0	90.5	80	120	38.35	5.80	20	
1,1-Dichloroethene	38.830	5.0	40.00	0	97.1	80	120	40.25	3.59	20	
1,1-Dichloropropene	38.540	5.0	40.00	0	96.4	80	120	36.55	5.30	20	
1,2,3-Trichlorobenzene	39.300	5.0	40.00	0	98.2	80	125	38.16	2.94	20	
1,2,3-Trichloropropane	42.260	5.0	40.00	0	106	80	120	40.69	3.79	20	
1,2,4-Trichlorobenzene	38.590	5.0	40.00	0	96.5	80	128	39.14	1.42	20	
1,2,4-Trimethylbenzene	38.130	5.0	40.00	0	95.3	80	124	38.36	0.601	20	
1,2-Dibromo-3-chloropropane	40.300	10	40.00	0	101	67	120	35.11	13.8	20	
1,2-Dibromoethane	37.620	5.0	40.00	0	94.1	74	120	37.40	0.587	20	
1,2-Dichlorobenzene	38.940	5.0	40.00	0	97.4	80	120	38.27	1.74	20	
1,2-Dichloroethane	39.130	5.0	40.00	0	97.8	78	120	38.45	1.75	20	
1,2-Dichloropropane	38.290	5.0	40.00	0	95.7	79	120	38.92	1.63	20	
1,3,5-Trimethylbenzene	38.770	5.0	40.00	0	96.9	80	124	38.46	0.803	20	
1,3-Dichlorobenzene	38.750	5.0	40.00	0	96.9	80	120	38.42	0.855	20	
1,3-Dichloropropane	38.530	5.0	40.00	0	96.3	80	120	38.17	0.939	20	
1,4-Dichlorobenzene	38.620	5.0	40.00	0	96.6	80	120	38.76	0.362	20	
2,2-Dichloropropane	26.960	5.0	40.00	0	67.4	53	120	28.91	6.98	20	
2-Chlorotoluene	38.980	5.0	40.00	0	97.5	80	124	38.77	0.540	20	
4-Chlorotoluene	39.760	5.0	40.00	0	99.4	80	120	38.49	3.25	20	
4-Isopropyltoluene	39.370	5.0	40.00	0	98.4	80	126	38.52	2.18	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike/Surrogate outside of limits due to matrix interference
- DO Surrogate Diluted Out
- Calculations are based on raw values

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009791
Project: MSSC, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID: **D130313LCSD** SampType: **LCSD** TestCode: **8260_S** Units: **µg/Kg** Prep Date: RunNo: **88103**
Client ID: **LCSS02** Batch ID: **D13VS020** TestNo: **EPA 8260B** Analysis Date: **3/13/2013** SeqNo: **1541999**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	37.710	5.0	40.00	0	94.3	80	120	37.95	0.634	20	
Bromobenzene	39.450	5.0	40.00	0	98.6	80	120	39.10	0.891	20	
Bromodichloromethane	35.190	5.0	40.00	0	88.0	69	120	37.33	5.90	20	
Bromoform	36.380	5.0	40.00	0	91.0	66	121	36.21	0.468	20	
Bromomethane	38.470	5.0	40.00	0	96.2	67	136	40.33	4.72	20	
Carbon tetrachloride	32.750	5.0	40.00	0	81.9	62	120	32.41	1.04	20	
Chlorobenzene	37.690	5.0	40.00	0	94.2	80	120	37.80	0.291	20	
Chloroethane	38.790	5.0	40.00	0	97.0	70	149	40.61	4.58	20	
Chloroform	35.210	5.0	40.00	0	88.0	80	120	37.32	5.82	20	
Chloromethane	37.800	5.0	40.00	0	94.5	59	123	39.43	4.22	20	
cis-1,2-Dichloroethene	36.140	5.0	40.00	0	90.4	80	120	37.52	3.75	20	
Dibromochloromethane	37.320	5.0	40.00	0	93.3	71	123	38.17	2.25	20	
Dibromomethane	37.310	5.0	40.00	0	93.3	78	120	38.78	3.86	20	
Dichlorodifluoromethane	37.800	5.0	40.00	0	94.5	62	120	38.38	1.52	20	
Ethylbenzene	37.570	5.0	40.00	0	93.9	80	120	37.34	0.614	20	
Hexachlorobutadiene	40.040	5.0	40.00	0	100	80	128	39.09	2.40	20	
Isopropylbenzene	39.680	5.0	40.00	0	99.2	80	126	39.17	1.29	20	
m,p-Xylene	75.400	10	80.00	0	94.3	80	120	74.28	1.50	20	
Methylene chloride	33.880	5.0	40.00	0	84.7	69	120	34.63	2.19	20	
MTBE	31.030	5.0	40.00	0	77.6	67	120	32.49	4.60	20	
n-Butylbenzene	38.650	5.0	40.00	0	96.6	80	135	38.01	1.67	20	
n-Propylbenzene	38.750	5.0	40.00	0	96.9	80	127	38.48	0.699	20	
Naphthalene	41.740	5.0	40.00	0	104	70	132	38.97	6.86	20	
o-Xylene	36.520	5.0	40.00	0	91.3	80	120	37.32	2.17	20	
sec-Butylbenzene	39.430	5.0	40.00	0	98.6	80	127	38.51	2.36	20	
Styrene	37.440	5.0	40.00	0	93.6	80	120	37.64	0.533	20	
tert-Butylbenzene	39.200	5.0	40.00	0	98.0	80	124	38.71	1.26	20	
Tetrachloroethene	38.820	5.0	40.00	0	97.0	80	122	37.49	3.49	20	
Toluene	37.000	5.0	40.00	0	92.5	80	120	37.53	1.42	20	
trans-1,2-Dichloroethene	37.370	5.0	40.00	0	93.4	79	120	38.86	3.91	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
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CLIENT: Tetra Tech
Work Order: N009791
Project: MSSC, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID: **D130313LCSD**	SampType: **LCSD**	TestCode: **8260_S**	Units: **µg/Kg**	Prep Date:	RunNo: **88103**
Client ID: **LCSS02**	Batch ID: **D13VS020**	TestNo: **EPA 8260B**		Analysis Date: **3/13/2013**	SeqNo: **1541999**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Trichloroethene	37.490	5.0	40.00	0	93.7	80	120	37.38	0.294	20	
Trichlorofluoromethane	37.690	5.0	40.00	0	94.2	69	145	39.10	3.67	20	
Vinyl chloride	38.980	5.0	40.00	0	97.5	75	122	39.65	1.70	20	
Surr: 1,2-Dichloroethane-d4	40.960		50.00		81.9	58	125		0		
Surr: 4-Bromofluorobenzene	50.700		50.00		101	52	138		0		
Surr: Dibromofluoromethane	43.290		50.00		86.6	57	121		0		
Surr: Toluene-d8	45.500		50.00		91.0	66	130		0		

Sample ID: **D130313MB2**	SampType: **MBLK**	TestCode: **8260_S**	Units: **µg/Kg**	Prep Date:	RunNo: **88103**
Client ID: **PBS**	Batch ID: **D13VS020**	TestNo: **EPA 8260B**		Analysis Date: **3/13/2013**	SeqNo: **1542000**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	5.0									
1,1,1-Trichloroethane	ND	5.0									
1,1,2,2-Tetrachloroethane	ND	5.0									
1,1,2-Trichloroethane	ND	5.0									
1,1-Dichloroethane	ND	5.0									
1,1-Dichloroethene	ND	5.0									
1,1-Dichloropropene	ND	5.0									
1,2,3-Trichlorobenzene	ND	5.0									
1,2,3-Trichloropropane	ND	5.0									
1,2,4-Trichlorobenzene	ND	5.0									
1,2,4-Trimethylbenzene	ND	5.0									
1,2-Dibromo-3-chloropropane	ND	10									
1,2-Dibromoethane	ND	5.0									
1,2-Dichlorobenzene	ND	5.0									
1,2-Dichloroethane	ND	5.0									
1,2-Dichloropropane	ND	5.0									
1,3,5-Trimethylbenzene	ND	5.0									
1,3-Dichlorobenzene	ND	5.0									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Tetra Tech
Work Order: N009791
Project: MSSC, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID: **D130313MB2** SampType: **MBLK** TestCode: **8260_S** Units: **µg/Kg** Prep Date: RunNo: **88103**
Client ID: **PBS** Batch ID: **D13VS020** TestNo: **EPA 8260B** Analysis Date: **3/13/2013** SeqNo: **1542000**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,3-Dichloropropane	ND	5.0									
1,4-Dichlorobenzene	ND	5.0									
2,2-Dichloropropane	ND	5.0									
2-Chlorotoluene	ND	5.0									
4-Chlorotoluene	ND	5.0									
4-Isopropyltoluene	ND	5.0									
Benzene	ND	5.0									
Bromobenzene	ND	5.0									
Bromodichloromethane	ND	5.0									
Bromoform	ND	5.0									
Bromomethane	ND	5.0									
Carbon tetrachloride	ND	5.0									
Chlorobenzene	ND	5.0									
Chloroethane	ND	5.0									
Chloroform	ND	5.0									
Chloromethane	ND	5.0									
cis-1,2-Dichloroethene	ND	5.0									
Dibromochloromethane	ND	5.0									
Dibromomethane	ND	5.0									
Dichlorodifluoromethane	ND	5.0									
Ethylbenzene	ND	5.0									
Hexachlorobutadiene	ND	5.0									
Isopropylbenzene	ND	5.0									
m,p-Xylene	ND	10									
Methylene chloride	ND	5.0									
MTBE	ND	5.0									
n-Butylbenzene	ND	5.0									
n-Propylbenzene	ND	5.0									
Naphthalene	ND	5.0									
o-Xylene	ND	5.0									

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits
- Calculations are based on raw values
- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

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CLIENT: Tetra Tech
Work Order: N009791
Project: MSSC, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID: **D130313MB2** SampType: **MBLK** TestCode: **8260_S** Units: **µg/Kg** Prep Date: RunNo: **88103**
Client ID: **PBS** Batch ID: **D13VS020** TestNo: **EPA 8260B** Analysis Date: **3/13/2013** SeqNo: **1542000**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
sec-Butylbenzene	ND	5.0									
Styrene	ND	5.0									
tert-Butylbenzene	ND	5.0									
Tetrachloroethene	ND	5.0									
Toluene	ND	5.0									
trans-1,2-Dichloroethene	ND	5.0									
Trichloroethene	ND	5.0									
Trichlorofluoromethane	ND	5.0									
Vinyl chloride	ND	5.0									
Surr: 1,2-Dichloroethane-d4	47.320		50.00		94.6	58	125				
Surr: 4-Bromofluorobenzene	44.880		50.00		89.8	52	138				
Surr: Dibromofluoromethane	47.130		50.00		94.3	57	121				
Surr: Toluene-d8	49.600		50.00		99.2	66	130				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
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CLIENT: Tetra Tech
Work Order: N009791
Project: MSSC, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130312LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88039**
Client ID: **LCSW** Batch ID: **P13VW039** TestNo: **EPA 8260B** Analysis Date: **3/12/2013** SeqNo: **1539548**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	22.370	0.50	20.00	0	112	74	122				
1,1,1-Trichloroethane	17.710	0.50	20.00	0	88.6	65	120				
1,1,2,2-Tetrachloroethane	20.460	0.50	20.00	0	102	80	120				
1,1,2-Trichloroethane	21.870	0.50	20.00	0	109	80	120				
1,1-Dichloroethane	16.780	0.50	20.00	0	83.9	80	120				
1,1-Dichloroethene	20.590	0.50	20.00	0	103	80	120				
1,1-Dichloropropene	20.810	0.50	20.00	0	104	80	120				
1,2,3-Trichlorobenzene	20.850	0.50	20.00	0	104	80	124				
1,2,3-Trichloropropane	20.580	0.50	20.00	0	103	80	120				
1,2,4-Trichlorobenzene	20.460	0.50	20.00	0	102	80	126				
1,2,4-Trimethylbenzene	19.010	0.50	20.00	0	95.1	80	123				
1,2-Dibromo-3-chloropropane	24.490	1.0	20.00	0	122	70	120				S
1,2-Dibromoethane	21.420	0.50	20.00	0	107	80	120				
1,2-Dichlorobenzene	19.740	0.50	20.00	0	98.7	80	120				
1,2-Dichloroethane	22.370	0.50	20.00	0	112	80	120				
1,2-Dichloropropane	20.130	0.50	20.00	0	101	80	120				
1,3,5-Trimethylbenzene	19.090	0.50	20.00	0	95.4	80	121				
1,3-Dichlorobenzene	19.590	0.50	20.00	0	98.0	80	120				
1,3-Dichloropropane	21.090	0.50	20.00	0	105	80	120				
1,4-Dichlorobenzene	18.740	0.50	20.00	0	93.7	80	120				
2,2-Dichloropropane	19.960	0.50	20.00	0	99.8	54	120				
2-Chlorotoluene	18.370	0.50	20.00	0	91.9	80	122				
4-Chlorotoluene	18.460	0.50	20.00	0	92.3	80	120				
4-Isopropyltoluene	18.820	0.50	20.00	0	94.1	80	122				
Benzene	18.950	0.50	20.00	0	94.8	80	120				
Bromobenzene	20.570	0.50	20.00	0	103	80	120				
Bromodichloromethane	21.600	0.50	20.00	0	108	70	120				
Bromoform	24.020	0.50	20.00	0	120	66	120				S
Bromomethane	20.420	0.50	20.00	0	102	48	155				
Carbon tetrachloride	22.580	0.50	20.00	0	113	60	120				

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike/Surrogate outside of limits due to matrix interference
- DO Surrogate Diluted Out
- Calculations are based on raw values

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009791
Project: MSSC, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130312LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88039**
Client ID: **LCSW** Batch ID: **P13VW039** TestNo: **EPA 8260B** Analysis Date: **3/12/2013** SeqNo: **1539548**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	20.200	0.50	20.00	0	101	80	120				
Chloroethane	22.280	0.50	20.00	0	111	62	147				
Chloroform	17.240	0.50	20.00	0	86.2	80	120				
Chloromethane	16.810	0.50	20.00	0	84.0	63	121				
cis-1,2-Dichloroethene	17.470	0.50	20.00	0	87.4	80	120				
Dibromochloromethane	22.550	0.50	20.00	0	113	67	123				
Dibromomethane	22.210	0.50	20.00	0	111	80	120				
Dichlorodifluoromethane	18.520	0.50	20.00	0	92.6	70	121				
Ethylbenzene	18.610	0.50	20.00	0	93.0	80	120				
Hexachlorobutadiene	21.410	0.50	20.00	0	107	80	123				
Isopropylbenzene	18.240	0.50	20.00	0	91.2	80	121				
m,p-Xylene	37.530	1.0	40.00	0	93.8	80	120				
Methylene chloride	16.770	2.0	20.00	0	83.9	75	120				
MTBE	17.060	0.50	20.00	0	85.3	70	120				
n-Butylbenzene	18.400	0.50	20.00	0	92.0	80	129				
n-Propylbenzene	17.820	0.50	20.00	0	89.1	80	122				
Naphthalene	20.240	0.50	20.00	0	101	73	127				
o-Xylene	19.730	0.50	20.00	0	98.6	80	120				
sec-Butylbenzene	18.010	0.50	20.00	0	90.1	80	120				
Styrene	20.460	0.50	20.00	0	102	80	120				
tert-Butylbenzene	19.290	0.50	20.00	0	96.5	80	120				
Tetrachloroethene	22.020	0.50	20.00	0	110	80	121				
Toluene	19.210	0.50	20.00	0	96.0	80	120				
trans-1,2-Dichloroethene	17.210	0.50	20.00	0	86.1	80	120				
Trichloroethene	21.350	0.50	20.00	0	107	80	120				
Trichlorofluoromethane	21.490	0.50	20.00	0	107	71	148				
Vinyl chloride	17.740	0.50	20.00	0	88.7	80	120				
Surr: 1,2-Dichloroethane-d4	24.120		25.00		96.5	56	120				
Surr: 4-Bromofluorobenzene	27.390		25.00		110	80	120				
Surr: Dibromofluoromethane	23.390		25.00		93.6	72	120				

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike/Surrogate outside of limits due to matrix interference
- DO Surrogate Diluted Out

Calculations are based on raw values

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009791
Project: MSSC, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130312LCS**	SampType: **LCS**	TestCode: **8260_WP_LL**	Units: **µg/L**	Prep Date:	RunNo: **88039**
Client ID: **LCSW**	Batch ID: **P13VW039**	TestNo: **EPA 8260B**		Analysis Date: **3/12/2013**	SeqNo: **1539548**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Toluene-d8	25.850		25.00		103	80	123				

Sample ID: **P130312LCSD**	SampType: **LCSD**	TestCode: **8260_WP_LL**	Units: **µg/L**	Prep Date:	RunNo: **88039**
Client ID: **LCSS02**	Batch ID: **P13VW039**	TestNo: **EPA 8260B**		Analysis Date: **3/12/2013**	SeqNo: **1539549**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	22.510	0.50	20.00	0	113	74	122	22.37	0.624	20	
1,1,1-Trichloroethane	17.900	0.50	20.00	0	89.5	65	120	17.71	1.07	20	
1,1,2,2-Tetrachloroethane	20.200	0.50	20.00	0	101	80	120	20.46	1.28	20	
1,1,2-Trichloroethane	22.220	0.50	20.00	0	111	80	120	21.87	1.59	20	
1,1-Dichloroethane	16.680	0.50	20.00	0	83.4	80	120	16.78	0.598	20	
1,1-Dichloroethene	20.690	0.50	20.00	0	103	80	120	20.59	0.484	20	
1,1-Dichloropropene	20.540	0.50	20.00	0	103	80	120	20.81	1.31	20	
1,2,3-Trichlorobenzene	21.310	0.50	20.00	0	107	80	124	20.85	2.18	20	
1,2,3-Trichloropropane	21.300	0.50	20.00	0	106	80	120	20.58	3.44	20	
1,2,4-Trichlorobenzene	20.420	0.50	20.00	0	102	80	126	20.46	0.196	20	
1,2,4-Trimethylbenzene	18.880	0.50	20.00	0	94.4	80	123	19.01	0.686	20	
1,2-Dibromo-3-chloropropane	25.150	1.0	20.00	0	126	70	120	24.49	2.66	20	S
1,2-Dibromoethane	22.620	0.50	20.00	0	113	80	120	21.42	5.45	20	
1,2-Dichlorobenzene	19.670	0.50	20.00	0	98.4	80	120	19.74	0.355	20	
1,2-Dichloroethane	22.010	0.50	20.00	0	110	80	120	22.37	1.62	20	
1,2-Dichloropropane	20.280	0.50	20.00	0	101	80	120	20.13	0.742	20	
1,3,5-Trimethylbenzene	18.770	0.50	20.00	0	93.8	80	121	19.09	1.69	20	
1,3-Dichlorobenzene	19.440	0.50	20.00	0	97.2	80	120	19.59	0.769	20	
1,3-Dichloropropane	20.680	0.50	20.00	0	103	80	120	21.09	1.96	20	
1,4-Dichlorobenzene	18.920	0.50	20.00	0	94.6	80	120	18.74	0.956	20	
2,2-Dichloropropane	19.340	0.50	20.00	0	96.7	54	120	19.96	3.16	20	
2-Chlorotoluene	18.320	0.50	20.00	0	91.6	80	122	18.37	0.273	20	
4-Chlorotoluene	18.160	0.50	20.00	0	90.8	80	120	18.46	1.64	20	
4-Isopropyltoluene	18.940	0.50	20.00	0	94.7	80	122	18.82	0.636	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike/Surrogate outside of limits due to matrix interference
- DO Surrogate Diluted Out
- Calculations are based on raw values

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009791
Project: MSSC, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130312LCSD** SampType: **LCSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88039**
Client ID: **LCSS02** Batch ID: **P13VW039** TestNo: **EPA 8260B** Analysis Date: **3/12/2013** SeqNo: **1539549**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	18.950	0.50	20.00	0	94.8	80	120	18.95	0	20	
Bromobenzene	20.900	0.50	20.00	0	104	80	120	20.57	1.59	20	
Bromodichloromethane	21.550	0.50	20.00	0	108	70	120	21.60	0.232	20	
Bromoform	24.540	0.50	20.00	0	123	66	120	24.02	2.14	20	S
Bromomethane	20.510	0.50	20.00	0	103	48	155	20.42	0.440	20	
Carbon tetrachloride	22.510	0.50	20.00	0	113	60	120	22.58	0.310	20	
Chlorobenzene	20.220	0.50	20.00	0	101	80	120	20.20	0.0990	20	
Chloroethane	21.890	0.50	20.00	0	109	62	147	22.28	1.77	20	
Chloroform	17.160	0.50	20.00	0	85.8	80	120	17.24	0.465	20	
Chloromethane	16.320	0.50	20.00	0	81.6	63	121	16.81	2.96	20	
cis-1,2-Dichloroethene	17.020	0.50	20.00	0	85.1	80	120	17.47	2.61	20	
Dibromochloromethane	23.240	0.50	20.00	0	116	67	123	22.55	3.01	20	
Dibromomethane	22.320	0.50	20.00	0	112	80	120	22.21	0.494	20	
Dichlorodifluoromethane	18.370	0.50	20.00	0	91.9	70	121	18.52	0.813	20	
Ethylbenzene	18.920	0.50	20.00	0	94.6	80	120	18.61	1.65	20	
Hexachlorobutadiene	21.230	0.50	20.00	0	106	80	123	21.41	0.844	20	
Isopropylbenzene	18.360	0.50	20.00	0	91.8	80	121	18.24	0.656	20	
m,p-Xylene	38.080	1.0	40.00	0	95.2	80	120	37.53	1.45	20	
Methylene chloride	16.890	2.0	20.00	0	84.4	75	120	16.77	0.713	20	
MTBE	17.490	0.50	20.00	0	87.5	70	120	17.06	2.49	20	
n-Butylbenzene	18.030	0.50	20.00	0	90.2	80	129	18.40	2.03	20	
n-Propylbenzene	17.860	0.50	20.00	0	89.3	80	122	17.82	0.224	20	
Naphthalene	20.780	0.50	20.00	0	104	73	127	20.24	2.63	20	
o-Xylene	19.800	0.50	20.00	0	99.0	80	120	19.73	0.354	20	
sec-Butylbenzene	17.890	0.50	20.00	0	89.4	80	120	18.01	0.669	20	
Styrene	20.840	0.50	20.00	0	104	80	120	20.46	1.84	20	
tert-Butylbenzene	19.000	0.50	20.00	0	95.0	80	120	19.29	1.51	20	
Tetrachloroethene	22.390	0.50	20.00	0	112	80	121	22.02	1.67	20	
Toluene	19.310	0.50	20.00	0	96.6	80	120	19.21	0.519	20	
trans-1,2-Dichloroethene	17.290	0.50	20.00	0	86.5	80	120	17.21	0.464	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike/Surrogate outside of limits due to matrix interference
- DO Surrogate Diluted Out
- Calculations are based on raw values

Advanced Technology Laboratories, Inc.
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CLIENT: Tetra Tech
Work Order: N009791
Project: MSSC, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130312LCSD** SampType: **LCSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88039**
Client ID: **LCSS02** Batch ID: **P13VW039** TestNo: **EPA 8260B** Analysis Date: **3/12/2013** SeqNo: **1539549**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Trichloroethene	21.330	0.50	20.00	0	107	80	120	21.35	0.0937	20	
Trichlorofluoromethane	20.930	0.50	20.00	0	105	71	148	21.49	2.64	20	
Vinyl chloride	17.650	0.50	20.00	0	88.2	80	120	17.74	0.509	20	
Surr: 1,2-Dichloroethane-d4	23.830		25.00		95.3	56	120		0		
Surr: 4-Bromofluorobenzene	27.000		25.00		108	80	120		0		
Surr: Dibromofluoromethane	22.630		25.00		90.5	72	120		0		
Surr: Toluene-d8	25.200		25.00		101	80	123		0		

Sample ID: **P130312MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88039**
Client ID: **PBW** Batch ID: **P13VW039** TestNo: **EPA 8260B** Analysis Date: **3/12/2013** SeqNo: **1539551**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	0.50									
1,1,1-Trichloroethane	ND	0.50									
1,1,2,2-Tetrachloroethane	ND	0.50									
1,1,2-Trichloroethane	ND	0.50									
1,1-Dichloroethane	ND	0.50									
1,1-Dichloroethene	ND	0.50									
1,1-Dichloropropene	ND	0.50									
1,2,3-Trichlorobenzene	ND	0.50									
1,2,3-Trichloropropane	ND	0.50									
1,2,4-Trichlorobenzene	ND	0.50									
1,2,4-Trimethylbenzene	ND	0.50									
1,2-Dibromo-3-chloropropane	ND	1.0									
1,2-Dibromoethane	ND	0.50									
1,2-Dichlorobenzene	ND	0.50									
1,2-Dichloroethane	ND	0.50									
1,2-Dichloropropane	ND	0.50									
1,3,5-Trimethylbenzene	ND	0.50									
1,3-Dichlorobenzene	ND	0.50									

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Tetra Tech
Work Order: N009791
Project: MSSC, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130312MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88039**
Client ID: **PBW** Batch ID: **P13VW039** TestNo: **EPA 8260B** Analysis Date: **3/12/2013** SeqNo: **1539551**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,3-Dichloropropane	ND	0.50									
1,4-Dichlorobenzene	ND	0.50									
2,2-Dichloropropane	ND	0.50									
2-Chlorotoluene	ND	0.50									
4-Chlorotoluene	ND	0.50									
4-Isopropyltoluene	ND	0.50									
Benzene	ND	0.50									
Bromobenzene	ND	0.50									
Bromodichloromethane	ND	0.50									
Bromoform	ND	0.50									
Bromomethane	ND	0.50									
Carbon tetrachloride	ND	0.50									
Chlorobenzene	ND	0.50									
Chloroethane	ND	0.50									
Chloroform	ND	0.50									
Chloromethane	ND	0.50									
cis-1,2-Dichloroethene	ND	0.50									
Dibromochloromethane	ND	0.50									
Dibromomethane	ND	0.50									
Dichlorodifluoromethane	ND	0.50									
Ethylbenzene	ND	0.50									
Hexachlorobutadiene	ND	0.50									
Isopropylbenzene	ND	0.50									
m,p-Xylene	ND	1.0									
Methylene chloride	ND	2.0									
MTBE	ND	0.50									
n-Butylbenzene	ND	0.50									
n-Propylbenzene	ND	0.50									
Naphthalene	ND	0.50									
o-Xylene	ND	0.50									

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

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3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009791
Project: MSSC, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130312MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88039**
Client ID: **PBW** Batch ID: **P13VW039** TestNo: **EPA 8260B** Analysis Date: **3/12/2013** SeqNo: **1539551**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
sec-Butylbenzene	ND	0.50									
Styrene	ND	0.50									
tert-Butylbenzene	ND	0.50									
Tetrachloroethene	ND	0.50									
Toluene	ND	0.50									
trans-1,2-Dichloroethene	ND	0.50									
Trichloroethene	ND	0.50									
Trichlorofluoromethane	ND	0.50									
Vinyl chloride	ND	0.50									
Surr: 1,2-Dichloroethane-d4	25.280		25.00		101	56	120				
Surr: 4-Bromofluorobenzene	25.750		25.00		103	80	120				
Surr: Dibromofluoromethane	24.450		25.00		97.8	72	120				
Surr: Toluene-d8	24.710		25.00		98.8	80	123				

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
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- Calculations are based on raw values
- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

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CLIENT: Tetra Tech
Work Order: N009791
Project: MSSC, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130313LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88053**
Client ID: **LCSW** Batch ID: **P13VW040** TestNo: **EPA 8260B** Analysis Date: **3/13/2013** SeqNo: **1540080**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	22.290	0.50	20.00	0	111	74	122				
1,1,1-Trichloroethane	19.070	0.50	20.00	0	95.4	65	120				
1,1,2,2-Tetrachloroethane	21.850	0.50	20.00	0	109	80	120				
1,1,2-Trichloroethane	22.670	0.50	20.00	0	113	80	120				
1,1-Dichloroethane	17.840	0.50	20.00	0	89.2	80	120				
1,1-Dichloroethene	22.150	0.50	20.00	0	111	80	120				
1,1-Dichloropropene	20.490	0.50	20.00	0	102	80	120				
1,2,3-Trichlorobenzene	21.560	0.50	20.00	0	108	80	124				
1,2,3-Trichloropropane	22.060	0.50	20.00	0	110	80	120				
1,2,4-Trichlorobenzene	20.340	0.50	20.00	0	102	80	126				
1,2,4-Trimethylbenzene	18.940	0.50	20.00	0	94.7	80	123				
1,2-Dibromo-3-chloropropane	26.190	1.0	20.00	0	131	70	120				S
1,2-Dibromoethane	23.020	0.50	20.00	0	115	80	120				
1,2-Dichlorobenzene	19.950	0.50	20.00	0	99.8	80	120				
1,2-Dichloroethane	22.450	0.50	20.00	0	112	80	120				
1,2-Dichloropropane	20.540	0.50	20.00	0	103	80	120				
1,3,5-Trimethylbenzene	19.050	0.50	20.00	0	95.2	80	121				
1,3-Dichlorobenzene	19.380	0.50	20.00	0	96.9	80	120				
1,3-Dichloropropane	21.110	0.50	20.00	0	106	80	120				
1,4-Dichlorobenzene	19.170	0.50	20.00	0	95.9	80	120				
2,2-Dichloropropane	20.860	0.50	20.00	0	104	54	120				
2-Chlorotoluene	18.370	0.50	20.00	0	91.9	80	122				
4-Chlorotoluene	18.340	0.50	20.00	0	91.7	80	120				
4-Isopropyltoluene	19.050	0.50	20.00	0	95.2	80	122				
Benzene	19.060	0.50	20.00	0	95.3	80	120				
Bromobenzene	21.070	0.50	20.00	0	105	80	120				
Bromodichloromethane	21.820	0.50	20.00	0	109	70	120				
Bromoform	24.450	0.50	20.00	0	122	66	120				S
Bromomethane	21.900	0.50	20.00	0	110	48	155				
Carbon tetrachloride	22.400	0.50	20.00	0	112	60	120				

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike/Surrogate outside of limits due to matrix interference
- DO Surrogate Diluted Out
- Calculations are based on raw values

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009791
Project: MSSC, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130313LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88053**
Client ID: **LCSW** Batch ID: **P13VW040** TestNo: **EPA 8260B** Analysis Date: **3/13/2013** SeqNo: **1540080**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	20.440	0.50	20.00	0	102	80	120				
Chloroethane	23.050	0.50	20.00	0	115	62	147				
Chloroform	18.350	0.50	20.00	0	91.8	80	120				
Chloromethane	17.750	0.50	20.00	0	88.8	63	121				
cis-1,2-Dichloroethene	18.200	0.50	20.00	0	91.0	80	120				
Dibromochloromethane	22.720	0.50	20.00	0	114	67	123				
Dibromomethane	23.310	0.50	20.00	0	117	80	120				
Dichlorodifluoromethane	19.760	0.50	20.00	0	98.8	70	121				
Ethylbenzene	18.900	0.50	20.00	0	94.5	80	120				
Hexachlorobutadiene	21.380	0.50	20.00	0	107	80	123				
Isopropylbenzene	18.270	0.50	20.00	0	91.4	80	121				
m,p-Xylene	37.400	1.0	40.00	0	93.5	80	120				
Methylene chloride	18.350	2.0	20.00	0	91.8	75	120				
MTBE	18.300	0.50	20.00	0	91.5	70	120				
n-Butylbenzene	18.280	0.50	20.00	0	91.4	80	129				
n-Propylbenzene	18.040	0.50	20.00	0	90.2	80	122				
Naphthalene	21.230	0.50	20.00	0	106	73	127				
o-Xylene	19.810	0.50	20.00	0	99.0	80	120				
sec-Butylbenzene	18.220	0.50	20.00	0	91.1	80	120				
Styrene	20.670	0.50	20.00	0	103	80	120				
tert-Butylbenzene	19.160	0.50	20.00	0	95.8	80	120				
Tetrachloroethene	22.230	0.50	20.00	0	111	80	121				
Toluene	19.530	0.50	20.00	0	97.6	80	120				
trans-1,2-Dichloroethene	18.630	0.50	20.00	0	93.2	80	120				
Trichloroethene	21.190	0.50	20.00	0	106	80	120				
Trichlorofluoromethane	22.720	0.50	20.00	0	114	71	148				
Vinyl chloride	19.610	0.50	20.00	0	98.0	80	120				
Surr: 1,2-Dichloroethane-d4	25.620		25.00		102	56	120				
Surr: 4-Bromofluorobenzene	26.860		25.00		107	80	120				
Surr: Dibromofluoromethane	24.530		25.00		98.1	72	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009791
Project: MSSC, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130313LCS**	SampType: **LCS**	TestCode: **8260_WP_LL**	Units: **µg/L**	Prep Date:	RunNo: **88053**
Client ID: **LCSW**	Batch ID: **P13VW040**	TestNo: **EPA 8260B**		Analysis Date: **3/13/2013**	SeqNo: **1540080**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Toluene-d8	25.180		25.00		101	80	123				

Sample ID: **P130313LCSD**	SampType: **LCSD**	TestCode: **8260_WP_LL**	Units: **µg/L**	Prep Date:	RunNo: **88053**
Client ID: **LCSS02**	Batch ID: **P13VW040**	TestNo: **EPA 8260B**		Analysis Date: **3/13/2013**	SeqNo: **1540081**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	22.540	0.50	20.00	0	113	74	122	22.29	1.12	20	
1,1,1-Trichloroethane	19.370	0.50	20.00	0	96.9	65	120	19.07	1.56	20	
1,1,2,2-Tetrachloroethane	21.290	0.50	20.00	0	106	80	120	21.85	2.60	20	
1,1,2-Trichloroethane	22.580	0.50	20.00	0	113	80	120	22.67	0.398	20	
1,1-Dichloroethane	17.570	0.50	20.00	0	87.9	80	120	17.84	1.52	20	
1,1-Dichloroethene	22.600	0.50	20.00	0	113	80	120	22.15	2.01	20	
1,1-Dichloropropene	20.620	0.50	20.00	0	103	80	120	20.49	0.632	20	
1,2,3-Trichlorobenzene	21.590	0.50	20.00	0	108	80	124	21.56	0.139	20	
1,2,3-Trichloropropane	22.130	0.50	20.00	0	111	80	120	22.06	0.317	20	
1,2,4-Trichlorobenzene	20.380	0.50	20.00	0	102	80	126	20.34	0.196	20	
1,2,4-Trimethylbenzene	18.970	0.50	20.00	0	94.8	80	123	18.94	0.158	20	
1,2-Dibromo-3-chloropropane	27.160	1.0	20.00	0	136	70	120	26.19	3.64	20	S
1,2-Dibromoethane	22.850	0.50	20.00	0	114	80	120	23.02	0.741	20	
1,2-Dichlorobenzene	19.990	0.50	20.00	0	100	80	120	19.95	0.200	20	
1,2-Dichloroethane	22.320	0.50	20.00	0	112	80	120	22.45	0.581	20	
1,2-Dichloropropane	20.890	0.50	20.00	0	104	80	120	20.54	1.69	20	
1,3,5-Trimethylbenzene	18.880	0.50	20.00	0	94.4	80	121	19.05	0.896	20	
1,3-Dichlorobenzene	19.470	0.50	20.00	0	97.4	80	120	19.38	0.463	20	
1,3-Dichloropropane	21.650	0.50	20.00	0	108	80	120	21.11	2.53	20	
1,4-Dichlorobenzene	19.100	0.50	20.00	0	95.5	80	120	19.17	0.366	20	
2,2-Dichloropropane	20.190	0.50	20.00	0	101	54	120	20.86	3.26	20	
2-Chlorotoluene	18.400	0.50	20.00	0	92.0	80	122	18.37	0.163	20	
4-Chlorotoluene	18.630	0.50	20.00	0	93.2	80	120	18.34	1.57	20	
4-Isopropyltoluene	18.890	0.50	20.00	0	94.4	80	122	19.05	0.843	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
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- Calculations are based on raw values
- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009791
Project: MSSC, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130313LCSD** SampType: **LCSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88053**
Client ID: **LCSS02** Batch ID: **P13VW040** TestNo: **EPA 8260B** Analysis Date: **3/13/2013** SeqNo: **1540081**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	19.250	0.50	20.00	0	96.2	80	120	19.06	0.992	20	
Bromobenzene	20.810	0.50	20.00	0	104	80	120	21.07	1.24	20	
Bromodichloromethane	21.800	0.50	20.00	0	109	70	120	21.82	0.0917	20	
Bromoform	24.940	0.50	20.00	0	125	66	120	24.45	1.98	20	S
Bromomethane	23.080	0.50	20.00	0	115	48	155	21.90	5.25	20	
Carbon tetrachloride	22.140	0.50	20.00	0	111	60	120	22.40	1.17	20	
Chlorobenzene	20.580	0.50	20.00	0	103	80	120	20.44	0.683	20	
Chloroethane	24.180	0.50	20.00	0	121	62	147	23.05	4.79	20	
Chloroform	18.630	0.50	20.00	0	93.2	80	120	18.35	1.51	20	
Chloromethane	17.800	0.50	20.00	0	89.0	63	121	17.75	0.281	20	
cis-1,2-Dichloroethene	18.870	0.50	20.00	0	94.4	80	120	18.20	3.61	20	
Dibromochloromethane	23.060	0.50	20.00	0	115	67	123	22.72	1.49	20	
Dibromomethane	22.950	0.50	20.00	0	115	80	120	23.31	1.56	20	
Dichlorodifluoromethane	19.900	0.50	20.00	0	99.5	70	121	19.76	0.706	20	
Ethylbenzene	19.130	0.50	20.00	0	95.7	80	120	18.90	1.21	20	
Hexachlorobutadiene	21.260	0.50	20.00	0	106	80	123	21.38	0.563	20	
Isopropylbenzene	18.330	0.50	20.00	0	91.7	80	121	18.27	0.328	20	
m,p-Xylene	38.460	1.0	40.00	0	96.2	80	120	37.40	2.79	20	
Methylene chloride	18.640	2.0	20.00	0	93.2	75	120	18.35	1.57	20	
MTBE	18.590	0.50	20.00	0	93.0	70	120	18.30	1.57	20	
n-Butylbenzene	18.320	0.50	20.00	0	91.6	80	129	18.28	0.219	20	
n-Propylbenzene	17.970	0.50	20.00	0	89.8	80	122	18.04	0.389	20	
Naphthalene	21.100	0.50	20.00	0	106	73	127	21.23	0.614	20	
o-Xylene	19.820	0.50	20.00	0	99.1	80	120	19.81	0.0505	20	
sec-Butylbenzene	18.240	0.50	20.00	0	91.2	80	120	18.22	0.110	20	
Styrene	20.800	0.50	20.00	0	104	80	120	20.67	0.627	20	
tert-Butylbenzene	19.250	0.50	20.00	0	96.2	80	120	19.16	0.469	20	
Tetrachloroethene	22.590	0.50	20.00	0	113	80	121	22.23	1.61	20	
Toluene	19.650	0.50	20.00	0	98.2	80	120	19.53	0.613	20	
trans-1,2-Dichloroethene	18.840	0.50	20.00	0	94.2	80	120	18.63	1.12	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
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CLIENT: Tetra Tech
Work Order: N009791
Project: MSSC, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130313LCSD** SampType: **LCSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88053**
Client ID: **LCSS02** Batch ID: **P13VW040** TestNo: **EPA 8260B** Analysis Date: **3/13/2013** SeqNo: **1540081**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Trichloroethene	21.910	0.50	20.00	0	110	80	120	21.19	3.34	20	
Trichlorofluoromethane	22.820	0.50	20.00	0	114	71	148	22.72	0.439	20	
Vinyl chloride	19.540	0.50	20.00	0	97.7	80	120	19.61	0.358	20	
Surr: 1,2-Dichloroethane-d4	25.300		25.00		101	56	120		0		
Surr: 4-Bromofluorobenzene	27.380		25.00		110	80	120		0		
Surr: Dibromofluoromethane	24.120		25.00		96.5	72	120		0		
Surr: Toluene-d8	25.390		25.00		102	80	123		0		

Sample ID: **P130313MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88053**
Client ID: **PBW** Batch ID: **P13VW040** TestNo: **EPA 8260B** Analysis Date: **3/13/2013** SeqNo: **1540083**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	0.50									
1,1,1-Trichloroethane	ND	0.50									
1,1,2,2-Tetrachloroethane	ND	0.50									
1,1,2-Trichloroethane	ND	0.50									
1,1-Dichloroethane	ND	0.50									
1,1-Dichloroethene	ND	0.50									
1,1-Dichloropropene	ND	0.50									
1,2,3-Trichlorobenzene	ND	0.50									
1,2,3-Trichloropropane	ND	0.50									
1,2,4-Trichlorobenzene	ND	0.50									
1,2,4-Trimethylbenzene	ND	0.50									
1,2-Dibromo-3-chloropropane	ND	1.0									
1,2-Dibromoethane	ND	0.50									
1,2-Dichlorobenzene	ND	0.50									
1,2-Dichloroethane	ND	0.50									
1,2-Dichloropropane	ND	0.50									
1,3,5-Trimethylbenzene	ND	0.50									
1,3-Dichlorobenzene	ND	0.50									

Qualifiers:

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- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Tetra Tech
Work Order: N009791
Project: MSSC, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130313MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88053**
Client ID: **PBW** Batch ID: **P13VW040** TestNo: **EPA 8260B** Analysis Date: **3/13/2013** SeqNo: **1540083**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,3-Dichloropropane	ND	0.50									
1,4-Dichlorobenzene	ND	0.50									
2,2-Dichloropropane	ND	0.50									
2-Chlorotoluene	ND	0.50									
4-Chlorotoluene	ND	0.50									
4-Isopropyltoluene	ND	0.50									
Benzene	ND	0.50									
Bromobenzene	ND	0.50									
Bromodichloromethane	ND	0.50									
Bromoform	ND	0.50									
Bromomethane	ND	0.50									
Carbon tetrachloride	ND	0.50									
Chlorobenzene	ND	0.50									
Chloroethane	ND	0.50									
Chloroform	ND	0.50									
Chloromethane	ND	0.50									
cis-1,2-Dichloroethene	ND	0.50									
Dibromochloromethane	ND	0.50									
Dibromomethane	ND	0.50									
Dichlorodifluoromethane	ND	0.50									
Ethylbenzene	ND	0.50									
Hexachlorobutadiene	ND	0.50									
Isopropylbenzene	ND	0.50									
m,p-Xylene	ND	1.0									
Methylene chloride	ND	2.0									
MTBE	ND	0.50									
n-Butylbenzene	ND	0.50									
n-Propylbenzene	ND	0.50									
Naphthalene	ND	0.50									
o-Xylene	ND	0.50									

Qualifiers:

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E Value above quantitation range
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3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009791
Project: MSSC, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130313MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88053**
Client ID: **PBW** Batch ID: **P13VW040** TestNo: **EPA 8260B** Analysis Date: **3/13/2013** SeqNo: **1540083**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
sec-Butylbenzene	ND	0.50									
Styrene	ND	0.50									
tert-Butylbenzene	ND	0.50									
Tetrachloroethene	ND	0.50									
Toluene	ND	0.50									
trans-1,2-Dichloroethene	ND	0.50									
Trichloroethene	ND	0.50									
Trichlorofluoromethane	ND	0.50									
Vinyl chloride	ND	0.50									
Surr: 1,2-Dichloroethane-d4	27.340		25.00		109	56	120				
Surr: 4-Bromofluorobenzene	26.340		25.00		105	80	120				
Surr: Dibromofluoromethane	25.970		25.00		104	72	120				
Surr: Toluene-d8	25.340		25.00		101	80	123				

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
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Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009791
Project: MSSC, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: PERMANGANATE

Sample ID: **MB-R87984**	SampType: **MBLK**	TestCode: **PERMANGAN**	Units: **mg/L**	Prep Date:	RunNo: **87984**
Client ID: **PBW**	Batch ID: **R87984**	TestNo: **Colorimetric**		Analysis Date: **3/11/2013**	SeqNo: **1541951**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Permanganate as KMnO4	ND	1.0									

Sample ID: **LCS-R87984**	SampType: **LCS**	TestCode: **PERMANGAN**	Units: **mg/L**	Prep Date:	RunNo: **87984**
Client ID: **LCSW**	Batch ID: **R87984**	TestNo: **Colorimetric**		Analysis Date: **3/11/2013**	SeqNo: **1541952**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Permanganate as KMnO4	20.390	1.0	20.00	0	102	80	120				

Sample ID: **N009791-001CMS**	SampType: **MS**	TestCode: **PERMANGAN**	Units: **mg/L**	Prep Date:	RunNo: **87984**
Client ID: **ZZZZZZ**	Batch ID: **R87984**	TestNo: **Colorimetric**		Analysis Date: **3/11/2013**	SeqNo: **1541954**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Permanganate as KMnO4	19.060	1.0	20.00	0	95.3	80	120				

Sample ID: **N009791-001CMSD**	SampType: **MSD**	TestCode: **PERMANGAN**	Units: **mg/L**	Prep Date:	RunNo: **87984**
Client ID: **ZZZZZZ**	Batch ID: **R87984**	TestNo: **Colorimetric**		Analysis Date: **3/11/2013**	SeqNo: **1541955**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Permanganate as KMnO4	19.040	1.0	20.00	0	95.2	80	120	19.06	0.105	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

Tetra Tech EM Inc.
San Diego Office

1230 Columbia Street, Suite 1000
San Diego, CA 92101
619.525.7188 Phone
619.525.7186 Fax

Chain of Custody Record No. 5121

Lab PO#:

Lab: ATL

26 IR1

Project name: MSSC

TtEMI technical contact: Rob Manriquez

Field samplers: Geoff Richards & Becki Deno

Project (CTO) number: 103P1726B9

TtEMI project manager: Rob Manriquez

Field samplers' signatures: Geoff Richards

Sample ID	Point ID/Depth	Date	Time	Matrix	MS / MSD	40 ml VOA	1 liter Amber	500 ml Poly	Sleeve	Glass Jar	250 ml Poly	Encore	VOA 8260B	SVOA	Pest	Metals	TPH Purgeables	TPH Extractables	PCB	Perm. grab cl⁻ K⁺		
MW-19I	MW-19I	3/8/13	1325	GW		X							X									1
MW-19I	↓		1325	↓				X								X						
MW-19I			1325					X											XX			
MW-19D3	MW-19D3		1520										X									2
MW-19D3	↓		1520													X						
MW-19D3			1520																XX			
MW-19D2	MW-19D2		1610										X									3
MW-19D2	↓		1610	↓												X						
MW-19D2			1610																XX			
MW-19D1	MW-19D1		1710										X									4
MW-19D1	↓		1710	↓												X						
MW-19D1			1710																XX			

Preservative Added

No./Container Types

Analysis Required

	Name (print)	Company Name	Date	Time
Relinquished by: Geoff Richards	Geoff Richards	Tetra Tech	3/11/13	1000
Received by:	HERSEY SAYAS	ATL	3/11/13	1100
Relinquished by:	HERSEY SAYAS	ATL	3/11/13	1138
Received by:				
Relinquished by:				
Received by:				

Turnaround time/remarks: Standard TAT

contact Rob.Manrique@tetratech.com
Lisa.Mercer@tetratech.com

* cl⁻ & K⁺ should be analyzed if possible from the 500 cc plastic Permanganate sample

Fed Ex #:

Tetra Tech EM Inc.
San Diego Office
1230 Columbia Street, Suite 1000
San Diego, CA 92101
619.525.7188 Phone
619.525.7186 Fax

Chain of Custody Record No. 5113

Lab PO#:

Lab: ATL

24 IRA

Project name: MSSC

TtEMI technical contact: Rob.Mentzer@tetratech.com

Field samplers: Geoff Richards, Becki Dano

Project (CTO) number: 103117-2829

TtEMI project manager: Rob Mentzer

Field samplers' signatures:

Sample ID	Point ID/Depth	Date	Time	Matrix	MS / MSD	No./Container Types: 40 ml VOA	1 liter Amber	500 ml Poly	Sleeve	Glass Jar	250 ml Poly	Encore	Preservative Added	Analysis Required: VOA	SVOA	Pest	Metals	TPH Purgeables	TPH Extractables	PCB	KMnO4 PEI/TCE					
MW-19	MW-19	3/5/13	1500	GW		X								X												- 5
MW-19	↓							X									X									
MW-19	↓							X												X	X					
Decon	Rinsate	3/7/13	1210	W		X															X					- 6
TT2IP&IGW51	PIP well 2 SIR	3/6/13	1340	GW		X								X												- 7
VM1 - 030613	IDW composite	3/6/13	1130	S						X				X												- 8
VM2 - 030613	↓	3/6/13	1300	S						X				X												- 9
SVE1030713		3/7/13	1030	S						X				X												- 10
AK-030613	↓	3/6/13	1450	S						X				X												- 11
PIP030613	↓	3/6/13	1610	S						X				X												- 12

KM1004791 - S

	Name (print)	Company Name	Date	Time
Relinquished by:	Geoff Richards	Tetra Tech	3/11/13	1100
Received by:	Hersey Sayles	ATL	3/11/13	1100
Relinquished by:	Hersey Sayles	ATL	3/11/13	1138
Received by:				
Relinquished by:				
Received by:				

Turnaround time/remarks: Standard TAT

cc contact → Lisa.Medve@tetratech.com

* KMnO4 by colorimetric

*IDW - soil samples are composites & should be analyzed as one (1) sample per location (i.e 3 4ounce glass jars for VM1-030613 → 1 analysis of composite)

Fed Ex #:

Advanced Technology Laboratories, Inc.

Please review the checklist below. Any NO signifies non-compliance. Any non-compliance will be noted and must be understood as having an impact on the quality of the data. All tests will be performed as requested regardless of any compliance issues.

If you have any questions or further instruction, please contact our Project Coordinator at (702) 307-2659.

Cooler Received/Opened On:	3/11/2013	Workorder:	N009791
Rep sample Temp (Deg C):	2.6	IR Gun ID:	1
Temp Blank:	☐ Yes ☑ No		
Carrier name:	ATL		
Last 4 digits of Tracking No.:	NA	Packing Material Used:	None
Cooling process:	☑ Ice ☐ Ice Pack ☐ Dry Ice ☐ Other ☐ None		

Sample Receipt Checklist

1. Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
2. Custody seals intact, signed, dated on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
3. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
4. Chain of custody present?	Yes ☑	No ☐	
5. Sampler's name present in COC?	Yes ☑	No ☐	
6. Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
7. Chain of custody agrees with sample labels?	Yes ☑	No ☐	
8. Samples in proper container/bottle?	Yes ☑	No ☐	
9. Sample containers intact?	Yes ☑	No ☐	
10. Sufficient sample volume for indicated test?	Yes ☑	No ☐	
11. All samples received within holding time?	Yes ☑	No ☐	
12. Temperature of rep sample or Temp Blank within acceptable limit?	Yes ☑	No ☐	NA ☐
13. Water - VOA vials have zero headspace?	Yes ☑	No ☐	NA ☐
14. Water - pH acceptable upon receipt? Example: pH > 12 for (CN,S); pH<2 for Metals	Yes ☑	No ☐	NA ☐
15. Did the bottle labels indicate correct preservatives used?	Yes ☑	No ☐	NA ☐
16. Were there Non-Conformance issues at login?	Yes ☐	No ☐	NA ☑
Was Client notified?	Yes ☐	No ☐	NA ☑

Comments:

Checklist Completed B MBC 3/12/13 Reviewed By:

March 21, 2013

Rob Manriquez
Tetra Tech
1230 Columbia Street, Suite 1000
San Diego, CA 92101

TEL: (858) 527-8803
FAX:

CA-ELAP No.: 2676
NV Cert. No.: NV-009222007A

Workorder No.: N009798

RE: Mall at Maryland Square, 103P172829

Attention: Rob Manriquez

Enclosed are the results for sample(s) received on March 12, 2013 by Advanced Technology Laboratories, Inc. . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (702) 307-2659 if I can be of further assistance to your company.

Sincerely,

Jose Tenorio Jr.
Laboratory Director

The cover letter and the case narrative are an integral part of this analytical report and cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories - Las Vegas.

CLIENT: Tetra Tech
Project: Mall at Maryland Square, 103P172829
Lab Order: N009798

CASE NARRATIVE

SAMPLE RECEIVING/GENERAL COMMENTS:

Samples were received intact with proper chain of custody documentation.

Cooler temperature and sample preservation were verified upon receipt of samples if applicable.

Information on sample receipt conditions including discrepancies can be found in attached Sample Receipt Checklist Form.

Samples were analyzed within method holding time.

Analytical Comments for EPA 6010B:

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) are outside recovery criteria for Potassium possibly due to matrix interference. The associated Laboratory Control Sample (LCS) recovery was acceptable.

Analytical Comments for EPA 6020:

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) are outside recovery criteria for Chromium and Manganese possibly due to matrix interference. The associated Laboratory Control Sample (LCS) recovery was acceptable.

Analytical Comments for EPA 8260B:

Laboratory Control Sample (LCS) recovery biased high for 1,2-Dibromo-3-chloropropane and Bromoform. Sample results were non-detect (ND) for these analytes therefore reanalysis of the samples was not necessary.

Sample Fraction A - clear sample
Sample Fraction D - colored sample

Advanced Technology Laboratories, Inc. *3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691*

CLIENT:	Tetra Tech	**Client Sample ID:**	MW-19D1/MSSC
Lab Order:	N009798	**Collection Date:**	3/12/2013 12:55:00 PM
Project:	Mall at Maryland Square, 103P172829	**Matrix:**	GROUNDWATER
Lab ID:	N009798-001A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS5_130313A QC Batch: P13VW040 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/13/2013 08:33 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/13/2013 08:33 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/13/2013 08:33 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/13/2013 08:33 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/13/2013 08:33 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/13/2013 08:33 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/13/2013 08:33 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/13/2013 08:33 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/13/2013 08:33 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/13/2013 08:33 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/13/2013 08:33 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	3/13/2013 08:33 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/13/2013 08:33 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/13/2013 08:33 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/13/2013 08:33 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/13/2013 08:33 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/13/2013 08:33 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/13/2013 08:33 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/13/2013 08:33 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/13/2013 08:33 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/13/2013 08:33 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/13/2013 08:33 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/13/2013 08:33 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/13/2013 08:33 PM
Benzene	ND	0.50		µg/L	1	3/13/2013 08:33 PM
Bromobenzene	ND	0.50		µg/L	1	3/13/2013 08:33 PM
Bromodichloromethane	1.7	0.50		µg/L	1	3/13/2013 08:33 PM
Bromoform	ND	0.50		µg/L	1	3/13/2013 08:33 PM
Bromomethane	ND	0.50		µg/L	1	3/13/2013 08:33 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/13/2013 08:33 PM
Chlorobenzene	ND	0.50		µg/L	1	3/13/2013 08:33 PM
Chloroethane	ND	0.50		µg/L	1	3/13/2013 08:33 PM
Chloroform	3.3	0.50		µg/L	1	3/13/2013 08:33 PM
Chloromethane	ND	0.50		µg/L	1	3/13/2013 08:33 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	3/13/2013 08:33 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	MW-19D1/MSSC
Lab Order:	N009798	**Collection Date:**	3/12/2013 12:55:00 PM
Project:	Mall at Maryland Square, 103P172829	**Matrix:**	GROUNDWATER
Lab ID:	N009798-001A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS5_130313A	QC Batch: P13VW040			PrepDate:		Analyst: **QBM**
Dibromochloromethane	1.4	0.50		µg/L	1	3/13/2013 08:33 PM
Dibromomethane	ND	0.50		µg/L	1	3/13/2013 08:33 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/13/2013 08:33 PM
Ethylbenzene	ND	0.50		µg/L	1	3/13/2013 08:33 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/13/2013 08:33 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/13/2013 08:33 PM
m,p-Xylene	ND	1.0		µg/L	1	3/13/2013 08:33 PM
Methylene chloride	ND	2.0		µg/L	1	3/13/2013 08:33 PM
MTBE	ND	0.50		µg/L	1	3/13/2013 08:33 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/13/2013 08:33 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/13/2013 08:33 PM
Naphthalene	ND	0.50		µg/L	1	3/13/2013 08:33 PM
o-Xylene	ND	0.50		µg/L	1	3/13/2013 08:33 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/13/2013 08:33 PM
Styrene	ND	0.50		µg/L	1	3/13/2013 08:33 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/13/2013 08:33 PM
Tetrachloroethene	9.4	0.50		µg/L	1	3/13/2013 08:33 PM
Toluene	ND	0.50		µg/L	1	3/13/2013 08:33 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/13/2013 08:33 PM
Trichloroethene	ND	0.50		µg/L	1	3/13/2013 08:33 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/13/2013 08:33 PM
Vinyl chloride	ND	0.50		µg/L	1	3/13/2013 08:33 PM
Surr: 1,2-Dichloroethane-d4	108	56-120		%REC	1	3/13/2013 08:33 PM
Surr: 4-Bromofluorobenzene	103	80-120		%REC	1	3/13/2013 08:33 PM
Surr: Dibromofluoromethane	102	72-120		%REC	1	3/13/2013 08:33 PM
Surr: Toluene-d8	101	80-123		%REC	1	3/13/2013 08:33 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	MW-19D1/MSSC
Lab Order:	N009798	**Collection Date:**	3/12/2013 10:50:00 AM
Project:	Mall at Maryland Square, 103P172829	**Matrix:**	GROUNDWATER
Lab ID:	N009798-001B		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
DISSOLVED METALS BY ICP-MS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130314A	QC Batch: 42424			PrepDate:	3/14/2013	Analyst: **CEI**
Arsenic	0.32	0.10		µg/L	1	3/14/2013 05:28 PM
Chromium	49	1.0		µg/L	1	3/14/2013 05:28 PM
Manganese	360000	1200		µg/L	2500	3/14/2013 04:07 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	MW-19D1/MSSC
Lab Order:	N009798	**Collection Date:**	3/12/2013 10:50:00 AM
Project:	Mall at Maryland Square, 103P172829	**Matrix:**	GROUNDWATER
Lab ID:	N009798-001C		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
PERMANGANATE BY COLORIMETRY						
		COLORIMETRIC				
RunID: WETCHEM_130313E	QC Batch: R88100			PrepDate:		Analyst: **JT**
Permanganate as KMnO4	2800	100		mg/L	100	3/13/2013
ANIONS BY ION CHROMATOGRAPHY						
		EPA 300.0				
RunID: IC2_130319A	QC Batch: R88123			PrepDate:		Analyst: **QBM**
Chloride	120	25		mg/L	50	3/19/2013 02:19 PM
DISSOLVED METALS BY ICP						
	EPA 3010A			**EPA 6010B**		
RunID: ICP2_130318D	QC Batch: 42444			PrepDate:	3/14/2013	Analyst: **CEI**
Potassium	390	120		mg/L	250	3/18/2013 12:03 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	MW-19D1/MSSC
Lab Order:	N009798	**Collection Date:**	3/12/2013 12:55:00 PM
Project:	Mall at Maryland Square, 103P172829	**Matrix:**	GROUNDWATER
Lab ID:	N009798-001D		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS5_130318A QC Batch: P13VW042 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/18/2013 08:07 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/18/2013 08:07 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/18/2013 08:07 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/18/2013 08:07 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/18/2013 08:07 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/18/2013 08:07 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/18/2013 08:07 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/18/2013 08:07 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/18/2013 08:07 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/18/2013 08:07 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/18/2013 08:07 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	3/18/2013 08:07 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/18/2013 08:07 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/18/2013 08:07 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/18/2013 08:07 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/18/2013 08:07 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/18/2013 08:07 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/18/2013 08:07 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/18/2013 08:07 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/18/2013 08:07 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/18/2013 08:07 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/18/2013 08:07 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/18/2013 08:07 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/18/2013 08:07 PM
Benzene	ND	0.50		µg/L	1	3/18/2013 08:07 PM
Bromobenzene	ND	0.50		µg/L	1	3/18/2013 08:07 PM
Bromodichloromethane	1.2	0.50		µg/L	1	3/18/2013 08:07 PM
Bromoform	ND	0.50		µg/L	1	3/18/2013 08:07 PM
Bromomethane	ND	0.50		µg/L	1	3/18/2013 08:07 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/18/2013 08:07 PM
Chlorobenzene	ND	0.50		µg/L	1	3/18/2013 08:07 PM
Chloroethane	ND	0.50		µg/L	1	3/18/2013 08:07 PM
Chloroform	3.2	0.50		µg/L	1	3/18/2013 08:07 PM
Chloromethane	ND	0.50		µg/L	1	3/18/2013 08:07 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	3/18/2013 08:07 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	MW-19D1/MSSC
Lab Order:	N009798	**Collection Date:**	3/12/2013 12:55:00 PM
Project:	Mall at Maryland Square, 103P172829	**Matrix:**	GROUNDWATER
Lab ID:	N009798-001D		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS5_130318A	QC Batch: P13VW042			PrepDate:		Analyst: **QBM**
Dibromochloromethane	0.79	0.50		µg/L	1	3/18/2013 08:07 PM
Dibromomethane	ND	0.50		µg/L	1	3/18/2013 08:07 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/18/2013 08:07 PM
Ethylbenzene	ND	0.50		µg/L	1	3/18/2013 08:07 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/18/2013 08:07 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/18/2013 08:07 PM
m,p-Xylene	ND	1.0		µg/L	1	3/18/2013 08:07 PM
Methylene chloride	ND	2.0		µg/L	1	3/18/2013 08:07 PM
MTBE	ND	0.50		µg/L	1	3/18/2013 08:07 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/18/2013 08:07 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/18/2013 08:07 PM
Naphthalene	ND	0.50		µg/L	1	3/18/2013 08:07 PM
o-Xylene	ND	0.50		µg/L	1	3/18/2013 08:07 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/18/2013 08:07 PM
Styrene	ND	0.50		µg/L	1	3/18/2013 08:07 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/18/2013 08:07 PM
Tetrachloroethene	ND	0.50		µg/L	1	3/18/2013 08:07 PM
Toluene	ND	0.50		µg/L	1	3/18/2013 08:07 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/18/2013 08:07 PM
Trichloroethene	ND	0.50		µg/L	1	3/18/2013 08:07 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/18/2013 08:07 PM
Vinyl chloride	ND	0.50		µg/L	1	3/18/2013 08:07 PM
Surr: 1,2-Dichloroethane-d4	103	56-120		%REC	1	3/18/2013 08:07 PM
Surr: 4-Bromofluorobenzene	101	80-120		%REC	1	3/18/2013 08:07 PM
Surr: Dibromofluoromethane	107	72-120		%REC	1	3/18/2013 08:07 PM
Surr: Toluene-d8	99.8	80-123		%REC	1	3/18/2013 08:07 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	MW-19/MSSC
Lab Order:	N009798	**Collection Date:**	3/12/2013 2:15:00 PM
Project:	Mall at Maryland Square, 103P172829	**Matrix:**	GROUNDWATER
Lab ID:	N009798-002A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS5_130313A QC Batch: P13VW040 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/13/2013 06:06 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/13/2013 06:06 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/13/2013 06:06 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/13/2013 06:06 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/13/2013 06:06 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/13/2013 06:06 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/13/2013 06:06 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/13/2013 06:06 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/13/2013 06:06 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/13/2013 06:06 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/13/2013 06:06 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	3/13/2013 06:06 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/13/2013 06:06 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/13/2013 06:06 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/13/2013 06:06 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/13/2013 06:06 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/13/2013 06:06 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/13/2013 06:06 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/13/2013 06:06 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/13/2013 06:06 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/13/2013 06:06 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/13/2013 06:06 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/13/2013 06:06 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/13/2013 06:06 PM
Benzene	ND	0.50		µg/L	1	3/13/2013 06:06 PM
Bromobenzene	ND	0.50		µg/L	1	3/13/2013 06:06 PM
Bromodichloromethane	0.95	0.50		µg/L	1	3/13/2013 06:06 PM
Bromoform	ND	0.50		µg/L	1	3/13/2013 06:06 PM
Bromomethane	ND	0.50		µg/L	1	3/13/2013 06:06 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/13/2013 06:06 PM
Chlorobenzene	ND	0.50		µg/L	1	3/13/2013 06:06 PM
Chloroethane	ND	0.50		µg/L	1	3/13/2013 06:06 PM
Chloroform	3.2	0.50		µg/L	1	3/13/2013 06:06 PM
Chloromethane	ND	0.50		µg/L	1	3/13/2013 06:06 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	3/13/2013 06:06 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	MW-19/MSSC
Lab Order:	N009798	**Collection Date:**	3/12/2013 2:15:00 PM
Project:	Mall at Maryland Square, 103P172829	**Matrix:**	GROUNDWATER
Lab ID:	N009798-002A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS5_130313A	QC Batch: P13VW040			PrepDate:		Analyst: **QBM**
Dibromochloromethane	0.62	0.50		µg/L	1	3/13/2013 06:06 PM
Dibromomethane	ND	0.50		µg/L	1	3/13/2013 06:06 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/13/2013 06:06 PM
Ethylbenzene	ND	0.50		µg/L	1	3/13/2013 06:06 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/13/2013 06:06 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/13/2013 06:06 PM
m,p-Xylene	ND	1.0		µg/L	1	3/13/2013 06:06 PM
Methylene chloride	ND	2.0		µg/L	1	3/13/2013 06:06 PM
MTBE	ND	0.50		µg/L	1	3/13/2013 06:06 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/13/2013 06:06 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/13/2013 06:06 PM
Naphthalene	ND	0.50		µg/L	1	3/13/2013 06:06 PM
o-Xylene	ND	0.50		µg/L	1	3/13/2013 06:06 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/13/2013 06:06 PM
Styrene	ND	0.50		µg/L	1	3/13/2013 06:06 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/13/2013 06:06 PM
Tetrachloroethene	390	5.0		µg/L	10	3/13/2013 07:35 PM
Toluene	ND	0.50		µg/L	1	3/13/2013 06:06 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/13/2013 06:06 PM
Trichloroethene	ND	0.50		µg/L	1	3/13/2013 06:06 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/13/2013 06:06 PM
Vinyl chloride	ND	0.50		µg/L	1	3/13/2013 06:06 PM
Surr: 1,2-Dichloroethane-d4	113	56-120		%REC	1	3/13/2013 06:06 PM
Surr: 1,2-Dichloroethane-d4	104	56-120		%REC	10	3/13/2013 07:35 PM
Surr: 4-Bromofluorobenzene	100	80-120		%REC	10	3/13/2013 07:35 PM
Surr: 4-Bromofluorobenzene	101	80-120		%REC	1	3/13/2013 06:06 PM
Surr: Dibromofluoromethane	104	72-120		%REC	1	3/13/2013 06:06 PM
Surr: Dibromofluoromethane	102	72-120		%REC	10	3/13/2013 07:35 PM
Surr: Toluene-d8	99.6	80-123		%REC	10	3/13/2013 07:35 PM
Surr: Toluene-d8	98.0	80-123		%REC	1	3/13/2013 06:06 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	MW-19/MSSC
Lab Order:	N009798	**Collection Date:**	3/12/2013 2:15:00 PM
Project:	Mall at Maryland Square, 103P172829	**Matrix:**	GROUNDWATER
Lab ID:	N009798-002B		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
DISSOLVED METALS BY ICP-MS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130314A	QC Batch: 42424			PrepDate:	3/14/2013	Analyst: **CEI**
Arsenic	2.0	0.50		µg/L	5	3/14/2013 03:34 PM
Chromium	25	5.0		µg/L	5	3/14/2013 03:34 PM
Manganese	120000	500		µg/L	1000	3/14/2013 04:13 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Tetra Tech	**Client Sample ID:**	MW-19/MSSC
Lab Order:	N009798	**Collection Date:**	3/12/2013 2:15:00 PM
Project:	Mall at Maryland Square, 103P172829	**Matrix:**	GROUNDWATER
Lab ID:	N009798-002C		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
PERMANGANATE BY COLORIMETRY						
		COLORIMETRIC				
RunID: WETCHEM_130313E	QC Batch: R88100			PrepDate:		Analyst: **JT**
Permanganate as KMnO4	450	100		mg/L	100	3/13/2013
ANIONS BY ION CHROMATOGRAPHY						
		EPA 300.0				
RunID: IC2_130319A	QC Batch: R88123			PrepDate:		Analyst: **QBM**
Chloride	170	25		mg/L	50	3/19/2013 02:54 PM
DISSOLVED METALS BY ICP						
	EPA 3010A			**EPA 6010B**		
RunID: ICP2_130318D	QC Batch: 42444			PrepDate:	3/14/2013	Analyst: **CEI**
Potassium	86	25		mg/L	50	3/18/2013 12:27 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	MW-19/MSSC
Lab Order:	N009798	**Collection Date:**	3/12/2013 2:15:00 PM
Project:	Mall at Maryland Square, 103P172829	**Matrix:**	GROUNDWATER
Lab ID:	N009798-002D		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS5_130318A QC Batch: P13VW042 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/18/2013 09:34 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/18/2013 09:34 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/18/2013 09:34 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/18/2013 09:34 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/18/2013 09:34 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/18/2013 09:34 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/18/2013 09:34 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/18/2013 09:34 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/18/2013 09:34 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/18/2013 09:34 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/18/2013 09:34 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	3/18/2013 09:34 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/18/2013 09:34 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/18/2013 09:34 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/18/2013 09:34 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/18/2013 09:34 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/18/2013 09:34 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/18/2013 09:34 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/18/2013 09:34 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/18/2013 09:34 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/18/2013 09:34 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/18/2013 09:34 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/18/2013 09:34 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/18/2013 09:34 PM
Benzene	ND	0.50		µg/L	1	3/18/2013 09:34 PM
Bromobenzene	ND	0.50		µg/L	1	3/18/2013 09:34 PM
Bromodichloromethane	0.51	0.50		µg/L	1	3/18/2013 09:34 PM
Bromoform	ND	0.50		µg/L	1	3/18/2013 09:34 PM
Bromomethane	ND	0.50		µg/L	1	3/18/2013 09:34 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/18/2013 09:34 PM
Chlorobenzene	ND	0.50		µg/L	1	3/18/2013 09:34 PM
Chloroethane	ND	0.50		µg/L	1	3/18/2013 09:34 PM
Chloroform	3.0	0.50		µg/L	1	3/18/2013 09:34 PM
Chloromethane	ND	0.50		µg/L	1	3/18/2013 09:34 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	3/18/2013 09:34 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	MW-19/MSSC
Lab Order:	N009798	**Collection Date:**	3/12/2013 2:15:00 PM
Project:	Mall at Maryland Square, 103P172829	**Matrix:**	GROUNDWATER
Lab ID:	N009798-002D		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS5_130318A QC Batch: P13VW042 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Dibromochloromethane	ND	0.50		µg/L	1	3/18/2013 09:34 PM
Dibromomethane	ND	0.50		µg/L	1	3/18/2013 09:34 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/18/2013 09:34 PM
Ethylbenzene	ND	0.50		µg/L	1	3/18/2013 09:34 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/18/2013 09:34 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/18/2013 09:34 PM
m,p-Xylene	ND	1.0		µg/L	1	3/18/2013 09:34 PM
Methylene chloride	ND	2.0		µg/L	1	3/18/2013 09:34 PM
MTBE	ND	0.50		µg/L	1	3/18/2013 09:34 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/18/2013 09:34 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/18/2013 09:34 PM
Naphthalene	ND	0.50		µg/L	1	3/18/2013 09:34 PM
o-Xylene	ND	0.50		µg/L	1	3/18/2013 09:34 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/18/2013 09:34 PM
Styrene	ND	0.50		µg/L	1	3/18/2013 09:34 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/18/2013 09:34 PM
Tetrachloroethene	ND	0.50		µg/L	1	3/18/2013 09:34 PM
Toluene	ND	0.50		µg/L	1	3/18/2013 09:34 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/18/2013 09:34 PM
Trichloroethene	ND	0.50		µg/L	1	3/18/2013 09:34 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/18/2013 09:34 PM
Vinyl chloride	ND	0.50		µg/L	1	3/18/2013 09:34 PM
Surr: 1,2-Dichloroethane-d4	101	56-120		%REC	1	3/18/2013 09:34 PM
Surr: 4-Bromofluorobenzene	101	80-120		%REC	1	3/18/2013 09:34 PM
Surr: Dibromofluoromethane	105	72-120		%REC	1	3/18/2013 09:34 PM
Surr: Toluene-d8	99.9	80-123		%REC	1	3/18/2013 09:34 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories, Inc.

ANALYTICAL RESULTS

Print Date: *21-Mar-13*

CLIENT:	Tetra Tech	**Client Sample ID:**	Permanganate Solution 01
Lab Order:	N009798	**Collection Date:**	3/12/2013 12:15:00 PM
Project:	Mall at Maryland Square, 103P172829	**Matrix:**	GROUNDWATER
Lab ID:	N009798-003A		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
PERMANGANATE BY COLORIMETRY						
		COLORIMETRIC				
RunID: WETCHEM_130313E	QC Batch: R88100			PrepDate:		Analyst: **JT**
Permanganate as KMnO4	21000	1000		mg/L	1000	3/13/2013

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Work Order: N009798
Project: Mall at Maryland Square, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 300_W_CL

Sample ID: **MB-R88123_CL**	SampType: **MBLK**	TestCode: **300_W_CL**	Units: **mg/L**	Prep Date:	RunNo: **88123**
Client ID: **PBW**	Batch ID: **R88123**	TestNo: **EPA 300.0**		Analysis Date: **3/19/2013**	SeqNo: **1542611**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	ND	0.50									

Sample ID: **LCS-R88123_CL**	SampType: **LCS**	TestCode: **300_W_CL**	Units: **mg/L**	Prep Date:	RunNo: **88123**
Client ID: **LCSW**	Batch ID: **R88123**	TestNo: **EPA 300.0**		Analysis Date: **3/19/2013**	SeqNo: **1542612**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	2.409	0.50	2.500	0	96.4	90	110				

Sample ID: **N009798-001CMS**	SampType: **MS**	TestCode: **300_W_CL**	Units: **mg/L**	Prep Date:	RunNo: **88123**
Client ID: **ZZZZZZ**	Batch ID: **R88123**	TestNo: **EPA 300.0**		Analysis Date: **3/19/2013**	SeqNo: **1542614**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	239.850	25	125.0	116.4	98.7	80	120				

Sample ID: **N009798-001CMSD**	SampType: **MSD**	TestCode: **300_W_CL**	Units: **mg/L**	Prep Date:	RunNo: **88123**
Client ID: **ZZZZZZ**	Batch ID: **R88123**	TestNo: **EPA 300.0**		Analysis Date: **3/19/2013**	SeqNo: **1542615**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	240.200	25	125.0	116.4	99.0	80	120	239.8	0.146	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Tetra Tech
Work Order: N009798
Project: Mall at Maryland Square, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_WD

Sample ID: **MB-42444**	SampType: **MBLK**	TestCode: **6010_WD**	Units: **mg/L**	Prep Date: **3/14/2013**	RunNo: **88115**
Client ID: **PBW**	Batch ID: **42444**	TestNo: **EPA 6010B**	**EPA 3010A**	Analysis Date: **3/18/2013**	SeqNo: **1542450**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Potassium	ND	0.50									

Sample ID: **LCS-42444**	SampType: **LCS**	TestCode: **6010_WD**	Units: **mg/L**	Prep Date: **3/14/2013**	RunNo: **88115**
Client ID: **LCSW**	Batch ID: **42444**	TestNo: **EPA 6010B**	**EPA 3010A**	Analysis Date: **3/18/2013**	SeqNo: **1542451**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Potassium	2.207	0.50	2.500	0	88.3	85	115				

Sample ID: **N009798-002C-MS**	SampType: **MS**	TestCode: **6010_WD**	Units: **mg/L**	Prep Date: **3/14/2013**	RunNo: **88115**
Client ID: **ZZZZZZ**	Batch ID: **42444**	TestNo: **EPA 6010B**	**EPA 3010A**	Analysis Date: **3/18/2013**	SeqNo: **1542465**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Potassium	93.468	25	5.000	86.25	144	75	125				S

Sample ID: **N009798-002C-MSD**	SampType: **MSD**	TestCode: **6010_WD**	Units: **mg/L**	Prep Date: **3/14/2013**	RunNo: **88115**
Client ID: **ZZZZZZ**	Batch ID: **42444**	TestNo: **EPA 6010B**	**EPA 3010A**	Analysis Date: **3/18/2013**	SeqNo: **1542466**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Potassium	93.781	25	5.000	86.25	151	75	125	93.47	0.334	20	S

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009798
Project: Mall at Maryland Square, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 6020_DIS

Sample ID: **MB-42424**	SampType: **MBLK**	TestCode: **6020_DIS**	Units: **µg/L**	Prep Date: **3/14/2013**	RunNo: **88061**
Client ID: **PBW**	Batch ID: **42424**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **3/14/2013**	SeqNo: **1540522**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.10									
Chromium	ND	1.0									
Manganese	ND	0.50									

Sample ID: **LCS-42424**	SampType: **LCS**	TestCode: **6020_DIS**	Units: **µg/L**	Prep Date: **3/14/2013**	RunNo: **88061**
Client ID: **LCSW**	Batch ID: **42424**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **3/14/2013**	SeqNo: **1540523**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	9.854	0.10	10.00	0	98.5	85	115				
Chromium	9.302	1.0	10.00	0	93.0	85	115				
Manganese	94.256	0.50	100.0	0	94.3	85	115				

Sample ID: **N009791-001B-MS**	SampType: **MS**	TestCode: **6020_DIS**	Units: **µg/L**	Prep Date: **3/14/2013**	RunNo: **88061**
Client ID: **ZZZZZZ**	Batch ID: **42424**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **3/14/2013**	SeqNo: **1541102**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	12.577	0.10	10.00	2.041	105	75	125				
Chromium	8.359	1.0	10.00	1.600	67.6	75	125				S
Manganese	68.709	0.50	100.0	0	68.7	75	125				S

Sample ID: **N009791-001B-MSD**	SampType: **MSD**	TestCode: **6020_DIS**	Units: **µg/L**	Prep Date: **3/14/2013**	RunNo: **88061**
Client ID: **ZZZZZZ**	Batch ID: **42424**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **3/14/2013**	SeqNo: **1541103**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	12.318	0.10	10.00	2.041	103	75	125	12.58	2.08	20	
Chromium	8.465	1.0	10.00	1.600	68.6	75	125	8.359	1.27	20	S
Manganese	67.998	0.50	100.0	0	68.0	75	125	68.71	1.04	20	S

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009798
Project: Mall at Maryland Square, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130313LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88053**
Client ID: **LCSW** Batch ID: **P13VW040** TestNo: **EPA 8260B** Analysis Date: **3/13/2013** SeqNo: **1540080**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	22.290	0.50	20.00	0	111	74	122				
1,1,1-Trichloroethane	19.070	0.50	20.00	0	95.4	65	120				
1,1,2,2-Tetrachloroethane	21.850	0.50	20.00	0	109	80	120				
1,1,2-Trichloroethane	22.670	0.50	20.00	0	113	80	120				
1,1-Dichloroethane	17.840	0.50	20.00	0	89.2	80	120				
1,1-Dichloroethene	22.150	0.50	20.00	0	111	80	120				
1,1-Dichloropropene	20.490	0.50	20.00	0	102	80	120				
1,2,3-Trichlorobenzene	21.560	0.50	20.00	0	108	80	124				
1,2,3-Trichloropropane	22.060	0.50	20.00	0	110	80	120				
1,2,4-Trichlorobenzene	20.340	0.50	20.00	0	102	80	126				
1,2,4-Trimethylbenzene	18.940	0.50	20.00	0	94.7	80	123				
1,2-Dibromo-3-chloropropane	26.190	1.0	20.00	0	131	70	120				S
1,2-Dibromoethane	23.020	0.50	20.00	0	115	80	120				
1,2-Dichlorobenzene	19.950	0.50	20.00	0	99.8	80	120				
1,2-Dichloroethane	22.450	0.50	20.00	0	112	80	120				
1,2-Dichloropropane	20.540	0.50	20.00	0	103	80	120				
1,3,5-Trimethylbenzene	19.050	0.50	20.00	0	95.2	80	121				
1,3-Dichlorobenzene	19.380	0.50	20.00	0	96.9	80	120				
1,3-Dichloropropane	21.110	0.50	20.00	0	106	80	120				
1,4-Dichlorobenzene	19.170	0.50	20.00	0	95.9	80	120				
2,2-Dichloropropane	20.860	0.50	20.00	0	104	54	120				
2-Chlorotoluene	18.370	0.50	20.00	0	91.9	80	122				
4-Chlorotoluene	18.340	0.50	20.00	0	91.7	80	120				
4-Isopropyltoluene	19.050	0.50	20.00	0	95.2	80	122				
Benzene	19.060	0.50	20.00	0	95.3	80	120				
Bromobenzene	21.070	0.50	20.00	0	105	80	120				
Bromodichloromethane	21.820	0.50	20.00	0	109	70	120				
Bromoform	24.450	0.50	20.00	0	122	66	120				S
Bromomethane	21.900	0.50	20.00	0	110	48	155				
Carbon tetrachloride	22.400	0.50	20.00	0	112	60	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009798
Project: Mall at Maryland Square, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130313LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88053**
Client ID: **LCSW** Batch ID: **P13VW040** TestNo: **EPA 8260B** Analysis Date: **3/13/2013** SeqNo: **1540080**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	20.440	0.50	20.00	0	102	80	120				
Chloroethane	23.050	0.50	20.00	0	115	62	147				
Chloroform	18.350	0.50	20.00	0	91.8	80	120				
Chloromethane	17.750	0.50	20.00	0	88.8	63	121				
cis-1,2-Dichloroethene	18.200	0.50	20.00	0	91.0	80	120				
Dibromochloromethane	22.720	0.50	20.00	0	114	67	123				
Dibromomethane	23.310	0.50	20.00	0	117	80	120				
Dichlorodifluoromethane	19.760	0.50	20.00	0	98.8	70	121				
Ethylbenzene	18.900	0.50	20.00	0	94.5	80	120				
Hexachlorobutadiene	21.380	0.50	20.00	0	107	80	123				
Isopropylbenzene	18.270	0.50	20.00	0	91.4	80	121				
m,p-Xylene	37.400	1.0	40.00	0	93.5	80	120				
Methylene chloride	18.350	2.0	20.00	0	91.8	75	120				
MTBE	18.300	0.50	20.00	0	91.5	70	120				
n-Butylbenzene	18.280	0.50	20.00	0	91.4	80	129				
n-Propylbenzene	18.040	0.50	20.00	0	90.2	80	122				
Naphthalene	21.230	0.50	20.00	0	106	73	127				
o-Xylene	19.810	0.50	20.00	0	99.0	80	120				
sec-Butylbenzene	18.220	0.50	20.00	0	91.1	80	120				
Styrene	20.670	0.50	20.00	0	103	80	120				
tert-Butylbenzene	19.160	0.50	20.00	0	95.8	80	120				
Tetrachloroethene	22.230	0.50	20.00	0	111	80	121				
Toluene	19.530	0.50	20.00	0	97.6	80	120				
trans-1,2-Dichloroethene	18.630	0.50	20.00	0	93.2	80	120				
Trichloroethene	21.190	0.50	20.00	0	106	80	120				
Trichlorofluoromethane	22.720	0.50	20.00	0	114	71	148				
Vinyl chloride	19.610	0.50	20.00	0	98.0	80	120				
Surr: 1,2-Dichloroethane-d4	25.620		25.00		102	56	120				
Surr: 4-Bromofluorobenzene	26.860		25.00		107	80	120				
Surr: Dibromofluoromethane	24.530		25.00		98.1	72	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009798
Project: Mall at Maryland Square, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130313LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88053**
Client ID: **LCSW** Batch ID: **P13VW040** TestNo: **EPA 8260B** Analysis Date: **3/13/2013** SeqNo: **1540080**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Toluene-d8	25.180		25.00		101	80	123				

Sample ID: **P130313MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88053**
Client ID: **PBW** Batch ID: **P13VW040** TestNo: **EPA 8260B** Analysis Date: **3/13/2013** SeqNo: **1540083**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	0.50									
1,1,1-Trichloroethane	ND	0.50									
1,1,2,2-Tetrachloroethane	ND	0.50									
1,1,2-Trichloroethane	ND	0.50									
1,1-Dichloroethane	ND	0.50									
1,1-Dichloroethene	ND	0.50									
1,1-Dichloropropene	ND	0.50									
1,2,3-Trichlorobenzene	ND	0.50									
1,2,3-Trichloropropane	ND	0.50									
1,2,4-Trichlorobenzene	ND	0.50									
1,2,4-Trimethylbenzene	ND	0.50									
1,2-Dibromo-3-chloropropane	ND	1.0									
1,2-Dibromoethane	ND	0.50									
1,2-Dichlorobenzene	ND	0.50									
1,2-Dichloroethane	ND	0.50									
1,2-Dichloropropane	ND	0.50									
1,3,5-Trimethylbenzene	ND	0.50									
1,3-Dichlorobenzene	ND	0.50									
1,3-Dichloropropane	ND	0.50									
1,4-Dichlorobenzene	ND	0.50									
2,2-Dichloropropane	ND	0.50									
2-Chlorotoluene	ND	0.50									
4-Chlorotoluene	ND	0.50									
4-Isopropyltoluene	ND	0.50									

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009798
Project: Mall at Maryland Square, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130313MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88053**
Client ID: **PBW** Batch ID: **P13VW040** TestNo: **EPA 8260B** Analysis Date: **3/13/2013** SeqNo: **1540083**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ND	0.50									
Bromobenzene	ND	0.50									
Bromodichloromethane	ND	0.50									
Bromoform	ND	0.50									
Bromomethane	ND	0.50									
Carbon tetrachloride	ND	0.50									
Chlorobenzene	ND	0.50									
Chloroethane	ND	0.50									
Chloroform	ND	0.50									
Chloromethane	ND	0.50									
cis-1,2-Dichloroethene	ND	0.50									
Dibromochloromethane	ND	0.50									
Dibromomethane	ND	0.50									
Dichlorodifluoromethane	ND	0.50									
Ethylbenzene	ND	0.50									
Hexachlorobutadiene	ND	0.50									
Isopropylbenzene	ND	0.50									
m,p-Xylene	ND	1.0									
Methylene chloride	ND	2.0									
MTBE	ND	0.50									
n-Butylbenzene	ND	0.50									
n-Propylbenzene	ND	0.50									
Naphthalene	ND	0.50									
o-Xylene	ND	0.50									
sec-Butylbenzene	ND	0.50									
Styrene	ND	0.50									
tert-Butylbenzene	ND	0.50									
Tetrachloroethene	ND	0.50									
Toluene	ND	0.50									
trans-1,2-Dichloroethene	ND	0.50									

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009798
Project: Mall at Maryland Square, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130313MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88053**
Client ID: **PBW** Batch ID: **P13VW040** TestNo: **EPA 8260B** Analysis Date: **3/13/2013** SeqNo: **1540083**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Trichloroethene	ND	0.50									
Trichlorofluoromethane	ND	0.50									
Vinyl chloride	ND	0.50									
Surr: 1,2-Dichloroethane-d4	27.340		25.00		109	56	120				
Surr: 4-Bromofluorobenzene	26.340		25.00		105	80	120				
Surr: Dibromofluoromethane	25.970		25.00		104	72	120				
Surr: Toluene-d8	25.340		25.00		101	80	123				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009798
Project: Mall at Maryland Square, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130318LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88121**
Client ID: **LCSW** Batch ID: **P13VW042** TestNo: **EPA 8260B** Analysis Date: **3/18/2013** SeqNo: **1542597**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	20.010	0.50	20.00	0	100	74	122				
1,1,1-Trichloroethane	19.970	0.50	20.00	0	99.8	65	120				
1,1,2,2-Tetrachloroethane	19.820	0.50	20.00	0	99.1	80	120				
1,1,2-Trichloroethane	19.710	0.50	20.00	0	98.6	80	120				
1,1-Dichloroethane	20.060	0.50	20.00	0	100	80	120				
1,1-Dichloroethene	20.180	0.50	20.00	0	101	80	120				
1,1-Dichloropropene	19.540	0.50	20.00	0	97.7	80	120				
1,2,3-Trichlorobenzene	20.500	0.50	20.00	0	103	80	124				
1,2,3-Trichloropropane	18.920	0.50	20.00	0	94.6	80	120				
1,2,4-Trichlorobenzene	20.660	0.50	20.00	0	103	80	126				
1,2,4-Trimethylbenzene	19.950	0.50	20.00	0	99.8	80	123				
1,2-Dibromo-3-chloropropane	20.590	1.0	20.00	0	103	70	120				
1,2-Dibromoethane	20.210	0.50	20.00	0	101	80	120				
1,2-Dichlorobenzene	20.360	0.50	20.00	0	102	80	120				
1,2-Dichloroethane	19.010	0.50	20.00	0	95.1	80	120				
1,2-Dichloropropane	19.180	0.50	20.00	0	95.9	80	120				
1,3,5-Trimethylbenzene	20.060	0.50	20.00	0	100	80	121				
1,3-Dichlorobenzene	19.930	0.50	20.00	0	99.7	80	120				
1,3-Dichloropropane	19.910	0.50	20.00	0	99.6	80	120				
1,4-Dichlorobenzene	19.650	0.50	20.00	0	98.2	80	120				
2,2-Dichloropropane	22.410	0.50	20.00	0	112	54	120				
2-Chlorotoluene	19.990	0.50	20.00	0	100	80	122				
4-Chlorotoluene	19.900	0.50	20.00	0	99.5	80	120				
4-Isopropyltoluene	20.090	0.50	20.00	0	100	80	122				
Benzene	19.580	0.50	20.00	0	97.9	80	120				
Bromobenzene	19.870	0.50	20.00	0	99.4	80	120				
Bromodichloromethane	20.050	0.50	20.00	0	100	70	120				
Bromoform	20.070	0.50	20.00	0	100	66	120				
Bromomethane	26.270	0.50	20.00	0	131	48	155				
Carbon tetrachloride	20.270	0.50	20.00	0	101	60	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009798
Project: Mall at Maryland Square, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130318LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88121**
Client ID: **LCSW** Batch ID: **P13VW042** TestNo: **EPA 8260B** Analysis Date: **3/18/2013** SeqNo: **1542597**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	19.440	0.50	20.00	0	97.2	80	120				
Chloroethane	20.440	0.50	20.00	0	102	62	147				
Chloroform	19.720	0.50	20.00	0	98.6	80	120				
Chloromethane	17.670	0.50	20.00	0	88.4	63	121				
cis-1,2-Dichloroethene	19.490	0.50	20.00	0	97.5	80	120				
Dibromochloromethane	19.940	0.50	20.00	0	99.7	67	123				
Dibromomethane	20.090	0.50	20.00	0	100	80	120				
Dichlorodifluoromethane	20.380	0.50	20.00	0	102	70	121				
Ethylbenzene	19.440	0.50	20.00	0	97.2	80	120				
Hexachlorobutadiene	20.900	0.50	20.00	0	104	80	123				
Isopropylbenzene	20.030	0.50	20.00	0	100	80	121				
m,p-Xylene	39.300	1.0	40.00	0	98.2	80	120				
Methylene chloride	19.170	2.0	20.00	0	95.9	75	120				
MTBE	19.470	0.50	20.00	0	97.4	70	120				
n-Butylbenzene	20.360	0.50	20.00	0	102	80	129				
n-Propylbenzene	20.180	0.50	20.00	0	101	80	122				
Naphthalene	21.050	0.50	20.00	0	105	73	127				
o-Xylene	19.710	0.50	20.00	0	98.6	80	120				
sec-Butylbenzene	19.700	0.50	20.00	0	98.5	80	120				
Styrene	20.080	0.50	20.00	0	100	80	120				
tert-Butylbenzene	20.020	0.50	20.00	0	100	80	120				
Tetrachloroethene	19.400	0.50	20.00	0	97.0	80	121				
Toluene	19.460	0.50	20.00	0	97.3	80	120				
trans-1,2-Dichloroethene	19.710	0.50	20.00	0	98.6	80	120				
Trichloroethene	19.580	0.50	20.00	0	97.9	80	120				
Trichlorofluoromethane	20.340	0.50	20.00	0	102	71	148				
Vinyl chloride	20.810	0.50	20.00	0	104	80	120				
Surr: 1,2-Dichloroethane-d4	25.640		25.00		103	56	120				
Surr: 4-Bromofluorobenzene	26.010		25.00		104	80	120				
Surr: Dibromofluoromethane	26.410		25.00		106	72	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009798
Project: Mall at Maryland Square, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130318LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88121**
Client ID: **LCSW** Batch ID: **P13VW042** TestNo: **EPA 8260B** Analysis Date: **3/18/2013** SeqNo: **1542597**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Toluene-d8	26.120		25.00		104	80	123				

Sample ID: **P130318MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88121**
Client ID: **PBW** Batch ID: **P13VW042** TestNo: **EPA 8260B** Analysis Date: **3/18/2013** SeqNo: **1542599**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	0.50									
1,1,1-Trichloroethane	ND	0.50									
1,1,2,2-Tetrachloroethane	ND	0.50									
1,1,2-Trichloroethane	ND	0.50									
1,1-Dichloroethane	ND	0.50									
1,1-Dichloroethene	ND	0.50									
1,1-Dichloropropene	ND	0.50									
1,2,3-Trichlorobenzene	ND	0.50									
1,2,3-Trichloropropane	ND	0.50									
1,2,4-Trichlorobenzene	ND	0.50									
1,2,4-Trimethylbenzene	ND	0.50									
1,2-Dibromo-3-chloropropane	ND	1.0									
1,2-Dibromoethane	ND	0.50									
1,2-Dichlorobenzene	ND	0.50									
1,2-Dichloroethane	ND	0.50									
1,2-Dichloropropane	ND	0.50									
1,3,5-Trimethylbenzene	ND	0.50									
1,3-Dichlorobenzene	ND	0.50									
1,3-Dichloropropane	ND	0.50									
1,4-Dichlorobenzene	ND	0.50									
2,2-Dichloropropane	ND	0.50									
2-Chlorotoluene	ND	0.50									
4-Chlorotoluene	ND	0.50									
4-Isopropyltoluene	ND	0.50									

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009798
Project: Mall at Maryland Square, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130318MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88121**
Client ID: **PBW** Batch ID: **P13VW042** TestNo: **EPA 8260B** Analysis Date: **3/18/2013** SeqNo: **1542599**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ND	0.50									
Bromobenzene	ND	0.50									
Bromodichloromethane	ND	0.50									
Bromoform	ND	0.50									
Bromomethane	0.440	0.50									
Carbon tetrachloride	ND	0.50									
Chlorobenzene	ND	0.50									
Chloroethane	ND	0.50									
Chloroform	ND	0.50									
Chloromethane	ND	0.50									
cis-1,2-Dichloroethene	ND	0.50									
Dibromochloromethane	ND	0.50									
Dibromomethane	ND	0.50									
Dichlorodifluoromethane	ND	0.50									
Ethylbenzene	ND	0.50									
Hexachlorobutadiene	ND	0.50									
Isopropylbenzene	ND	0.50									
m,p-Xylene	ND	1.0									
Methylene chloride	ND	2.0									
MTBE	ND	0.50									
n-Butylbenzene	ND	0.50									
n-Propylbenzene	ND	0.50									
Naphthalene	ND	0.50									
o-Xylene	ND	0.50									
sec-Butylbenzene	ND	0.50									
Styrene	ND	0.50									
tert-Butylbenzene	ND	0.50									
Tetrachloroethene	ND	0.50									
Toluene	ND	0.50									
trans-1,2-Dichloroethene	ND	0.50									

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009798
Project: Mall at Maryland Square, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130318MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88121**
Client ID: **PBW** Batch ID: **P13VW042** TestNo: **EPA 8260B** Analysis Date: **3/18/2013** SeqNo: **1542599**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Trichloroethene	ND	0.50									
Trichlorofluoromethane	ND	0.50									
Vinyl chloride	ND	0.50									
Surr: 1,2-Dichloroethane-d4	25.090		25.00		100	56	120				
Surr: 4-Bromofluorobenzene	25.030		25.00		100	80	120				
Surr: Dibromofluoromethane	26.260		25.00		105	72	120				
Surr: Toluene-d8	25.240		25.00		101	80	123				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009798
Project: Mall at Maryland Square, 103P172829

ANALYTICAL QC SUMMARY REPORT

TestCode: PERMANGANATE

Sample ID: **MB-R88100**	SampType: **MBLK**	TestCode: **PERMANGAN**	Units: **mg/L**	Prep Date:	RunNo: **88100**
Client ID: **PBW**	Batch ID: **R88100**	TestNo: **Colorimetric**		Analysis Date: **3/13/2013**	SeqNo: **1541960**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Permanganate as KMnO4	ND	1.0									

Sample ID: **LCS-R88100**	SampType: **LCS**	TestCode: **PERMANGAN**	Units: **mg/L**	Prep Date:	RunNo: **88100**
Client ID: **LCSW**	Batch ID: **R88100**	TestNo: **Colorimetric**		Analysis Date: **3/13/2013**	SeqNo: **1541961**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Permanganate as KMnO4	20.440	1.0	20.00	0	102	80	120				

Sample ID: **N009811-001AMS**	SampType: **MS**	TestCode: **PERMANGAN**	Units: **mg/L**	Prep Date:	RunNo: **88100**
Client ID: **ZZZZZZ**	Batch ID: **R88100**	TestNo: **Colorimetric**		Analysis Date: **3/13/2013**	SeqNo: **1541966**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Permanganate as KMnO4	39130.000	1000	20000	18750	102	80	120				

Sample ID: **N009811-001AMSD**	SampType: **MSD**	TestCode: **PERMANGAN**	Units: **mg/L**	Prep Date:	RunNo: **88100**
Client ID: **ZZZZZZ**	Batch ID: **R88100**	TestNo: **Colorimetric**		Analysis Date: **3/13/2013**	SeqNo: **1541967**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Permanganate as KMnO4	39190.000	1000	20000	18750	102	80	120	39130	0.153	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CHAIN OF CUSTODY RECORD

Page 1 of 1

Advanced Technology Laboratories, Inc.
3151-3153 W. Post Rd.
Las Vegas, NV 89118
Tel:(702) 307-2659•Fax:(702) 307-2691

FOR LABORATORY USE ONLY:

P.O.#

Logged By: Date: 3/12/13

Method of Transport
Client ☐
ATL INC ☑
FEDEX ☐
Other:

Sample Condition Upon Receipt
1. CHILLED 2.4°C Y☐ N☐ (ICE IR#1)
2. HEADSPACE (VOA) Y☐ N☐
3. CONTAINER INTACT Y☐ N☐
4. SEALED Y☐ N☐
5. # OF SPLS MATCH COC Y☐ N☐
6. PRESERVED Y☐ N☐

Client: Tetra Tech
Address: 1230 Columbia St suite 1000
TEL: (619) 525.7788
Attn: Rob Mendiguez
City San Diego State CA Zip Code 92101
FAX: ( )

Project Name: Mall at Maryland Square
Project #: 103P172529
Sampler: (Printed Name) Geoff Richards (Signature)

I attest to the validity and authenticity of this sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action.

Relinquished by: (Signature and Printed name) Geoff Richards Geoff Richards	Date: 3/12/13	Time: 1710	Received by: (Signature and Printed name) MB CARTIN	Date: 3/12/13	Time: 1710
Relinquished by: (Signature and Printed name)	Date:	Time:	Received by: (Signature and Printed name)	Date:	Time:
Relinquished by: (Signature and Printed name)	Date:	Time:	Received by: (Signature and Printed name)	Date:	Time:

I hereby authorize ATL INC to perform the work indicated below:
Project Mgr/Submitter:
Geoff Richards (Print Name) 3/12/13 (Date)
(Signature)

Send Report To:
Attn: Rob Mendiguez
Co: Tetra Tech
Address: Same
City San Diego State CA Zip 92101

Bill To:
Attn: Same
Co: Tetra Tech
Address: Same
City Same State CA Zip 92101

Special Instructions/Comments:
* GW to be analyzed by 8260B was pre-treated w KMnO4 so samples were collected in unpreserved 40 mL VOAs + NaHSO4 were used to stop destruction of VOCs.
*dissolved metals filtered.

Sample/Records-Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $ 2.00 / sample / mo (after 45 days)
- Records : $ 1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested: 8260B (VOC); 8260B (BTEX), (MTBE); 8015B (GRO); 8015B (DRO), (Motor Oil/ORO); RCRA8 (6010B/7000); Metals dissolved (Mg, Mn, Fe); Permanganate by Potassium and Chloride

SPECIFY APPROPRIATE MATRIX: SOIL; WATER; GROUND WATER; WASTEWATER

QA/QC: RTNE ☐ CT ☐ RWQCB ☐ LEVEL IV ____ OTHER ____

ITEM	LAB USE ONLY: Batch # / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	TAT	Container(s) #	Type	PRESERVATION	REMARKS
	NOU9798-1	MW-1901 / MSSC	3/12/13	1255		3	G VOA		Thiosulfate
	-2	MW-19D1 / MSSC		1050		1	Poly 500	N	
	-3	MW-19D1 / MSSC		1050		1	poly 500	—	
	-4	MW-1901 / MSSC		1255		3	G VOA	—	Unpreserved
	-5	MW-19 / MSSC		1415		3	G V		Thiosulfate
	-6	MW-19 / MSSC				1	P P	N	
	-7	MW-19 / MSSC				1	P P	—	
	-8	MW-19 / MSSC				3	G V	—	Unpreserved
	-9	Permanganate Solution 01	3/12/13	1215		1	P P	—	

•TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: ☐ A= Overnight ≤ 24 hr ☐ B= Emergency Next workday ☐ C= Critical 2 Workdays ☐ D= Urgent 3 Workdays ☐ E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter

Advanced Technology Laboratories, Inc.

Please review the checklist below. Any NO signifies non-compliance. Any non-compliance will be noted and must be understood as having an impact on the quality of the data. All tests will be performed as requested regardless of any compliance issues.

If you have any questions or further instruction, please contact our Project Coordinator at (702) 307-2659.

Cooler Received/Opened On:	3/12/2013	Workorder:	N009798
Rep sample Temp (Deg C):	2.4	IR Gun ID:	1
Temp Blank:	☐ Yes ☑ No		
Carrier name:	ATL		
Last 4 digits of Tracking No.:	NA	Packing Material Used:	None
Cooling process:	☑ Ice ☐ Ice Pack ☐ Dry Ice ☐ Other ☐ None		

Sample Receipt Checklist

1. Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
2. Custody seals intact, signed, dated on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
3. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
4. Chain of custody present?	Yes ☑	No ☐	
5. Sampler's name present in COC?	Yes ☑	No ☐	
6. Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
7. Chain of custody agrees with sample labels?	Yes ☑	No ☐	
8. Samples in proper container/bottle?	Yes ☑	No ☐	
9. Sample containers intact?	Yes ☑	No ☐	
10. Sufficient sample volume for indicated test?	Yes ☑	No ☐	
11. All samples received within holding time?	Yes ☑	No ☐	
12. Temperature of rep sample or Temp Blank within acceptable limit?	Yes ☑	No ☐	NA ☐
13. Water - VOA vials have zero headspace?	Yes ☑	No ☐	NA ☐
14. Water - pH acceptable upon receipt? Example: pH > 12 for (CN,S); pH<2 for Metals	Yes ☑	No ☐	NA ☐
15. Did the bottle labels indicate correct preservatives used?	Yes ☑	No ☐	NA ☐
16. Were there Non-Conformance issues at login?	Yes ☐	No ☐	NA ☑
Was Client notified?	Yes ☐	No ☐	NA ☑

Comments:

Checklist Completed B MBC 3/13/13 Reviewed By:

March 20, 2013

Rob Manriquez
Tetra Tech
1230 Columbia Street, Suite 1000
San Diego, CA 92101

TEL: (858) 527-8803
FAX:

CA-ELAP No.:2676
NV Cert. No.:NV-009222007A

Workorder No.: N009811

RE: Maryland Square, 103P172829.01

Attention: Rob Manriquez

Enclosed are the results for sample(s) received on March 13, 2013 by Advanced Technology Laboratories, Inc. . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (702) 307-2659 if I can be of further assistance to your company.

Sincerely,

Jose Tenorio Jr.
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories - Las Vegas.

CLIENT: Tetra Tech
Project: Maryland Square, 103P172829.01
Lab Order: N009811

CASE NARRATIVE

SAMPLE RECEIVING/GENERAL COMMENTS:

Samples were received intact with proper chain of custody documentation.

Cooler temperature and sample preservation were verified upon receipt of samples if applicable.

Information on sample receipt conditions including discrepancies can be found in attached Sample Receipt Checklist Form.

Samples were analyzed within method holding time.

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

Advanced Technology Laboratories, Inc.

ANALYTICAL RESULTS

Print Date: *20-Mar-13*

CLIENT:	Tetra Tech	**Client Sample ID:**	Permanganate Solution - 02
Lab Order:	N009811	**Collection Date:**	3/13/2013 12:17:00 PM
Project:	Maryland Square, 103P172829.01	**Matrix:**	WATER
Lab ID:	N009811-001		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
PERMANGANATE BY COLORIMETRY						
			COLORIMETRIC			
RunID: WETCHEM_130313E	QC Batch: R88100			PrepDate:		Analyst: **JT**
Permanganate as KMnO4	19000	1000		mg/L	1000	3/13/2013

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories, Inc.

3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009811
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: PERMANGANATE

Sample ID: **MB-R88100**	SampType: **MBLK**	TestCode: **PERMANGAN**	Units: **mg/L**	Prep Date:	RunNo: **88100**
Client ID: **PBW**	Batch ID: **R88100**	TestNo: **Colorimetric**		Analysis Date: **3/13/2013**	SeqNo: **1541960**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Permanganate as KMnO4	ND	1.0									

Sample ID: **LCS-R88100**	SampType: **LCS**	TestCode: **PERMANGAN**	Units: **mg/L**	Prep Date:	RunNo: **88100**
Client ID: **LCSW**	Batch ID: **R88100**	TestNo: **Colorimetric**		Analysis Date: **3/13/2013**	SeqNo: **1541961**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Permanganate as KMnO4	20.440	1.0	20.00	0	102	80	120				

Sample ID: **N009811-001AMS**	SampType: **MS**	TestCode: **PERMANGAN**	Units: **mg/L**	Prep Date:	RunNo: **88100**
Client ID: **ZZZZZZ**	Batch ID: **R88100**	TestNo: **Colorimetric**		Analysis Date: **3/13/2013**	SeqNo: **1541966**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Permanganate as KMnO4	39130.000	1000	20000	18750	102	80	120				

Sample ID: **N009811-001AMSD**	SampType: **MSD**	TestCode: **PERMANGAN**	Units: **mg/L**	Prep Date:	RunNo: **88100**
Client ID: **ZZZZZZ**	Batch ID: **R88100**	TestNo: **Colorimetric**		Analysis Date: **3/13/2013**	SeqNo: **1541967**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Permanganate as KMnO4	39190.000	1000	20000	18750	102	80	120	39130	0.153	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.

3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CHAIN OF CUSTODY RECORD

Page 1 of 1

Advanced Technology Laboratories, Inc.
3151-3153 W. Post Rd.
Las Vegas, NV 89118
Tel:(702) 307-2659•Fax:(702) 307-2691

FOR LABORATORY USE ONLY:

P.O.# 103P172829.01

Logged By: BDano Date: 3-13-13

Method of Transport: Client ☐ ATL INC ☐ FEDEX ☐ Other:

Sample Condition Upon Receipt
1. CHILLED 4.2 ICE 1.2.1 Y☒ N☐ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐
3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: TetraTech
Attn: Rob Munriguez
Address: 1230 Columbia St #1020
City San Diego State CA Zip Code 92101
TEL:( )
FAX:( )

Project Name: Marjan Sylvan Project #: 103P172829.01 Sampler: BeckiDano
I attest to the validity and authenticity of this sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action. (Printed Name) (Signature)

Relinquished by: (Signature and Printed name)	BECKI DANO	Date: 3/13/13	Time: 1224	Received by: (Signature and Printed name)	HERSEY SANJAY	Date: 3/13/13	Time: 1229
Relinquished by: (Signature and Printed name)	HERSEY SANJAY	Date: 3/13/13	Time: 1251	Received by: (Signature and Printed name)	Hersey SANJAY	Date: 3/13/13	Time: 1255
Relinquished by: (Signature and Printed name)		Date:	Time:	Received by: (Signature and Printed name)		Date:	Time:

I hereby authorize ATL INC to perform the work indicated below:
Project Mgr/Submitter:
BECKI DANO 3-13-13
Print Name Date
Signature

Send Report To:
Attn: Rob Munriguez
Co: TetraTech
Address: 1230 Columbia St #1020
City San Diego State CA Zip 92101

Bill To:
Attn: Same
Co:
Address:
City State Zip

Special Instructions/Comments:
Permanganate Concentration by colorimeter
email results when ready
Rob.Munriguez@tetratech.com Lisa.Medvec@tetratech.com
Becki.Dano@tetratech.com

Sample/Records-Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $ 2.00 / sample / mo (after 45 days)
- Records : $ 1.00 / ATL workorder / mo (after 1 year)

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8260B (VOC)	8260B (BTEX),(MTBE)	8015B (GRO)	8015B (DRO),(Motor Oil/ORO)	RCRA8/6010B/7000	Permanganate	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	N009811-1	Permanganate Blank-02	3/13	1247						X		X			E	1	P	P	-

SPECIFY APPROPRIATE MATRIX

QA/QC: RTNE ☐ CT ☐ RWQCB ☐ LEVEL IV ☐ OTHER

•TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: ☐ A= Overnight ≤ 24 hr ☐ B= Emergency Next workday ☐ C= Critical 2 Workdays ☐ D= Urgent 3 Workdays ☐ E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: White with report, Yellow to folder, Pink to submitter

Advanced Technology Laboratories, Inc.

Please review the checklist below. Any NO signifies non-compliance. Any non-compliance will be noted and must be understood as having an impact on the quality of the data. All tests will be performed as requested regardless of any compliance issues.

If you have any questions or further instruction, please contact our Project Coordinator at (702) 307-2659.

Cooler Received/Opened On:	3/13/2013	Workorder:	N009811
Rep sample Temp (Deg C):	4.2	IR Gun ID:	1
Temp Blank:	☐ Yes ☑ No		
Carrier name:	ATL		
Last 4 digits of Tracking No.:	NA	Packing Material Used:	None
Cooling process:	☑ Ice ☐ Ice Pack ☐ Dry Ice ☐ Other ☐ None		

Sample Receipt Checklist

1. Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
2. Custody seals intact, signed, dated on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
3. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
4. Chain of custody present?	Yes ☑	No ☐	
5. Sampler's name present in COC?	Yes ☑	No ☐	
6. Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
7. Chain of custody agrees with sample labels?	Yes ☑	No ☐	
8. Samples in proper container/bottle?	Yes ☑	No ☐	
9. Sample containers intact?	Yes ☑	No ☐	
10. Sufficient sample volume for indicated test?	Yes ☑	No ☐	
11. All samples received within holding time?	Yes ☑	No ☐	
12. Temperature of rep sample or Temp Blank within acceptable limit?	Yes ☑	No ☐	NA ☐
13. Water - VOA vials have zero headspace?	Yes ☐	No ☐	NA ☑
14. Water - pH acceptable upon receipt? Example: pH > 12 for (CN,S); pH<2 for Metals	Yes ☐	No ☐	NA ☑
15. Did the bottle labels indicate correct preservatives used?	Yes ☐	No ☐	NA ☑
16. Were there Non-Conformance issues at login?	Yes ☐	No ☐	NA ☑
Was Client notified?	Yes ☐	No ☐	NA ☑

Comments:

Checklist Completed B MBC 3/14/13

Reviewed By:

March 28, 2013

Rob Manriquez
Tetra Tech
1230 Columbia Street, Suite 1000
San Diego, CA 92101

TEL: (858) 527-8803
FAX:

CA-ELAP No.:2676
NV Cert. No.:NV-009222007A

Workorder No.: N009848

RE: Maryland Square, 103P172829.01

Attention: Rob Manriquez

Enclosed are the results for sample(s) received on March 19, 2013 by Advanced Technology Laboratories, Inc. . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (702) 307-2659 if I can be of further assistance to your company.

Sincerely,

for

Jose Tenorio Jr.
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories - Las Vegas.

CLIENT: Tetra Tech
Project: Maryland Square, 103P172829.01
Lab Order: N009848

CASE NARRATIVE

SAMPLE RECEIVING/GENERAL COMMENTS:

Samples were received intact with proper chain of custody documentation.

Cooler temperature and sample preservation were verified upon receipt of samples if applicable.

Information on sample receipt conditions including discrepancies can be found in attached Sample Receipt Checklist Form.

Samples were analyzed within method holding time.

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT:	Tetra Tech	**Client Sample ID:**	MW-19I
Lab Order:	N009848	**Collection Date:**	3/19/2013 8:40:00 AM
Project:	Maryland Square, 103P172829.01	**Matrix:**	GROUNDWATER
Lab ID:	N009848-001		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
PERMANGANATE BY COLORIMETRY						
		COLORIMETRIC				
RunID: WETCHEM_130320A	QC Batch: R88138			PrepDate:		Analyst: **JT**
Permanganate as KMnO4	17	1.0		mg/L	1	3/20/2013
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS5_130325B	QC Batch: P13VW047			PrepDate:		Analyst: **QBM**
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/25/2013 06:25 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/25/2013 06:25 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/25/2013 06:25 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/25/2013 06:25 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/25/2013 06:25 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/25/2013 06:25 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/25/2013 06:25 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/25/2013 06:25 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/25/2013 06:25 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/25/2013 06:25 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/25/2013 06:25 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	3/25/2013 06:25 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/25/2013 06:25 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/25/2013 06:25 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/25/2013 06:25 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/25/2013 06:25 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/25/2013 06:25 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/25/2013 06:25 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/25/2013 06:25 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/25/2013 06:25 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/25/2013 06:25 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/25/2013 06:25 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/25/2013 06:25 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/25/2013 06:25 PM
Benzene	ND	0.50		µg/L	1	3/25/2013 06:25 PM
Bromobenzene	ND	0.50		µg/L	1	3/25/2013 06:25 PM
Bromodichloromethane	ND	0.50		µg/L	1	3/25/2013 06:25 PM
Bromoform	ND	0.50		µg/L	1	3/25/2013 06:25 PM
Bromomethane	ND	0.50		µg/L	1	3/25/2013 06:25 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/25/2013 06:25 PM
Chlorobenzene	ND	0.50		µg/L	1	3/25/2013 06:25 PM
Chloroethane	ND	0.50		µg/L	1	3/25/2013 06:25 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N009848
Project: Maryland Square, 103P172829.01
Lab ID: N009848-001

Client Sample ID: MW-19I
Collection Date: 3/19/2013 8:40:00 AM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_130325B	QC Batch: P13VW047			PrepDate:		Analyst: **QBM**
Chloroform	1.8	0.50		µg/L	1	3/25/2013 06:25 PM
Chloromethane	ND	0.50		µg/L	1	3/25/2013 06:25 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	3/25/2013 06:25 PM
Dibromochloromethane	ND	0.50		µg/L	1	3/25/2013 06:25 PM
Dibromomethane	ND	0.50		µg/L	1	3/25/2013 06:25 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/25/2013 06:25 PM
Ethylbenzene	ND	0.50		µg/L	1	3/25/2013 06:25 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/25/2013 06:25 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/25/2013 06:25 PM
m,p-Xylene	ND	1.0		µg/L	1	3/25/2013 06:25 PM
Methylene chloride	ND	2.0		µg/L	1	3/25/2013 06:25 PM
MTBE	ND	0.50		µg/L	1	3/25/2013 06:25 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/25/2013 06:25 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/25/2013 06:25 PM
Naphthalene	ND	0.50		µg/L	1	3/25/2013 06:25 PM
o-Xylene	ND	0.50		µg/L	1	3/25/2013 06:25 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/25/2013 06:25 PM
Styrene	ND	0.50		µg/L	1	3/25/2013 06:25 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/25/2013 06:25 PM
Tetrachloroethene	280	5.0		µg/L	10	3/25/2013 07:23 PM
Toluene	ND	0.50		µg/L	1	3/25/2013 06:25 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/25/2013 06:25 PM
Trichloroethene	ND	0.50		µg/L	1	3/25/2013 06:25 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/25/2013 06:25 PM
Vinyl chloride	ND	0.50		µg/L	1	3/25/2013 06:25 PM
Surr: 1,2-Dichloroethane-d4	105	56-120		%REC	1	3/25/2013 06:25 PM
Surr: 1,2-Dichloroethane-d4	96.0	56-120		%REC	10	3/25/2013 07:23 PM
Surr: 4-Bromofluorobenzene	101	80-120		%REC	1	3/25/2013 06:25 PM
Surr: 4-Bromofluorobenzene	98.2	80-120		%REC	10	3/25/2013 07:23 PM
Surr: Dibromofluoromethane	106	72-120		%REC	1	3/25/2013 06:25 PM
Surr: Dibromofluoromethane	103	72-120		%REC	10	3/25/2013 07:23 PM
Surr: Toluene-d8	99.6	80-123		%REC	1	3/25/2013 06:25 PM
Surr: Toluene-d8	99.0	80-123		%REC	10	3/25/2013 07:23 PM
ANIONS BY ION CHROMATOGRAPHY				**EPA 300.0**		
RunID: IC2_130320A	QC Batch: R88162			PrepDate:		Analyst: **QBM**

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Tetra Tech	**Client Sample ID:**	MW-19I
Lab Order:	N009848	**Collection Date:**	3/19/2013 8:40:00 AM
Project:	Maryland Square, 103P172829.01	**Matrix:**	GROUNDWATER
Lab ID:	N009848-001		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ANIONS BY ION CHROMATOGRAPHY						
			EPA 300.0			
RunID: IC2_130320A	QC Batch: R88162			PrepDate:		Analyst: **QBM**
Chloride	150	25		mg/L	50	3/20/2013 02:11 PM
DISSOLVED METALS BY ICP						
	EPA 3010A			**EPA 6010B**		
RunID: ICP2_130325B	QC Batch: 42480			PrepDate:	3/20/2013	Analyst: **CEI**
Potassium	13	5.0		mg/L	10	3/25/2013 09:53 AM
DISSOLVED METALS BY ICP-MS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130325B	QC Batch: 42479			PrepDate:	3/20/2013	Analyst: **CEI**
Arsenic	1.7	0.50		µg/L	5	3/25/2013 03:51 PM
Chromium	14	5.0		µg/L	5	3/25/2013 03:51 PM
Manganese	2700	12		µg/L	25	3/25/2013 04:19 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Work Order: N009848
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 300_W_CL

Sample ID: **MB-R88162_CL**	SampType: **MBLK**	TestCode: **300_W_CL**	Units: **mg/L**	Prep Date:	RunNo: **88162**
Client ID: **PBW**	Batch ID: **R88162**	TestNo: **EPA 300.0**		Analysis Date: **3/20/2013**	SeqNo: **1544017**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	ND	0.50									

Sample ID: **LCS-R88162_CL**	SampType: **LCS**	TestCode: **300_W_CL**	Units: **mg/L**	Prep Date:	RunNo: **88162**
Client ID: **LCSW**	Batch ID: **R88162**	TestNo: **EPA 300.0**		Analysis Date: **3/20/2013**	SeqNo: **1544018**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	2.415	0.50	2.500	0	96.6	90	110				

Sample ID: **N009851-002DMS**	SampType: **MS**	TestCode: **300_W_CL**	Units: **mg/L**	Prep Date:	RunNo: **88162**
Client ID: **ZZZZZZ**	Batch ID: **R88162**	TestNo: **EPA 300.0**		Analysis Date: **3/20/2013**	SeqNo: **1544020**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	1207.600	100	500.0	726.2	96.3	80	120				

Sample ID: **N009851-002DMSD**	SampType: **MSD**	TestCode: **300_W_CL**	Units: **mg/L**	Prep Date:	RunNo: **88162**
Client ID: **ZZZZZZ**	Batch ID: **R88162**	TestNo: **EPA 300.0**		Analysis Date: **3/20/2013**	SeqNo: **1544021**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	1212.000	100	500.0	726.2	97.2	80	120	1208	0.364	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Tetra Tech
Work Order: N009848
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_WD

Sample ID: **MB-42480**	SampType: **MBLK**	TestCode: **6010_WD**	Units: **mg/L**	Prep Date: **3/20/2013**	RunNo: **88188**
Client ID: **PBW**	Batch ID: **42480**	TestNo: **EPA 6010B**	**EPA 3010A**	Analysis Date: **3/25/2013**	SeqNo: **1544798**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Potassium	ND	0.50									

Sample ID: **LCS-42480**	SampType: **LCS**	TestCode: **6010_WD**	Units: **mg/L**	Prep Date: **3/20/2013**	RunNo: **88188**
Client ID: **LCSW**	Batch ID: **42480**	TestNo: **EPA 6010B**	**EPA 3010A**	Analysis Date: **3/25/2013**	SeqNo: **1544799**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Potassium	2.245	0.50	2.500	0	89.8	85	115				

Sample ID: **N009848-001C-MS**	SampType: **MS**	TestCode: **6010_WD**	Units: **mg/L**	Prep Date: **3/20/2013**	RunNo: **88188**
Client ID: **ZZZZZZ**	Batch ID: **42480**	TestNo: **EPA 6010B**	**EPA 3010A**	Analysis Date: **3/25/2013**	SeqNo: **1544804**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Potassium	17.897	5.0	5.000	13.07	96.6	75	125				

Sample ID: **N009848-001C-MSD**	SampType: **MSD**	TestCode: **6010_WD**	Units: **mg/L**	Prep Date: **3/20/2013**	RunNo: **88188**
Client ID: **ZZZZZZ**	Batch ID: **42480**	TestNo: **EPA 6010B**	**EPA 3010A**	Analysis Date: **3/25/2013**	SeqNo: **1544805**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Potassium	17.686	5.0	5.000	13.07	92.3	75	125	17.90	1.19	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009848
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 6020_DIS

Sample ID: **MB-42479**	SampType: **MBLK**	TestCode: **6020_DIS**	Units: **µg/L**	Prep Date: **3/20/2013**	RunNo: **88202**
Client ID: **PBW**	Batch ID: **42479**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **3/25/2013**	SeqNo: **1546471**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.10									
Chromium	ND	1.0									
Manganese	ND	0.50									

Sample ID: **LCS-42479**	SampType: **LCS**	TestCode: **6020_DIS**	Units: **µg/L**	Prep Date: **3/20/2013**	RunNo: **88202**
Client ID: **LCSW**	Batch ID: **42479**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **3/25/2013**	SeqNo: **1546472**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	10.126	0.10	10.00	0	101	85	115				
Chromium	9.707	1.0	10.00	0	97.1	85	115				
Manganese	95.045	0.50	100.0	0	95.0	85	115				

Sample ID: **N009853-001A-MS**	SampType: **MS**	TestCode: **6020_DIS**	Units: **µg/L**	Prep Date: **3/20/2013**	RunNo: **88202**
Client ID: **ZZZZZZ**	Batch ID: **42479**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **3/25/2013**	SeqNo: **1546476**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	17.677	0.10	10.00	5.874	118	75	125				
Chromium	10.097	1.0	10.00	0.4201	96.8	75	125				

Sample ID: **N009853-001A-MSD**	SampType: **MSD**	TestCode: **6020_DIS**	Units: **µg/L**	Prep Date: **3/20/2013**	RunNo: **88202**
Client ID: **ZZZZZZ**	Batch ID: **42479**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **3/25/2013**	SeqNo: **1546477**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	18.070	0.10	10.00	5.874	122	75	125	17.68	2.20	20	
Chromium	9.854	1.0	10.00	0.4201	94.3	75	125	10.10	2.44	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009848
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 6020_DIS

Sample ID: **N009853-001A-MS**	SampType: **MS**	TestCode: **6020_DIS**	Units: **µg/L**	Prep Date: **3/20/2013**	RunNo: **88202**
Client ID: **ZZZZZZ**	Batch ID: **42479**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **3/25/2013**	SeqNo: **1546485**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Manganese	206.569	2.5	100.0	112.1	94.5	75	125				

Sample ID: **N009853-001A-MSD**	SampType: **MSD**	TestCode: **6020_DIS**	Units: **µg/L**	Prep Date: **3/20/2013**	RunNo: **88202**
Client ID: **ZZZZZZ**	Batch ID: **42479**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **3/25/2013**	SeqNo: **1546486**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Manganese	204.156	2.5	100.0	112.1	92.1	75	125	206.6	1.17	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009848
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130325LCS2** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88189**
Client ID: **LCSW** Batch ID: **P13VW047** TestNo: **EPA 8260B** Analysis Date: **3/25/2013** SeqNo: **1545125**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	16.710	0.50	20.00	0	83.6	74	122				
1,1,1-Trichloroethane	17.380	0.50	20.00	0	86.9	65	120				
1,1,2,2-Tetrachloroethane	17.910	0.50	20.00	0	89.6	80	120				
1,1,2-Trichloroethane	19.060	0.50	20.00	0	95.3	80	120				
1,1-Dichloroethane	18.900	0.50	20.00	0	94.5	80	120				
1,1-Dichloroethene	19.560	0.50	20.00	0	97.8	80	120				
1,1-Dichloropropene	19.450	0.50	20.00	0	97.3	80	120				
1,2,3-Trichlorobenzene	20.750	0.50	20.00	0	104	80	124				
1,2,3-Trichloropropane	17.200	0.50	20.00	0	86.0	80	120				
1,2,4-Trichlorobenzene	20.620	0.50	20.00	0	103	80	126				
1,2,4-Trimethylbenzene	18.850	0.50	20.00	0	94.3	80	123				
1,2-Dibromo-3-chloropropane	15.470	1.0	20.00	0	77.4	70	120				
1,2-Dibromoethane	18.470	0.50	20.00	0	92.4	80	120				
1,2-Dichlorobenzene	20.280	0.50	20.00	0	101	80	120				
1,2-Dichloroethane	18.290	0.50	20.00	0	91.4	80	120				
1,2-Dichloropropane	18.530	0.50	20.00	0	92.6	80	120				
1,3,5-Trimethylbenzene	18.810	0.50	20.00	0	94.1	80	121				
1,3-Dichlorobenzene	19.860	0.50	20.00	0	99.3	80	120				
1,3-Dichloropropane	18.870	0.50	20.00	0	94.4	80	120				
1,4-Dichlorobenzene	19.590	0.50	20.00	0	98.0	80	120				
2,2-Dichloropropane	15.650	0.50	20.00	0	78.2	54	120				
2-Chlorotoluene	18.250	0.50	20.00	0	91.2	80	122				
4-Chlorotoluene	18.450	0.50	20.00	0	92.2	80	120				
4-Isopropyltoluene	19.960	0.50	20.00	0	99.8	80	122				
Benzene	19.180	0.50	20.00	0	95.9	80	120				
Bromobenzene	18.970	0.50	20.00	0	94.8	80	120				
Bromodichloromethane	18.390	0.50	20.00	0	92.0	70	120				
Bromoform	18.050	0.50	20.00	0	90.3	66	120				
Bromomethane	25.320	0.50	20.00	0	127	48	155				
Carbon tetrachloride	16.080	0.50	20.00	0	80.4	60	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009848
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130325LCS2** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88189**
Client ID: **LCSW** Batch ID: **P13VW047** TestNo: **EPA 8260B** Analysis Date: **3/25/2013** SeqNo: **1545125**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	19.680	0.50	20.00	0	98.4	80	120				
Chloroethane	20.800	0.50	20.00	0	104	62	147				
Chloroform	19.100	0.50	20.00	0	95.5	80	120				
Chloromethane	19.000	0.50	20.00	0	95.0	63	121				
cis-1,2-Dichloroethene	19.430	0.50	20.00	0	97.2	80	120				
Dibromochloromethane	18.580	0.50	20.00	0	92.9	67	123				
Dibromomethane	19.390	0.50	20.00	0	97.0	80	120				
Dichlorodifluoromethane	18.070	0.50	20.00	0	90.4	70	121				
Ethylbenzene	19.060	0.50	20.00	0	95.3	80	120				
Hexachlorobutadiene	21.720	0.50	20.00	0	109	80	123				
Isopropylbenzene	19.030	0.50	20.00	0	95.2	80	121				
m,p-Xylene	38.940	1.0	40.00	0	97.4	80	120				
Methylene chloride	18.930	2.0	20.00	0	94.6	75	120				
MTBE	17.130	0.50	20.00	0	85.7	70	120				
n-Butylbenzene	19.820	0.50	20.00	0	99.1	80	129				
n-Propylbenzene	18.680	0.50	20.00	0	93.4	80	122				
Naphthalene	20.660	0.50	20.00	0	103	73	127				
o-Xylene	19.410	0.50	20.00	0	97.0	80	120				
sec-Butylbenzene	19.360	0.50	20.00	0	96.8	80	120				
Styrene	19.540	0.50	20.00	0	97.7	80	120				
tert-Butylbenzene	19.190	0.50	20.00	0	96.0	80	120				
Tetrachloroethene	19.150	0.50	20.00	0	95.8	80	121				
Toluene	19.300	0.50	20.00	0	96.5	80	120				
trans-1,2-Dichloroethene	18.970	0.50	20.00	0	94.8	80	120				
Trichloroethene	19.540	0.50	20.00	0	97.7	80	120				
Trichlorofluoromethane	19.570	0.50	20.00	0	97.9	71	148				
Vinyl chloride	18.640	0.50	20.00	0	93.2	80	120				
Surr: 1,2-Dichloroethane-d4	23.950		25.00		95.8	56	120				
Surr: 4-Bromofluorobenzene	25.180		25.00		101	80	120				
Surr: Dibromofluoromethane	25.790		25.00		103	72	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009848
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130325LCS2**	SampType: **LCS**	TestCode: **8260_WP_LL**	Units: **µg/L**	Prep Date:	RunNo: **88189**
Client ID: **LCSW**	Batch ID: **P13VW047**	TestNo: **EPA 8260B**		Analysis Date: **3/25/2013**	SeqNo: **1545125**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Toluene-d8	25.500		25.00		102	80	123				

Sample ID: **P130325LCSD**	SampType: **LCSD**	TestCode: **8260_WP_LL**	Units: **µg/L**	Prep Date:	RunNo: **88189**
Client ID: **LCSS02**	Batch ID: **P13VW047**	TestNo: **EPA 8260B**		Analysis Date: **3/25/2013**	SeqNo: **1545126**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	17.490	0.50	20.00	0	87.5	74	122	16.71	4.56	20	
1,1,1-Trichloroethane	18.480	0.50	20.00	0	92.4	65	120	17.38	6.13	20	
1,1,2,2-Tetrachloroethane	19.540	0.50	20.00	0	97.7	80	120	17.91	8.70	20	
1,1,2-Trichloroethane	18.890	0.50	20.00	0	94.4	80	120	19.06	0.896	20	
1,1-Dichloroethane	19.700	0.50	20.00	0	98.5	80	120	18.90	4.15	20	
1,1-Dichloroethene	20.110	0.50	20.00	0	101	80	120	19.56	2.77	20	
1,1-Dichloropropene	19.840	0.50	20.00	0	99.2	80	120	19.45	1.99	20	
1,2,3-Trichlorobenzene	21.280	0.50	20.00	0	106	80	124	20.75	2.52	20	
1,2,3-Trichloropropane	19.040	0.50	20.00	0	95.2	80	120	17.20	10.2	20	
1,2,4-Trichlorobenzene	20.790	0.50	20.00	0	104	80	126	20.62	0.821	20	
1,2,4-Trimethylbenzene	20.480	0.50	20.00	0	102	80	123	18.85	8.29	20	
1,2-Dibromo-3-chloropropane	16.150	1.0	20.00	0	80.8	70	120	15.47	4.30	20	
1,2-Dibromoethane	18.570	0.50	20.00	0	92.8	80	120	18.47	0.540	20	
1,2-Dichlorobenzene	20.500	0.50	20.00	0	103	80	120	20.28	1.08	20	
1,2-Dichloroethane	18.350	0.50	20.00	0	91.8	80	120	18.29	0.328	20	
1,2-Dichloropropane	19.110	0.50	20.00	0	95.6	80	120	18.53	3.08	20	
1,3,5-Trimethylbenzene	20.370	0.50	20.00	0	102	80	121	18.81	7.96	20	
1,3-Dichlorobenzene	20.300	0.50	20.00	0	102	80	120	19.86	2.19	20	
1,3-Dichloropropane	19.630	0.50	20.00	0	98.2	80	120	18.87	3.95	20	
1,4-Dichlorobenzene	19.960	0.50	20.00	0	99.8	80	120	19.59	1.87	20	
2,2-Dichloropropane	16.270	0.50	20.00	0	81.4	54	120	15.65	3.88	20	
2-Chlorotoluene	19.680	0.50	20.00	0	98.4	80	122	18.25	7.54	20	
4-Chlorotoluene	20.120	0.50	20.00	0	101	80	120	18.45	8.66	20	
4-Isopropyltoluene	20.480	0.50	20.00	0	102	80	122	19.96	2.57	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits
- Calculations are based on raw values
- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009848
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130325LCSD** SampType: **LCSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88189**
Client ID: **LCSS02** Batch ID: **P13VW047** TestNo: **EPA 8260B** Analysis Date: **3/25/2013** SeqNo: **1545126**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	19.650	0.50	20.00	0	98.2	80	120	19.18	2.42	20	
Bromobenzene	20.390	0.50	20.00	0	102	80	120	18.97	7.22	20	
Bromodichloromethane	18.930	0.50	20.00	0	94.6	70	120	18.39	2.89	20	
Bromoform	18.610	0.50	20.00	0	93.0	66	120	18.05	3.06	20	
Bromomethane	24.680	0.50	20.00	0	123	48	155	25.32	2.56	20	
Carbon tetrachloride	16.930	0.50	20.00	0	84.6	60	120	16.08	5.15	20	
Chlorobenzene	19.930	0.50	20.00	0	99.7	80	120	19.68	1.26	20	
Chloroethane	21.570	0.50	20.00	0	108	62	147	20.80	3.63	20	
Chloroform	19.540	0.50	20.00	0	97.7	80	120	19.10	2.28	20	
Chloromethane	18.910	0.50	20.00	0	94.6	63	121	19.00	0.475	20	
cis-1,2-Dichloroethene	20.100	0.50	20.00	0	101	80	120	19.43	3.39	20	
Dibromochloromethane	18.860	0.50	20.00	0	94.3	67	123	18.58	1.50	20	
Dibromomethane	19.780	0.50	20.00	0	98.9	80	120	19.39	1.99	20	
Dichlorodifluoromethane	18.490	0.50	20.00	0	92.5	70	121	18.07	2.30	20	
Ethylbenzene	19.460	0.50	20.00	0	97.3	80	120	19.06	2.08	20	
Hexachlorobutadiene	21.980	0.50	20.00	0	110	80	123	21.72	1.19	20	
Isopropylbenzene	20.480	0.50	20.00	0	102	80	121	19.03	7.34	20	
m,p-Xylene	39.150	1.0	40.00	0	97.9	80	120	38.94	0.538	20	
Methylene chloride	19.430	2.0	20.00	0	97.2	75	120	18.93	2.61	20	
MTBE	18.040	0.50	20.00	0	90.2	70	120	17.13	5.17	20	
n-Butylbenzene	20.380	0.50	20.00	0	102	80	129	19.82	2.79	20	
n-Propylbenzene	19.940	0.50	20.00	0	99.7	80	122	18.68	6.53	20	
Naphthalene	20.890	0.50	20.00	0	104	73	127	20.66	1.11	20	
o-Xylene	19.590	0.50	20.00	0	98.0	80	120	19.41	0.923	20	
sec-Butylbenzene	19.990	0.50	20.00	0	100	80	120	19.36	3.20	20	
Styrene	19.890	0.50	20.00	0	99.4	80	120	19.54	1.78	20	
tert-Butylbenzene	20.530	0.50	20.00	0	103	80	120	19.19	6.75	20	
Tetrachloroethene	19.900	0.50	20.00	0	99.5	80	121	19.15	3.84	20	
Toluene	19.590	0.50	20.00	0	98.0	80	120	19.30	1.49	20	
trans-1,2-Dichloroethene	20.570	0.50	20.00	0	103	80	120	18.97	8.09	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009848
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130325LCSD** SampType: **LCSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88189**
Client ID: **LCSS02** Batch ID: **P13VW047** TestNo: **EPA 8260B** Analysis Date: **3/25/2013** SeqNo: **1545126**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Trichloroethene	19.850	0.50	20.00	0	99.2	80	120	19.54	1.57	20	
Trichlorofluoromethane	20.430	0.50	20.00	0	102	71	148	19.57	4.30	20	
Vinyl chloride	18.960	0.50	20.00	0	94.8	80	120	18.64	1.70	20	
Surr: 1,2-Dichloroethane-d4	24.710		25.00		98.8	56	120		0		
Surr: 4-Bromofluorobenzene	24.800		25.00		99.2	80	120		0		
Surr: Dibromofluoromethane	25.810		25.00		103	72	120		0		
Surr: Toluene-d8	25.690		25.00		103	80	123		0		

Sample ID: **P130325MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88189**
Client ID: **PBW** Batch ID: **P13VW047** TestNo: **EPA 8260B** Analysis Date: **3/25/2013** SeqNo: **1545127**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	0.50									
1,1,1-Trichloroethane	ND	0.50									
1,1,2,2-Tetrachloroethane	ND	0.50									
1,1,2-Trichloroethane	ND	0.50									
1,1-Dichloroethane	ND	0.50									
1,1-Dichloroethene	ND	0.50									
1,1-Dichloropropene	ND	0.50									
1,2,3-Trichlorobenzene	ND	0.50									
1,2,3-Trichloropropane	ND	0.50									
1,2,4-Trichlorobenzene	ND	0.50									
1,2,4-Trimethylbenzene	ND	0.50									
1,2-Dibromo-3-chloropropane	ND	1.0									
1,2-Dibromoethane	ND	0.50									
1,2-Dichlorobenzene	ND	0.50									
1,2-Dichloroethane	ND	0.50									
1,2-Dichloropropane	ND	0.50									
1,3,5-Trimethylbenzene	ND	0.50									
1,3-Dichlorobenzene	ND	0.50									

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009848
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130325MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88189**
Client ID: **PBW** Batch ID: **P13VW047** TestNo: **EPA 8260B** Analysis Date: **3/25/2013** SeqNo: **1545127**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,3-Dichloropropane	ND	0.50									
1,4-Dichlorobenzene	ND	0.50									
2,2-Dichloropropane	ND	0.50									
2-Chlorotoluene	ND	0.50									
4-Chlorotoluene	ND	0.50									
4-Isopropyltoluene	ND	0.50									
Benzene	ND	0.50									
Bromobenzene	ND	0.50									
Bromodichloromethane	ND	0.50									
Bromoform	ND	0.50									
Bromomethane	ND	0.50									
Carbon tetrachloride	ND	0.50									
Chlorobenzene	ND	0.50									
Chloroethane	ND	0.50									
Chloroform	ND	0.50									
Chloromethane	ND	0.50									
cis-1,2-Dichloroethene	ND	0.50									
Dibromochloromethane	ND	0.50									
Dibromomethane	ND	0.50									
Dichlorodifluoromethane	ND	0.50									
Ethylbenzene	ND	0.50									
Hexachlorobutadiene	ND	0.50									
Isopropylbenzene	ND	0.50									
m,p-Xylene	ND	1.0									
Methylene chloride	ND	2.0									
MTBE	ND	0.50									
n-Butylbenzene	ND	0.50									
n-Propylbenzene	ND	0.50									
Naphthalene	ND	0.50									
o-Xylene	ND	0.50									

Qualifiers:

B Analyte detected in the associated Method Blank
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DO Surrogate Diluted Out
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H Holding times for preparation or analysis exceeded
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CLIENT: Tetra Tech
Work Order: N009848
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130325MB2**	SampType: **MBLK**	TestCode: **8260_WP_LL**	Units: **µg/L**	Prep Date:	RunNo: **88189**
Client ID: **PBW**	Batch ID: **P13VW047**	TestNo: **EPA 8260B**		Analysis Date: **3/25/2013**	SeqNo: **1545127**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
sec-Butylbenzene	ND	0.50									
Styrene	ND	0.50									
tert-Butylbenzene	ND	0.50									
Tetrachloroethene	ND	0.50									
Toluene	ND	0.50									
trans-1,2-Dichloroethene	ND	0.50									
Trichloroethene	ND	0.50									
Trichlorofluoromethane	ND	0.50									
Vinyl chloride	ND	0.50									
Surr: 1,2-Dichloroethane-d4	23.560		25.00		94.2	56	120				
Surr: 4-Bromofluorobenzene	24.540		25.00		98.2	80	120				
Surr: Dibromofluoromethane	25.970		25.00		104	72	120				
Surr: Toluene-d8	25.210		25.00		101	80	123				

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009848
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: PERMANGANATE

Sample ID: **MB-R88138**	SampType: **MBLK**	TestCode: **PERMANGAN**	Units: **mg/L**	Prep Date:	RunNo: **88138**
Client ID: **PBW**	Batch ID: **R88138**	TestNo: **Colorimetric**		Analysis Date: **3/20/2013**	SeqNo: **1543196**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Permanganate as KMnO4	ND	1.0									

Sample ID: **LCS-R88138**	SampType: **LCS**	TestCode: **PERMANGAN**	Units: **mg/L**	Prep Date:	RunNo: **88138**
Client ID: **LCSW**	Batch ID: **R88138**	TestNo: **Colorimetric**		Analysis Date: **3/20/2013**	SeqNo: **1543197**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Permanganate as KMnO4	19.470	1.0	20.00	0	97.4	80	120				

Sample ID: **N009848-001C-MS**	SampType: **MS**	TestCode: **PERMANGAN**	Units: **mg/L**	Prep Date:	RunNo: **88138**
Client ID: **ZZZZZZ**	Batch ID: **R88138**	TestNo: **Colorimetric**		Analysis Date: **3/20/2013**	SeqNo: **1543200**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Permanganate as KMnO4	58.260	2.0	40.00	16.79	104	80	120				

Sample ID: **N009848-001C-MSD**	SampType: **MSD**	TestCode: **PERMANGAN**	Units: **mg/L**	Prep Date:	RunNo: **88138**
Client ID: **ZZZZZZ**	Batch ID: **R88138**	TestNo: **Colorimetric**		Analysis Date: **3/20/2013**	SeqNo: **1543201**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Permanganate as KMnO4	58.140	2.0	40.00	16.79	103	80	120	58.26	0.206	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CHAIN OF CUSTODY RECORD

Page 1 of 1

Advanced Technology Laboratories, Inc.
3151-3153 W. Post Rd.
Las Vegas, NV 89118
Tel:(702) 307-2659•Fax:(702) 307-2691

FOR LABORATORY USE ONLY:

P.O.# 103P172829.01
Logged By: B Dano Date: 3-19-13

Method of Transport
Client ☐
ATL INC ☐
FEDEX ☐
Other:

Sample Condition Upon Receipt
1. CHILLED 1.3°C ICE Y☐ N☐ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐
3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: TetraTech
Attn: Rob Munriguez
Address: 1230 Columbia St # 1000
City San Diego State CA Zip Code 92101
TEL:( )
FAX:( )
Project Name: Maryland Square
Project #: 103P172829.01
Sampler: I attest to the validity and authenticity of this sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action. (Printed Name) BECKI DANO (Signature)

Relinquished by: (Signature and Printed name) BECKI DANO Date: 3-19-13 Time: 1538
Received by: (Signature and Printed name) [illegible] Date: 3/19/13 Time: 1538
Relinquished by: (Signature and Printed name) Date: Time:
Received by: (Signature and Printed name) Date: Time:
Relinquished by: (Signature and Printed name) Date: Time:
Received by: (Signature and Printed name) Date: Time:

I hereby authorize ATL INC to perform the work indicated below:
Project Mgr/Submitter: BECKI DANO 3-19-13
Print Name Date
Signature

Send Report To:
Attn: Rob Munriguez
Co: TetraTech
Address: 1230 Columbia St #1000
City San Diego State CA Zip 92101

Bill To:
Attn: Same
Co:
Address:
City State Zip

Special Instructions/Comments:
Email Results when ready
becki.dano@tetratech.com
Lisa.Medve@tetratech.com
Rob.Munriguez@tetratech.com
Cathy.Richards@tetratech.com

Sample/Records-Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $ 2.00 / sample / mo (after 45 days)
- Records : $ 1.00 / ATL workorder / mo (after 1 year)

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time
	N009848-1	MW-19I	3/19	0840

Circle or Add Analysis(es) Requested

8260B (VOC)	8260B (BTEX) (MTBE)	8015B (GRO)	8015B (DRO), (Motor Oil/ORO)	RCRA8 (6010B/7000)	Trimagnesium bis(orthophosphate)	Chloride, Sulfate	Dissolved metals
X			X	X			

SPECIFY APPROPRIATE MATRIX

SOIL	WATER	GROUND WATER	WASTEWATER
		X	

TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
E	5	VOA P P G P	HNO3	Thiosulfate (3 VOA)

QA/QC
RTNE ☐
CT ☐
RWQCB ☐
LEVEL IV
OTHER

•TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: ☐ A= Overnight ≤ 24 hr ☐ B= Emergency Next workday ☐ C= Critical 2 Workdays ☐ D= Urgent 3 Workdays ☐ E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter

Advanced Technology Laboratories, Inc.

Please review the checklist below. Any NO signifies non-compliance. Any non-compliance will be noted and must be understood as having an impact on the quality of the data. All tests will be performed as requested regardless of any compliance issues.

If you have any questions or further instruction, please contact our Project Coordinator at (702) 307-2659.

Cooler Received/Opened On:	3/19/2013	Workorder:	N009848
Rep sample Temp (Deg C):	1.3	IR Gun ID:	1
Temp Blank:	☐ Yes ☑ No		
Carrier name:	Client		
Last 4 digits of Tracking No.:	NA	Packing Material Used:	None
Cooling process:	☑ Ice ☐ Ice Pack ☐ Dry Ice ☐ Other ☐ None		

Sample Receipt Checklist

1. Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
2. Custody seals intact, signed, dated on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
3. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
4. Chain of custody present?	Yes ☑	No ☐	
5. Sampler's name present in COC?	Yes ☑	No ☐	
6. Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
7. Chain of custody agrees with sample labels?	Yes ☑	No ☐	
8. Samples in proper container/bottle?	Yes ☑	No ☐	
9. Sample containers intact?	Yes ☑	No ☐	
10. Sufficient sample volume for indicated test?	Yes ☑	No ☐	
11. All samples received within holding time?	Yes ☑	No ☐	
12. Temperature of rep sample or Temp Blank within acceptable limit?	Yes ☑	No ☐	NA ☐
13. Water - VOA vials have zero headspace?	Yes ☑	No ☐	NA ☐
14. Water - pH acceptable upon receipt? Example: pH > 12 for (CN,S); pH<2 for Metals	Yes ☑	No ☐	NA ☐
15. Did the bottle labels indicate correct preservatives used?	Yes ☑	No ☐	NA ☐
16. Were there Non-Conformance issues at login?	Yes ☐	No ☐	NA ☑
Was Client notified?	Yes ☐	No ☐	NA ☑

Comments:

Checklist Completed B MBC MBC 3/20/13

Reviewed By:

April 04, 2013

Rob Manriquez
Tetra Tech
1230 Columbia Street, Suite 1000
San Diego, CA 92101
TEL: (858) 527-8803
FAX:

CA-ELAP No.:2676
NV Cert. No.:NV-009222007A

Workorder No.: N009896

RE: Maryland Square, 103P172829.01

Attention: Rob Manriquez

Enclosed are the results for sample(s) received on March 27, 2013 by Advanced Technology Laboratories, Inc. . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (702) 307-2659 if I can be of further assistance to your company.

Sincerely,

for Jose Tenorio Jr.
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories - Las Vegas.

CLIENT: Tetra Tech
Project: Maryland Square, 103P172829.01
Lab Order: N009896

CASE NARRATIVE

SAMPLE RECEIVING/GENERAL COMMENTS:

Samples were received intact with proper chain of custody documentation.

Cooler temperature and sample preservation were verified upon receipt of samples if applicable.

Information on sample receipt conditions including discrepancies can be found in attached Sample Receipt Checklist Form.

Samples were analyzed within method holding time.

Analytical Comments for EPA 6010B:

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) are outside recovery criteria for Manganese possibly due to matrix interference. The associated Laboratory Control Sample (LCS) recovery was acceptable.

Analytical Comments for EPA 8260B:

Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD) recovery bias high for Carbon Tetrachloride and 2,2-Dichloropropane. Sample results were non- detect (ND) for these analytes, therefore reanalysis was not necessary.

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

Advanced Technology Laboratories, Inc.

ANALYTICAL RESULTS

Print Date: *04-Apr-13*

CLIENT:	Tetra Tech	**Client Sample ID:**	SB-01 (Stepout) 54'
Lab Order:	N009896	**Collection Date:**	3/25/2013 11:45:00 AM
Project:	Maryland Square, 103P172829.01	**Matrix:**	SOIL
Lab ID:	N009896-001		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP2_130402A	QC Batch: 42557			PrepDate:	3/29/2013	Analyst: **CEI**
Manganese	71	10		mg/Kg	1	4/2/2013 10:14 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

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Advanced Technology Laboratories, Inc.

ANALYTICAL RESULTS

Print Date: *04-Apr-13*

CLIENT:	Tetra Tech	**Client Sample ID:**	SB-02 (Stepout) 45'
Lab Order:	N009896	**Collection Date:**	3/26/2013 9:20:00 AM
Project:	Maryland Square, 103P172829.01	**Matrix:**	SOIL
Lab ID:	N009896-002		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP2_130402A	QC Batch: 42557			PrepDate:	3/29/2013	Analyst: **CEI**
Manganese	100	10		mg/Kg	1	4/2/2013 10:21 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

Advanced Technology Laboratories, Inc.

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Advanced Technology Laboratories, Inc.

ANALYTICAL RESULTS

Print Date: *04-Apr-13*

CLIENT:	Tetra Tech	**Client Sample ID:**	SB-02 (Stepout) 39'
Lab Order:	N009896	**Collection Date:**	3/26/2013 8:40:00 AM
Project:	Maryland Square, 103P172829.01	**Matrix:**	SOIL
Lab ID:	N009896-003		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP2_130402A	QC Batch: 42557			PrepDate:	3/29/2013	Analyst: **CEI**
Manganese	68	10		mg/Kg	1	4/2/2013 10:27 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories, Inc.

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Advanced Technology Laboratories, Inc.

ANALYTICAL RESULTS

Print Date: *04-Apr-13*

CLIENT:	Tetra Tech	**Client Sample ID:**	SB-02 (Stepout) 42'
Lab Order:	N009896	**Collection Date:**	3/26/2013 8:45:00 AM
Project:	Maryland Square, 103P172829.01	**Matrix:**	SOIL
Lab ID:	N009896-004		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP2_130402A	QC Batch: 42557			PrepDate:	3/29/2013	Analyst: **CEI**
Manganese	210	10		mg/Kg	1	4/2/2013 10:33 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

Advanced Technology Laboratories, Inc.

3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT:	Tetra Tech	**Client Sample ID:**	SB-02 (Stepout) 37.5'
Lab Order:	N009896	**Collection Date:**	3/26/2013 8:25:00 AM
Project:	Maryland Square, 103P172829.01	**Matrix:**	SOIL
Lab ID:	N009896-005		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP2_130402A	QC Batch: 42557			PrepDate:	3/29/2013	Analyst: **CEI**
Manganese	61	10		mg/Kg	1	4/2/2013 10:40 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	OS-1-33ft
Lab Order:	N009896	**Collection Date:**	3/26/2013 5:01:00 PM
Project:	Maryland Square, 103P172829.01	**Matrix:**	SOIL
Lab ID:	N009896-006		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_130327B	QC Batch: P13VS011			PrepDate:		Analyst: **QBM**
1,1,1,2-Tetrachloroethane	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
1,1,1-Trichloroethane	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
1,1,2,2-Tetrachloroethane	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
1,1,2-Trichloroethane	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
1,1-Dichloroethane	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
1,1-Dichloroethene	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
1,1-Dichloropropene	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
1,2,3-Trichlorobenzene	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
1,2,3-Trichloropropane	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
1,2,4-Trichlorobenzene	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
1,2,4-Trimethylbenzene	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
1,2-Dibromo-3-chloropropane	ND	10		µg/Kg	1	3/27/2013 09:25 PM
1,2-Dibromoethane	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
1,2-Dichlorobenzene	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
1,2-Dichloroethane	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
1,2-Dichloropropane	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
1,3,5-Trimethylbenzene	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
1,3-Dichlorobenzene	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
1,3-Dichloropropane	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
1,4-Dichlorobenzene	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
2,2-Dichloropropane	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
2-Chlorotoluene	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
4-Chlorotoluene	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
4-Isopropyltoluene	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
Benzene	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
Bromobenzene	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
Bromodichloromethane	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
Bromoform	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
Bromomethane	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
Carbon tetrachloride	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
Chlorobenzene	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
Chloroethane	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
Chloroform	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
Chloromethane	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
cis-1,2-Dichloroethene	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
cis-1,3-Dichloropropene	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Tetra Tech	**Client Sample ID:**	OS-1-33ft
Lab Order:	N009896	**Collection Date:**	3/26/2013 5:01:00 PM
Project:	Maryland Square, 103P172829.01	**Matrix:**	SOIL
Lab ID:	N009896-006		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_130327B	QC Batch: P13VS011				PrepDate:	Analyst: **QBM**
Dibromochloromethane	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
Dibromomethane	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
Dichlorodifluoromethane	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
Ethylbenzene	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
Hexachlorobutadiene	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
Isopropylbenzene	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
m,p-Xylene	ND	10		µg/Kg	1	3/27/2013 09:25 PM
Methylene chloride	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
n-Butylbenzene	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
n-Propylbenzene	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
Naphthalene	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
o-Xylene	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
sec-Butylbenzene	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
Styrene	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
tert-Butylbenzene	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
Tetrachloroethene	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
Toluene	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
trans-1,2-Dichloroethene	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
Trichloroethene	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
Trichlorofluoromethane	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
Vinyl chloride	ND	5.0		µg/Kg	1	3/27/2013 09:25 PM
Surr: 1,2-Dichloroethane-d4	104	58-125		%REC	1	3/27/2013 09:25 PM
Surr: 4-Bromofluorobenzene	106	52-138		%REC	1	3/27/2013 09:25 PM
Surr: Dibromofluoromethane	106	57-121		%REC	1	3/27/2013 09:25 PM
Surr: Toluene-d8	104	66-130		%REC	1	3/27/2013 09:25 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	OS-1-49ft
Lab Order:	N009896	**Collection Date:**	3/26/2013 5:04:00 PM
Project:	Maryland Square, 103P172829.01	**Matrix:**	SOIL
Lab ID:	N009896-007		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS5_130327B	QC Batch: P13VS011			PrepDate:		Analyst: **QBM**
1,1,1,2-Tetrachloroethane	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
1,1,1-Trichloroethane	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
1,1,2,2-Tetrachloroethane	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
1,1,2-Trichloroethane	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
1,1-Dichloroethane	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
1,1-Dichloroethene	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
1,1-Dichloropropene	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
1,2,3-Trichlorobenzene	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
1,2,3-Trichloropropane	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
1,2,4-Trichlorobenzene	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
1,2,4-Trimethylbenzene	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
1,2-Dibromo-3-chloropropane	ND	10		µg/Kg	1	3/27/2013 09:49 PM
1,2-Dibromoethane	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
1,2-Dichlorobenzene	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
1,2-Dichloroethane	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
1,2-Dichloropropane	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
1,3,5-Trimethylbenzene	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
1,3-Dichlorobenzene	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
1,3-Dichloropropane	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
1,4-Dichlorobenzene	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
2,2-Dichloropropane	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
2-Chlorotoluene	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
4-Chlorotoluene	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
4-Isopropyltoluene	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
Benzene	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
Bromobenzene	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
Bromodichloromethane	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
Bromoform	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
Bromomethane	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
Carbon tetrachloride	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
Chlorobenzene	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
Chloroethane	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
Chloroform	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
Chloromethane	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
cis-1,2-Dichloroethene	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
cis-1,3-Dichloropropene	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Tetra Tech	**Client Sample ID:**	OS-1-49ft
Lab Order:	N009896	**Collection Date:**	3/26/2013 5:04:00 PM
Project:	Maryland Square, 103P172829.01	**Matrix:**	SOIL
Lab ID:	N009896-007		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS5_130327B	QC Batch: P13VS011			PrepDate:		Analyst: **QBM**
Dibromochloromethane	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
Dibromomethane	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
Dichlorodifluoromethane	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
Ethylbenzene	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
Hexachlorobutadiene	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
Isopropylbenzene	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
m,p-Xylene	ND	10		µg/Kg	1	3/27/2013 09:49 PM
Methylene chloride	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
n-Butylbenzene	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
n-Propylbenzene	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
Naphthalene	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
o-Xylene	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
sec-Butylbenzene	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
Styrene	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
tert-Butylbenzene	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
Tetrachloroethene	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
Toluene	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
trans-1,2-Dichloroethene	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
Trichloroethene	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
Trichlorofluoromethane	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
Vinyl chloride	ND	5.0		µg/Kg	1	3/27/2013 09:49 PM
Surr: 1,2-Dichloroethane-d4	101	58-125		%REC	1	3/27/2013 09:49 PM
Surr: 4-Bromofluorobenzene	104	52-138		%REC	1	3/27/2013 09:49 PM
Surr: Dibromofluoromethane	108	57-121		%REC	1	3/27/2013 09:49 PM
Surr: Toluene-d8	104	66-130		%REC	1	3/27/2013 09:49 PM
ICP METALS						
	EPA 3050B			**EPA 6010B**		
RunID: ICP2_130402A	QC Batch: 42557			PrepDate:	3/29/2013	Analyst: **CEI**
Manganese	51	10		mg/Kg	1	4/2/2013 10:47 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	SB-01-IDW
Lab Order:	N009896	**Collection Date:**	3/25/2013 12:00:00 PM
Project:	Maryland Square, 103P172829.01	**Matrix:**	SOIL
Lab ID:	N009896-008		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS5_130327B	QC Batch: P13VS011			PrepDate:		Analyst: **QBM**
1,1,1,2-Tetrachloroethane	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
1,1,1-Trichloroethane	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
1,1,2,2-Tetrachloroethane	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
1,1,2-Trichloroethane	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
1,1-Dichloroethane	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
1,1-Dichloroethene	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
1,1-Dichloropropene	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
1,2,3-Trichlorobenzene	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
1,2,3-Trichloropropane	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
1,2,4-Trichlorobenzene	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
1,2,4-Trimethylbenzene	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
1,2-Dibromo-3-chloropropane	ND	10		µg/Kg	1	3/28/2013 03:02 AM
1,2-Dibromoethane	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
1,2-Dichlorobenzene	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
1,2-Dichloroethane	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
1,2-Dichloropropane	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
1,3,5-Trimethylbenzene	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
1,3-Dichlorobenzene	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
1,3-Dichloropropane	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
1,4-Dichlorobenzene	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
2,2-Dichloropropane	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
2-Chlorotoluene	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
4-Chlorotoluene	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
4-Isopropyltoluene	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
Benzene	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
Bromobenzene	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
Bromodichloromethane	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
Bromoform	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
Bromomethane	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
Carbon tetrachloride	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
Chlorobenzene	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
Chloroethane	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
Chloroform	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
Chloromethane	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
cis-1,2-Dichloroethene	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
cis-1,3-Dichloropropene	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Tetra Tech	**Client Sample ID:**	SB-01-IDW
Lab Order:	N009896	**Collection Date:**	3/25/2013 12:00:00 PM
Project:	Maryland Square, 103P172829.01	**Matrix:**	SOIL
Lab ID:	N009896-008		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_130327B	QC Batch: P13VS011				PrepDate:	Analyst: **QBM**
Dibromochloromethane	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
Dibromomethane	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
Dichlorodifluoromethane	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
Ethylbenzene	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
Hexachlorobutadiene	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
Isopropylbenzene	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
m,p-Xylene	ND	10		µg/Kg	1	3/28/2013 03:02 AM
Methylene chloride	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
n-Butylbenzene	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
n-Propylbenzene	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
Naphthalene	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
o-Xylene	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
sec-Butylbenzene	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
Styrene	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
tert-Butylbenzene	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
Tetrachloroethene	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
Toluene	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
trans-1,2-Dichloroethene	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
Trichloroethene	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
Trichlorofluoromethane	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
Vinyl chloride	ND	5.0		µg/Kg	1	3/28/2013 03:02 AM
Surr: 1,2-Dichloroethane-d4	107	58-125		%REC	1	3/28/2013 03:02 AM
Surr: 4-Bromofluorobenzene	101	52-138		%REC	1	3/28/2013 03:02 AM
Surr: Dibromofluoromethane	107	57-121		%REC	1	3/28/2013 03:02 AM
Surr: Toluene-d8	98.7	66-130		%REC	1	3/28/2013 03:02 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	IDWSOLID OS-1
Lab Order:	N009896	**Collection Date:**	3/26/2013 3:30:00 PM
Project:	Maryland Square, 103P172829.01	**Matrix:**	SOIL
Lab ID:	N009896-009		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS5_130327B	QC Batch: P13VS011			PrepDate:		Analyst: **QBM**
1,1,1,2-Tetrachloroethane	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
1,1,1-Trichloroethane	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
1,1,2,2-Tetrachloroethane	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
1,1,2-Trichloroethane	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
1,1-Dichloroethane	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
1,1-Dichloroethene	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
1,1-Dichloropropene	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
1,2,3-Trichlorobenzene	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
1,2,3-Trichloropropane	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
1,2,4-Trichlorobenzene	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
1,2,4-Trimethylbenzene	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
1,2-Dibromo-3-chloropropane	ND	10		µg/Kg	1	3/27/2013 10:37 PM
1,2-Dibromoethane	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
1,2-Dichlorobenzene	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
1,2-Dichloroethane	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
1,2-Dichloropropane	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
1,3,5-Trimethylbenzene	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
1,3-Dichlorobenzene	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
1,3-Dichloropropane	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
1,4-Dichlorobenzene	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
2,2-Dichloropropane	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
2-Chlorotoluene	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
4-Chlorotoluene	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
4-Isopropyltoluene	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
Benzene	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
Bromobenzene	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
Bromodichloromethane	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
Bromoform	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
Bromomethane	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
Carbon tetrachloride	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
Chlorobenzene	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
Chloroethane	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
Chloroform	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
Chloromethane	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
cis-1,2-Dichloroethene	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
cis-1,3-Dichloropropene	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Tetra Tech	**Client Sample ID:**	IDWSOLID OS-1
Lab Order:	N009896	**Collection Date:**	3/26/2013 3:30:00 PM
Project:	Maryland Square, 103P172829.01	**Matrix:**	SOIL
Lab ID:	N009896-009		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_130327B	QC Batch: P13VS011				PrepDate:	Analyst: **QBM**
Dibromochloromethane	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
Dibromomethane	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
Dichlorodifluoromethane	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
Ethylbenzene	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
Hexachlorobutadiene	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
Isopropylbenzene	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
m,p-Xylene	ND	10		µg/Kg	1	3/27/2013 10:37 PM
Methylene chloride	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
n-Butylbenzene	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
n-Propylbenzene	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
Naphthalene	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
o-Xylene	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
sec-Butylbenzene	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
Styrene	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
tert-Butylbenzene	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
Tetrachloroethene	23	5.0		µg/Kg	1	3/27/2013 10:37 PM
Toluene	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
trans-1,2-Dichloroethene	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
Trichloroethene	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
Trichlorofluoromethane	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
Vinyl chloride	ND	5.0		µg/Kg	1	3/27/2013 10:37 PM
Surr: 1,2-Dichloroethane-d4	107	58-125		%REC	1	3/27/2013 10:37 PM
Surr: 4-Bromofluorobenzene	102	52-138		%REC	1	3/27/2013 10:37 PM
Surr: Dibromofluoromethane	110	57-121		%REC	1	3/27/2013 10:37 PM
Surr: Toluene-d8	104	66-130		%REC	1	3/27/2013 10:37 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	IDW-SB-02
Lab Order:	N009896	**Collection Date:**	3/26/2013 10:30:00 AM
Project:	Maryland Square, 103P172829.01	**Matrix:**	SOIL
Lab ID:	N009896-010		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS5_130327B	QC Batch: P13VS011			PrepDate:		Analyst: **QBM**
1,1,1,2-Tetrachloroethane	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
1,1,1-Trichloroethane	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
1,1,2,2-Tetrachloroethane	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
1,1,2-Trichloroethane	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
1,1-Dichloroethane	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
1,1-Dichloroethene	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
1,1-Dichloropropene	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
1,2,3-Trichlorobenzene	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
1,2,3-Trichloropropane	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
1,2,4-Trichlorobenzene	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
1,2,4-Trimethylbenzene	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
1,2-Dibromo-3-chloropropane	ND	10		µg/Kg	1	3/27/2013 11:01 PM
1,2-Dibromoethane	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
1,2-Dichlorobenzene	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
1,2-Dichloroethane	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
1,2-Dichloropropane	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
1,3,5-Trimethylbenzene	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
1,3-Dichlorobenzene	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
1,3-Dichloropropane	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
1,4-Dichlorobenzene	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
2,2-Dichloropropane	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
2-Chlorotoluene	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
4-Chlorotoluene	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
4-Isopropyltoluene	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
Benzene	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
Bromobenzene	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
Bromodichloromethane	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
Bromoform	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
Bromomethane	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
Carbon tetrachloride	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
Chlorobenzene	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
Chloroethane	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
Chloroform	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
Chloromethane	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
cis-1,2-Dichloroethene	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
cis-1,3-Dichloropropene	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Tetra Tech	**Client Sample ID:**	IDW-SB-02
Lab Order:	N009896	**Collection Date:**	3/26/2013 10:30:00 AM
Project:	Maryland Square, 103P172829.01	**Matrix:**	SOIL
Lab ID:	N009896-010		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_130327B	QC Batch: P13VS011				PrepDate:	Analyst: **QBM**
Dibromochloromethane	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
Dibromomethane	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
Dichlorodifluoromethane	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
Ethylbenzene	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
Hexachlorobutadiene	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
Isopropylbenzene	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
m,p-Xylene	ND	10		µg/Kg	1	3/27/2013 11:01 PM
Methylene chloride	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
n-Butylbenzene	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
n-Propylbenzene	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
Naphthalene	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
o-Xylene	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
sec-Butylbenzene	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
Styrene	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
tert-Butylbenzene	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
Tetrachloroethene	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
Toluene	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
trans-1,2-Dichloroethene	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
Trichloroethene	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
Trichlorofluoromethane	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
Vinyl chloride	ND	5.0		µg/Kg	1	3/27/2013 11:01 PM
Surr: 1,2-Dichloroethane-d4	107	58-125		%REC	1	3/27/2013 11:01 PM
Surr: 4-Bromofluorobenzene	100	52-138		%REC	1	3/27/2013 11:01 PM
Surr: Dibromofluoromethane	108	57-121		%REC	1	3/27/2013 11:01 PM
Surr: Toluene-d8	101	66-130		%REC	1	3/27/2013 11:01 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Work Order: N009896
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-42557**	SampType: **MBLK**	TestCode: **6010_S**	Units: **mg/Kg**	Prep Date: **3/29/2013**	RunNo: **88275**
Client ID: **PBS**	Batch ID: **42557**	TestNo: **EPA 6010B**	**EPA 3050B**	Analysis Date: **4/2/2013**	SeqNo: **1548580**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Manganese	ND	10									

Sample ID: **LCS-42557**	SampType: **LCS**	TestCode: **6010_S**	Units: **mg/Kg**	Prep Date: **3/29/2013**	RunNo: **88275**
Client ID: **LCSS**	Batch ID: **42557**	TestNo: **EPA 6010B**	**EPA 3050B**	Analysis Date: **4/2/2013**	SeqNo: **1548581**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Manganese	100.669	10	100.0	0	101	80	120				

Sample ID: **N009896-007A-MS**	SampType: **MS**	TestCode: **6010_S**	Units: **mg/Kg**	Prep Date: **3/29/2013**	RunNo: **88275**
Client ID: **ZZZZZZ**	Batch ID: **42557**	TestNo: **EPA 6010B**	**EPA 3050B**	Analysis Date: **4/2/2013**	SeqNo: **1548593**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Manganese	120.644	10	99.55	51.38	69.6	75	125				S

Sample ID: **N009896-007A-MSD**	SampType: **MSD**	TestCode: **6010_S**	Units: **mg/Kg**	Prep Date: **3/29/2013**	RunNo: **88275**
Client ID: **ZZZZZZ**	Batch ID: **42557**	TestNo: **EPA 6010B**	**EPA 3050B**	Analysis Date: **4/2/2013**	SeqNo: **1548594**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Manganese	121.084	10	100.1	51.38	69.7	75	125	120.6	0.364	20	S

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Tetra Tech
Work Order: N009896
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID: **P130327LCS2** SampType: **LCS** TestCode: **8260_S** Units: **µg/Kg** Prep Date: RunNo: **88216**
Client ID: **LCSS** Batch ID: **P13VS011** TestNo: **EPA 8260B** Analysis Date: **3/27/2013** SeqNo: **1546447**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	46.240	5.0	40.00	0	116	76	120				
1,1,1-Trichloroethane	45.870	5.0	40.00	0	115	67	120				
1,1,2,2-Tetrachloroethane	41.330	5.0	40.00	0	103	79	120				
1,1,2-Trichloroethane	40.630	5.0	40.00	0	102	79	120				
1,1-Dichloroethane	40.600	5.0	40.00	0	102	80	120				
1,1-Dichloroethene	39.960	5.0	40.00	0	99.9	80	120				
1,1-Dichloropropene	40.660	5.0	40.00	0	102	80	120				
1,2,3-Trichlorobenzene	40.620	5.0	40.00	0	102	80	125				
1,2,3-Trichloropropane	40.130	5.0	40.00	0	100	80	120				
1,2,4-Trichlorobenzene	42.850	5.0	40.00	0	107	80	128				
1,2,4-Trimethylbenzene	41.430	5.0	40.00	0	104	80	124				
1,2-Dibromo-3-chloropropane	43.970	10	40.00	0	110	67	120				
1,2-Dibromoethane	42.970	5.0	40.00	0	107	74	120				
1,2-Dichlorobenzene	40.110	5.0	40.00	0	100	80	120				
1,2-Dichloroethane	38.040	5.0	40.00	0	95.1	78	120				
1,2-Dichloropropane	39.600	5.0	40.00	0	99.0	79	120				
1,3,5-Trimethylbenzene	41.990	5.0	40.00	0	105	80	124				
1,3-Dichlorobenzene	40.560	5.0	40.00	0	101	80	120				
1,3-Dichloropropane	39.580	5.0	40.00	0	99.0	80	120				
1,4-Dichlorobenzene	39.840	5.0	40.00	0	99.6	80	120				
2,2-Dichloropropane	49.380	5.0	40.00	0	123	53	120				S
2-Chlorotoluene	40.020	5.0	40.00	0	100	80	124				
4-Chlorotoluene	40.690	5.0	40.00	0	102	80	120				
4-Isopropyltoluene	44.170	5.0	40.00	0	110	80	126				
Benzene	40.350	5.0	40.00	0	101	80	120				
Bromobenzene	39.780	5.0	40.00	0	99.4	80	120				
Bromodichloromethane	43.490	5.0	40.00	0	109	69	120				
Bromoform	48.320	5.0	40.00	0	121	66	121				
Bromomethane	30.540	5.0	40.00	0	76.4	67	136				
Carbon tetrachloride	51.000	5.0	40.00	0	128	62	120				S

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009896
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID: **P130327LCS2** SampType: **LCS** TestCode: **8260_S** Units: **µg/Kg** Prep Date: RunNo: **88216**
Client ID: **LCSS** Batch ID: **P13VS011** TestNo: **EPA 8260B** Analysis Date: **3/27/2013** SeqNo: **1546447**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	40.420	5.0	40.00	0	101	80	120				
Chloroethane	42.570	5.0	40.00	0	106	70	149				
Chloroform	39.830	5.0	40.00	0	99.6	80	120				
Chloromethane	31.940	5.0	40.00	0	79.8	59	123				
cis-1,2-Dichloroethene	40.350	5.0	40.00	0	101	80	120				
cis-1,3-Dichloropropene	43.820	5.0	40.00	0	110	73	120				
Dibromochloromethane	46.090	5.0	40.00	0	115	71	123				
Dibromomethane	38.490	5.0	40.00	0	96.2	78	120				
Dichlorodifluoromethane	39.680	5.0	40.00	0	99.2	62	120				
Ethylbenzene	41.380	5.0	40.00	0	103	80	120				
Hexachlorobutadiene	41.620	5.0	40.00	0	104	80	128				
Isopropylbenzene	42.700	5.0	40.00	0	107	80	126				
m,p-Xylene	82.610	10	80.00	0	103	80	120				
Methylene chloride	35.020	5.0	40.00	0	87.6	69	120				
n-Butylbenzene	43.530	5.0	40.00	0	109	80	135				
n-Propylbenzene	41.580	5.0	40.00	0	104	80	127				
Naphthalene	42.090	5.0	40.00	0	105	70	132				
o-Xylene	40.780	5.0	40.00	0	102	80	120				
sec-Butylbenzene	43.110	5.0	40.00	0	108	80	127				
Styrene	39.780	5.0	40.00	0	99.4	80	120				
tert-Butylbenzene	42.150	5.0	40.00	0	105	80	124				
Tetrachloroethene	41.260	5.0	40.00	0	103	80	122				
Toluene	39.750	5.0	40.00	0	99.4	80	120				
trans-1,2-Dichloroethene	40.470	5.0	40.00	0	101	79	120				
Trichloroethene	41.510	5.0	40.00	0	104	80	120				
Trichlorofluoromethane	40.770	5.0	40.00	0	102	69	145				
Vinyl chloride	40.120	5.0	40.00	0	100	75	122				
Surr: 1,2-Dichloroethane-d4	51.980		50.00		104	58	125				
Surr: 4-Bromofluorobenzene	50.360		50.00		101	52	138				
Surr: Dibromofluoromethane	52.750		50.00		106	57	121				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009896
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID: **P130327LCS2**	SampType: **LCS**	TestCode: **8260_S**	Units: **µg/Kg**	Prep Date:			RunNo: **88216**			
Client ID: **LCSS**	Batch ID: **P13VS011**	TestNo: **EPA 8260B**		Analysis Date: **3/27/2013**			SeqNo: **1546447**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Toluene-d8	50.750		50.00		102	66	130				

Sample ID: **P130327LCSD2**	SampType: **LCSD**	TestCode: **8260_S**	Units: **µg/Kg**	Prep Date:			RunNo: **88216**			
Client ID: **LCSS02**	Batch ID: **P13VS011**	TestNo: **EPA 8260B**		Analysis Date: **3/27/2013**			SeqNo: **1546448**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	45.340	5.0	40.00	0	113	76	120	46.24	1.97	20	
1,1,1-Trichloroethane	43.520	5.0	40.00	0	109	67	120	45.87	5.26	20	
1,1,2,2-Tetrachloroethane	40.140	5.0	40.00	0	100	79	120	41.33	2.92	20	
1,1,2-Trichloroethane	38.990	5.0	40.00	0	97.5	79	120	40.63	4.12	20	
1,1-Dichloroethane	39.780	5.0	40.00	0	99.4	80	120	40.60	2.04	20	
1,1-Dichloroethene	37.430	5.0	40.00	0	93.6	80	120	39.96	6.54	20	
1,1-Dichloropropene	39.870	5.0	40.00	0	99.7	80	120	40.66	1.96	20	
1,2,3-Trichlorobenzene	38.750	5.0	40.00	0	96.9	80	125	40.62	4.71	20	
1,2,3-Trichloropropane	40.470	5.0	40.00	0	101	80	120	40.13	0.844	20	
1,2,4-Trichlorobenzene	40.700	5.0	40.00	0	102	80	128	42.85	5.15	20	
1,2,4-Trimethylbenzene	40.800	5.0	40.00	0	102	80	124	41.43	1.53	20	
1,2-Dibromo-3-chloropropane	42.570	10	40.00	0	106	67	120	43.97	3.24	20	
1,2-Dibromoethane	42.260	5.0	40.00	0	106	74	120	42.97	1.67	20	
1,2-Dichlorobenzene	39.710	5.0	40.00	0	99.3	80	120	40.11	1.00	20	
1,2-Dichloroethane	37.040	5.0	40.00	0	92.6	78	120	38.04	2.66	20	
1,2-Dichloropropane	38.910	5.0	40.00	0	97.3	79	120	39.60	1.76	20	
1,3,5-Trimethylbenzene	41.060	5.0	40.00	0	103	80	124	41.99	2.24	20	
1,3-Dichlorobenzene	39.860	5.0	40.00	0	99.7	80	120	40.56	1.74	20	
1,3-Dichloropropane	39.090	5.0	40.00	0	97.7	80	120	39.58	1.25	20	
1,4-Dichlorobenzene	38.900	5.0	40.00	0	97.3	80	120	39.84	2.39	20	
2,2-Dichloropropane	47.200	5.0	40.00	0	118	53	120	49.38	4.51	20	
2-Chlorotoluene	39.540	5.0	40.00	0	98.8	80	124	40.02	1.21	20	
4-Chlorotoluene	39.910	5.0	40.00	0	99.8	80	120	40.69	1.94	20	
4-Isopropyltoluene	42.840	5.0	40.00	0	107	80	126	44.17	3.06	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits
- Calculations are based on raw values
- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009896
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID: **P130327LCSD2** SampType: **LCSD** TestCode: **8260_S** Units: **µg/Kg** Prep Date: RunNo: **88216**
Client ID: **LCSS02** Batch ID: **P13VS011** TestNo: **EPA 8260B** Analysis Date: **3/27/2013** SeqNo: **1546448**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	39.320	5.0	40.00	0	98.3	80	120	40.35	2.59	20	
Bromobenzene	39.280	5.0	40.00	0	98.2	80	120	39.78	1.26	20	
Bromodichloromethane	41.870	5.0	40.00	0	105	69	120	43.49	3.80	20	
Bromoform	47.710	5.0	40.00	0	119	66	121	48.32	1.27	20	
Bromomethane	30.570	5.0	40.00	0	76.4	67	136	30.54	0.0982	20	
Carbon tetrachloride	49.210	5.0	40.00	0	123	62	120	51.00	3.57	20	S
Chlorobenzene	40.040	5.0	40.00	0	100	80	120	40.42	0.945	20	
Chloroethane	40.740	5.0	40.00	0	102	70	149	42.57	4.39	20	
Chloroform	39.590	5.0	40.00	0	99.0	80	120	39.83	0.604	20	
Chloromethane	32.560	5.0	40.00	0	81.4	59	123	31.94	1.92	20	
cis-1,2-Dichloroethene	39.690	5.0	40.00	0	99.2	80	120	40.35	1.65	20	
cis-1,3-Dichloropropene	41.650	5.0	40.00	0	104	73	120	43.82	5.08	20	
Dibromochloromethane	45.840	5.0	40.00	0	115	71	123	46.09	0.544	20	
Dibromomethane	38.850	5.0	40.00	0	97.1	78	120	38.49	0.931	20	
Dichlorodifluoromethane	38.260	5.0	40.00	0	95.7	62	120	39.68	3.64	20	
Ethylbenzene	40.040	5.0	40.00	0	100	80	120	41.38	3.29	20	
Hexachlorobutadiene	39.590	5.0	40.00	0	99.0	80	128	41.62	5.00	20	
Isopropylbenzene	41.190	5.0	40.00	0	103	80	126	42.70	3.60	20	
m,p-Xylene	81.350	10	80.00	0	102	80	120	82.61	1.54	20	
Methylene chloride	36.500	5.0	40.00	0	91.2	69	120	35.02	4.14	20	
n-Butylbenzene	42.190	5.0	40.00	0	105	80	135	43.53	3.13	20	
n-Propylbenzene	40.330	5.0	40.00	0	101	80	127	41.58	3.05	20	
Naphthalene	40.190	5.0	40.00	0	100	70	132	42.09	4.62	20	
o-Xylene	39.580	5.0	40.00	0	99.0	80	120	40.78	2.99	20	
sec-Butylbenzene	41.370	5.0	40.00	0	103	80	127	43.11	4.12	20	
Styrene	39.310	5.0	40.00	0	98.3	80	120	39.78	1.19	20	
tert-Butylbenzene	40.950	5.0	40.00	0	102	80	124	42.15	2.89	20	
Tetrachloroethene	39.430	5.0	40.00	0	98.6	80	122	41.26	4.54	20	
Toluene	38.550	5.0	40.00	0	96.4	80	120	39.75	3.07	20	
trans-1,2-Dichloroethene	39.260	5.0	40.00	0	98.2	79	120	40.47	3.04	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009896
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID: **P130327LCSD2**	SampType: **LCSD**	TestCode: **8260_S**	Units: **µg/Kg**	Prep Date:	RunNo: **88216**
Client ID: **LCSS02**	Batch ID: **P13VS011**	TestNo: **EPA 8260B**		Analysis Date: **3/27/2013**	SeqNo: **1546448**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Trichloroethene	38.450	5.0	40.00	0	96.1	80	120	41.51	7.65	20	
Trichlorofluoromethane	39.820	5.0	40.00	0	99.6	69	145	40.77	2.36	20	
Vinyl chloride	39.020	5.0	40.00	0	97.6	75	122	40.12	2.78	20	
Surr: 1,2-Dichloroethane-d4	51.860		50.00		104	58	125		0		
Surr: 4-Bromofluorobenzene	50.580		50.00		101	52	138		0		
Surr: Dibromofluoromethane	51.550		50.00		103	57	121		0		
Surr: Toluene-d8	50.620		50.00		101	66	130		0		

Sample ID: **P130327MB4**	SampType: **MBLK**	TestCode: **8260_S**	Units: **µg/Kg**	Prep Date:	RunNo: **88216**
Client ID: **PBS**	Batch ID: **P13VS011**	TestNo: **EPA 8260B**		Analysis Date: **3/27/2013**	SeqNo: **1546870**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	5.0									
1,1,1-Trichloroethane	ND	5.0									
1,1,2,2-Tetrachloroethane	ND	5.0									
1,1,2-Trichloroethane	ND	5.0									
1,1-Dichloroethane	ND	5.0									
1,1-Dichloroethene	ND	5.0									
1,1-Dichloropropene	ND	5.0									
1,2,3-Trichlorobenzene	ND	5.0									
1,2,3-Trichloropropane	ND	5.0									
1,2,4-Trichlorobenzene	ND	5.0									
1,2,4-Trimethylbenzene	ND	5.0									
1,2-Dibromo-3-chloropropane	ND	10									
1,2-Dibromoethane	ND	5.0									
1,2-Dichlorobenzene	ND	5.0									
1,2-Dichloroethane	ND	5.0									
1,2-Dichloropropane	ND	5.0									
1,3,5-Trimethylbenzene	ND	5.0									
1,3-Dichlorobenzene	ND	5.0									

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009896
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID: **P130327MB4** SampType: **MBLK** TestCode: **8260_S** Units: **µg/Kg** Prep Date: RunNo: **88216**
Client ID: **PBS** Batch ID: **P13VS011** TestNo: **EPA 8260B** Analysis Date: **3/27/2013** SeqNo: **1546870**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,3-Dichloropropane	ND	5.0									
1,4-Dichlorobenzene	ND	5.0									
2,2-Dichloropropane	ND	5.0									
2-Chlorotoluene	ND	5.0									
4-Chlorotoluene	ND	5.0									
4-Isopropyltoluene	ND	5.0									
Benzene	ND	5.0									
Bromobenzene	ND	5.0									
Bromodichloromethane	ND	5.0									
Bromoform	ND	5.0									
Bromomethane	ND	5.0									
Carbon tetrachloride	ND	5.0									
Chlorobenzene	ND	5.0									
Chloroethane	ND	5.0									
Chloroform	ND	5.0									
Chloromethane	ND	5.0									
cis-1,2-Dichloroethene	ND	5.0									
cis-1,3-Dichloropropene	ND	5.0									
Dibromochloromethane	ND	5.0									
Dibromomethane	ND	5.0									
Dichlorodifluoromethane	ND	5.0									
Ethylbenzene	ND	5.0									
Hexachlorobutadiene	ND	5.0									
Isopropylbenzene	ND	5.0									
m,p-Xylene	ND	10									
Methylene chloride	ND	5.0									
n-Butylbenzene	ND	5.0									
n-Propylbenzene	ND	5.0									
Naphthalene	ND	5.0									
o-Xylene	ND	5.0									

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits
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CLIENT: Tetra Tech
Work Order: N009896
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID: **P130327MB4** SampType: **MBLK** TestCode: **8260_S** Units: **µg/Kg** Prep Date: RunNo: **88216**
Client ID: **PBS** Batch ID: **P13VS011** TestNo: **EPA 8260B** Analysis Date: **3/27/2013** SeqNo: **1546870**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
sec-Butylbenzene	ND	5.0									
Styrene	ND	5.0									
tert-Butylbenzene	ND	5.0									
Tetrachloroethene	ND	5.0									
Toluene	ND	5.0									
trans-1,2-Dichloroethene	ND	5.0									
Trichloroethene	ND	5.0									
Trichlorofluoromethane	ND	5.0									
Vinyl chloride	ND	5.0									
Surr: 1,2-Dichloroethane-d4	54.790		50.00		110	58	125				
Surr: 4-Bromofluorobenzene	48.080		50.00		96.2	52	138				
Surr: Dibromofluoromethane	54.610		50.00		109	57	121				
Surr: Toluene-d8	50.510		50.00		101	66	130				

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories, Inc.
3151-3153 W. Post Rd.
Las Vegas, NV 89118
Tel:(702) 307-2659•Fax:(702) 307-2691

FOR LABORATORY USE ONLY:

P.O.# 103P172829.01

Logged By: Becki Dano Date: 3-27-13

Method of Transport
Client ☐
ATL INC ☑
FEDEX ☐
Other:

Sample Condition Upon Receipt
1. CHILLED ICE 3.4 IR1 Y☑ N☐ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐
3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: Tetra Tech
Attn: Rob Mannigel
Address: 1230 Columbia St #1000
City San Diego State CA Zip Code 92101
TEL:( )
FAX:( )
Project Name: Mayland Square
Project #: 103P172829.01
Sampler: I attest to the validity and authenticity of this sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action. (Printed Name) Becki DANO (Signature)

Relinquished by: (Signature and Printed name)	Becki DANO	Date: 3-27-13	Time: 1420	Received by: (Signature and Printed name)	Hersey Stamas	Date: 3/27/13	Time: 1420
Relinquished by: (Signature and Printed name)	Hersey Stamas	Date: 3-27-13	Time: 1503	Received by: (Signature and Printed name)		Date: 3/27/13	Time: 1503
Relinquished by: (Signature and Printed name)		Date:	Time:	Received by: (Signature and Printed name)		Date:	Time:

I hereby authorize ATL INC to perform the work indicated below:
Project Mgr/Submitter:
Becki DANO 3-27
Print Name Date
Signature

Send Report To:
Attn: Rob Mannigel
Co: Tetra Tech
Address: 1230 Columbia St #1000
City San Diego State CA Zip 92101

Bill To:
Attn: Same
Co:
Address:
City State Zip

Special Instructions/Comments:
email results when ready
Becki.Dano@tetratech.com
Cheng.Richard@tetratech.com
Chit.Christian@tetratech.com

Sample/Records-Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $ 2.00 / sample / mo (after 45 days)
- Records : $ 1.00 / ATL workorder / mo (after 1 year)

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8260B (VOC)	8260B (BTEX),(MTBE)	8015B (GRO)	8015B (DRO),(Motor Oil/ORO)	RCRA8 (6010B/7000)	Total 111	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	N007896-1	SB-01 (Stepout) 54'	3/25	1145	~~X~~ NO					X	X					1	J/G	1	
	-2	SB-02 (Stepout) 45'	3/26	0920						X	X							1	
	-3	SB-02 (Stepout) 39'	3/26	0840						X	X							1	
	-4	SB-02 (Stepout) 42'	3/26	0845						X	X							1	
	-5	SB-02 (Stepout) 37.5'	3/26	0825						X	X							1	
	-6	OS-1 - 33ft	3/26	1701	X						X							1	
	-7	OS-1 - 49 ft	3/26	1704	X					X	X							1	
	-8	SB-01 IDW	3/25	1200	X						X							1	
	-9	IDW SOLID OS-1	3/26	1530	X						X							1	
	-10	IDW-SB-02	3/26	1030	X						X							1	

Circle or Add Analysis(es) Requested
SPECIFY APPROPRIATE MATRIX
Container(s)
PRESERVATION
QA/QC: RTNE ☐ CT ☐ RWQCB ☐ LEVEL IV ___ OTHER ___

•TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: ☐ A= Overnight ≤ 24 hr ☐ B= Emergency Next workday ☐ C= Critical 2 Workdays ☐ D= Urgent 3 Workdays ☐ E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter

Advanced Technology Laboratories, Inc.

Please review the checklist below. Any NO signifies non-compliance. Any non-compliance will be noted and must be understood as having an impact on the quality of the data. All tests will be performed as requested regardless of any compliance issues.

If you have any questions or further instruction, please contact our Project Coordinator at (702) 307-2659.

Cooler Received/Opened On:	3/27/2013	Workorder:	N009896
Rep sample Temp (Deg C):	3.4	IR Gun ID:	1
Temp Blank:	☐ Yes ☑ No		
Carrier name:	ATL		
Last 4 digits of Tracking No.:	NA	Packing Material Used:	None
Cooling process:	☑ Ice ☐ Ice Pack ☐ Dry Ice ☐ Other ☐ None		

Sample Receipt Checklist

1. Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
2. Custody seals intact, signed, dated on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
3. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
4. Chain of custody present?	Yes ☑	No ☐	
5. Sampler's name present in COC?	Yes ☑	No ☐	
6. Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
7. Chain of custody agrees with sample labels?	Yes ☑	No ☐	
8. Samples in proper container/bottle?	Yes ☑	No ☐	
9. Sample containers intact?	Yes ☑	No ☐	
10. Sufficient sample volume for indicated test?	Yes ☑	No ☐	
11. All samples received within holding time?	Yes ☑	No ☐	
12. Temperature of rep sample or Temp Blank within acceptable limit?	Yes ☑	No ☐	NA ☐
13. Water - VOA vials have zero headspace?	Yes ☐	No ☐	NA ☑
14. Water - pH acceptable upon receipt? Example: pH > 12 for (CN,S); pH<2 for Metals	Yes ☐	No ☐	NA ☑
15. Did the bottle labels indicate correct preservatives used?	Yes ☐	No ☐	NA ☑
16. Were there Non-Conformance issues at login?	Yes ☐	No ☐	NA ☑
Was Client notified?	Yes ☐	No ☐	NA ☑

Comments:

Checklist Completed B MBC MBC 3/28/13

Reviewed By:

April 04, 2013

Rob Manriquez
Tetra Tech
1230 Columbia Street, Suite 1000
San Diego, CA 92101

TEL: (858) 527-8803
FAX:

CA-ELAP No.:2676
NV Cert. No.:NV-009222007A

Workorder No.: N009897

RE: Maryland Square, 103P172829.01

Attention: Rob Manriquez

Enclosed are the results for sample(s) received on March 27, 2013 by Advanced Technology Laboratories, Inc. . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (702) 307-2659 if I can be of further assistance to your company.

Sincerely,

for

Jose Tenorio Jr.
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories - Las Vegas.

CLIENT: Tetra Tech
Project: Maryland Square, 103P172829.01
Lab Order: N009897

CASE NARRATIVE

SAMPLE RECEIVING/GENERAL COMMENTS:

Samples were received intact with proper chain of custody documentation.

Cooler temperature and sample preservation were verified upon receipt of samples if applicable.

Information on sample receipt conditions including discrepancies can be found in attached Sample Receipt Checklist Form.

Samples were analyzed within method holding time.

Analytical Comments for EPA 6020_Dissolved:

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) are outside recovery criteria for Manganese since the analyte concentration in the sample is disproportionate to the spike level. The associated Laboratory Control Sample (LCS) recovery was acceptable.

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT:	Tetra Tech	**Client Sample ID:**	PIPDECON
Lab Order:	N009897	**Collection Date:**	3/21/2013 2:00:00 PM
Project:	Maryland Square, 103P172829.01	**Matrix:**	GROUNDWATER
Lab ID:	N009897-001		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_130401A	QC Batch: P13VW054			PrepDate:		Analyst: **QBM**
Tetrachloroethene	6.9	0.50		µg/L	1	4/1/2013 07:26 PM
Trichloroethene	ND	0.50		µg/L	1	4/1/2013 07:26 PM
Surr: 1,2-Dichloroethane-d4	99.0	56-120		%REC	1	4/1/2013 07:26 PM
Surr: 4-Bromofluorobenzene	94.4	80-120		%REC	1	4/1/2013 07:26 PM
Surr: Dibromofluoromethane	101	72-120		%REC	1	4/1/2013 07:26 PM
Surr: Toluene-d8	98.9	80-123		%REC	1	4/1/2013 07:26 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	SBDECON
Lab Order:	N009897	**Collection Date:**	3/26/2013 8:50:00 AM
Project:	Maryland Square, 103P172829.01	**Matrix:**	GROUNDWATER
Lab ID:	N009897-002		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_130401A	QC Batch: P13VW054			PrepDate:		Analyst: **QBM**
Tetrachloroethene	9.5	0.50		µg/L	1	4/1/2013 07:55 PM
Trichloroethene	ND	0.50		µg/L	1	4/1/2013 07:55 PM
Surr: 1,2-Dichloroethane-d4	104	56-120		%REC	1	4/1/2013 07:55 PM
Surr: 4-Bromofluorobenzene	91.4	80-120		%REC	1	4/1/2013 07:55 PM
Surr: Dibromofluoromethane	108	72-120		%REC	1	4/1/2013 07:55 PM
Surr: Toluene-d8	94.3	80-123		%REC	1	4/1/2013 07:55 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N009897
Project: Maryland Square, 103P172829.01
Lab ID: N009897-003

Client Sample ID: MW-19I
Collection Date: 3/26/2013 4:00:00 PM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
PERMANGANATE BY COLORIMETRY				**COLORIMETRIC**		
RunID: WETCHEM_130328B	QC Batch: R88222			PrepDate:		Analyst: **JT**
Permanganate as KMnO4	300	20		mg/L	20	3/28/2013
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_130401A	QC Batch: P13VW054			PrepDate:		Analyst: **QBM**
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	4/1/2013 08:53 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	4/1/2013 08:53 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	4/1/2013 08:53 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	4/1/2013 08:53 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	4/1/2013 08:53 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	4/1/2013 08:53 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	4/1/2013 08:53 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	4/1/2013 08:53 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	4/1/2013 08:53 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	4/1/2013 08:53 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	4/1/2013 08:53 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	4/1/2013 08:53 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	4/1/2013 08:53 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	4/1/2013 08:53 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	4/1/2013 08:53 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	4/1/2013 08:53 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	4/1/2013 08:53 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	4/1/2013 08:53 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	4/1/2013 08:53 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	4/1/2013 08:53 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	4/1/2013 08:53 PM
2-Chlorotoluene	ND	0.50		µg/L	1	4/1/2013 08:53 PM
4-Chlorotoluene	ND	0.50		µg/L	1	4/1/2013 08:53 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	4/1/2013 08:53 PM
Benzene	ND	0.50		µg/L	1	4/1/2013 08:53 PM
Bromobenzene	ND	0.50		µg/L	1	4/1/2013 08:53 PM
Bromodichloromethane	ND	0.50		µg/L	1	4/1/2013 08:53 PM
Bromoform	ND	0.50		µg/L	1	4/1/2013 08:53 PM
Bromomethane	0.56	0.50		µg/L	1	4/1/2013 08:53 PM
Carbon tetrachloride	ND	0.50		µg/L	1	4/1/2013 08:53 PM
Chlorobenzene	ND	0.50		µg/L	1	4/1/2013 08:53 PM
Chloroethane	ND	0.50		µg/L	1	4/1/2013 08:53 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT:	Tetra Tech	**Client Sample ID:**	MW-19I
Lab Order:	N009897	**Collection Date:**	3/26/2013 4:00:00 PM
Project:	Maryland Square, 103P172829.01	**Matrix:**	GROUNDWATER
Lab ID:	N009897-003		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS5_130401A	QC Batch: P13VW054			PrepDate:		Analyst: **QBM**
Chloroform	2.5	0.50		µg/L	1	4/1/2013 08:53 PM
Chloromethane	ND	0.50		µg/L	1	4/1/2013 08:53 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	4/1/2013 08:53 PM
Dibromochloromethane	ND	0.50		µg/L	1	4/1/2013 08:53 PM
Dibromomethane	ND	0.50		µg/L	1	4/1/2013 08:53 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	4/1/2013 08:53 PM
Ethylbenzene	ND	0.50		µg/L	1	4/1/2013 08:53 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	4/1/2013 08:53 PM
Isopropylbenzene	ND	0.50		µg/L	1	4/1/2013 08:53 PM
m,p-Xylene	ND	1.0		µg/L	1	4/1/2013 08:53 PM
Methylene chloride	ND	2.0		µg/L	1	4/1/2013 08:53 PM
MTBE	ND	0.50		µg/L	1	4/1/2013 08:53 PM
n-Butylbenzene	ND	0.50		µg/L	1	4/1/2013 08:53 PM
n-Propylbenzene	ND	0.50		µg/L	1	4/1/2013 08:53 PM
Naphthalene	ND	0.50		µg/L	1	4/1/2013 08:53 PM
o-Xylene	ND	0.50		µg/L	1	4/1/2013 08:53 PM
sec-Butylbenzene	ND	0.50		µg/L	1	4/1/2013 08:53 PM
Styrene	ND	0.50		µg/L	1	4/1/2013 08:53 PM
tert-Butylbenzene	ND	0.50		µg/L	1	4/1/2013 08:53 PM
Tetrachloroethene	9.4	0.50		µg/L	1	4/1/2013 08:53 PM
Toluene	ND	0.50		µg/L	1	4/1/2013 08:53 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	4/1/2013 08:53 PM
Trichloroethene	ND	0.50		µg/L	1	4/1/2013 08:53 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	4/1/2013 08:53 PM
Vinyl chloride	ND	0.50		µg/L	1	4/1/2013 08:53 PM
Surr: 1,2-Dichloroethane-d4	104	56-120		%REC	1	4/1/2013 08:53 PM
Surr: 4-Bromofluorobenzene	93.6	80-120		%REC	1	4/1/2013 08:53 PM
Surr: Dibromofluoromethane	106	72-120		%REC	1	4/1/2013 08:53 PM
Surr: Toluene-d8	98.4	80-123		%REC	1	4/1/2013 08:53 PM
DISSOLVED METALS BY ICP-MS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130402A	QC Batch: 42550			PrepDate:	3/28/2013	Analyst: **CEI**
Arsenic	0.93	0.50		µg/L	5	4/2/2013 12:20 PM
Chromium	44	5.0		µg/L	5	4/2/2013 12:20 PM
Manganese	27000	120		µg/L	250	4/3/2013 06:36 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Lab Order: N009897
Project: Maryland Square, 103P172829.01
Lab ID: N009897-004

Client Sample ID: MW-19
Collection Date: 3/27/2013 10:27:00 AM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
PERMANGANATE BY COLORIMETRY				**COLORIMETRIC**		
RunID: WETCHEM_130328B	QC Batch: R88222			PrepDate:		Analyst: **JT**
Permanganate as KMnO4	700	20		mg/L	20	3/28/2013
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_130401A	QC Batch: P13VW054			PrepDate:		Analyst: **QBM**
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	4/1/2013 09:22 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	4/1/2013 09:22 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	4/1/2013 09:22 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	4/1/2013 09:22 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	4/1/2013 09:22 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	4/1/2013 09:22 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	4/1/2013 09:22 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	4/1/2013 09:22 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	4/1/2013 09:22 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	4/1/2013 09:22 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	4/1/2013 09:22 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	4/1/2013 09:22 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	4/1/2013 09:22 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	4/1/2013 09:22 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	4/1/2013 09:22 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	4/1/2013 09:22 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	4/1/2013 09:22 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	4/1/2013 09:22 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	4/1/2013 09:22 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	4/1/2013 09:22 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	4/1/2013 09:22 PM
2-Chlorotoluene	ND	0.50		µg/L	1	4/1/2013 09:22 PM
4-Chlorotoluene	ND	0.50		µg/L	1	4/1/2013 09:22 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	4/1/2013 09:22 PM
Benzene	ND	0.50		µg/L	1	4/1/2013 09:22 PM
Bromobenzene	ND	0.50		µg/L	1	4/1/2013 09:22 PM
Bromodichloromethane	0.60	0.50		µg/L	1	4/1/2013 09:22 PM
Bromoform	ND	0.50		µg/L	1	4/1/2013 09:22 PM
Bromomethane	ND	0.50		µg/L	1	4/1/2013 09:22 PM
Carbon tetrachloride	ND	0.50		µg/L	1	4/1/2013 09:22 PM
Chlorobenzene	ND	0.50		µg/L	1	4/1/2013 09:22 PM
Chloroethane	ND	0.50		µg/L	1	4/1/2013 09:22 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT:	Tetra Tech	**Client Sample ID:**	MW-19
Lab Order:	N009897	**Collection Date:**	3/27/2013 10:27:00 AM
Project:	Maryland Square, 103P172829.01	**Matrix:**	GROUNDWATER
Lab ID:	N009897-004		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS5_130401A	QC Batch: P13VW054			PrepDate:		Analyst: **QBM**
Chloroform	2.6	0.50		µg/L	1	4/1/2013 09:22 PM
Chloromethane	ND	0.50		µg/L	1	4/1/2013 09:22 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	4/1/2013 09:22 PM
Dibromochloromethane	ND	0.50		µg/L	1	4/1/2013 09:22 PM
Dibromomethane	ND	0.50		µg/L	1	4/1/2013 09:22 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	4/1/2013 09:22 PM
Ethylbenzene	ND	0.50		µg/L	1	4/1/2013 09:22 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	4/1/2013 09:22 PM
Isopropylbenzene	ND	0.50		µg/L	1	4/1/2013 09:22 PM
m,p-Xylene	ND	1.0		µg/L	1	4/1/2013 09:22 PM
Methylene chloride	ND	2.0		µg/L	1	4/1/2013 09:22 PM
MTBE	ND	0.50		µg/L	1	4/1/2013 09:22 PM
n-Butylbenzene	ND	0.50		µg/L	1	4/1/2013 09:22 PM
n-Propylbenzene	ND	0.50		µg/L	1	4/1/2013 09:22 PM
Naphthalene	ND	0.50		µg/L	1	4/1/2013 09:22 PM
o-Xylene	ND	0.50		µg/L	1	4/1/2013 09:22 PM
sec-Butylbenzene	ND	0.50		µg/L	1	4/1/2013 09:22 PM
Styrene	ND	0.50		µg/L	1	4/1/2013 09:22 PM
tert-Butylbenzene	ND	0.50		µg/L	1	4/1/2013 09:22 PM
Tetrachloroethene	14	0.50		µg/L	1	4/1/2013 09:22 PM
Toluene	ND	0.50		µg/L	1	4/1/2013 09:22 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	4/1/2013 09:22 PM
Trichloroethene	ND	0.50		µg/L	1	4/1/2013 09:22 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	4/1/2013 09:22 PM
Vinyl chloride	ND	0.50		µg/L	1	4/1/2013 09:22 PM
Surr: 1,2-Dichloroethane-d4	103	56-120		%REC	1	4/1/2013 09:22 PM
Surr: 4-Bromofluorobenzene	92.6	80-120		%REC	1	4/1/2013 09:22 PM
Surr: Dibromofluoromethane	106	72-120		%REC	1	4/1/2013 09:22 PM
Surr: Toluene-d8	99.1	80-123		%REC	1	4/1/2013 09:22 PM
DISSOLVED METALS BY ICP-MS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130403B	QC Batch: 42550			PrepDate:	3/28/2013	Analyst: **CEI**
Arsenic	0.33	0.10		µg/L	1	4/3/2013 06:20 PM
Chromium	130	5.0		µg/L	5	4/2/2013 12:26 PM
Manganese	43000	250		µg/L	500	4/3/2013 07:45 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Lab Order: N009897
Project: Maryland Square, 103P172829.01
Lab ID: N009897-005

Client Sample ID: MW-19D1
Collection Date: 3/27/2013 12:18:00 PM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
PERMANGANATE BY COLORIMETRY				**COLORIMETRIC**		
RunID: WETCHEM_130328B	QC Batch: R88222			PrepDate:		Analyst: **JT**
Permanganate as KMnO4	71	20		mg/L	20	3/28/2013
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_130401A	QC Batch: P13VW054			PrepDate:		Analyst: **QBM**
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	4/1/2013 08:24 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	4/1/2013 08:24 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	4/1/2013 08:24 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	4/1/2013 08:24 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	4/1/2013 08:24 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	4/1/2013 08:24 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	4/1/2013 08:24 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	4/1/2013 08:24 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	4/1/2013 08:24 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	4/1/2013 08:24 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	4/1/2013 08:24 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	4/1/2013 08:24 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	4/1/2013 08:24 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	4/1/2013 08:24 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	4/1/2013 08:24 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	4/1/2013 08:24 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	4/1/2013 08:24 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	4/1/2013 08:24 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	4/1/2013 08:24 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	4/1/2013 08:24 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	4/1/2013 08:24 PM
2-Chlorotoluene	ND	0.50		µg/L	1	4/1/2013 08:24 PM
4-Chlorotoluene	ND	0.50		µg/L	1	4/1/2013 08:24 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	4/1/2013 08:24 PM
Benzene	ND	0.50		µg/L	1	4/1/2013 08:24 PM
Bromobenzene	ND	0.50		µg/L	1	4/1/2013 08:24 PM
Bromodichloromethane	ND	0.50		µg/L	1	4/1/2013 08:24 PM
Bromoform	ND	0.50		µg/L	1	4/1/2013 08:24 PM
Bromomethane	0.57	0.50		µg/L	1	4/1/2013 08:24 PM
Carbon tetrachloride	ND	0.50		µg/L	1	4/1/2013 08:24 PM
Chlorobenzene	ND	0.50		µg/L	1	4/1/2013 08:24 PM
Chloroethane	ND	0.50		µg/L	1	4/1/2013 08:24 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT: Tetra Tech
Lab Order: N009897
Project: Maryland Square, 103P172829.01
Lab ID: N009897-005

Client Sample ID: MW-19D1
Collection Date: 3/27/2013 12:18:00 PM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS5_130401A	QC Batch: P13VW054			PrepDate:		Analyst: **QBM**
Chloroform	0.62	0.50		µg/L	1	4/1/2013 08:24 PM
Chloromethane	ND	0.50		µg/L	1	4/1/2013 08:24 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	4/1/2013 08:24 PM
Dibromochloromethane	ND	0.50		µg/L	1	4/1/2013 08:24 PM
Dibromomethane	ND	0.50		µg/L	1	4/1/2013 08:24 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	4/1/2013 08:24 PM
Ethylbenzene	ND	0.50		µg/L	1	4/1/2013 08:24 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	4/1/2013 08:24 PM
Isopropylbenzene	ND	0.50		µg/L	1	4/1/2013 08:24 PM
m,p-Xylene	ND	1.0		µg/L	1	4/1/2013 08:24 PM
Methylene chloride	ND	2.0		µg/L	1	4/1/2013 08:24 PM
MTBE	ND	0.50		µg/L	1	4/1/2013 08:24 PM
n-Butylbenzene	ND	0.50		µg/L	1	4/1/2013 08:24 PM
n-Propylbenzene	ND	0.50		µg/L	1	4/1/2013 08:24 PM
Naphthalene	ND	0.50		µg/L	1	4/1/2013 08:24 PM
o-Xylene	ND	0.50		µg/L	1	4/1/2013 08:24 PM
sec-Butylbenzene	ND	0.50		µg/L	1	4/1/2013 08:24 PM
Styrene	ND	0.50		µg/L	1	4/1/2013 08:24 PM
tert-Butylbenzene	ND	0.50		µg/L	1	4/1/2013 08:24 PM
Tetrachloroethene	17	0.50		µg/L	1	4/1/2013 08:24 PM
Toluene	ND	0.50		µg/L	1	4/1/2013 08:24 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	4/1/2013 08:24 PM
Trichloroethene	ND	0.50		µg/L	1	4/1/2013 08:24 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	4/1/2013 08:24 PM
Vinyl chloride	ND	0.50		µg/L	1	4/1/2013 08:24 PM
Surr: 1,2-Dichloroethane-d4	103	56-120		%REC	1	4/1/2013 08:24 PM
Surr: 4-Bromofluorobenzene	92.2	80-120		%REC	1	4/1/2013 08:24 PM
Surr: Dibromofluoromethane	105	72-120		%REC	1	4/1/2013 08:24 PM
Surr: Toluene-d8	100	80-123		%REC	1	4/1/2013 08:24 PM
DISSOLVED METALS BY ICP-MS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130402A	QC Batch: 42550			PrepDate:	3/28/2013	Analyst: **CEI**
Arsenic	1.2	0.50		µg/L	5	4/2/2013 12:32 PM
Chromium	35	5.0		µg/L	5	4/2/2013 12:32 PM
Manganese	30000	120		µg/L	250	4/3/2013 07:50 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Work Order: N009897
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 6020_DIS

Sample ID: **MB-42550**	SampType: **MBLK**	TestCode: **6020_DIS**	Units: **µg/L**	Prep Date: **3/28/2013**	RunNo: **88278**
Client ID: **PBW**	Batch ID: **42550**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **4/2/2013**	SeqNo: **1548725**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.10									
Chromium	ND	1.0									
Manganese	ND	0.50									

Sample ID: **LCS-42550**	SampType: **LCS**	TestCode: **6020_DIS**	Units: **µg/L**	Prep Date: **3/28/2013**	RunNo: **88278**
Client ID: **LCSW**	Batch ID: **42550**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **4/2/2013**	SeqNo: **1548726**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	10.331	0.10	10.00	0	103	85	115				
Chromium	9.780	1.0	10.00	0	97.8	85	115				
Manganese	99.266	0.50	100.0	0	99.3	85	115				

Sample ID: **N009897-003C-MS**	SampType: **MS**	TestCode: **6020_DIS**	Units: **µg/L**	Prep Date: **3/28/2013**	RunNo: **88286**
Client ID: **ZZZZZZ**	Batch ID: **42550**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **4/3/2013**	SeqNo: **1549557**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	11.282	0.50	10.00	0.9317	104	75	125				
Chromium	54.635	5.0	10.00	44.47	102	75	125				

Sample ID: **N009897-003C-MSD**	SampType: **MSD**	TestCode: **6020_DIS**	Units: **µg/L**	Prep Date: **3/28/2013**	RunNo: **88286**
Client ID: **ZZZZZZ**	Batch ID: **42550**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **4/3/2013**	SeqNo: **1549558**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	11.628	0.50	10.00	0.9317	107	75	125	11.28	3.01	20	
Chromium	55.508	5.0	10.00	44.47	110	75	125	54.63	1.59	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Tetra Tech
Work Order: N009897
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 6020_DIS

Sample ID: **N009897-003C-MS**	SampType: **MS**	TestCode: **6020_DIS**	Units: **µg/L**	Prep Date: **3/28/2013**	RunNo: **88286**
Client ID: **ZZZZZZ**	Batch ID: **42550**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **4/3/2013**	SeqNo: **1549567**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Manganese	27444.216	120	100.0	26680	760	75	125				S

Sample ID: **N009897-003C-MSD**	SampType: **MSD**	TestCode: **6020_DIS**	Units: **µg/L**	Prep Date: **3/28/2013**	RunNo: **88286**
Client ID: **ZZZZZZ**	Batch ID: **42550**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **4/3/2013**	SeqNo: **1549568**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Manganese	27665.292	120	100.0	26680	982	75	125	27440	0.802	20	S

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009897
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130401LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88267**
Client ID: **LCSW** Batch ID: **P13VW054** TestNo: **EPA 8260B** Analysis Date: **4/1/2013** SeqNo: **1548362**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	20.760	0.50	20.00	0	104	74	122				
1,1,1-Trichloroethane	20.180	0.50	20.00	0	101	65	120				
1,1,2,2-Tetrachloroethane	18.890	0.50	20.00	0	94.4	80	120				
1,1,2-Trichloroethane	18.830	0.50	20.00	0	94.2	80	120				
1,1-Dichloroethane	17.520	0.50	20.00	0	87.6	80	120				
1,1-Dichloroethene	21.130	0.50	20.00	0	106	80	120				
1,1-Dichloropropene	19.020	0.50	20.00	0	95.1	80	120				
1,2,3-Trichlorobenzene	22.020	0.50	20.00	0	110	80	124				
1,2,3-Trichloropropane	18.080	0.50	20.00	0	90.4	80	120				
1,2,4-Trichlorobenzene	21.260	0.50	20.00	0	106	80	126				
1,2,4-Trimethylbenzene	19.860	0.50	20.00	0	99.3	80	123				
1,2-Dibromo-3-chloropropane	20.640	1.0	20.00	0	103	70	120				
1,2-Dibromoethane	19.670	0.50	20.00	0	98.4	80	120				
1,2-Dichlorobenzene	21.180	0.50	20.00	0	106	80	120				
1,2-Dichloroethane	19.180	0.50	20.00	0	95.9	80	120				
1,2-Dichloropropane	17.090	0.50	20.00	0	85.4	80	120				
1,3,5-Trimethylbenzene	20.060	0.50	20.00	0	100	80	121				
1,3-Dichlorobenzene	20.910	0.50	20.00	0	105	80	120				
1,3-Dichloropropane	18.880	0.50	20.00	0	94.4	80	120				
1,4-Dichlorobenzene	20.540	0.50	20.00	0	103	80	120				
2,2-Dichloropropane	20.300	0.50	20.00	0	102	54	120				
2-Chlorotoluene	19.470	0.50	20.00	0	97.4	80	122				
4-Chlorotoluene	19.320	0.50	20.00	0	96.6	80	120				
4-Isopropyltoluene	20.320	0.50	20.00	0	102	80	122				
Benzene	18.820	0.50	20.00	0	94.1	80	120				
Bromobenzene	20.920	0.50	20.00	0	105	80	120				
Bromodichloromethane	19.780	0.50	20.00	0	98.9	70	120				
Bromoform	23.700	0.50	20.00	0	118	66	120				
Bromomethane	27.670	0.50	20.00	0	138	48	155				
Carbon tetrachloride	21.640	0.50	20.00	0	108	60	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009897
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130401LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88267**
Client ID: **LCSW** Batch ID: **P13VW054** TestNo: **EPA 8260B** Analysis Date: **4/1/2013** SeqNo: **1548362**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	19.980	0.50	20.00	0	99.9	80	120				
Chloroethane	20.620	0.50	20.00	0	103	62	147				
Chloroform	19.720	0.50	20.00	0	98.6	80	120				
Chloromethane	12.830	0.50	20.00	0	64.2	63	121				
cis-1,2-Dichloroethene	18.990	0.50	20.00	0	95.0	80	120				
Dibromochloromethane	21.830	0.50	20.00	0	109	67	123				
Dibromomethane	19.740	0.50	20.00	0	98.7	80	120				
Dichlorodifluoromethane	15.170	0.50	20.00	0	75.8	70	121				
Ethylbenzene	19.180	0.50	20.00	0	95.9	80	120				
Hexachlorobutadiene	22.630	0.50	20.00	0	113	80	123				
Isopropylbenzene	19.730	0.50	20.00	0	98.6	80	121				
m,p-Xylene	39.160	1.0	40.00	0	97.9	80	120				
Methylene chloride	18.070	2.0	20.00	0	90.4	75	120				
MTBE	17.910	0.50	20.00	0	89.6	70	120				
n-Butylbenzene	20.300	0.50	20.00	0	102	80	129				
n-Propylbenzene	19.320	0.50	20.00	0	96.6	80	122				
Naphthalene	21.790	0.50	20.00	0	109	73	127				
o-Xylene	19.520	0.50	20.00	0	97.6	80	120				
sec-Butylbenzene	19.850	0.50	20.00	0	99.2	80	120				
Styrene	20.520	0.50	20.00	0	103	80	120				
tert-Butylbenzene	20.230	0.50	20.00	0	101	80	120				
Tetrachloroethene	20.100	0.50	20.00	0	101	80	121				
Toluene	19.590	0.50	20.00	0	98.0	80	120				
trans-1,2-Dichloroethene	19.310	0.50	20.00	0	96.6	80	120				
Trichloroethene	19.760	0.50	20.00	0	98.8	80	120				
Trichlorofluoromethane	22.140	0.50	20.00	0	111	71	148				
Vinyl chloride	17.030	0.50	20.00	0	85.2	80	120				
Surr: 1,2-Dichloroethane-d4	24.430		25.00		97.7	56	120				
Surr: 4-Bromofluorobenzene	24.610		25.00		98.4	80	120				
Surr: Dibromofluoromethane	25.400		25.00		102	72	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009897
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130401LCS**	SampType: **LCS**	TestCode: **8260_WP_LL**	Units: **µg/L**	Prep Date:	RunNo: **88267**
Client ID: **LCSW**	Batch ID: **P13VW054**	TestNo: **EPA 8260B**		Analysis Date: **4/1/2013**	SeqNo: **1548362**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Toluene-d8	25.370		25.00		101	80	123				

Sample ID: **P130401LCSD**	SampType: **LCSD**	TestCode: **8260_WP_LL**	Units: **µg/L**	Prep Date:	RunNo: **88267**
Client ID: **LCSS02**	Batch ID: **P13VW054**	TestNo: **EPA 8260B**		Analysis Date: **4/1/2013**	SeqNo: **1548363**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	21.020	0.50	20.00	0	105	74	122	20.76	1.24	20	
1,1,1-Trichloroethane	19.320	0.50	20.00	0	96.6	65	120	20.18	4.35	20	
1,1,2,2-Tetrachloroethane	19.060	0.50	20.00	0	95.3	80	120	18.89	0.896	20	
1,1,2-Trichloroethane	18.570	0.50	20.00	0	92.8	80	120	18.83	1.39	20	
1,1-Dichloroethane	17.370	0.50	20.00	0	86.9	80	120	17.52	0.860	20	
1,1-Dichloroethene	21.070	0.50	20.00	0	105	80	120	21.13	0.284	20	
1,1-Dichloropropene	19.240	0.50	20.00	0	96.2	80	120	19.02	1.15	20	
1,2,3-Trichlorobenzene	22.140	0.50	20.00	0	111	80	124	22.02	0.543	20	
1,2,3-Trichloropropane	19.020	0.50	20.00	0	95.1	80	120	18.08	5.07	20	
1,2,4-Trichlorobenzene	21.560	0.50	20.00	0	108	80	126	21.26	1.40	20	
1,2,4-Trimethylbenzene	20.050	0.50	20.00	0	100	80	123	19.86	0.952	20	
1,2-Dibromo-3-chloropropane	21.790	1.0	20.00	0	109	70	120	20.64	5.42	20	
1,2-Dibromoethane	19.680	0.50	20.00	0	98.4	80	120	19.67	0.0508	20	
1,2-Dichlorobenzene	21.140	0.50	20.00	0	106	80	120	21.18	0.189	20	
1,2-Dichloroethane	20.030	0.50	20.00	0	100	80	120	19.18	4.34	20	
1,2-Dichloropropane	17.510	0.50	20.00	0	87.6	80	120	17.09	2.43	20	
1,3,5-Trimethylbenzene	19.990	0.50	20.00	0	100	80	121	20.06	0.350	20	
1,3-Dichlorobenzene	20.580	0.50	20.00	0	103	80	120	20.91	1.59	20	
1,3-Dichloropropane	18.860	0.50	20.00	0	94.3	80	120	18.88	0.106	20	
1,4-Dichlorobenzene	20.500	0.50	20.00	0	103	80	120	20.54	0.195	20	
2,2-Dichloropropane	19.770	0.50	20.00	0	98.8	54	120	20.30	2.65	20	
2-Chlorotoluene	19.340	0.50	20.00	0	96.7	80	122	19.47	0.670	20	
4-Chlorotoluene	19.590	0.50	20.00	0	98.0	80	120	19.32	1.39	20	
4-Isopropyltoluene	20.490	0.50	20.00	0	102	80	122	20.32	0.833	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike/Surrogate outside of limits due to matrix interference
- DO Surrogate Diluted Out
- Calculations are based on raw values

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009897
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130401LCSD** SampType: **LCSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88267**
Client ID: **LCSS02** Batch ID: **P13VW054** TestNo: **EPA 8260B** Analysis Date: **4/1/2013** SeqNo: **1548363**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	18.770	0.50	20.00	0	93.8	80	120	18.82	0.266	20	
Bromobenzene	20.830	0.50	20.00	0	104	80	120	20.92	0.431	20	
Bromodichloromethane	19.840	0.50	20.00	0	99.2	70	120	19.78	0.303	20	
Bromoform	23.320	0.50	20.00	0	117	66	120	23.70	1.62	20	
Bromomethane	26.640	0.50	20.00	0	133	48	155	27.67	3.79	20	
Carbon tetrachloride	20.990	0.50	20.00	0	105	60	120	21.64	3.05	20	
Chlorobenzene	20.270	0.50	20.00	0	101	80	120	19.98	1.44	20	
Chloroethane	20.560	0.50	20.00	0	103	62	147	20.62	0.291	20	
Chloroform	19.120	0.50	20.00	0	95.6	80	120	19.72	3.09	20	
Chloromethane	12.720	0.50	20.00	0	63.6	63	121	12.83	0.861	20	
cis-1,2-Dichloroethene	18.730	0.50	20.00	0	93.6	80	120	18.99	1.38	20	
Dibromochloromethane	21.980	0.50	20.00	0	110	67	123	21.83	0.685	20	
Dibromomethane	19.180	0.50	20.00	0	95.9	80	120	19.74	2.88	20	
Dichlorodifluoromethane	14.570	0.50	20.00	0	72.9	70	121	15.17	4.03	20	
Ethylbenzene	19.560	0.50	20.00	0	97.8	80	120	19.18	1.96	20	
Hexachlorobutadiene	22.710	0.50	20.00	0	114	80	123	22.63	0.353	20	
Isopropylbenzene	19.910	0.50	20.00	0	99.6	80	121	19.73	0.908	20	
m,p-Xylene	39.120	1.0	40.00	0	97.8	80	120	39.16	0.102	20	
Methylene chloride	17.580	2.0	20.00	0	87.9	75	120	18.07	2.75	20	
MTBE	17.990	0.50	20.00	0	90.0	70	120	17.91	0.446	20	
n-Butylbenzene	20.240	0.50	20.00	0	101	80	129	20.30	0.296	20	
n-Propylbenzene	19.530	0.50	20.00	0	97.6	80	122	19.32	1.08	20	
Naphthalene	22.080	0.50	20.00	0	110	73	127	21.79	1.32	20	
o-Xylene	19.520	0.50	20.00	0	97.6	80	120	19.52	0	20	
sec-Butylbenzene	19.560	0.50	20.00	0	97.8	80	120	19.85	1.47	20	
Styrene	20.250	0.50	20.00	0	101	80	120	20.52	1.32	20	
tert-Butylbenzene	20.180	0.50	20.00	0	101	80	120	20.23	0.247	20	
Tetrachloroethene	19.940	0.50	20.00	0	99.7	80	121	20.10	0.799	20	
Toluene	19.370	0.50	20.00	0	96.9	80	120	19.59	1.13	20	
trans-1,2-Dichloroethene	19.510	0.50	20.00	0	97.6	80	120	19.31	1.03	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009897
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130401LCSD** SampType: **LCSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88267**
Client ID: **LCSS02** Batch ID: **P13VW054** TestNo: **EPA 8260B** Analysis Date: **4/1/2013** SeqNo: **1548363**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Trichloroethene	19.950	0.50	20.00	0	99.8	80	120	19.76	0.957	20	
Trichlorofluoromethane	21.850	0.50	20.00	0	109	71	148	22.14	1.32	20	
Vinyl chloride	16.510	0.50	20.00	0	82.6	80	120	17.03	3.10	20	
Surr: 1,2-Dichloroethane-d4	24.700		25.00		98.8	56	120		0		
Surr: 4-Bromofluorobenzene	24.360		25.00		97.4	80	120		0		
Surr: Dibromofluoromethane	24.630		25.00		98.5	72	120		0		
Surr: Toluene-d8	25.080		25.00		100	80	123		0		

Sample ID: **P130401MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88267**
Client ID: **PBW** Batch ID: **P13VW054** TestNo: **EPA 8260B** Analysis Date: **4/1/2013** SeqNo: **1548364**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	0.50									
1,1,1-Trichloroethane	ND	0.50									
1,1,2,2-Tetrachloroethane	ND	0.50									
1,1,2-Trichloroethane	ND	0.50									
1,1-Dichloroethane	ND	0.50									
1,1-Dichloroethene	ND	0.50									
1,1-Dichloropropene	ND	0.50									
1,2,3-Trichlorobenzene	ND	0.50									
1,2,3-Trichloropropane	ND	0.50									
1,2,4-Trichlorobenzene	ND	0.50									
1,2,4-Trimethylbenzene	ND	0.50									
1,2-Dibromo-3-chloropropane	ND	1.0									
1,2-Dibromoethane	ND	0.50									
1,2-Dichlorobenzene	ND	0.50									
1,2-Dichloroethane	ND	0.50									
1,2-Dichloropropane	ND	0.50									
1,3,5-Trimethylbenzene	ND	0.50									
1,3-Dichlorobenzene	ND	0.50									

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Tetra Tech
Work Order: N009897
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130401MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88267**
Client ID: **PBW** Batch ID: **P13VW054** TestNo: **EPA 8260B** Analysis Date: **4/1/2013** SeqNo: **1548364**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,3-Dichloropropane	ND	0.50									
1,4-Dichlorobenzene	ND	0.50									
2,2-Dichloropropane	ND	0.50									
2-Chlorotoluene	ND	0.50									
4-Chlorotoluene	ND	0.50									
4-Isopropyltoluene	ND	0.50									
Benzene	ND	0.50									
Bromobenzene	ND	0.50									
Bromodichloromethane	ND	0.50									
Bromoform	ND	0.50									
Bromomethane	ND	0.50									
Carbon tetrachloride	ND	0.50									
Chlorobenzene	ND	0.50									
Chloroethane	ND	0.50									
Chloroform	ND	0.50									
Chloromethane	ND	0.50									
cis-1,2-Dichloroethene	ND	0.50									
Dibromochloromethane	ND	0.50									
Dibromomethane	ND	0.50									
Dichlorodifluoromethane	ND	0.50									
Ethylbenzene	ND	0.50									
Hexachlorobutadiene	ND	0.50									
Isopropylbenzene	ND	0.50									
m,p-Xylene	ND	1.0									
Methylene chloride	ND	2.0									
MTBE	ND	0.50									
n-Butylbenzene	ND	0.50									
n-Propylbenzene	ND	0.50									
Naphthalene	ND	0.50									
o-Xylene	ND	0.50									

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

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3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009897
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130401MB2**	SampType: **MBLK**	TestCode: **8260_WP_LL**	Units: **µg/L**	Prep Date:	RunNo: **88267**
Client ID: **PBW**	Batch ID: **P13VW054**	TestNo: **EPA 8260B**		Analysis Date: **4/1/2013**	SeqNo: **1548364**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
sec-Butylbenzene	ND	0.50									
Styrene	ND	0.50									
tert-Butylbenzene	ND	0.50									
Tetrachloroethene	ND	0.50									
Toluene	ND	0.50									
trans-1,2-Dichloroethene	ND	0.50									
Trichloroethene	ND	0.50									
Trichlorofluoromethane	ND	0.50									
Vinyl chloride	ND	0.50									
Surr: 1,2-Dichloroethane-d4	24.340		25.00		97.4	56	120				
Surr: 4-Bromofluorobenzene	22.740		25.00		91.0	80	120				
Surr: Dibromofluoromethane	25.560		25.00		102	72	120				
Surr: Toluene-d8	25.050		25.00		100	80	123				

Sample ID: **N009901-004ADUP**	SampType: **DUP**	TestCode: **8260_WP_LL**	Units: **µg/L**	Prep Date:	RunNo: **88267**
Client ID: **ZZZZZZ**	Batch ID: **P13VW054**	TestNo: **EPA 8260B**		Analysis Date: **4/1/2013**	SeqNo: **1548372**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	0.50						0	0	20	
1,1,1-Trichloroethane	ND	0.50						0	0	20	
1,1,2,2-Tetrachloroethane	ND	0.50						0	0	20	
1,1,2-Trichloroethane	ND	0.50						0	0	20	
1,1-Dichloroethane	ND	0.50						0	0	20	
1,1-Dichloroethene	ND	0.50						0	0	20	
1,1-Dichloropropene	ND	0.50						0	0	20	
1,2,3-Trichlorobenzene	ND	0.50						0	0	20	
1,2,3-Trichloropropane	ND	0.50						0	0	20	
1,2,4-Trichlorobenzene	ND	0.50						0	0	20	
1,2,4-Trimethylbenzene	ND	0.50						0	0	20	
1,2-Dibromo-3-chloropropane	ND	1.0						0	0	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009897
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **N009901-004ADUP** SampType: **DUP** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88267**
Client ID: **ZZZZZZ** Batch ID: **P13VW054** TestNo: **EPA 8260B** Analysis Date: **4/1/2013** SeqNo: **1548372**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2-Dibromoethane	ND	0.50						0	0	20	
1,2-Dichlorobenzene	ND	0.50						0	0	20	
1,2-Dichloroethane	ND	0.50						0	0	20	
1,2-Dichloropropane	ND	0.50						0	0	20	
1,3,5-Trimethylbenzene	ND	0.50						0	0	20	
1,3-Dichlorobenzene	ND	0.50						0	0	20	
1,3-Dichloropropane	ND	0.50						0	0	20	
1,4-Dichlorobenzene	ND	0.50						0	0	20	
2,2-Dichloropropane	ND	0.50						0	0	20	
2-Chlorotoluene	ND	0.50						0	0	20	
4-Chlorotoluene	ND	0.50						0	0	20	
4-Isopropyltoluene	ND	0.50						0	0	20	
Benzene	ND	0.50						0	0	20	
Bromobenzene	ND	0.50						0	0	20	
Bromodichloromethane	ND	0.50						0	0	20	
Bromoform	ND	0.50						0	0	20	
Bromomethane	ND	0.50						0	0	20	
Carbon tetrachloride	ND	0.50						0	0	20	
Chlorobenzene	ND	0.50						0	0	20	
Chloroethane	ND	0.50						0	0	20	
Chloroform	ND	0.50						0	0	20	
Chloromethane	ND	0.50						0	0	20	
cis-1,2-Dichloroethene	ND	0.50						0	0	20	
Dibromochloromethane	ND	0.50						0	0	20	
Dibromomethane	ND	0.50						0	0	20	
Dichlorodifluoromethane	ND	0.50						0	0	20	
Ethylbenzene	ND	0.50						0	0	20	
Hexachlorobutadiene	ND	0.50						0	0	20	
Isopropylbenzene	ND	0.50						0	0	20	
m,p-Xylene	ND	1.0						0	0	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009897
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **N009901-004ADUP** SampType: **DUP** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88267**
Client ID: **ZZZZZZ** Batch ID: **P13VW054** TestNo: **EPA 8260B** Analysis Date: **4/1/2013** SeqNo: **1548372**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methylene chloride	ND	2.0						0	0	20	
MTBE	ND	0.50						0	0	20	
n-Butylbenzene	ND	0.50						0	0	20	
n-Propylbenzene	ND	0.50						0	0	20	
Naphthalene	0.880	0.50						0.7000	22.8	20	R
o-Xylene	ND	0.50						0	0	20	
sec-Butylbenzene	ND	0.50						0	0	20	
Styrene	ND	0.50						0	0	20	
tert-Butylbenzene	ND	0.50						0	0	20	
Tetrachloroethene	ND	0.50						0	0	20	
Toluene	ND	0.50						0	0	20	
trans-1,2-Dichloroethene	ND	0.50						0	0	20	
Trichloroethene	0.990	0.50						1.030	3.96	20	
Trichlorofluoromethane	ND	0.50						0	0	20	
Vinyl chloride	ND	0.50						0	0	20	
Surr: 1,2-Dichloroethane-d4	25.810		25.00		103	56	120		0		
Surr: 4-Bromofluorobenzene	23.150		25.00		92.6	80	120		0		
Surr: Dibromofluoromethane	26.410		25.00		106	72	120		0		
Surr: Toluene-d8	24.360		25.00		97.4	80	123		0		

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009897
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: PERMANGANATE

Sample ID: **MB-R88222**	SampType: **MBLK**	TestCode: **PERMANGAN**	Units: **mg/L**	Prep Date:	RunNo: **88222**
Client ID: **PBW**	Batch ID: **R88222**	TestNo: **Colorimetric**		Analysis Date: **3/28/2013**	SeqNo: **1546911**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Permanganate as KMnO4	ND	1.0									

Sample ID: **LCS-R88222**	SampType: **LCS**	TestCode: **PERMANGAN**	Units: **mg/L**	Prep Date:	RunNo: **88222**
Client ID: **LCSW**	Batch ID: **R88222**	TestNo: **Colorimetric**		Analysis Date: **3/28/2013**	SeqNo: **1546912**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Permanganate as KMnO4	20.560	1.0	20.00	0	103	80	120				

Sample ID: **N009897-003B-MS**	SampType: **MS**	TestCode: **PERMANGAN**	Units: **mg/L**	Prep Date:	RunNo: **88222**
Client ID: **ZZZZZZ**	Batch ID: **R88222**	TestNo: **Colorimetric**		Analysis Date: **3/28/2013**	SeqNo: **1546914**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Permanganate as KMnO4	676.200	20	400.0	299.6	94.2	80	120				

Sample ID: **N009897-003B-MSD**	SampType: **MSD**	TestCode: **PERMANGAN**	Units: **mg/L**	Prep Date:	RunNo: **88222**
Client ID: **ZZZZZZ**	Batch ID: **R88222**	TestNo: **Colorimetric**		Analysis Date: **3/28/2013**	SeqNo: **1546915**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Permanganate as KMnO4	700.000	20	400.0	299.6	100	80	120	676.2	3.46	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CHAIN OF CUSTODY RECORD

Page 1 of 1

Advanced Technology Laboratories, Inc.
3151-3153 W. Post Rd.
Las Vegas, NV 89118
Tel:(702) 307-2659•Fax:(702) 307-2691

FOR LABORATORY USE ONLY:

P.O.# 103P172829.01

Logged By: BDano Date: 3-27-13

Method of Transport: Client ☐ ATL INC ☐ FEDEX ☐ Other:

Sample Condition Upon Receipt
1. CHILLED 3.4 IR1 ICE Y☑ N☐ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐
3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: Tetra Tech
Address: 1230 Columbia St #1220
TEL:( )
Attn: Rod Hannigan
City San Diego State CA Zip Code 92101
FAX:( )
Project Name: Maryland Square
Project #: 103P172829.01
Sampler: I attest to the validity and authenticity of this sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action. (Printed Name) Becki DANO (Signature)

Relinquished by: (Signature and Printed name) Becki DANO	Date: 3/27/13	Time: 1420	Received by: (Signature and Printed name) HERSEY SAYAS	Date: 3/27/13	Time: 1420
Relinquished by: (Signature and Printed name) HERSEY SAYAS	Date: 3/27/13	Time: 1503	Received by: (Signature and Printed name)	Date: 3/27/13	Time: 1503
Relinquished by: (Signature and Printed name)	Date:	Time:	Received by: (Signature and Printed name)	Date:	Time:

I hereby authorize ATL INC to perform the work indicated below:
Project Mgr/Submitter:
Becki DANO
Print Name Date
Signature

Send Report To:
Attn: Rod Hannigan
Co: Tetra Tech
Address: 1230 Columbia St #1220
City San Diego State CA Zip 92101

Bill To:
Attn:
Co: Same
Address:
City State Zip

Special Instructions/Comments: email when ready
Lisa.Medve@tetratech.com
Becki.Dano@tetratech.com
Geeb.Richard@tetratech.com

Sample/Records-Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $ 2.00 / sample / mo (after 45 days)
- Records : $ 1.00 / ATL workorder / mo (after 1 year)

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8260B (VOC)	8260B (BTEX),(MTBE)	8015B (GRO)	8015B (DRO),(Motor Oil/ORO)	RCRA8 (6010B/7000)	8260 Ket/Ite only	Permanganate disturbance	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	K1009897-1	PIP DECON	3/21	1400					X				X	X	X	E	3	V;G	H	
	-2	SB DECON	3/26	0850					X				X	X	X	E	3	V;G	#	thiosulfate
	-3	MW-9I	3/26	1600	X					X	X			X		E	5	multi	N	3 VOA-HCl 2 Poly
	-4	MW-19	3/27	1027	X					X	X			X		E	5	multi	N	3 VOA-HCl 2 Poly
	-5	MW-19D1	3/27	1218	X					X	X			X		E	5	multi	N	3 VOA-HCl 2 Poly
		~~SB-02(Stkpool)5'~~	~~3/25~~	~~1000~~																
		~~SB-01(Stkpool)5'~~	~~3/25~~	~~1145~~																

QA/QC: RTNE ☐ CT ☐ RWQCB ☐ LEVEL IV ___ OTHER ___

•TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: ☐ A= Overnight ≤ 24 hr ☐ B= Emergency Next workday ☐ C= Critical 2 Workdays ☐ D= Urgent 3 Workdays ☐ E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter

Advanced Technology Laboratories, Inc.

Please review the checklist below. Any NO signifies non-compliance. Any non-compliance will be noted and must be understood as having an impact on the quality of the data. All tests will be performed as requested regardless of any compliance issues.

If you have any questions or further instruction, please contact our Project Coordinator at (702) 307-2659.

Cooler Received/Opened On:	3/27/2013	Workorder:	N009897
Rep sample Temp (Deg C):	3.4	IR Gun ID:	1
Temp Blank:	☐ Yes ☑ No		
Carrier name:	ATL		
Last 4 digits of Tracking No.:	NA	Packing Material Used:	None
Cooling process:	☑ Ice ☐ Ice Pack ☐ Dry Ice ☐ Other ☐ None		

Sample Receipt Checklist

1. Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
2. Custody seals intact, signed, dated on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
3. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
4. Chain of custody present?	Yes ☑	No ☐	
5. Sampler's name present in COC?	Yes ☑	No ☐	
6. Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
7. Chain of custody agrees with sample labels?	Yes ☑	No ☐	
8. Samples in proper container/bottle?	Yes ☑	No ☐	
9. Sample containers intact?	Yes ☑	No ☐	
10. Sufficient sample volume for indicated test?	Yes ☑	No ☐	
11. All samples received within holding time?	Yes ☑	No ☐	
12. Temperature of rep sample or Temp Blank within acceptable limit?	Yes ☑	No ☐	NA ☐
13. Water - VOA vials have zero headspace?	Yes ☑	No ☐	NA ☐
14. Water - pH acceptable upon receipt? Example: pH > 12 for (CN,S); pH<2 for Metals	Yes ☑	No ☐	NA ☐
15. Did the bottle labels indicate correct preservatives used?	Yes ☑	No ☐	NA ☐
16. Were there Non-Conformance issues at login?	Yes ☐	No ☐	NA ☑
Was Client notified?	Yes ☐	No ☐	NA ☑

Comments:

Checklist Completed B MBC MBC 3/28/13

Reviewed By:

May 06, 2013

Rob Manriquez
Tetra Tech
1230 Columbia Street, Suite 1000
San Diego, CA 92101

TEL: (858) 527-8803
FAX:

CA-ELAP No.: 2676
NV Cert. No.: NV-009222007A

Workorder No.: N010153

RE: Maryland Square, 103P172829.01

Attention: Rob Manriquez

Enclosed are the results for sample(s) received on May 02, 2013 by Advanced Technology Laboratories, Inc. . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (702) 307-2659 if I can be of further assistance to your company.

Sincerely,

Jose Tenorio Jr.
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories - Las Vegas.

CLIENT: Tetra Tech
Project: Maryland Square, 103P172829.01
Lab Order: N010153

CASE NARRATIVE

SAMPLE RECEIVING/GENERAL COMMENTS:

Samples were received intact with proper chain of custody documentation.

Cooler temperature and sample preservation were verified upon receipt of samples if applicable.

Information on sample receipt conditions including discrepancies can be found in attached Sample Receipt Checklist Form.

Samples were analyzed within method holding time.

Analytical Comments for EPA 6010B:

Matrix Spike (MS) and /or Matrix Spike Duplicate (MSD) are outside recovery criteria for Chromium since the analyte concentration in the sample is disproportionate to the spike level. The associated Laboratory Control Sample (LCS) recovery was acceptable.

Analytical Comments for EPA 8260B:

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) are outside recovery criteria for some analytes possibly due to matrix interference. The associated Laboratory Control Sample (LCS) recovery was acceptable.

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-001

Client Sample ID: CMT-1-1
Collection Date: 5/1/2013 10:14:00 AM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
			EPA 8260B			
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	5/3/2013 06:33 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
2-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
4-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Benzene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Bromobenzene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Bromodichloromethane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Bromoform	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Bromomethane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Carbon tetrachloride	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Chlorobenzene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Chloroethane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Chloroform	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Chloromethane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Dibromochloromethane	ND	0.50		µg/L	1	5/3/2013 06:33 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-001

Client Sample ID: CMT-1-1
Collection Date: 5/1/2013 10:14:00 AM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
Dibromomethane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Ethylbenzene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Isopropylbenzene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
m,p-Xylene	ND	1.0		µg/L	1	5/3/2013 06:33 PM
Methylene chloride	ND	2.0		µg/L	1	5/3/2013 06:33 PM
MTBE	ND	0.50		µg/L	1	5/3/2013 06:33 PM
n-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
n-Propylbenzene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Naphthalene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
o-Xylene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
sec-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Styrene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
tert-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Tetrachloroethene	1.2	0.50		µg/L	1	5/3/2013 06:33 PM
Toluene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Trichloroethene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Vinyl chloride	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Surr: 1,2-Dichloroethane-d4	99.6	70-127		%REC	1	5/3/2013 06:33 PM
Surr: 4-Bromofluorobenzene	95.8	80-120		%REC	1	5/3/2013 06:33 PM
Surr: Dibromofluoromethane	96.8	73-128		%REC	1	5/3/2013 06:33 PM
Surr: Toluene-d8	98.7	80-120		%REC	1	5/3/2013 06:33 PM
ANIONS BY ION CHROMATOGRAPHY						
		EPA 300.0				
RunID: IC2_130505A	QC Batch: R88729			PrepDate:		Analyst: **QBM**
Chloride	180	25		mg/L	50	5/5/2013 12:51 PM
ICP-MS METALS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130503A	QC Batch: 42878			PrepDate:	5/2/2013	Analyst: **CEI**
Arsenic	5.9	0.10		µg/L	1	5/3/2013 04:53 PM
Chromium	210	5.0		µg/L	5	5/3/2013 06:54 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-002

Client Sample ID: CMT-1-2
Collection Date: 5/1/2013 11:24:00 AM
Matrix: GROUNDWATER

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS1_130503A QC Batch: D13VW016 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	5/3/2013 05:25 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
2-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
4-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Benzene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Bromobenzene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Bromodichloromethane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Bromoform	2.2	0.50		µg/L	1	5/3/2013 05:25 PM
Bromomethane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Carbon tetrachloride	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Chlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Chloroethane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Chloroform	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Chloromethane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Dibromochloromethane	ND	0.50		µg/L	1	5/3/2013 05:25 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-002

Client Sample ID: CMT-1-2
Collection Date: 5/1/2013 11:24:00 AM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
Dibromomethane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Ethylbenzene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Isopropylbenzene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
m,p-Xylene	ND	1.0		µg/L	1	5/3/2013 05:25 PM
Methylene chloride	ND	2.0		µg/L	1	5/3/2013 05:25 PM
MTBE	ND	0.50		µg/L	1	5/3/2013 05:25 PM
n-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
n-Propylbenzene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Naphthalene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
o-Xylene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
sec-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Styrene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
tert-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Tetrachloroethene	2.3	0.50		µg/L	1	5/3/2013 05:25 PM
Toluene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Trichloroethene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Vinyl chloride	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Surr: 1,2-Dichloroethane-d4	97.7	70-127		%REC	1	5/3/2013 05:25 PM
Surr: 4-Bromofluorobenzene	96.3	80-120		%REC	1	5/3/2013 05:25 PM
Surr: Dibromofluoromethane	97.7	73-128		%REC	1	5/3/2013 05:25 PM
Surr: Toluene-d8	96.9	80-120		%REC	1	5/3/2013 05:25 PM
ANIONS BY ION CHROMATOGRAPHY						
		EPA 300.0				
RunID: IC2_130505A	QC Batch: R88729			PrepDate:		Analyst: **QBM**
Chloride	170	25		mg/L	50	5/5/2013 01:16 PM
ICP-MS METALS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130503A	QC Batch: 42878			PrepDate:	5/2/2013	Analyst: **CEI**
Arsenic	3.5	0.10		µg/L	1	5/3/2013 04:59 PM
Chromium	25	1.0		µg/L	1	5/3/2013 04:59 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-003

Client Sample ID: CMT-1-3
Collection Date: 5/1/2013 12:19:00 PM
Matrix: GROUNDWATER

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS1_130503A | QC Batch: D13VW016 | PrepDate: | Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	5/3/2013 11:28 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
2-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
4-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Benzene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Bromobenzene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Bromodichloromethane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Bromoform	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Bromomethane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Carbon tetrachloride	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Chlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Chloroethane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Chloroform	0.78	0.50		µg/L	1	5/3/2013 11:28 PM
Chloromethane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Dibromochloromethane	ND	0.50		µg/L	1	5/3/2013 11:28 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-003

Client Sample ID: CMT-1-3
Collection Date: 5/1/2013 12:19:00 PM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
Dibromomethane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Ethylbenzene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Isopropylbenzene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
m,p-Xylene	ND	1.0		µg/L	1	5/3/2013 11:28 PM
Methylene chloride	ND	2.0		µg/L	1	5/3/2013 11:28 PM
MTBE	ND	0.50		µg/L	1	5/3/2013 11:28 PM
n-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
n-Propylbenzene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Naphthalene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
o-Xylene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
sec-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Styrene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
tert-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Tetrachloroethene	96	0.50		µg/L	1	5/3/2013 11:28 PM
Toluene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Trichloroethene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Vinyl chloride	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Surr: 1,2-Dichloroethane-d4	112	70-127		%REC	1	5/3/2013 11:28 PM
Surr: 4-Bromofluorobenzene	96.9	80-120		%REC	1	5/3/2013 11:28 PM
Surr: Dibromofluoromethane	104	73-128		%REC	1	5/3/2013 11:28 PM
Surr: Toluene-d8	98.2	80-120		%REC	1	5/3/2013 11:28 PM
ANIONS BY ION CHROMATOGRAPHY						
		EPA 300.0				
RunID: IC2_130505A	QC Batch: R88729			PrepDate:		Analyst: **QBM**
Chloride	170	25		mg/L	50	5/5/2013 01:54 PM
ICP-MS METALS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130503A	QC Batch: 42878			PrepDate:	5/2/2013	Analyst: **CEI**
Arsenic	3.3	0.10		µg/L	1	5/3/2013 05:05 PM
Chromium	38	1.0		µg/L	1	5/3/2013 05:05 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-004

Client Sample ID: CMT-1-4
Collection Date: 5/1/2013 12:59:00 PM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	5/3/2013 11:06 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
2-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
4-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Benzene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Bromobenzene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Bromodichloromethane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Bromoform	4.7	0.50		µg/L	1	5/3/2013 11:06 PM
Bromomethane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Carbon tetrachloride	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Chlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Chloroethane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Chloroform	0.80	0.50		µg/L	1	5/3/2013 11:06 PM
Chloromethane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Dibromochloromethane	ND	0.50		µg/L	1	5/3/2013 11:06 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-004

Client Sample ID: CMT-1-4
Collection Date: 5/1/2013 12:59:00 PM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
Dibromomethane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Ethylbenzene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Isopropylbenzene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
m,p-Xylene	ND	1.0		µg/L	1	5/3/2013 11:06 PM
Methylene chloride	ND	2.0		µg/L	1	5/3/2013 11:06 PM
MTBE	ND	0.50		µg/L	1	5/3/2013 11:06 PM
n-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
n-Propylbenzene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Naphthalene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
o-Xylene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
sec-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Styrene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
tert-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Tetrachloroethene	78	0.50		µg/L	1	5/3/2013 11:06 PM
Toluene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Trichloroethene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Vinyl chloride	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Surr: 1,2-Dichloroethane-d4	113	70-127		%REC	1	5/3/2013 11:06 PM
Surr: 4-Bromofluorobenzene	97.7	80-120		%REC	1	5/3/2013 11:06 PM
Surr: Dibromofluoromethane	106	73-128		%REC	1	5/3/2013 11:06 PM
Surr: Toluene-d8	97.2	80-120		%REC	1	5/3/2013 11:06 PM
ANIONS BY ION CHROMATOGRAPHY						
		EPA 300.0				
RunID: IC2_130505A	QC Batch: R88729			PrepDate:		Analyst: **QBM**
Chloride	170	25		mg/L	50	5/5/2013 02:07 PM
ICP-MS METALS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130503A	QC Batch: 42878			PrepDate:	5/2/2013	Analyst: **CEI**
Arsenic	2.7	0.10		µg/L	1	5/3/2013 05:10 PM
Chromium	47	1.0		µg/L	1	5/3/2013 05:10 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-005

Client Sample ID: CMT-1-5
Collection Date: 5/1/2013 1:46:00 PM
Matrix: GROUNDWATER

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS1_130503A QC Batch: D13VW016 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	5/3/2013 10:44 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
2-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
4-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Benzene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Bromobenzene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Bromodichloromethane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Bromoform	4.6	0.50		µg/L	1	5/3/2013 10:44 PM
Bromomethane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Carbon tetrachloride	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Chlorobenzene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Chloroethane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Chloroform	0.82	0.50		µg/L	1	5/3/2013 10:44 PM
Chloromethane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Dibromochloromethane	ND	0.50		µg/L	1	5/3/2013 10:44 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference
- DO Surrogate Diluted Out
- E Value above quantitation range
- ND Not Detected at the Reporting Limit

Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-005

Client Sample ID: CMT-1-5
Collection Date: 5/1/2013 1:46:00 PM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
Dibromomethane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Ethylbenzene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Isopropylbenzene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
m,p-Xylene	ND	1.0		µg/L	1	5/3/2013 10:44 PM
Methylene chloride	ND	2.0		µg/L	1	5/3/2013 10:44 PM
MTBE	ND	0.50		µg/L	1	5/3/2013 10:44 PM
n-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
n-Propylbenzene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Naphthalene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
o-Xylene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
sec-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Styrene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
tert-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Tetrachloroethene	79	0.50		µg/L	1	5/3/2013 10:44 PM
Toluene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Trichloroethene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Vinyl chloride	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Surr: 1,2-Dichloroethane-d4	116	70-127		%REC	1	5/3/2013 10:44 PM
Surr: 4-Bromofluorobenzene	99.6	80-120		%REC	1	5/3/2013 10:44 PM
Surr: Dibromofluoromethane	108	73-128		%REC	1	5/3/2013 10:44 PM
Surr: Toluene-d8	97.8	80-120		%REC	1	5/3/2013 10:44 PM
ANIONS BY ION CHROMATOGRAPHY						
		EPA 300.0				
RunID: IC2_130505A	QC Batch: R88729			PrepDate:		Analyst: **QBM**
Chloride	170	25		mg/L	50	5/5/2013 02:58 PM
ICP-MS METALS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130503A	QC Batch: 42878			PrepDate:	5/2/2013	Analyst: **CEI**
Arsenic	3.1	0.10		µg/L	1	5/3/2013 05:16 PM
Chromium	41	1.0		µg/L	1	5/3/2013 05:16 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-006

Client Sample ID: CMT-1-6
Collection Date: 5/1/2013 2:36:00 PM
Matrix: GROUNDWATER

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS1_130503A QC Batch: D13VW016 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,1-Dichloroethane	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,1-Dichloroethene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,1-Dichloropropene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	5/4/2013 12:13 AM
1,2-Dibromoethane	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,2-Dichloroethane	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,2-Dichloropropane	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,3-Dichloropropane	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
2,2-Dichloropropane	ND	0.50		µg/L	1	5/4/2013 12:13 AM
2-Chlorotoluene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
4-Chlorotoluene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
4-Isopropyltoluene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Benzene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Bromobenzene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Bromodichloromethane	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Bromoform	7.5	0.50		µg/L	1	5/4/2013 12:13 AM
Bromomethane	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Carbon tetrachloride	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Chlorobenzene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Chloroethane	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Chloroform	1.5	0.50		µg/L	1	5/4/2013 12:13 AM
Chloromethane	ND	0.50		µg/L	1	5/4/2013 12:13 AM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Dibromochloromethane	ND	0.50		µg/L	1	5/4/2013 12:13 AM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-006

Client Sample ID: CMT-1-6
Collection Date: 5/1/2013 2:36:00 PM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
			EPA 8260B			
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
Dibromomethane	0.59	0.50		µg/L	1	5/4/2013 12:13 AM
Dichlorodifluoromethane	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Ethylbenzene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Hexachlorobutadiene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Isopropylbenzene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
m,p-Xylene	ND	1.0		µg/L	1	5/4/2013 12:13 AM
Methylene chloride	ND	2.0		µg/L	1	5/4/2013 12:13 AM
MTBE	ND	0.50		µg/L	1	5/4/2013 12:13 AM
n-Butylbenzene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
n-Propylbenzene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Naphthalene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
o-Xylene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
sec-Butylbenzene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Styrene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
tert-Butylbenzene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Tetrachloroethene	430	5.0		µg/L	10	5/3/2013 08:49 PM
Toluene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Trichloroethene	1.1	0.50		µg/L	1	5/4/2013 12:13 AM
Trichlorofluoromethane	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Vinyl chloride	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Surr: 1,2-Dichloroethane-d4	111	70-127		%REC	1	5/4/2013 12:13 AM
Surr: 1,2-Dichloroethane-d4	102	70-127		%REC	10	5/3/2013 08:49 PM
Surr: 4-Bromofluorobenzene	97.8	80-120		%REC	1	5/4/2013 12:13 AM
Surr: 4-Bromofluorobenzene	96.2	80-120		%REC	10	5/3/2013 08:49 PM
Surr: Dibromofluoromethane	105	73-128		%REC	1	5/4/2013 12:13 AM
Surr: Dibromofluoromethane	100	73-128		%REC	10	5/3/2013 08:49 PM
Surr: Toluene-d8	98.6	80-120		%REC	10	5/3/2013 08:49 PM
Surr: Toluene-d8	96.0	80-120		%REC	1	5/4/2013 12:13 AM
ANIONS BY ION CHROMATOGRAPHY						
			EPA 300.0			
RunID: IC2_130505A	QC Batch: R88729			PrepDate:		Analyst: **QBM**
Chloride	170	25		mg/L	50	5/5/2013 03:10 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Tetra Tech	**Client Sample ID:**	CMT-1-6
Lab Order:	N010153	**Collection Date:**	5/1/2013 2:36:00 PM
Project:	Maryland Square, 103P172829.01	**Matrix:**	GROUNDWATER
Lab ID:	N010153-006		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP-MS METALS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130503A	QC Batch: 42878			PrepDate:	5/2/2013	Analyst: **CEI**
Arsenic	2.7	0.10		µg/L	1	5/3/2013 05:21 PM
Chromium	12	1.0		µg/L	1	5/3/2013 05:21 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-007

Client Sample ID: CMT-1-7
Collection Date: 5/1/2013 3:11:00 PM
Matrix: GROUNDWATER

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS1_130503A QC Batch: D13VW016 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,1-Dichloroethane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,1-Dichloroethene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,1-Dichloropropene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	5/4/2013 01:23 AM
1,2-Dibromoethane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,2-Dichloroethane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,2-Dichloropropane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,3-Dichloropropane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
2,2-Dichloropropane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
2-Chlorotoluene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
4-Chlorotoluene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
4-Isopropyltoluene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Benzene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Bromobenzene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Bromodichloromethane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Bromoform	1.9	0.50		µg/L	1	5/4/2013 01:23 AM
Bromomethane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Carbon tetrachloride	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Chlorobenzene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Chloroethane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Chloroform	2.5	0.50		µg/L	1	5/4/2013 01:23 AM
Chloromethane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
cis-1,2-Dichloroethene	5.0	0.50		µg/L	1	5/4/2013 01:23 AM
Dibromochloromethane	ND	0.50		µg/L	1	5/4/2013 01:23 AM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-007

Client Sample ID: CMT-1-7
Collection Date: 5/1/2013 3:11:00 PM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
			EPA 8260B			
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
Dibromomethane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Dichlorodifluoromethane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Ethylbenzene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Hexachlorobutadiene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Isopropylbenzene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
m,p-Xylene	ND	1.0		µg/L	1	5/4/2013 01:23 AM
Methylene chloride	ND	2.0		µg/L	1	5/4/2013 01:23 AM
MTBE	ND	0.50		µg/L	1	5/4/2013 01:23 AM
n-Butylbenzene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
n-Propylbenzene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Naphthalene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
o-Xylene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
sec-Butylbenzene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Styrene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
tert-Butylbenzene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Tetrachloroethene	1200	25		µg/L	50	5/3/2013 09:35 PM
Toluene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Trichloroethene	6.8	0.50		µg/L	1	5/4/2013 01:23 AM
Trichlorofluoromethane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Vinyl chloride	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Surr: 1,2-Dichloroethane-d4	116	70-127		%REC	1	5/4/2013 01:23 AM
Surr: 1,2-Dichloroethane-d4	103	70-127		%REC	50	5/3/2013 09:35 PM
Surr: 4-Bromofluorobenzene	96.2	80-120		%REC	1	5/4/2013 01:23 AM
Surr: 4-Bromofluorobenzene	95.3	80-120		%REC	50	5/3/2013 09:35 PM
Surr: Dibromofluoromethane	107	73-128		%REC	1	5/4/2013 01:23 AM
Surr: Dibromofluoromethane	99.6	73-128		%REC	50	5/3/2013 09:35 PM
Surr: Toluene-d8	99.8	80-120		%REC	50	5/3/2013 09:35 PM
Surr: Toluene-d8	92.9	80-120		%REC	1	5/4/2013 01:23 AM
ANIONS BY ION CHROMATOGRAPHY						
			EPA 300.0			
RunID: IC2_130505A	QC Batch: R88729			PrepDate:		Analyst: **QBM**
Chloride	160	25		mg/L	50	5/5/2013 03:23 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-007

Client Sample ID: CMT-1-7
Collection Date: 5/1/2013 3:11:00 PM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP-MS METALS						
EPA 3010A				**EPA 6020**		
RunID: ICP7_130503A	QC Batch: 42878			PrepDate:	5/2/2013	Analyst: **CEI**
Arsenic	2.7	0.10		µg/L	1	5/3/2013 05:27 PM
Chromium	2.0	1.0		µg/L	1	5/3/2013 05:27 PM

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-008

Client Sample ID: MW-20D1
Collection Date: 5/1/2013 3:57:00 PM
Matrix: GROUNDWATER

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS1_130503A | QC Batch: D13VW016 | PrepDate: | Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	5/3/2013 05:48 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
2-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
4-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Benzene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Bromobenzene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Bromodichloromethane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Bromoform	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Bromomethane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Carbon tetrachloride	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Chlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Chloroethane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Chloroform	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Chloromethane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Dibromochloromethane	ND	0.50		µg/L	1	5/3/2013 05:48 PM

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-008

Client Sample ID: MW-20D1
Collection Date: 5/1/2013 3:57:00 PM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
Dibromomethane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Ethylbenzene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Isopropylbenzene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
m,p-Xylene	ND	1.0		µg/L	1	5/3/2013 05:48 PM
Methylene chloride	ND	2.0		µg/L	1	5/3/2013 05:48 PM
MTBE	ND	0.50		µg/L	1	5/3/2013 05:48 PM
n-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
n-Propylbenzene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Naphthalene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
o-Xylene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
sec-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Styrene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
tert-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Tetrachloroethene	3.7	0.50		µg/L	1	5/3/2013 05:48 PM
Toluene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Trichloroethene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Vinyl chloride	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Surr: 1,2-Dichloroethane-d4	102	70-127		%REC	1	5/3/2013 05:48 PM
Surr: 4-Bromofluorobenzene	98.3	80-120		%REC	1	5/3/2013 05:48 PM
Surr: Dibromofluoromethane	99.0	73-128		%REC	1	5/3/2013 05:48 PM
Surr: Toluene-d8	98.6	80-120		%REC	1	5/3/2013 05:48 PM
ANIONS BY ION CHROMATOGRAPHY						
		EPA 300.0				
RunID: IC2_130505A	QC Batch: R88729			PrepDate:		Analyst: **QBM**
Chloride	110	10		mg/L	20	5/5/2013 03:35 PM
ICP-MS METALS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130503A	QC Batch: 42878			PrepDate: 5/2/2013		Analyst: **CEI**
Arsenic	13	0.10		µg/L	1	5/3/2013 05:32 PM
Chromium	70	1.0		µg/L	1	5/3/2013 05:32 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-009

Client Sample ID: MW-20D2
Collection Date: 5/1/2013 4:35:00 PM
Matrix: GROUNDWATER

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS1_130503A | QC Batch: D13VW016 | PrepDate: | Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	5/3/2013 06:10 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
2-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
4-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Benzene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Bromobenzene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Bromodichloromethane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Bromoform	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Bromomethane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Carbon tetrachloride	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Chlorobenzene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Chloroethane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Chloroform	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Chloromethane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Dibromochloromethane	ND	0.50		µg/L	1	5/3/2013 06:10 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT:	Tetra Tech	**Client Sample ID:**	MW-20D2
Lab Order:	N010153	**Collection Date:**	5/1/2013 4:35:00 PM
Project:	Maryland Square, 103P172829.01	**Matrix:**	GROUNDWATER
Lab ID:	N010153-009		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
Dibromomethane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Ethylbenzene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Isopropylbenzene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
m,p-Xylene	ND	1.0		µg/L	1	5/3/2013 06:10 PM
Methylene chloride	ND	2.0		µg/L	1	5/3/2013 06:10 PM
MTBE	ND	0.50		µg/L	1	5/3/2013 06:10 PM
n-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
n-Propylbenzene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Naphthalene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
o-Xylene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
sec-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Styrene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
tert-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Tetrachloroethene	1.1	0.50		µg/L	1	5/3/2013 06:10 PM
Toluene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Trichloroethene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Vinyl chloride	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Surr: 1,2-Dichloroethane-d4	101	70-127		%REC	1	5/3/2013 06:10 PM
Surr: 4-Bromofluorobenzene	99.2	80-120		%REC	1	5/3/2013 06:10 PM
Surr: Dibromofluoromethane	98.5	73-128		%REC	1	5/3/2013 06:10 PM
Surr: Toluene-d8	97.7	80-120		%REC	1	5/3/2013 06:10 PM
ANIONS BY ION CHROMATOGRAPHY						
		EPA 300.0				
RunID: IC2_130505A	QC Batch: R88729			PrepDate:		Analyst: **QBM**
Chloride	22	5.0		mg/L	10	5/5/2013 03:48 PM
ICP-MS METALS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130503A	QC Batch: 42878			PrepDate:	5/2/2013	Analyst: **CEI**
Arsenic	1.7	0.10		µg/L	1	5/3/2013 06:01 PM
Chromium	27	1.0		µg/L	1	5/3/2013 06:01 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-010

Client Sample ID: MW-20D3
Collection Date: 5/1/2013 5:25:00 PM
Matrix: GROUNDWATER

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS1_130503A | QC Batch: D13VW016 | PrepDate: | Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	5/3/2013 04:40 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
2-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
4-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Benzene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Bromobenzene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Bromodichloromethane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Bromoform	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Bromomethane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Carbon tetrachloride	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Chlorobenzene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Chloroethane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Chloroform	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Chloromethane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Dibromochloromethane	ND	0.50		µg/L	1	5/3/2013 04:40 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT:	Tetra Tech	**Client Sample ID:**	MW-20D3
Lab Order:	N010153	**Collection Date:**	5/1/2013 5:25:00 PM
Project:	Maryland Square, 103P172829.01	**Matrix:**	GROUNDWATER
Lab ID:	N010153-010		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
Dibromomethane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Ethylbenzene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Isopropylbenzene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
m,p-Xylene	ND	1.0		µg/L	1	5/3/2013 04:40 PM
Methylene chloride	ND	2.0		µg/L	1	5/3/2013 04:40 PM
MTBE	ND	0.50		µg/L	1	5/3/2013 04:40 PM
n-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
n-Propylbenzene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Naphthalene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
o-Xylene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
sec-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Styrene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
tert-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Tetrachloroethene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Toluene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Trichloroethene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Vinyl chloride	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Surr: 1,2-Dichloroethane-d4	97.6	70-127		%REC	1	5/3/2013 04:40 PM
Surr: 4-Bromofluorobenzene	96.8	80-120		%REC	1	5/3/2013 04:40 PM
Surr: Dibromofluoromethane	96.4	73-128		%REC	1	5/3/2013 04:40 PM
Surr: Toluene-d8	96.7	80-120		%REC	1	5/3/2013 04:40 PM
ANIONS BY ION CHROMATOGRAPHY						
		EPA 300.0				
RunID: IC2_130505A	QC Batch: R88729			PrepDate:		Analyst: **QBM**
Chloride	5.9	2.5		mg/L	5	5/5/2013 04:01 PM
ICP-MS METALS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130503A	QC Batch: 42878			PrepDate:	5/2/2013	Analyst: **CEI**
Arsenic	2.7	0.10		µg/L	1	5/3/2013 06:06 PM
Chromium	8.4	1.0		µg/L	1	5/3/2013 06:06 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-011

Client Sample ID: MW-20
Collection Date: 5/2/2013 9:12:00 AM
Matrix: GROUNDWATER

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS1_130503A | QC Batch: D13VW016 | PrepDate: | Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,1-Dichloroethane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,1-Dichloroethene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,1-Dichloropropene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	5/4/2013 01:00 AM
1,2-Dibromoethane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,2-Dichloroethane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,2-Dichloropropane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,3-Dichloropropane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
2,2-Dichloropropane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
2-Chlorotoluene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
4-Chlorotoluene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
4-Isopropyltoluene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Benzene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Bromobenzene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Bromodichloromethane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Bromoform	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Bromomethane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Carbon tetrachloride	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Chlorobenzene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Chloroethane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Chloroform	1.1	0.50		µg/L	1	5/4/2013 01:00 AM
Chloromethane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Dibromochloromethane	ND	0.50		µg/L	1	5/4/2013 01:00 AM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-011

Client Sample ID: MW-20
Collection Date: 5/2/2013 9:12:00 AM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
			EPA 8260B			
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
Dibromomethane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Dichlorodifluoromethane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Ethylbenzene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Hexachlorobutadiene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Isopropylbenzene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
m,p-Xylene	ND	1.0		µg/L	1	5/4/2013 01:00 AM
Methylene chloride	ND	2.0		µg/L	1	5/4/2013 01:00 AM
MTBE	ND	0.50		µg/L	1	5/4/2013 01:00 AM
n-Butylbenzene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
n-Propylbenzene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Naphthalene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
o-Xylene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
sec-Butylbenzene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Styrene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
tert-Butylbenzene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Tetrachloroethene	470	10		µg/L	20	5/3/2013 09:13 PM
Toluene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Trichloroethene	1.4	0.50		µg/L	1	5/4/2013 01:00 AM
Trichlorofluoromethane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Vinyl chloride	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Surr: 1,2-Dichloroethane-d4	113	70-127		%REC	1	5/4/2013 01:00 AM
Surr: 1,2-Dichloroethane-d4	104	70-127		%REC	20	5/3/2013 09:13 PM
Surr: 4-Bromofluorobenzene	96.9	80-120		%REC	1	5/4/2013 01:00 AM
Surr: 4-Bromofluorobenzene	92.2	80-120		%REC	20	5/3/2013 09:13 PM
Surr: Dibromofluoromethane	105	73-128		%REC	1	5/4/2013 01:00 AM
Surr: Dibromofluoromethane	99.2	73-128		%REC	20	5/3/2013 09:13 PM
Surr: Toluene-d8	98.7	80-120		%REC	20	5/3/2013 09:13 PM
Surr: Toluene-d8	94.3	80-120		%REC	1	5/4/2013 01:00 AM
ANIONS BY ION CHROMATOGRAPHY						
			EPA 300.0			
RunID: IC2_130505A	QC Batch: R88729			PrepDate:		Analyst: **QBM**
Chloride	200	25		mg/L	50	5/5/2013 04:13 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-011

Client Sample ID: MW-20
Collection Date: 5/2/2013 9:12:00 AM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP-MS METALS						
EPA 3010A				**EPA 6020**		
RunID: ICP7_130503A	QC Batch: 42878			PrepDate:	5/2/2013	Analyst: **CEI**
Arsenic	4.0	0.10		µg/L	1	5/3/2013 06:21 PM
Chromium	2.7	1.0		µg/L	1	5/3/2013 06:21 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Tetra Tech	**Client Sample ID:**	MW-19
Lab Order:	N010153	**Collection Date:**	5/2/2013 11:42:00 AM
Project:	Maryland Square, 103P172829.01	**Matrix:**	GROUNDWATER
Lab ID:	N010153-012		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
PERMANGANATE BY COLORIMETRY						
		COLORIMETRIC				
RunID: WETCHEM_130503E	QC Batch: R88719			PrepDate:		Analyst: **JT**
Permanganate as KMnO4	ND	1.00		mg/L	1	5/3/2013
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,1-Dichloroethane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,1-Dichloroethene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,1-Dichloropropene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	5/4/2013 12:37 AM
1,2-Dibromoethane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,2-Dichloroethane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,2-Dichloropropane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,3-Dichloropropane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
2,2-Dichloropropane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
2-Chlorotoluene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
4-Chlorotoluene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
4-Isopropyltoluene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Benzene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Bromobenzene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Bromodichloromethane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Bromoform	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Bromomethane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Carbon tetrachloride	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Chlorobenzene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Chloroethane	ND	0.50		µg/L	1	5/4/2013 12:37 AM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-012

Client Sample ID: MW-19
Collection Date: 5/2/2013 11:42:00 AM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 8260B						
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
Chloroform	2.2	0.50		µg/L	1	5/4/2013 12:37 AM
Chloromethane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Dibromochloromethane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Dibromomethane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Dichlorodifluoromethane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Ethylbenzene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Hexachlorobutadiene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Isopropylbenzene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
m,p-Xylene	ND	1.0		µg/L	1	5/4/2013 12:37 AM
Methylene chloride	ND	2.0		µg/L	1	5/4/2013 12:37 AM
MTBE	ND	0.50		µg/L	1	5/4/2013 12:37 AM
n-Butylbenzene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
n-Propylbenzene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Naphthalene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
o-Xylene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
sec-Butylbenzene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Styrene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
tert-Butylbenzene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Tetrachloroethene	810	5.0		µg/L	10	5/3/2013 08:04 PM
Toluene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Trichloroethene	2.2	0.50		µg/L	1	5/4/2013 12:37 AM
Trichlorofluoromethane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Vinyl chloride	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Surr: 1,2-Dichloroethane-d4	114	70-127		%REC	1	5/4/2013 12:37 AM
Surr: 1,2-Dichloroethane-d4	103	70-127		%REC	10	5/3/2013 08:04 PM
Surr: 4-Bromofluorobenzene	95.9	80-120		%REC	1	5/4/2013 12:37 AM
Surr: 4-Bromofluorobenzene	93.9	80-120		%REC	10	5/3/2013 08:04 PM
Surr: Dibromofluoromethane	108	73-128		%REC	1	5/4/2013 12:37 AM
Surr: Dibromofluoromethane	98.2	73-128		%REC	10	5/3/2013 08:04 PM
Surr: Toluene-d8	98.2	80-120		%REC	10	5/3/2013 08:04 PM
Surr: Toluene-d8	97.4	80-120		%REC	1	5/4/2013 12:37 AM
DISSOLVED METALS BY ICP						
EPA 3010A				**EPA 6010B**		
RunID: ICP2_130503B	QC Batch: 42881			PrepDate: 5/2/2013		Analyst: **CEI**

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-012

Client Sample ID: MW-19
Collection Date: 5/2/2013 11:42:00 AM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
DISSOLVED METALS BY ICP						
EPA 3010A / **EPA 6010B**						
RunID: ICP2_130503B QC Batch: 42881 PrepDate: 5/2/2013 Analyst: **CEI**						
Potassium	41	2.5		mg/L	5	5/3/2013 12:10 PM
DISSOLVED METALS BY ICP-MS						
EPA 3010A / **EPA 6020**						
RunID: ICP7_130503A QC Batch: 42878 PrepDate: 5/2/2013 Analyst: **CEI**						
Arsenic	2.7	0.10		µg/L	1	5/3/2013 06:26 PM
Chromium	9.7	1.0		µg/L	1	5/3/2013 06:26 PM
Manganese	460	2.5		µg/L	5	5/6/2013 08:26 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-013

Client Sample ID: MW-19D1
Collection Date: 5/2/2013 10:52:00 AM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
PERMANGANATE BY COLORIMETRY						
		COLORIMETRIC				
RunID: WETCHEM_130503E	QC Batch: R88719			PrepDate:		Analyst: **JT**
Permanganate as KMnO4	ND	1.00		mg/L	1	5/3/2013
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	5/3/2013 11:51 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
2-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
4-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Benzene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Bromobenzene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Bromodichloromethane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Bromoform	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Bromomethane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Carbon tetrachloride	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Chlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Chloroethane	ND	0.50		µg/L	1	5/3/2013 11:51 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-013

Client Sample ID: MW-19D1
Collection Date: 5/2/2013 10:52:00 AM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
Chloroform	0.59	0.50		µg/L	1	5/3/2013 11:51 PM
Chloromethane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Dibromochloromethane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Dibromomethane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Ethylbenzene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Isopropylbenzene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
m,p-Xylene	ND	1.0		µg/L	1	5/3/2013 11:51 PM
Methylene chloride	ND	2.0		µg/L	1	5/3/2013 11:51 PM
MTBE	ND	0.50		µg/L	1	5/3/2013 11:51 PM
n-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
n-Propylbenzene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Naphthalene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
o-Xylene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
sec-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Styrene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
tert-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Tetrachloroethene	99	0.50		µg/L	1	5/3/2013 11:51 PM
Toluene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Trichloroethene	0.54	0.50		µg/L	1	5/3/2013 11:51 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Vinyl chloride	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Surr: 1,2-Dichloroethane-d4	114	70-127		%REC	1	5/3/2013 11:51 PM
Surr: 4-Bromofluorobenzene	97.0	80-120		%REC	1	5/3/2013 11:51 PM
Surr: Dibromofluoromethane	104	73-128		%REC	1	5/3/2013 11:51 PM
Surr: Toluene-d8	98.4	80-120		%REC	1	5/3/2013 11:51 PM
DISSOLVED METALS BY ICP						
	EPA 3010A			**EPA 6010B**		
RunID: ICP2_130503B	QC Batch: 42881			PrepDate:	5/2/2013	Analyst: **CEI**
Potassium	9.7	2.5		mg/L	5	5/3/2013 12:13 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-013

Client Sample ID: MW-19D1
Collection Date: 5/2/2013 10:52:00 AM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
DISSOLVED METALS BY ICP-MS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130503A	QC Batch: 42878			PrepDate:	5/2/2013	Analyst: **CEI**
Arsenic	2.1	0.10		µg/L	1	5/3/2013 06:32 PM
Chromium	1.9	1.0		µg/L	1	5/3/2013 06:32 PM
Manganese	11	0.50		µg/L	1	5/3/2013 06:32 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-014

Client Sample ID: MW-19I
Collection Date: 5/2/2013 10:05:00 AM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
PERMANGANATE BY COLORIMETRY						
		COLORIMETRIC				
RunID: WETCHEM_130503E	QC Batch: R88719			PrepDate:		Analyst: **JT**
Permanganate as KMnO4	68.4	5.00		mg/L	5	5/3/2013
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	5/3/2013 05:02 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
2-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
4-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Benzene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Bromobenzene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Bromodichloromethane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Bromoform	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Bromomethane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Carbon tetrachloride	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Chlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Chloroethane	ND	0.50		µg/L	1	5/3/2013 05:02 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-014

Client Sample ID: MW-19I
Collection Date: 5/2/2013 10:05:00 AM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 8260B						
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
Chloroform	2.1	0.50		µg/L	1	5/3/2013 05:02 PM
Chloromethane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Dibromochloromethane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Dibromomethane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Ethylbenzene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Isopropylbenzene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
m,p-Xylene	ND	1.0		µg/L	1	5/3/2013 05:02 PM
Methylene chloride	ND	2.0		µg/L	1	5/3/2013 05:02 PM
MTBE	ND	0.50		µg/L	1	5/3/2013 05:02 PM
n-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
n-Propylbenzene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Naphthalene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
o-Xylene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
sec-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Styrene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
tert-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Tetrachloroethene	0.61	0.50		µg/L	1	5/3/2013 05:02 PM
Toluene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Trichloroethene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Vinyl chloride	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Surr: 1,2-Dichloroethane-d4	105	70-127		%REC	1	5/3/2013 05:02 PM
Surr: 4-Bromofluorobenzene	94.5	80-120		%REC	1	5/3/2013 05:02 PM
Surr: Dibromofluoromethane	99.7	73-128		%REC	1	5/3/2013 05:02 PM
Surr: Toluene-d8	98.0	80-120		%REC	1	5/3/2013 05:02 PM
DISSOLVED METALS BY ICP						
EPA 3010A				**EPA 6010B**		
RunID: ICP2_130503B	QC Batch: 42881			PrepDate:	5/2/2013	Analyst: **CEI**
Potassium	21	2.5		mg/L	5	5/3/2013 12:16 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-014

Client Sample ID: MW-19I
Collection Date: 5/2/2013 10:05:00 AM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
DISSOLVED METALS BY ICP-MS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130503A	QC Batch: 42878			PrepDate:	5/2/2013	Analyst: **CEI**
Arsenic	1.2	0.10		µg/L	1	5/3/2013 06:37 PM
Chromium	43	1.0		µg/L	1	5/3/2013 06:37 PM
Manganese	20000	100		µg/L	200	5/3/2013 07:44 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	PT-Water
Lab Order:	N010153	**Collection Date:**	5/2/2013 12:40:00 PM
Project:	Maryland Square, 103P172829.01	**Matrix:**	WATER
Lab ID:	N010153-015		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130504A	QC Batch: D13VW017			PrepDate:		Analyst: **QBM**
Tetrachloroethene	22	2.5		µg/L	5	5/4/2013 09:51 PM
Trichloroethene	ND	2.5		µg/L	5	5/4/2013 09:51 PM
Surr: 1,2-Dichloroethane-d4	95.1	70-127		%REC	5	5/4/2013 09:51 PM
Surr: 4-Bromofluorobenzene	87.0	80-120		%REC	5	5/4/2013 09:51 PM
Surr: Dibromofluoromethane	92.0	73-128		%REC	5	5/4/2013 09:51 PM
Surr: Toluene-d8	88.9	80-120		%REC	5	5/4/2013 09:51 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 300_W_CL

Sample ID: **MB-R88729_CL**	SampType: **MBLK**	TestCode: **300_W_CL**	Units: **mg/L**	Prep Date:	RunNo: **88729**
Client ID: **PBW**	Batch ID: **R88729**	TestNo: **EPA 300.0**		Analysis Date: **5/5/2013**	SeqNo: **1569241**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	ND	0.50									

Sample ID: **LCS-R88729_CL**	SampType: **LCS**	TestCode: **300_W_CL**	Units: **mg/L**	Prep Date:	RunNo: **88729**
Client ID: **LCSW**	Batch ID: **R88729**	TestNo: **EPA 300.0**		Analysis Date: **5/5/2013**	SeqNo: **1569242**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	2.456	0.50	2.500	0	98.2	90	110				

Sample ID: **N010153-001BDUP**	SampType: **DUP**	TestCode: **300_W_CL**	Units: **mg/L**	Prep Date:	RunNo: **88729**
Client ID: **ZZZZZZ**	Batch ID: **R88729**	TestNo: **EPA 300.0**		Analysis Date: **5/5/2013**	SeqNo: **1569244**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	180.350	25						180.2	0.111	20	

Sample ID: **N010153-002BMS**	SampType: **MS**	TestCode: **300_W_CL**	Units: **mg/L**	Prep Date:	RunNo: **88729**
Client ID: **ZZZZZZ**	Batch ID: **R88729**	TestNo: **EPA 300.0**		Analysis Date: **5/5/2013**	SeqNo: **1569246**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	299.500	25	125.0	171.1	103	80	120				

Sample ID: **N010153-002BMSD**	SampType: **MSD**	TestCode: **300_W_CL**	Units: **mg/L**	Prep Date:	RunNo: **88729**
Client ID: **ZZZZZZ**	Batch ID: **R88729**	TestNo: **EPA 300.0**		Analysis Date: **5/5/2013**	SeqNo: **1569247**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	296.750	25	125.0	171.1	101	80	120	299.5	0.922	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
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CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 300_W_CL

Sample ID: **N010153-004BMS** SampType: **MS** TestCode: **300_W_CL** Units: **mg/L** Prep Date: RunNo: **88729**
Client ID: **ZZZZZZ** Batch ID: **R88729** TestNo: **EPA 300.0** Analysis Date: **5/5/2013** SeqNo: **1569250**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	293.150	25	125.0	169.5	98.9	80	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

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CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_WD

Sample ID: **MB-42881**	SampType: **MBLK**	TestCode: **6010_WD**	Units: **mg/L**	Prep Date: **5/2/2013**	RunNo: **88731**
Client ID: **PBW**	Batch ID: **42881**	TestNo: **EPA 6010B**	**EPA 3010A**	Analysis Date: **5/3/2013**	SeqNo: **1569286**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Potassium	0.013	0.50									

Sample ID: **LCS-42881**	SampType: **LCS**	TestCode: **6010_WD**	Units: **mg/L**	Prep Date: **5/2/2013**	RunNo: **88731**
Client ID: **LCSW**	Batch ID: **42881**	TestNo: **EPA 6010B**	**EPA 3010A**	Analysis Date: **5/3/2013**	SeqNo: **1569287**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Potassium	18.233	0.50	20.00	0	91.2	85	115				

Sample ID: **N010153-012C-MS**	SampType: **MS**	TestCode: **6010_WD**	Units: **mg/L**	Prep Date: **5/2/2013**	RunNo: **88731**
Client ID: **ZZZZZZ**	Batch ID: **42881**	TestNo: **EPA 6010B**	**EPA 3010A**	Analysis Date: **5/3/2013**	SeqNo: **1569293**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Potassium	63.506	2.5	20.00	41.28	111	75	125				

Sample ID: **N010153-012C-MSD**	SampType: **MSD**	TestCode: **6010_WD**	Units: **mg/L**	Prep Date: **5/2/2013**	RunNo: **88731**
Client ID: **ZZZZZZ**	Batch ID: **42881**	TestNo: **EPA 6010B**	**EPA 3010A**	Analysis Date: **5/3/2013**	SeqNo: **1569294**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Potassium	63.826	2.5	20.00	41.28	113	75	125	63.51	0.502	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

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CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 6020_DIS

Sample ID: **MB-42878**	SampType: **MBLK**	TestCode: **6020_DIS**	Units: **µg/L**	Prep Date: **5/2/2013**	RunNo: **88722**
Client ID: **PBW**	Batch ID: **42878**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **5/3/2013**	SeqNo: **1568730**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.10									
Chromium	ND	1.0									
Manganese	ND	0.50									

Sample ID: **LCS-42878**	SampType: **LCS**	TestCode: **6020_DIS**	Units: **µg/L**	Prep Date: **5/2/2013**	RunNo: **88722**
Client ID: **LCSW**	Batch ID: **42878**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **5/3/2013**	SeqNo: **1568731**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	9.235	0.10	10.00	0	92.3	85	115				
Chromium	8.807	1.0	10.00	0	88.1	85	115				
Manganese	93.008	0.50	100.0	0	93.0	85	115				

Sample ID: **N010153-001C-MS**	SampType: **MS**	TestCode: **6020_DIS**	Units: **µg/L**	Prep Date: **5/2/2013**	RunNo: **88722**
Client ID: **ZZZZZZ**	Batch ID: **42878**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **5/3/2013**	SeqNo: **1568748**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	16.915	0.10	10.00	5.929	110	75	125				
Manganese	97.954	0.50	100.0	0	98.0	75	125				

Sample ID: **N010153-001C-MSD**	SampType: **MSD**	TestCode: **6020_DIS**	Units: **µg/L**	Prep Date: **5/2/2013**	RunNo: **88722**
Client ID: **ZZZZZZ**	Batch ID: **42878**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **5/3/2013**	SeqNo: **1568749**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	16.470	0.10	10.00	5.929	105	75	125	16.91	2.66	20	
Manganese	96.119	0.50	100.0	0	96.1	75	125	97.95	1.89	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

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CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 6020_DIS

Sample ID: **N010153-001C-MS**	SampType: **MS**	TestCode: **6020_DIS**	Units: **µg/L**	Prep Date: **5/2/2013**	RunNo: **88722**
Client ID: **ZZZZZZ**	Batch ID: **42878**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **5/3/2013**	SeqNo: **1568754**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	212.697	5.0	10.00	206.9	57.5	75	125				S

Sample ID: **N010153-001C-MSD**	SampType: **MSD**	TestCode: **6020_DIS**	Units: **µg/L**	Prep Date: **5/2/2013**	RunNo: **88722**
Client ID: **ZZZZZZ**	Batch ID: **42878**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **5/3/2013**	SeqNo: **1568755**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	210.747	5.0	10.00	206.9	38.0	75	125	212.7	0.921	20	S

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

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CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 6020_W

Sample ID: **MB-42878**	SampType: **MBLK**	TestCode: **6020_W**	Units: **µg/L**	Prep Date: **5/2/2013**	RunNo: **88722**
Client ID: **PBW**	Batch ID: **42878**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **5/3/2013**	SeqNo: **1568646**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.10									
Chromium	ND	1.0									

Sample ID: **LCS-42878**	SampType: **LCS**	TestCode: **6020_W**	Units: **µg/L**	Prep Date: **5/2/2013**	RunNo: **88722**
Client ID: **LCSW**	Batch ID: **42878**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **5/3/2013**	SeqNo: **1568647**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	9.235	0.10	10.00	0	92.3	85	115				
Chromium	8.807	1.0	10.00	0	88.1	85	115				

Sample ID: **N010153-001C-MS**	SampType: **MS**	TestCode: **6020_W**	Units: **µg/L**	Prep Date: **5/2/2013**	RunNo: **88722**
Client ID: **ZZZZZZ**	Batch ID: **42878**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **5/3/2013**	SeqNo: **1568664**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	16.915	0.10	10.00	5.929	110	75	125				

Sample ID: **N010153-001C-MSD**	SampType: **MSD**	TestCode: **6020_W**	Units: **µg/L**	Prep Date: **5/2/2013**	RunNo: **88722**
Client ID: **ZZZZZZ**	Batch ID: **42878**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **5/3/2013**	SeqNo: **1568665**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	16.470	0.10	10.00	5.929	105	75	125	16.91	2.66	20	

Sample ID: **N010153-001C-MS**	SampType: **MS**	TestCode: **6020_W**	Units: **µg/L**	Prep Date: **5/2/2013**	RunNo: **88722**
Client ID: **ZZZZZZ**	Batch ID: **42878**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **5/3/2013**	SeqNo: **1568670**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	212.697	5.0	10.00	206.9	57.5	75	125				S

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

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CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 6020_W

Sample ID: **N010153-001C-MSD**	SampType: **MSD**	TestCode: **6020_W**	Units: **µg/L**		Prep Date: **5/2/2013**			RunNo: **88722**	
Client ID: **ZZZZZZ**	Batch ID: **42878**	TestNo: **EPA 6020**	**EPA 3010A**		Analysis Date: **5/3/2013**			SeqNo: **1568671**	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	210.747	5.0	10.00	206.9	38.0	75	125	212.7	0.921	20	S

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

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CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260WATERP

Sample ID: **D130503LCS** SampType: **LCS** TestCode: **8260WATERP** Units: **µg/L** Prep Date: RunNo: **88727**
Client ID: **LCSW** Batch ID: **D13VW016** TestNo: **EPA 8260B** Analysis Date: **5/3/2013** SeqNo: **1569141**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	21.490	0.50	20.00	0	107	77	127				
1,1,1-Trichloroethane	21.770	0.50	20.00	0	109	74	122				
1,1,2,2-Tetrachloroethane	20.740	0.50	20.00	0	104	70	128				
1,1,2-Trichloroethane	20.650	0.50	20.00	0	103	73	120				
1,1-Dichloroethane	20.790	0.50	20.00	0	104	72	120				
1,1-Dichloroethene	21.120	0.50	20.00	0	106	69	125				
1,1-Dichloropropene	21.190	0.50	20.00	0	106	80	120				
1,2,3-Trichlorobenzene	21.940	0.50	20.00	0	110	80	126				
1,2,3-Trichloropropane	21.510	0.50	20.00	0	108	68	126				
1,2,4-Trichlorobenzene	21.450	0.50	20.00	0	107	80	125				
1,2,4-Trimethylbenzene	22.140	0.50	20.00	0	111	80	124				
1,2-Dibromo-3-chloropropane	22.080	1.0	20.00	0	110	66	129				
1,2-Dibromoethane	21.210	0.50	20.00	0	106	78	120				
1,2-Dichlorobenzene	21.020	0.50	20.00	0	105	80	120				
1,2-Dichloroethane	20.950	0.50	20.00	0	105	79	120				
1,2-Dichloropropane	21.010	0.50	20.00	0	105	75	120				
1,3,5-Trimethylbenzene	22.460	0.50	20.00	0	112	80	122				
1,3-Dichlorobenzene	20.660	0.50	20.00	0	103	80	120				
1,3-Dichloropropane	20.980	0.50	20.00	0	105	80	120				
1,4-Dichlorobenzene	20.310	0.50	20.00	0	102	80	120				
2,2-Dichloropropane	21.540	0.50	20.00	0	108	61	151				
2-Chlorotoluene	21.780	0.50	20.00	0	109	80	120				
4-Chlorotoluene	21.670	0.50	20.00	0	108	80	120				
4-Isopropyltoluene	23.440	0.50	20.00	0	117	80	122				
Benzene	20.830	0.50	20.00	0	104	80	120				
Bromobenzene	21.040	0.50	20.00	0	105	80	120				
Bromodichloromethane	21.220	0.50	20.00	0	106	79	123				
Bromoform	19.370	0.50	20.00	0	96.9	65	141				
Bromomethane	19.990	0.50	20.00	0	100	13	175				
Carbon tetrachloride	22.030	0.50	20.00	0	110	71	136				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260WATERP

Sample ID: **D130503LCS** SampType: **LCS** TestCode: **8260WATERP** Units: **µg/L** Prep Date: RunNo: **88727**
Client ID: **LCSW** Batch ID: **D13VW016** TestNo: **EPA 8260B** Analysis Date: **5/3/2013** SeqNo: **1569141**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	20.730	0.50	20.00	0	104	80	120				
Chloroethane	21.490	0.50	20.00	0	107	63	137				
Chloroform	20.220	0.50	20.00	0	101	71	120				
Chloromethane	20.570	0.50	20.00	0	103	35	145				
cis-1,2-Dichloroethene	21.090	0.50	20.00	0	105	74	120				
Dibromochloromethane	21.670	0.50	20.00	0	108	74	127				
Dibromomethane	21.050	0.50	20.00	0	105	80	120				
Dichlorodifluoromethane	21.140	0.50	20.00	0	106	67	123				
Ethylbenzene	20.880	0.50	20.00	0	104	80	120				
Hexachlorobutadiene	22.160	0.50	20.00	0	111	80	120				
Isopropylbenzene	22.710	0.50	20.00	0	114	80	120				
m,p-Xylene	43.710	1.0	40.00	0	109	80	120				
Methylene chloride	18.900	2.0	20.00	0	94.5	63	126				
MTBE	20.400	0.50	20.00	0	102	68	119				
n-Butylbenzene	23.250	0.50	20.00	0	116	80	121				
n-Propylbenzene	22.500	0.50	20.00	0	112	80	120				
Naphthalene	22.480	0.50	20.00	0	112	74	131				
o-Xylene	22.250	0.50	20.00	0	111	80	120				
sec-Butylbenzene	23.220	0.50	20.00	0	116	80	120				
Styrene	22.990	0.50	20.00	0	115	80	120				
tert-Butylbenzene	22.790	0.50	20.00	0	114	80	120				
Tetrachloroethene	21.390	0.50	20.00	0	107	80	120				
Toluene	20.290	0.50	20.00	0	101	80	120				
trans-1,2-Dichloroethene	21.200	0.50	20.00	0	106	74	120				
Trichloroethene	20.800	0.50	20.00	0	104	80	120				
Trichlorofluoromethane	22.390	0.50	20.00	0	112	67	135				
Vinyl chloride	20.840	0.50	20.00	0	104	72	120				
Surr: 1,2-Dichloroethane-d4	26.020		25.00		104	70	127				
Surr: 4-Bromofluorobenzene	25.450		25.00		102	80	120				
Surr: Dibromofluoromethane	25.240		25.00		101	73	128				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260WATERP

Sample ID: **D130503LCS**	SampType: **LCS**	TestCode: **8260WATERP**	Units: **µg/L**	Prep Date:	RunNo: **88727**
Client ID: **LCSW**	Batch ID: **D13VW016**	TestNo: **EPA 8260B**		Analysis Date: **5/3/2013**	SeqNo: **1569141**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Toluene-d8	25.020		25.00		100	80	120				

Sample ID: **N010153-010AMS**	SampType: **MS**	TestCode: **8260WATERP**	Units: **µg/L**	Prep Date:	RunNo: **88727**
Client ID: **ZZZZZZ**	Batch ID: **D13VW016**	TestNo: **EPA 8260B**		Analysis Date: **5/3/2013**	SeqNo: **1569142**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	17.770	0.50	20.00	0	88.8	67	135				
1,1,1-Trichloroethane	20.200	0.50	20.00	0	101	67	131				
1,1,2,2-Tetrachloroethane	14.120	0.50	20.00	0	70.6	67	131				
1,1,2-Trichloroethane	19.670	0.50	20.00	0	98.4	73	120				
1,1-Dichloroethane	19.880	0.50	20.00	0	99.4	69	124				
1,1-Dichloroethene	19.160	0.50	20.00	0	95.8	65	128				
1,1-Dichloropropene	19.270	0.50	20.00	0	96.4	79	120				
1,2,3-Trichlorobenzene	14.780	0.50	20.00	0	73.9	79	124				S
1,2,3-Trichloropropane	14.130	0.50	20.00	0	70.6	64	123				
1,2,4-Trichlorobenzene	15.170	0.50	20.00	0	75.8	79	124				S
1,2,4-Trimethylbenzene	15.830	0.50	20.00	0	79.2	61	135				
1,2-Dibromo-3-chloropropane	13.980	1.0	20.00	0	69.9	52	140				
1,2-Dibromoethane	19.260	0.50	20.00	0	96.3	70	122				
1,2-Dichlorobenzene	14.860	0.50	20.00	0	74.3	80	120				S
1,2-Dichloroethane	19.590	0.50	20.00	0	98.0	75	122				
1,2-Dichloropropane	20.280	0.50	20.00	0	101	73	120				
1,3,5-Trimethylbenzene	15.960	0.50	20.00	0	79.8	74	124				
1,3-Dichlorobenzene	14.870	0.50	20.00	0	74.4	80	120				S
1,3-Dichloropropane	16.950	0.50	20.00	0	84.8	78	120				
1,4-Dichlorobenzene	14.580	0.50	20.00	0	72.9	80	120				S
2,2-Dichloropropane	21.340	0.50	20.00	0	107	51	154				
2-Chlorotoluene	15.610	0.50	20.00	0	78.0	79	120				S
4-Chlorotoluene	15.540	0.50	20.00	0	77.7	80	120				S
4-Isopropyltoluene	16.180	0.50	20.00	0	80.9	80	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260WATERP

Sample ID: **N010153-010AMS** SampType: **MS** TestCode: **8260WATERP** Units: **µg/L** Prep Date: RunNo: **88727**
Client ID: **ZZZZZZ** Batch ID: **D13VW016** TestNo: **EPA 8260B** Analysis Date: **5/3/2013** SeqNo: **1569142**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	19.730	0.50	20.00	0	98.6	72	122				
Bromobenzene	15.240	0.50	20.00	0	76.2	80	120				S
Bromodichloromethane	20.430	0.50	20.00	0	102	72	130				
Bromoform	15.450	0.50	20.00	0	77.2	49	155				
Bromomethane	19.720	0.50	20.00	0	98.6	11	165				
Carbon tetrachloride	19.770	0.50	20.00	0	98.8	60	145				
Chlorobenzene	16.910	0.50	20.00	0	84.6	80	120				
Chloroethane	20.270	0.50	20.00	0	101	53	145				
Chloroform	20.170	0.50	20.00	0	101	66	130				
Chloromethane	19.690	0.50	20.00	0	98.4	40	137				
cis-1,2-Dichloroethene	20.370	0.50	20.00	0	102	73	120				
Dibromochloromethane	17.880	0.50	20.00	0	89.4	60	137				
Dibromomethane	19.250	0.50	20.00	0	96.2	78	120				
Dichlorodifluoromethane	19.470	0.50	20.00	0	97.4	57	128				
Ethylbenzene	16.740	0.50	20.00	0	83.7	80	120				
Hexachlorobutadiene	14.480	0.50	20.00	0	72.4	74	120				S
Isopropylbenzene	15.710	0.50	20.00	0	78.6	80	120				S
m,p-Xylene	34.900	1.0	40.00	0	87.2	80	120				
Methylene chloride	18.000	2.0	20.00	0	90.0	59	125				
MTBE	18.870	0.50	20.00	0	94.4	62	125				
n-Butylbenzene	16.200	0.50	20.00	0	81.0	80	122				
n-Propylbenzene	15.780	0.50	20.00	0	78.9	79	120				S
Naphthalene	14.270	0.50	20.00	0	71.4	65	130				
o-Xylene	17.940	0.50	20.00	0	89.7	80	120				
sec-Butylbenzene	15.840	0.50	20.00	0	79.2	80	120				S
Styrene	18.580	0.50	20.00	0	92.9	50	138				
tert-Butylbenzene	15.530	0.50	20.00	0	77.7	80	120				S
Tetrachloroethene	17.060	0.50	20.00	0	85.3	76	120				
Toluene	19.120	0.50	20.00	0	95.6	78	120				
trans-1,2-Dichloroethene	19.790	0.50	20.00	0	99.0	72	122				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260WATERP

Sample ID: **N010153-010AMS** SampType: **MS** TestCode: **8260WATERP** Units: **µg/L** Prep Date: RunNo: **88727**
Client ID: **ZZZZZZ** Batch ID: **D13VW016** TestNo: **EPA 8260B** Analysis Date: **5/3/2013** SeqNo: **1569142**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Trichloroethene	19.090	0.50	20.00	0	95.4	76	120				
Trichlorofluoromethane	20.090	0.50	20.00	0	100	53	148				
Vinyl chloride	19.420	0.50	20.00	0	97.1	67	120				
Surr: 1,2-Dichloroethane-d4	24.600		25.00		98.4	70	127				
Surr: 4-Bromofluorobenzene	21.100		25.00		84.4	80	120				
Surr: Dibromofluoromethane	24.970		25.00		99.9	73	128				
Surr: Toluene-d8	23.990		25.00		96.0	80	120				

Sample ID: **N010153-010AMSD** SampType: **MSD** TestCode: **8260WATERP** Units: **µg/L** Prep Date: RunNo: **88727**
Client ID: **ZZZZZZ** Batch ID: **D13VW016** TestNo: **EPA 8260B** Analysis Date: **5/3/2013** SeqNo: **1569143**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	19.230	0.50	20.00	0	96.2	67	135	17.77	7.89	20	
1,1,1-Trichloroethane	19.660	0.50	20.00	0	98.3	67	131	20.20	2.71	20	
1,1,2,2-Tetrachloroethane	15.770	0.50	20.00	0	78.8	67	131	14.12	11.0	20	
1,1,2-Trichloroethane	20.520	0.50	20.00	0	103	73	120	19.67	4.23	20	
1,1-Dichloroethane	19.440	0.50	20.00	0	97.2	69	124	19.88	2.24	20	
1,1-Dichloroethene	18.100	0.50	20.00	0	90.5	65	128	19.16	5.69	20	
1,1-Dichloropropene	18.510	0.50	20.00	0	92.6	79	120	19.27	4.02	20	
1,2,3-Trichlorobenzene	15.670	0.50	20.00	0	78.4	79	124	14.78	5.85	20	S
1,2,3-Trichloropropane	15.530	0.50	20.00	0	77.7	64	123	14.13	9.44	20	
1,2,4-Trichlorobenzene	15.740	0.50	20.00	0	78.7	79	124	15.17	3.69	20	S
1,2,4-Trimethylbenzene	11.910	0.50	20.00	0	59.6	61	135	15.83	28.3	20	SR
1,2-Dibromo-3-chloropropane	15.820	1.0	20.00	0	79.1	52	140	13.98	12.3	20	
1,2-Dibromoethane	20.740	0.50	20.00	0	104	70	122	19.26	7.40	20	
1,2-Dichlorobenzene	15.420	0.50	20.00	0	77.1	80	120	14.86	3.70	20	S
1,2-Dichloroethane	20.070	0.50	20.00	0	100	75	122	19.59	2.42	20	
1,2-Dichloropropane	20.290	0.50	20.00	0	101	73	120	20.28	0.0493	20	
1,3,5-Trimethylbenzene	12.360	0.50	20.00	0	61.8	74	124	15.96	25.4	20	SR
1,3-Dichlorobenzene	15.170	0.50	20.00	0	75.8	80	120	14.87	2.00	20	S

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260WATERP

Sample ID: **N010153-010AMSD** SampType: **MSD** TestCode: **8260WATERP** Units: **µg/L** Prep Date: RunNo: **88727**
Client ID: **ZZZZZZ** Batch ID: **D13VW016** TestNo: **EPA 8260B** Analysis Date: **5/3/2013** SeqNo: **1569143**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,3-Dichloropropane	19.180	0.50	20.00	0	95.9	78	120	16.95	12.3	20	
1,4-Dichlorobenzene	14.990	0.50	20.00	0	75.0	80	120	14.58	2.77	20	S
2,2-Dichloropropane	20.570	0.50	20.00	0	103	51	154	21.34	3.67	20	
2-Chlorotoluene	15.170	0.50	20.00	0	75.8	79	120	15.61	2.86	20	S
4-Chlorotoluene	15.660	0.50	20.00	0	78.3	80	120	15.54	0.769	20	S
4-Isopropyltoluene	15.190	0.50	20.00	0	76.0	80	120	16.18	6.31	20	S
Benzene	19.600	0.50	20.00	0	98.0	72	122	19.73	0.661	20	
Bromobenzene	15.560	0.50	20.00	0	77.8	80	120	15.24	2.08	20	S
Bromodichloromethane	20.240	0.50	20.00	0	101	72	130	20.43	0.934	20	
Bromoform	17.310	0.50	20.00	0	86.6	49	155	15.45	11.4	20	
Bromomethane	19.740	0.50	20.00	0	98.7	11	165	19.72	0.101	20	
Carbon tetrachloride	19.450	0.50	20.00	0	97.3	60	145	19.77	1.63	20	
Chlorobenzene	18.260	0.50	20.00	0	91.3	80	120	16.91	7.68	20	
Chloroethane	19.940	0.50	20.00	0	99.7	53	145	20.27	1.64	20	
Chloroform	19.540	0.50	20.00	0	97.7	66	130	20.17	3.17	20	
Chloromethane	19.900	0.50	20.00	0	99.5	40	137	19.69	1.06	20	
cis-1,2-Dichloroethene	20.260	0.50	20.00	0	101	73	120	20.37	0.541	20	
Dibromochloromethane	19.900	0.50	20.00	0	99.5	60	137	17.88	10.7	20	
Dibromomethane	20.360	0.50	20.00	0	102	78	120	19.25	5.60	20	
Dichlorodifluoromethane	19.080	0.50	20.00	0	95.4	57	128	19.47	2.02	20	
Ethylbenzene	17.730	0.50	20.00	0	88.6	80	120	16.74	5.74	20	
Hexachlorobutadiene	14.220	0.50	20.00	0	71.1	74	120	14.48	1.81	20	S
Isopropylbenzene	15.470	0.50	20.00	0	77.4	80	120	15.71	1.54	20	S
m,p-Xylene	34.540	1.0	40.00	0	86.4	80	120	34.90	1.04	20	
Methylene chloride	18.170	2.0	20.00	0	90.9	59	125	18.00	0.940	20	
MTBE	20.020	0.50	20.00	0	100	62	125	18.87	5.91	20	
n-Butylbenzene	15.720	0.50	20.00	0	78.6	80	122	16.20	3.01	20	S
n-Propylbenzene	15.330	0.50	20.00	0	76.7	79	120	15.78	2.89	20	S
Naphthalene	14.630	0.50	20.00	0	73.2	65	130	14.27	2.49	20	
o-Xylene	18.190	0.50	20.00	0	91.0	80	120	17.94	1.38	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260WATERP

Sample ID: **N010153-010AMSD** SampType: **MSD** TestCode: **8260WATERP** Units: **µg/L** Prep Date: RunNo: **88727**
Client ID: **ZZZZZZ** Batch ID: **D13VW016** TestNo: **EPA 8260B** Analysis Date: **5/3/2013** SeqNo: **1569143**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
sec-Butylbenzene	15.420	0.50	20.00	0	77.1	80	120	15.84	2.69	20	S
Styrene	12.590	0.50	20.00	0	63.0	50	138	18.58	38.4	20	R
tert-Butylbenzene	15.520	0.50	20.00	0	77.6	80	120	15.53	0.0644	20	S
Tetrachloroethene	17.890	0.50	20.00	0	89.4	76	120	17.06	4.75	20	
Toluene	18.600	0.50	20.00	0	93.0	78	120	19.12	2.76	20	
trans-1,2-Dichloroethene	18.870	0.50	20.00	0	94.4	72	122	19.79	4.76	20	
Trichloroethene	18.640	0.50	20.00	0	93.2	76	120	19.09	2.39	20	
Trichlorofluoromethane	19.560	0.50	20.00	0	97.8	53	148	20.09	2.67	20	
Vinyl chloride	19.250	0.50	20.00	0	96.2	67	120	19.42	0.879	20	
Surr: 1,2-Dichloroethane-d4	25.270		25.00		101	70	127		0		
Surr: 4-Bromofluorobenzene	23.030		25.00		92.1	80	120		0		
Surr: Dibromofluoromethane	25.150		25.00		101	73	128		0		
Surr: Toluene-d8	23.260		25.00		93.0	80	120		0		

Sample ID: **D130503MB2** SampType: **MBLK** TestCode: **8260WATERP** Units: **µg/L** Prep Date: RunNo: **88727**
Client ID: **PBW** Batch ID: **D13VW016** TestNo: **EPA 8260B** Analysis Date: **5/3/2013** SeqNo: **1569144**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	0.50									
1,1,1-Trichloroethane	ND	0.50									
1,1,2,2-Tetrachloroethane	ND	0.50									
1,1,2-Trichloroethane	ND	0.50									
1,1-Dichloroethane	ND	0.50									
1,1-Dichloroethene	ND	0.50									
1,1-Dichloropropene	ND	0.50									
1,2,3-Trichlorobenzene	ND	0.50									
1,2,3-Trichloropropane	ND	0.50									
1,2,4-Trichlorobenzene	ND	0.50									
1,2,4-Trimethylbenzene	ND	0.50									
1,2-Dibromo-3-chloropropane	ND	1.0									

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260WATERP

Sample ID: **D130503MB2** SampType: **MBLK** TestCode: **8260WATERP** Units: **µg/L** Prep Date: RunNo: **88727**
Client ID: **PBW** Batch ID: **D13VW016** TestNo: **EPA 8260B** Analysis Date: **5/3/2013** SeqNo: **1569144**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2-Dibromoethane	ND	0.50									
1,2-Dichlorobenzene	ND	0.50									
1,2-Dichloroethane	ND	0.50									
1,2-Dichloropropane	ND	0.50									
1,3,5-Trimethylbenzene	ND	0.50									
1,3-Dichlorobenzene	ND	0.50									
1,3-Dichloropropane	ND	0.50									
1,4-Dichlorobenzene	ND	0.50									
2,2-Dichloropropane	ND	0.50									
2-Chlorotoluene	ND	0.50									
4-Chlorotoluene	ND	0.50									
4-Isopropyltoluene	ND	0.50									
Benzene	ND	0.50									
Bromobenzene	ND	0.50									
Bromodichloromethane	ND	0.50									
Bromoform	ND	0.50									
Bromomethane	ND	0.50									
Carbon tetrachloride	ND	0.50									
Chlorobenzene	ND	0.50									
Chloroethane	ND	0.50									
Chloroform	ND	0.50									
Chloromethane	ND	0.50									
cis-1,2-Dichloroethene	ND	0.50									
Dibromochloromethane	ND	0.50									
Dibromomethane	ND	0.50									
Dichlorodifluoromethane	ND	0.50									
Ethylbenzene	ND	0.50									
Hexachlorobutadiene	ND	0.50									
Isopropylbenzene	ND	0.50									
m,p-Xylene	ND	1.0									

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
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CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260WATERP

Sample ID: **D130503MB2** SampType: **MBLK** TestCode: **8260WATERP** Units: **µg/L** Prep Date: RunNo: **88727**
Client ID: **PBW** Batch ID: **D13VW016** TestNo: **EPA 8260B** Analysis Date: **5/3/2013** SeqNo: **1569144**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methylene chloride	ND	2.0									
MTBE	ND	0.50									
n-Butylbenzene	ND	0.50									
n-Propylbenzene	ND	0.50									
Naphthalene	ND	0.50									
o-Xylene	ND	0.50									
sec-Butylbenzene	ND	0.50									
Styrene	ND	0.50									
tert-Butylbenzene	ND	0.50									
Tetrachloroethene	ND	0.50									
Toluene	ND	0.50									
trans-1,2-Dichloroethene	ND	0.50									
Trichloroethene	ND	0.50									
Trichlorofluoromethane	ND	0.50									
Vinyl chloride	ND	0.50									
Surr: 1,2-Dichloroethane-d4	23.780		25.00		95.1	70	127				
Surr: 4-Bromofluorobenzene	23.930		25.00		95.7	80	120				
Surr: Dibromofluoromethane	23.620		25.00		94.5	73	128				
Surr: Toluene-d8	24.610		25.00		98.4	80	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

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CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260WATERP

Sample ID: **D130504LCS** SampType: **LCS** TestCode: **8260WATERP** Units: **µg/L** Prep Date: RunNo: **88734**
Client ID: **LCSW** Batch ID: **D13VW017** TestNo: **EPA 8260B** Analysis Date: **5/4/2013** SeqNo: **1569479**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	21.190	0.50	20.00	0	106	77	127				
1,1,2,2-Tetrachloroethane	21.040	0.50	20.00	0	105	70	128				
1,1,2-Trichloroethane	20.810	0.50	20.00	0	104	73	120				
1,2,3-Trichloropropane	21.940	0.50	20.00	0	110	68	126				
1,2,4-Trichlorobenzene	18.810	0.50	20.00	0	94.1	80	125				
1,2-Dibromoethane	19.990	0.50	20.00	0	100	78	120				
1,2-Dichlorobenzene	19.780	0.50	20.00	0	98.9	80	120				
1,2-Dichloroethane	22.190	0.50	20.00	0	111	79	120				
1,2-Dichloropropane	20.810	0.50	20.00	0	104	75	120				
1,3-Dichlorobenzene	19.690	0.50	20.00	0	98.4	80	120				
1,3-Dichloropropane	20.940	0.50	20.00	0	105	80	120				
2,2-Dichloropropane	23.510	0.50	20.00	0	118	61	151				
2-Chlorotoluene	21.870	0.50	20.00	0	109	80	120				
Benzene	20.690	0.50	20.00	0	103	80	120				
Bromobenzene	19.600	0.50	20.00	0	98.0	80	120				
Bromodichloromethane	22.280	0.50	20.00	0	111	79	123				
Bromoform	18.720	0.50	20.00	0	93.6	65	141				
Bromomethane	23.480	0.50	20.00	0	117	13	175				
Carbon tetrachloride	22.830	0.50	20.00	0	114	71	136				
Chloroethane	24.150	0.50	20.00	0	121	63	137				
Chloromethane	22.160	0.50	20.00	0	111	35	145				
Dibromochloromethane	21.360	0.50	20.00	0	107	74	127				
Dibromomethane	21.180	0.50	20.00	0	106	80	120				
Dichlorodifluoromethane	22.640	0.50	20.00	0	113	67	123				
Ethylbenzene	21.110	0.50	20.00	0	106	80	120				
Hexachlorobutadiene	19.750	0.50	20.00	0	98.8	80	120				
Isopropylbenzene	22.120	0.50	20.00	0	111	80	120				
m,p-Xylene	43.980	1.0	40.00	0	110	80	120				
Methylene chloride	18.930	2.0	20.00	0	94.6	63	126				
MTBE	19.990	0.50	20.00	0	100	68	119				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260WATERP

Sample ID: **D130504LCS** SampType: **LCS** TestCode: **8260WATERP** Units: **µg/L** Prep Date: RunNo: **88734**
Client ID: **LCSW** Batch ID: **D13VW017** TestNo: **EPA 8260B** Analysis Date: **5/4/2013** SeqNo: **1569479**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
n-Propylbenzene	22.380	0.50	20.00	0	112	80	120				
sec-Butylbenzene	22.620	0.50	20.00	0	113	80	120				
Styrene	22.090	0.50	20.00	0	110	80	120				
tert-Butylbenzene	21.910	0.50	20.00	0	110	80	120				
Toluene	20.070	0.50	20.00	0	100	80	120				
trans-1,2-Dichloroethene	20.590	0.50	20.00	0	103	74	120				
Trichloroethene	19.040	0.50	20.00	0	95.2	80	120				
Trichlorofluoromethane	25.630	0.50	20.00	0	128	67	135				
Vinyl chloride	22.950	0.50	20.00	0	115	72	120				
Surr: 1,2-Dichloroethane-d4	27.970		25.00		112	70	127				
Surr: 4-Bromofluorobenzene	25.070		25.00		100	80	120				
Surr: Dibromofluoromethane	25.930		25.00		104	73	128				

Sample ID: **N010107-003GMS** SampType: **MS** TestCode: **8260WATERP** Units: **µg/L** Prep Date: RunNo: **88734**
Client ID: **ZZZZZZ** Batch ID: **D13VW017** TestNo: **EPA 8260B** Analysis Date: **5/4/2013** SeqNo: **1569480**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	20.920	0.50	20.00	0	105	67	135				
1,1,1-Trichloroethane	22.130	0.50	20.00	0	111	67	131				
1,1,2-Trichloroethane	21.190	0.50	20.00	0	106	73	120				
1,1-Dichloroethane	21.250	0.50	20.00	0	106	69	124				
1,1-Dichloroethene	22.710	0.50	20.00	0	114	65	128				
1,1-Dichloropropene	20.080	0.50	20.00	0	100	79	120				
1,2,4-Trichlorobenzene	18.900	0.50	20.00	0	94.5	79	124				
1,2,4-Trimethylbenzene	21.370	0.50	20.00	0	107	61	135				
1,2-Dibromo-3-chloropropane	20.760	1.0	20.00	0	104	52	140				
1,2-Dichloroethane	21.800	0.50	20.00	0	109	75	122				
1,2-Dichloropropane	20.960	0.50	20.00	0	105	73	120				
1,3-Dichlorobenzene	19.420	0.50	20.00	0	97.1	80	120				
1,3-Dichloropropane	20.720	0.50	20.00	0	104	78	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260WATERP

Sample ID: **N010107-003GMS** SampType: **MS** TestCode: **8260WATERP** Units: **µg/L** Prep Date: RunNo: **88734**
Client ID: **ZZZZZZ** Batch ID: **D13VW017** TestNo: **EPA 8260B** Analysis Date: **5/4/2013** SeqNo: **1569480**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
2,2-Dichloropropane	23.310	0.50	20.00	0	117	51	154				
2-Chlorotoluene	21.220	0.50	20.00	0	106	79	120				
4-Chlorotoluene	21.100	0.50	20.00	0	106	80	120				
4-Isopropyltoluene	21.590	0.50	20.00	0	108	80	120				
Benzene	20.000	0.50	20.00	0	100	72	122				
Bromodichloromethane	22.250	0.50	20.00	0	111	72	130				
Bromoform	18.950	0.50	20.00	0	94.8	49	155				
Bromomethane	22.650	0.50	20.00	0	113	11	165				
Carbon tetrachloride	21.290	0.50	20.00	0	106	60	145				
Chlorobenzene	19.470	0.50	20.00	0	97.4	80	120				
Chloroform	21.730	0.50	20.00	0	109	66	130				
Chloromethane	22.050	0.50	20.00	0	110	40	137				
cis-1,2-Dichloroethene	41.900	0.50	20.00	20.22	108	73	120				
Dibromochloromethane	22.090	0.50	20.00	0	110	60	137				
Dichlorodifluoromethane	21.770	0.50	20.00	0	109	57	128				
Ethylbenzene	20.220	0.50	20.00	0	101	80	120				
Hexachlorobutadiene	18.150	0.50	20.00	0	90.8	74	120				
m,p-Xylene	42.000	1.0	40.00	0	105	80	120				
MTBE	20.940	0.50	20.00	0	105	62	125				
n-Butylbenzene	21.820	0.50	20.00	0	109	80	122				
n-Propylbenzene	21.350	0.50	20.00	0	107	79	120				
Naphthalene	19.080	0.50	20.00	0	95.4	65	130				
sec-Butylbenzene	21.170	0.50	20.00	0	106	80	120				
Tetrachloroethene	41.290	0.50	20.00	21.54	98.8	76	120				
trans-1,2-Dichloroethene	20.710	0.50	20.00	0.6500	100	72	122				
Trichloroethene	34.530	0.50	20.00	15.17	96.8	76	120				
Surr: 1,2-Dichloroethane-d4	27.950		25.00		112	70	127				
Surr: Dibromofluoromethane	25.840		25.00		103	73	128				
Surr: Toluene-d8	23.440		25.00		93.8	80	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

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CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260WATERP

Sample ID: **N010107-003GMSD** SampType: **MSD** TestCode: **8260WATERP** Units: **µg/L** Prep Date: RunNo: **88734**
Client ID: **ZZZZZZ** Batch ID: **D13VW017** TestNo: **EPA 8260B** Analysis Date: **5/4/2013** SeqNo: **1569481**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	22.110	0.50	20.00	0	111	67	135	20.92	5.53	20	
1,1,2,2-Tetrachloroethane	21.790	0.50	20.00	0	109	67	131	21.20	2.74	20	
1,1,2-Trichloroethane	21.610	0.50	20.00	0	108	73	120	21.19	1.96	20	
1,1-Dichloroethane	22.050	0.50	20.00	0	110	69	124	21.25	3.70	20	
1,1-Dichloroethene	22.050	0.50	20.00	0	110	65	128	22.71	2.95	20	
1,1-Dichloropropene	20.380	0.50	20.00	0	102	79	120	20.08	1.48	20	
1,2,3-Trichlorobenzene	19.650	0.50	20.00	0	98.2	79	124	19.22	2.21	20	
1,2,3-Trichloropropane	21.820	0.50	20.00	0	109	64	123	21.22	2.79	20	
1,2,4-Trimethylbenzene	14.660	0.50	20.00	0	73.3	61	135	21.37	37.2	20	R
1,2-Dibromo-3-chloropropane	20.740	1.0	20.00	0	104	52	140	20.76	0.0964	20	
1,2-Dibromoethane	21.440	0.50	20.00	0	107	70	122	20.68	3.61	20	
1,2-Dichlorobenzene	20.440	0.50	20.00	0	102	80	120	19.98	2.28	20	
1,2-Dichloroethane	22.610	0.50	20.00	0	113	75	122	21.80	3.65	20	
1,3,5-Trimethylbenzene	17.620	0.50	20.00	0	88.1	74	124	21.27	18.8	20	
1,4-Dichlorobenzene	20.080	0.50	20.00	0	100	80	120	19.34	3.75	20	
2-Chlorotoluene	21.590	0.50	20.00	0	108	79	120	21.22	1.73	20	
4-Chlorotoluene	21.890	0.50	20.00	0	109	80	120	21.10	3.68	20	
Benzene	20.800	0.50	20.00	0	104	72	122	20.00	3.92	20	
Bromobenzene	20.480	0.50	20.00	0	102	80	120	19.46	5.11	20	
Bromodichloromethane	22.780	0.50	20.00	0	114	72	130	22.25	2.35	20	
Bromomethane	23.010	0.50	20.00	0	115	11	165	22.65	1.58	20	
Chlorobenzene	20.200	0.50	20.00	0	101	80	120	19.47	3.68	20	
Chloroethane	24.230	0.50	20.00	0	121	53	145	23.71	2.17	20	
Chloromethane	22.000	0.50	20.00	0	110	40	137	22.05	0.227	20	
cis-1,2-Dichloroethene	41.760	0.50	20.00	20.22	108	73	120	41.90	0.335	20	
Dibromochloromethane	22.350	0.50	20.00	0	112	60	137	22.09	1.17	20	
Dibromomethane	21.510	0.50	20.00	0	108	78	120	21.26	1.17	20	
Ethylbenzene	20.410	0.50	20.00	0	102	80	120	20.22	0.935	20	
Isopropylbenzene	21.340	0.50	20.00	0	107	80	120	21.00	1.61	20	
m,p-Xylene	40.020	1.0	40.00	0	100	80	120	42.00	4.83	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

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CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260WATERP

Sample ID: **N010107-003GMSD** SampType: **MSD** TestCode: **8260WATERP** Units: **µg/L** Prep Date: RunNo: **88734**
Client ID: **ZZZZZZ** Batch ID: **D13VW017** TestNo: **EPA 8260B** Analysis Date: **5/4/2013** SeqNo: **1569481**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
MTBE	21.280	0.50	20.00	0	106	62	125	20.94	1.61	20	
n-Butylbenzene	22.050	0.50	20.00	0	110	80	122	21.82	1.05	20	
Naphthalene	16.870	0.50	20.00	0	84.4	65	130	19.08	12.3	20	
o-Xylene	20.810	0.50	20.00	0	104	80	120	21.27	2.19	20	
Styrene	11.030	0.50	20.00	0	55.2	50	138	21.58	64.7	20	R
Tetrachloroethene	39.270	0.50	20.00	21.54	88.7	76	120	41.29	5.01	20	
trans-1,2-Dichloroethene	21.110	0.50	20.00	0.6500	102	72	122	20.71	1.91	20	
Trichloroethene	33.460	0.50	20.00	15.17	91.4	76	120	34.53	3.15	20	
Vinyl chloride	22.230	0.50	20.00	0	111	67	120	22.12	0.496	20	
Surr: 1,2-Dichloroethane-d4	29.000		25.00		116	70	127		0		
Surr: 4-Bromofluorobenzene	25.720		25.00		103	80	120		0		
Surr: Dibromofluoromethane	26.920		25.00		108	73	128		0		

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

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CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: PERMANGANATE

Sample ID: **MB-R88719**	SampType: **MBLK**	TestCode: **PERMANGAN**	Units: **mg/L**	Prep Date:	RunNo: **88719**
Client ID: **PBW**	Batch ID: **R88719**	TestNo: **Colorimetric**		Analysis Date: **5/3/2013**	SeqNo: **1568616**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Permanganate as KMnO4	ND	1.00									

Sample ID: **LCS-R88719**	SampType: **LCS**	TestCode: **PERMANGAN**	Units: **mg/L**	Prep Date:	RunNo: **88719**
Client ID: **LCSW**	Batch ID: **R88719**	TestNo: **Colorimetric**		Analysis Date: **5/3/2013**	SeqNo: **1568617**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Permanganate as KMnO4	21.500	1.00	20.00	0	108	80	120				

Sample ID: **N010153-014B-MS**	SampType: **MS**	TestCode: **PERMANGAN**	Units: **mg/L**	Prep Date:	RunNo: **88719**
Client ID: **ZZZZZZ**	Batch ID: **R88719**	TestNo: **Colorimetric**		Analysis Date: **5/3/2013**	SeqNo: **1568621**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Permanganate as KMnO4	174.750	5.00	100.0	68.40	106	80	120				

Sample ID: **N010153-014B-MSD**	SampType: **MSD**	TestCode: **PERMANGAN**	Units: **mg/L**	Prep Date:	RunNo: **88719**
Client ID: **ZZZZZZ**	Batch ID: **R88719**	TestNo: **Colorimetric**		Analysis Date: **5/3/2013**	SeqNo: **1568622**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Permanganate as KMnO4	175.850	5.00	100.0	68.40	107	80	120	174.8	0.627	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories, Inc.
3151-3153 W. Post Rd.
Las Vegas, NV 89118
Tel:(702) 307-2659•Fax:(702) 307-2691

FOR LABORATORY USE ONLY:

P.O.# 1038172829.01

Logged By: B. Dano Date: 5-1/2-13

Method of Transport
Client ☐
ATL INC ☐
FEDEX ☐
Other: ____

Sample Condition Upon Receipt
1. CHILLED 3.8 IR Y☑ N☐ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐
3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: Tetra Tech
Attn: Rob Manriquez
Address: 1230 Columbia St #1100
City San Diego State CA Zip Code 92101
TEL:( )
FAX:( )
Project Name: Maryland Square Project #: 1038172829.01
Sampler: I attest to the validity and authenticity of this sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action. (Printed Name) BECKI DANO (Signature)

Relinquished by: (Signature and Printed name)	BECKI DANO	Date: 5/2/13	Time: 1249	Received by: (Signature and Printed name)	HERSEY SMYAS	Date: 5/2/13	Time: 1249
Relinquished by: (Signature and Printed name)	HERSEY SMYAS	Date: 5/2/13	Time: 1315	Received by: (Signature and Printed name)	HERSEY SMYAS	Date: 5/2/13	Time: 1315
Relinquished by: (Signature and Printed name)		Date:	Time:	Received by: (Signature and Printed name)		Date:	Time:

I hereby authorize ATL INC to perform the work indicated below:
Project Mgr/Submitter:
BECKI DANO 5/2/13
Print Name Date
Signature

Send Report To:
Attn: Rob Manriquez
Co: Tetra Tech
Address: 1230 Columbia St #1100
City San Diego State CA Zip 92101

Bill To:
Attn: Dano
Co:
Address:
City State Zip

Special Instructions/Comments:
Email when ready to
chit.christan@tetratech.com
Becki.Dano@tetratech.com
Lisa.medus@tetratech.com

Sample/Records-Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $ 2.00 / sample / mo (after 45 days)
- Records : $ 1.00 / ATL workorder / mo (after 1 year)

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8260B (VOC)	8260B (BTEX),(MTBE)	8015B (GRO)	8015B (DRO),(Motor Oil/ORO)	RCRA8 (6010B/7000)	Arsenic	Mercury (CAM 17)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	N010153-1	CMT-1-1	5/1	1014	X					X	X			X			C	5	mi/lf		
	-2	CMT-1-2	5/1	1124	X					X	X			X			C	5	mi/lf		
	-3	CMT-1-3	5/1	1219	X					X	X			X			C	5	mi/lf		
	-4	CMT-1-4	5/1	1259	X					X	X			X			C	5	mi/lf		
	-5	CMT-1-5	5/1	1346	X					X	X			X			C	5	mi/lf		
	-6	CMT-1-6	5/1	1436	X					X	X			X			C	5	mi/lf		
	-7	CMT-1-7	5/1	1511	X					X	X			X			C	5	mi/lf		
	-8	MW-20D1	5/1	1557	X					X	X			X			C	5	mi/lf		
	-9	MW-20D2	5/1	1635	X					X	X			X			C	5	mi/lf		
	-10	MW-20D3	5/1	1725	X					X	X			X			C	5	mi/lf		

QA/QC: RTNE ☐ CT ☐ RWQCB ☐ LEVEL IV ____ OTHER ____

•TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: ☐ A= Overnight ≤ 24 hr ☐ B= Emergency Next workday ☐ C= Critical 2 Workdays ☐ D= Urgent 3 Workdays ☐ E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories, Inc.
3151-3153 W. Post Rd.
Las Vegas, NV 89118
Tel:(702) 307-2659•Fax:(702) 307-2691

FOR LABORATORY USE ONLY:

P.O.# 103P172829.01
Logged By: BDANO Date: 5-1/2-13

Method of Transport
Client ☐
ATL INC ☐
FEDEX ☐
Other:

Sample Condition Upon Receipt
1. CHILLED 3.8 | 1.2 Y☒ N☐ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐
3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: Tetra Tech
Attn: Rob Munriquez
Address: 1230 Columbia St #1000
City San Diego State CA Zip Code 92101
TEL:( )
FAX:( )

Project Name: Mumland Square Project #: 103P172829.01
Sampler: Becki DANO
I attest to the validity and authenticity of this sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action. (Printed Name) (Signature)

Relinquished by: (Signature and Printed name) Becki DANO	Date: 5/2/13	Time: 1459	Received by: (Signature and Printed name) Hersey SAYLES	Date: 5/2/13	Time: 1459
Relinquished by: (Signature and Printed name) Hersey SAYLES	Date: 5/2/13	Time: 1315	Received by: (Signature and Printed name) Hersey SAYLES	Date: 5/2/13	Time: 1315
Relinquished by: (Signature and Printed name)	Date:	Time:	Received by: (Signature and Printed name)	Date:	Time:

I hereby authorize ATL INC to perform the work indicated below:
Project Mgr/Submitter: Becki DANO 5/2/13
Print Name Date
Signature

Send Report To:
Attn: Rob Munriquez
Co: Tetra Tech
Address: 1230 Columbia St #1000
City San Diego State CA Zip 92101

Bill To:
Attn:
Co:
Address:
City State Zip

Special Instructions/Comments:
See page 1

Sample/Records-Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

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- Sample : $ 2.00 / sample / mo (after 45 days)
- Records : $ 1.00 / ATL workorder / mo (after 1 year)

ITEM	LAB USE ONLY: Batch #: Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8260B (VOC)	8260B (BTEX),(MTBE)	8015B (GRO)	8015B (DRO),(Motor Oil/ORO)	RCRA8 (6010B/7000)	CAM17 Metals (Dissolved)	Perchlorate (Dissolved)	Dissolved Methane, Ethane, Ethene (RSK-175 Mod)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	K1010153-11	MW-2D	5/2	0917	X					X	X	X		W			C	5	mv/a		
	-12	MW-19	5/2	1142	X					X	X	X		W			C	5	mv/a		
	-13	MW-19D1	5/2	1052	X					X	X	X		W			C	5	mv/a		
	-14	MW-19I	5/2	1005	X					X	X	X		W			C	5	mv/a		
	-15	PT-WATER	5/2	1240	X									W	X	X	C	3	mv/a		ICE ONLY

QA/QC: RTNE ☐ CT ☐ RWQCB ☐ LEVEL IV ☐ OTHER

•TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: ☐ A= Overnight ≤ 24 hr ☐ B= Emergency Next workday ☐ C= Critical 2 Workdays ☐ D= Urgent 3 Workdays ☐ E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter

Advanced Technology Laboratories, Inc.

Please review the checklist below. Any NO signifies non-compliance. Any non-compliance will be noted and must be understood as having an impact on the quality of the data. All tests will be performed as requested regardless of any compliance issues.

If you have any questions or further instruction, please contact our Project Coordinator at (702) 307-2659.

Cooler Received/Opened On:	5/2/2013	Workorder:	N010153
Rep sample Temp (Deg C):	3.8	IR Gun ID:	1
Temp Blank:	☐ Yes ☑ No		
Carrier name:	ATL		
Last 4 digits of Tracking No.:	N/A	Packing Material Used:	None
Cooling process:	☑ Ice ☐ Ice Pack ☐ Dry Ice ☐ Other ☐ None		

Sample Receipt Checklist

1. Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
2. Custody seals intact, signed, dated on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
3. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
4. Chain of custody present?	Yes ☑	No ☐	
5. Sampler's name present in COC?	Yes ☑	No ☐	
6. Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
7. Chain of custody agrees with sample labels?	Yes ☑	No ☐	
8. Samples in proper container/bottle?	Yes ☑	No ☐	
9. Sample containers intact?	Yes ☑	No ☐	
10. Sufficient sample volume for indicated test?	Yes ☑	No ☐	
11. All samples received within holding time?	Yes ☑	No ☐	
12. Temperature of rep sample or Temp Blank within acceptable limit?	Yes ☑	No ☐	NA ☐
13. Water - VOA vials have zero headspace?	Yes ☑	No ☐	NA ☐
14. Water - pH acceptable upon receipt? Example: pH > 12 for (CN,S); pH<2 for Metals	Yes ☑	No ☐	NA ☐
15. Did the bottle labels indicate correct preservatives used?	Yes ☑	No ☐	NA ☐
16. Were there Non-Conformance issues at login?	Yes ☐	No ☐	NA ☑
Was Client notified?	Yes ☐	No ☐	NA ☑

Comments:

Checklist Completed B MBC MBC 5/2/13

Reviewed By:

April 04, 2013

Rob Manriquez
Tetra Tech
1230 Columbia Street, Suite 1000
San Diego, CA 92101
TEL: (858) 527-8803
FAX:

CA-ELAP No.:2676
NV Cert. No.:NV-009222007A

Workorder No.: N009889

RE: Maryland Square, 103P172829.01

Attention: Rob Manriquez

Enclosed are the results for sample(s) received on March 26, 2013 by Advanced Technology Laboratories, Inc. . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (702) 307-2659 if I can be of further assistance to your company.

Sincerely,

Jose Tenorio Jr.
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories - Las Vegas.

CLIENT: Tetra Tech
Project: Maryland Square, 103P172829.01
Lab Order: N009889

CASE NARRATIVE

SAMPLE RECEIVING/GENERAL COMMENTS:

Samples were received intact with proper chain of custody documentation.

Cooler temperature and sample preservation were verified upon receipt of samples if applicable.

Information on sample receipt conditions including discrepancies can be found in attached Sample Receipt Checklist Form.

Samples were analyzed within method holding time.

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Lab Order: N009889
Project: Maryland Square, 103P172829.01
Lab ID: N009889-001

Client Sample ID: CMT-1-1
Collection Date: 3/25/2013 11:41:00 AM
Matrix: GROUNDWATER

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS5_130331A QC Batch: P13VW053 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2013 12:10 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/31/2013 12:10 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2013 12:10 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/31/2013 12:10 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/31/2013 12:10 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/31/2013 12:10 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/31/2013 12:10 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2013 12:10 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/31/2013 12:10 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2013 12:10 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2013 12:10 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	3/31/2013 12:10 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/31/2013 12:10 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2013 12:10 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/31/2013 12:10 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2013 12:10 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2013 12:10 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2013 12:10 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/31/2013 12:10 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2013 12:10 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2013 12:10 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/31/2013 12:10 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/31/2013 12:10 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/31/2013 12:10 PM
Benzene	ND	0.50		µg/L	1	3/31/2013 12:10 PM
Bromobenzene	ND	0.50		µg/L	1	3/31/2013 12:10 PM
Bromodichloromethane	ND	0.50		µg/L	1	3/31/2013 12:10 PM
Bromoform	ND	0.50		µg/L	1	3/31/2013 12:10 PM
Bromomethane	0.54	0.50		µg/L	1	3/31/2013 12:10 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/31/2013 12:10 PM
Chlorobenzene	ND	0.50		µg/L	1	3/31/2013 12:10 PM
Chloroethane	ND	0.50		µg/L	1	3/31/2013 12:10 PM
Chloroform	ND	0.50		µg/L	1	3/31/2013 12:10 PM
Chloromethane	ND	0.50		µg/L	1	3/31/2013 12:10 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	3/31/2013 12:10 PM
Dibromochloromethane	ND	0.50		µg/L	1	3/31/2013 12:10 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Tetra Tech	**Client Sample ID:**	CMT-1-1
Lab Order:	N009889	**Collection Date:**	3/25/2013 11:41:00 AM
Project:	Maryland Square, 103P172829.01	**Matrix:**	GROUNDWATER
Lab ID:	N009889-001		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS5_130331A	QC Batch: P13VW053			PrepDate:		Analyst: **QBM**
Dibromomethane	ND	0.50		µg/L	1	3/31/2013 12:10 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/31/2013 12:10 PM
Ethylbenzene	ND	0.50		µg/L	1	3/31/2013 12:10 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/31/2013 12:10 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/31/2013 12:10 PM
m,p-Xylene	ND	1.0		µg/L	1	3/31/2013 12:10 PM
Methylene chloride	ND	2.0		µg/L	1	3/31/2013 12:10 PM
MTBE	ND	0.50		µg/L	1	3/31/2013 12:10 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/31/2013 12:10 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/31/2013 12:10 PM
Naphthalene	ND	0.50		µg/L	1	3/31/2013 12:10 PM
o-Xylene	ND	0.50		µg/L	1	3/31/2013 12:10 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/31/2013 12:10 PM
Styrene	1.4	0.50		µg/L	1	3/31/2013 12:10 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/31/2013 12:10 PM
Tetrachloroethene	4.7	0.50		µg/L	1	3/31/2013 12:10 PM
Toluene	0.50	0.50		µg/L	1	3/31/2013 12:10 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/31/2013 12:10 PM
Trichloroethene	ND	0.50		µg/L	1	3/31/2013 12:10 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/31/2013 12:10 PM
Vinyl chloride	ND	0.50		µg/L	1	3/31/2013 12:10 PM
Surr: 1,2-Dichloroethane-d4	103	56-120		%REC	1	3/31/2013 12:10 PM
Surr: 4-Bromofluorobenzene	94.7	80-120		%REC	1	3/31/2013 12:10 PM
Surr: Dibromofluoromethane	107	72-120		%REC	1	3/31/2013 12:10 PM
Surr: Toluene-d8	100	80-123		%REC	1	3/31/2013 12:10 PM
ANIONS BY ION CHROMATOGRAPHY						
		EPA 300.0				
RunID: IC2_130328A	QC Batch: R88230			PrepDate:		Analyst: **QBM**
Chloride	200	25		mg/L	50	3/28/2013 05:47 PM
ICP-MS METALS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130402A	QC Batch: 42550			PrepDate:	3/28/2013	Analyst: **CEI**
Arsenic	4.0	0.10		µg/L	1	4/2/2013 12:39 PM
Chromium	ND	1.0		µg/L	1	4/2/2013 12:39 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N009889
Project: Maryland Square, 103P172829.01
Lab ID: N009889-002

Client Sample ID: CMT-1-2
Collection Date: 3/25/2013 1:00:00 PM
Matrix: GROUNDWATER

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS5_130331A QC Batch: P13VW053 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2013 12:39 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/31/2013 12:39 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2013 12:39 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/31/2013 12:39 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/31/2013 12:39 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/31/2013 12:39 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/31/2013 12:39 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2013 12:39 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/31/2013 12:39 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2013 12:39 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2013 12:39 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	3/31/2013 12:39 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/31/2013 12:39 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2013 12:39 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/31/2013 12:39 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2013 12:39 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2013 12:39 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2013 12:39 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/31/2013 12:39 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2013 12:39 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2013 12:39 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/31/2013 12:39 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/31/2013 12:39 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/31/2013 12:39 PM
Benzene	ND	0.50		µg/L	1	3/31/2013 12:39 PM
Bromobenzene	ND	0.50		µg/L	1	3/31/2013 12:39 PM
Bromodichloromethane	ND	0.50		µg/L	1	3/31/2013 12:39 PM
Bromoform	ND	0.50		µg/L	1	3/31/2013 12:39 PM
Bromomethane	ND	0.50		µg/L	1	3/31/2013 12:39 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/31/2013 12:39 PM
Chlorobenzene	ND	0.50		µg/L	1	3/31/2013 12:39 PM
Chloroethane	ND	0.50		µg/L	1	3/31/2013 12:39 PM
Chloroform	ND	0.50		µg/L	1	3/31/2013 12:39 PM
Chloromethane	ND	0.50		µg/L	1	3/31/2013 12:39 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	3/31/2013 12:39 PM
Dibromochloromethane	ND	0.50		µg/L	1	3/31/2013 12:39 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT:	Tetra Tech	**Client Sample ID:**	CMT-1-2
Lab Order:	N009889	**Collection Date:**	3/25/2013 1:00:00 PM
Project:	Maryland Square, 103P172829.01	**Matrix:**	GROUNDWATER
Lab ID:	N009889-002		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS5_130331A	QC Batch: P13VW053			PrepDate:		Analyst: **QBM**
Dibromomethane	ND	0.50		µg/L	1	3/31/2013 12:39 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/31/2013 12:39 PM
Ethylbenzene	ND	0.50		µg/L	1	3/31/2013 12:39 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/31/2013 12:39 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/31/2013 12:39 PM
m,p-Xylene	ND	1.0		µg/L	1	3/31/2013 12:39 PM
Methylene chloride	ND	2.0		µg/L	1	3/31/2013 12:39 PM
MTBE	ND	0.50		µg/L	1	3/31/2013 12:39 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/31/2013 12:39 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/31/2013 12:39 PM
Naphthalene	ND	0.50		µg/L	1	3/31/2013 12:39 PM
o-Xylene	ND	0.50		µg/L	1	3/31/2013 12:39 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/31/2013 12:39 PM
Styrene	0.72	0.50		µg/L	1	3/31/2013 12:39 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/31/2013 12:39 PM
Tetrachloroethene	48	0.50		µg/L	1	3/31/2013 12:39 PM
Toluene	ND	0.50		µg/L	1	3/31/2013 12:39 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/31/2013 12:39 PM
Trichloroethene	3.1	0.50		µg/L	1	3/31/2013 12:39 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/31/2013 12:39 PM
Vinyl chloride	ND	0.50		µg/L	1	3/31/2013 12:39 PM
Surr: 1,2-Dichloroethane-d4	98.8	56-120		%REC	1	3/31/2013 12:39 PM
Surr: 4-Bromofluorobenzene	96.2	80-120		%REC	1	3/31/2013 12:39 PM
Surr: Dibromofluoromethane	103	72-120		%REC	1	3/31/2013 12:39 PM
Surr: Toluene-d8	98.6	80-123		%REC	1	3/31/2013 12:39 PM
ANIONS BY ION CHROMATOGRAPHY						
		EPA 300.0				
RunID: IC2_130328A	QC Batch: R88230			PrepDate:		Analyst: **QBM**
Chloride	200	25		mg/L	50	3/28/2013 06:24 PM
ICP-MS METALS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130402A	QC Batch: 42550			PrepDate:	3/28/2013	Analyst: **CEI**
Arsenic	14	0.10		µg/L	1	4/2/2013 12:45 PM
Chromium	ND	1.0		µg/L	1	4/2/2013 12:45 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Lab Order: N009889
Project: Maryland Square, 103P172829.01
Lab ID: N009889-003

Client Sample ID: CMT-1-3
Collection Date: 3/25/2013 2:45:00 PM
Matrix: GROUNDWATER

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS5_130331A QC Batch: P13VW053 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2013 01:08 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/31/2013 01:08 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2013 01:08 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/31/2013 01:08 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/31/2013 01:08 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/31/2013 01:08 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/31/2013 01:08 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2013 01:08 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/31/2013 01:08 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2013 01:08 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2013 01:08 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	3/31/2013 01:08 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/31/2013 01:08 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2013 01:08 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/31/2013 01:08 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2013 01:08 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2013 01:08 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2013 01:08 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/31/2013 01:08 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2013 01:08 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2013 01:08 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/31/2013 01:08 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/31/2013 01:08 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/31/2013 01:08 PM
Benzene	ND	0.50		µg/L	1	3/31/2013 01:08 PM
Bromobenzene	ND	0.50		µg/L	1	3/31/2013 01:08 PM
Bromodichloromethane	ND	0.50		µg/L	1	3/31/2013 01:08 PM
Bromoform	ND	0.50		µg/L	1	3/31/2013 01:08 PM
Bromomethane	ND	0.50		µg/L	1	3/31/2013 01:08 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/31/2013 01:08 PM
Chlorobenzene	ND	0.50		µg/L	1	3/31/2013 01:08 PM
Chloroethane	ND	0.50		µg/L	1	3/31/2013 01:08 PM
Chloroform	1.2	0.50		µg/L	1	3/31/2013 01:08 PM
Chloromethane	ND	0.50		µg/L	1	3/31/2013 01:08 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	3/31/2013 01:08 PM
Dibromochloromethane	ND	0.50		µg/L	1	3/31/2013 01:08 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Tetra Tech	**Client Sample ID:**	CMT-1-3
Lab Order:	N009889	**Collection Date:**	3/25/2013 2:45:00 PM
Project:	Maryland Square, 103P172829.01	**Matrix:**	GROUNDWATER
Lab ID:	N009889-003		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_130331A	QC Batch: P13VW053			PrepDate:		Analyst: **QBM**
Dibromomethane	ND	0.50		µg/L	1	3/31/2013 01:08 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/31/2013 01:08 PM
Ethylbenzene	ND	0.50		µg/L	1	3/31/2013 01:08 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/31/2013 01:08 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/31/2013 01:08 PM
m,p-Xylene	ND	1.0		µg/L	1	3/31/2013 01:08 PM
Methylene chloride	ND	2.0		µg/L	1	3/31/2013 01:08 PM
MTBE	ND	0.50		µg/L	1	3/31/2013 01:08 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/31/2013 01:08 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/31/2013 01:08 PM
Naphthalene	ND	0.50		µg/L	1	3/31/2013 01:08 PM
o-Xylene	ND	0.50		µg/L	1	3/31/2013 01:08 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/31/2013 01:08 PM
Styrene	ND	0.50		µg/L	1	3/31/2013 01:08 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/31/2013 01:08 PM
Tetrachloroethene	270	5.0		µg/L	10	4/1/2013 12:41 PM
Toluene	ND	0.50		µg/L	1	3/31/2013 01:08 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/31/2013 01:08 PM
Trichloroethene	1.6	0.50		µg/L	1	3/31/2013 01:08 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/31/2013 01:08 PM
Vinyl chloride	ND	0.50		µg/L	1	3/31/2013 01:08 PM
Surr: 1,2-Dichloroethane-d4	101	56-120		%REC	1	3/31/2013 01:08 PM
Surr: 1,2-Dichloroethane-d4	99.8	56-120		%REC	10	4/1/2013 12:41 PM
Surr: 4-Bromofluorobenzene	95.2	80-120		%REC	1	3/31/2013 01:08 PM
Surr: 4-Bromofluorobenzene	93.2	80-120		%REC	10	4/1/2013 12:41 PM
Surr: Dibromofluoromethane	105	72-120		%REC	10	4/1/2013 12:41 PM
Surr: Dibromofluoromethane	105	72-120		%REC	1	3/31/2013 01:08 PM
Surr: Toluene-d8	98.3	80-123		%REC	10	4/1/2013 12:41 PM
Surr: Toluene-d8	100	80-123		%REC	1	3/31/2013 01:08 PM
ANIONS BY ION CHROMATOGRAPHY				**EPA 300.0**		
RunID: IC2_130328A	QC Batch: R88230			PrepDate:		Analyst: **QBM**
Chloride	170	25		mg/L	50	3/28/2013 06:37 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Tetra Tech	**Client Sample ID:**	CMT-1-3
Lab Order:	N009889	**Collection Date:**	3/25/2013 2:45:00 PM
Project:	Maryland Square, 103P172829.01	**Matrix:**	GROUNDWATER
Lab ID:	N009889-003		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP-MS METALS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130402A	QC Batch: 42550			PrepDate:	3/28/2013	Analyst: **CEI**
Arsenic	2.5	0.10		µg/L	1	4/2/2013 12:51 PM
Chromium	3.2	1.0		µg/L	1	4/2/2013 12:51 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N009889
Project: Maryland Square, 103P172829.01
Lab ID: N009889-004

Client Sample ID: CMT-1-4
Collection Date: 3/25/2013 4:28:00 PM
Matrix: GROUNDWATER

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS5_130331A QC Batch: P13VW053 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2013 01:37 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/31/2013 01:37 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2013 01:37 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/31/2013 01:37 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/31/2013 01:37 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/31/2013 01:37 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/31/2013 01:37 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2013 01:37 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/31/2013 01:37 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2013 01:37 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2013 01:37 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	3/31/2013 01:37 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/31/2013 01:37 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2013 01:37 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/31/2013 01:37 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2013 01:37 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2013 01:37 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2013 01:37 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/31/2013 01:37 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2013 01:37 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2013 01:37 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/31/2013 01:37 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/31/2013 01:37 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/31/2013 01:37 PM
Benzene	ND	0.50		µg/L	1	3/31/2013 01:37 PM
Bromobenzene	ND	0.50		µg/L	1	3/31/2013 01:37 PM
Bromodichloromethane	ND	0.50		µg/L	1	3/31/2013 01:37 PM
Bromoform	ND	0.50		µg/L	1	3/31/2013 01:37 PM
Bromomethane	ND	0.50		µg/L	1	3/31/2013 01:37 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/31/2013 01:37 PM
Chlorobenzene	ND	0.50		µg/L	1	3/31/2013 01:37 PM
Chloroethane	ND	0.50		µg/L	1	3/31/2013 01:37 PM
Chloroform	1.1	0.50		µg/L	1	3/31/2013 01:37 PM
Chloromethane	ND	0.50		µg/L	1	3/31/2013 01:37 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	3/31/2013 01:37 PM
Dibromochloromethane	ND	0.50		µg/L	1	3/31/2013 01:37 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT: Tetra Tech
Lab Order: N009889
Project: Maryland Square, 103P172829.01
Lab ID: N009889-004

Client Sample ID: CMT-1-4
Collection Date: 3/25/2013 4:28:00 PM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_130331A	QC Batch: P13VW053			PrepDate:		Analyst: **QBM**
Dibromomethane	ND	0.50		µg/L	1	3/31/2013 01:37 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/31/2013 01:37 PM
Ethylbenzene	ND	0.50		µg/L	1	3/31/2013 01:37 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/31/2013 01:37 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/31/2013 01:37 PM
m,p-Xylene	ND	1.0		µg/L	1	3/31/2013 01:37 PM
Methylene chloride	ND	2.0		µg/L	1	3/31/2013 01:37 PM
MTBE	ND	0.50		µg/L	1	3/31/2013 01:37 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/31/2013 01:37 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/31/2013 01:37 PM
Naphthalene	ND	0.50		µg/L	1	3/31/2013 01:37 PM
o-Xylene	ND	0.50		µg/L	1	3/31/2013 01:37 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/31/2013 01:37 PM
Styrene	ND	0.50		µg/L	1	3/31/2013 01:37 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/31/2013 01:37 PM
Tetrachloroethene	310	5.0		µg/L	10	4/1/2013 01:10 PM
Toluene	ND	0.50		µg/L	1	3/31/2013 01:37 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/31/2013 01:37 PM
Trichloroethene	1.6	0.50		µg/L	1	3/31/2013 01:37 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/31/2013 01:37 PM
Vinyl chloride	ND	0.50		µg/L	1	3/31/2013 01:37 PM
Surr: 1,2-Dichloroethane-d4	101	56-120		%REC	1	3/31/2013 01:37 PM
Surr: 1,2-Dichloroethane-d4	103	56-120		%REC	10	4/1/2013 01:10 PM
Surr: 4-Bromofluorobenzene	93.5	80-120		%REC	1	3/31/2013 01:37 PM
Surr: 4-Bromofluorobenzene	92.7	80-120		%REC	10	4/1/2013 01:10 PM
Surr: Dibromofluoromethane	103	72-120		%REC	10	4/1/2013 01:10 PM
Surr: Dibromofluoromethane	104	72-120		%REC	1	3/31/2013 01:37 PM
Surr: Toluene-d8	97.0	80-123		%REC	10	4/1/2013 01:10 PM
Surr: Toluene-d8	99.6	80-123		%REC	1	3/31/2013 01:37 PM
ANIONS BY ION CHROMATOGRAPHY				**EPA 300.0**		
RunID: IC2_130328A	QC Batch: R88230			PrepDate:		Analyst: **QBM**
Chloride	160	25		mg/L	50	3/28/2013 06:50 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Tetra Tech	**Client Sample ID:**	CMT-1-4
Lab Order:	N009889	**Collection Date:**	3/25/2013 4:28:00 PM
Project:	Maryland Square, 103P172829.01	**Matrix:**	GROUNDWATER
Lab ID:	N009889-004		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP-MS METALS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130402A	QC Batch: 42550			PrepDate:	3/28/2013	Analyst: **CEI**
Arsenic	2.4	0.10		µg/L	1	4/2/2013 12:57 PM
Chromium	ND	1.0		µg/L	1	4/2/2013 12:57 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	CMT-1-5
Lab Order:	N009889	**Collection Date:**	3/25/2013 6:00:00 PM
Project:	Maryland Square, 103P172829.01	**Matrix:**	GROUNDWATER
Lab ID:	N009889-005		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_130331A	QC Batch: P13VW053			PrepDate:		Analyst: **QBM**
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2013 02:06 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/31/2013 02:06 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2013 02:06 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/31/2013 02:06 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/31/2013 02:06 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/31/2013 02:06 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/31/2013 02:06 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2013 02:06 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/31/2013 02:06 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2013 02:06 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2013 02:06 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	3/31/2013 02:06 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/31/2013 02:06 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2013 02:06 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/31/2013 02:06 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2013 02:06 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2013 02:06 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2013 02:06 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/31/2013 02:06 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2013 02:06 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2013 02:06 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/31/2013 02:06 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/31/2013 02:06 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/31/2013 02:06 PM
Benzene	ND	0.50		µg/L	1	3/31/2013 02:06 PM
Bromobenzene	ND	0.50		µg/L	1	3/31/2013 02:06 PM
Bromodichloromethane	ND	0.50		µg/L	1	3/31/2013 02:06 PM
Bromoform	ND	0.50		µg/L	1	3/31/2013 02:06 PM
Bromomethane	ND	0.50		µg/L	1	3/31/2013 02:06 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/31/2013 02:06 PM
Chlorobenzene	ND	0.50		µg/L	1	3/31/2013 02:06 PM
Chloroethane	ND	0.50		µg/L	1	3/31/2013 02:06 PM
Chloroform	1.0	0.50		µg/L	1	3/31/2013 02:06 PM
Chloromethane	ND	0.50		µg/L	1	3/31/2013 02:06 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	3/31/2013 02:06 PM
Dibromochloromethane	ND	0.50		µg/L	1	3/31/2013 02:06 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Lab Order: N009889
Project: Maryland Square, 103P172829.01
Lab ID: N009889-005

Client Sample ID: CMT-1-5
Collection Date: 3/25/2013 6:00:00 PM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_130331A	QC Batch: P13VW053			PrepDate:		Analyst: **QBM**
Dibromomethane	ND	0.50		µg/L	1	3/31/2013 02:06 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/31/2013 02:06 PM
Ethylbenzene	ND	0.50		µg/L	1	3/31/2013 02:06 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/31/2013 02:06 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/31/2013 02:06 PM
m,p-Xylene	ND	1.0		µg/L	1	3/31/2013 02:06 PM
Methylene chloride	ND	2.0		µg/L	1	3/31/2013 02:06 PM
MTBE	ND	0.50		µg/L	1	3/31/2013 02:06 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/31/2013 02:06 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/31/2013 02:06 PM
Naphthalene	ND	0.50		µg/L	1	3/31/2013 02:06 PM
o-Xylene	ND	0.50		µg/L	1	3/31/2013 02:06 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/31/2013 02:06 PM
Styrene	ND	0.50		µg/L	1	3/31/2013 02:06 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/31/2013 02:06 PM
Tetrachloroethene	280	5.0		µg/L	10	4/1/2013 01:39 PM
Toluene	ND	0.50		µg/L	1	3/31/2013 02:06 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/31/2013 02:06 PM
Trichloroethene	2.4	0.50		µg/L	1	3/31/2013 02:06 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/31/2013 02:06 PM
Vinyl chloride	ND	0.50		µg/L	1	3/31/2013 02:06 PM
Surr: 1,2-Dichloroethane-d4	103	56-120		%REC	1	3/31/2013 02:06 PM
Surr: 1,2-Dichloroethane-d4	102	56-120		%REC	10	4/1/2013 01:39 PM
Surr: 4-Bromofluorobenzene	93.4	80-120		%REC	1	3/31/2013 02:06 PM
Surr: 4-Bromofluorobenzene	93.9	80-120		%REC	10	4/1/2013 01:39 PM
Surr: Dibromofluoromethane	107	72-120		%REC	10	4/1/2013 01:39 PM
Surr: Dibromofluoromethane	104	72-120		%REC	1	3/31/2013 02:06 PM
Surr: Toluene-d8	101	80-123		%REC	10	4/1/2013 01:39 PM
Surr: Toluene-d8	100	80-123		%REC	1	3/31/2013 02:06 PM
ANIONS BY ION CHROMATOGRAPHY				**EPA 300.0**		
RunID: IC2_130328A	QC Batch: R88230			PrepDate:		Analyst: **QBM**
Chloride	170	25		mg/L	50	3/28/2013 07:02 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Tetra Tech	**Client Sample ID:**	CMT-1-5
Lab Order:	N009889	**Collection Date:**	3/25/2013 6:00:00 PM
Project:	Maryland Square, 103P172829.01	**Matrix:**	GROUNDWATER
Lab ID:	N009889-005		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP-MS METALS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130402A	QC Batch: 42550			PrepDate:	3/28/2013	Analyst: **CEI**
Arsenic	4.1	0.10		µg/L	1	4/2/2013 01:21 PM
Chromium	ND	1.0		µg/L	1	4/2/2013 01:21 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Lab Order: N009889
Project: Maryland Square, 103P172829.01
Lab ID: N009889-006

Client Sample ID: CMT-1-6
Collection Date: 3/25/2013 7:15:00 PM
Matrix: GROUNDWATER

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS5_130331A QC Batch: P13VW053 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2013 02:35 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/31/2013 02:35 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2013 02:35 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/31/2013 02:35 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/31/2013 02:35 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/31/2013 02:35 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/31/2013 02:35 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2013 02:35 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/31/2013 02:35 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2013 02:35 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2013 02:35 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	3/31/2013 02:35 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/31/2013 02:35 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2013 02:35 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/31/2013 02:35 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2013 02:35 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2013 02:35 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2013 02:35 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/31/2013 02:35 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2013 02:35 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2013 02:35 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/31/2013 02:35 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/31/2013 02:35 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/31/2013 02:35 PM
Benzene	ND	0.50		µg/L	1	3/31/2013 02:35 PM
Bromobenzene	ND	0.50		µg/L	1	3/31/2013 02:35 PM
Bromodichloromethane	ND	0.50		µg/L	1	3/31/2013 02:35 PM
Bromoform	ND	0.50		µg/L	1	3/31/2013 02:35 PM
Bromomethane	ND	0.50		µg/L	1	3/31/2013 02:35 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/31/2013 02:35 PM
Chlorobenzene	ND	0.50		µg/L	1	3/31/2013 02:35 PM
Chloroethane	ND	0.50		µg/L	1	3/31/2013 02:35 PM
Chloroform	1.8	0.50		µg/L	1	3/31/2013 02:35 PM
Chloromethane	ND	0.50		µg/L	1	3/31/2013 02:35 PM
cis-1,2-Dichloroethene	1.7	0.50		µg/L	1	3/31/2013 02:35 PM
Dibromochloromethane	ND	0.50		µg/L	1	3/31/2013 02:35 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N009889
Project: Maryland Square, 103P172829.01
Lab ID: N009889-006

Client Sample ID: CMT-1-6
Collection Date: 3/25/2013 7:15:00 PM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_130331A	QC Batch: P13VW053			PrepDate:		Analyst: **QBM**
Dibromomethane	ND	0.50		µg/L	1	3/31/2013 02:35 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/31/2013 02:35 PM
Ethylbenzene	ND	0.50		µg/L	1	3/31/2013 02:35 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/31/2013 02:35 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/31/2013 02:35 PM
m,p-Xylene	ND	1.0		µg/L	1	3/31/2013 02:35 PM
Methylene chloride	ND	2.0		µg/L	1	3/31/2013 02:35 PM
MTBE	ND	0.50		µg/L	1	3/31/2013 02:35 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/31/2013 02:35 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/31/2013 02:35 PM
Naphthalene	ND	0.50		µg/L	1	3/31/2013 02:35 PM
o-Xylene	ND	0.50		µg/L	1	3/31/2013 02:35 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/31/2013 02:35 PM
Styrene	ND	0.50		µg/L	1	3/31/2013 02:35 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/31/2013 02:35 PM
Tetrachloroethene	390	5.0		µg/L	10	4/1/2013 02:08 PM
Toluene	ND	0.50		µg/L	1	3/31/2013 02:35 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/31/2013 02:35 PM
Trichloroethene	4.1	0.50		µg/L	1	3/31/2013 02:35 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/31/2013 02:35 PM
Vinyl chloride	ND	0.50		µg/L	1	3/31/2013 02:35 PM
Surr: 1,2-Dichloroethane-d4	101	56-120		%REC	1	3/31/2013 02:35 PM
Surr: 1,2-Dichloroethane-d4	101	56-120		%REC	10	4/1/2013 02:08 PM
Surr: 4-Bromofluorobenzene	94.4	80-120		%REC	1	3/31/2013 02:35 PM
Surr: 4-Bromofluorobenzene	93.2	80-120		%REC	10	4/1/2013 02:08 PM
Surr: Dibromofluoromethane	103	72-120		%REC	10	4/1/2013 02:08 PM
Surr: Dibromofluoromethane	105	72-120		%REC	1	3/31/2013 02:35 PM
Surr: Toluene-d8	98.5	80-123		%REC	10	4/1/2013 02:08 PM
Surr: Toluene-d8	99.6	80-123		%REC	1	3/31/2013 02:35 PM
ANIONS BY ION CHROMATOGRAPHY				**EPA 300.0**		
RunID: IC2_130328A	QC Batch: R88230			PrepDate:		Analyst: **QBM**
Chloride	160	25		mg/L	50	3/28/2013 07:15 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Tetra Tech	**Client Sample ID:**	CMT-1-6
Lab Order:	N009889	**Collection Date:**	3/25/2013 7:15:00 PM
Project:	Maryland Square, 103P172829.01	**Matrix:**	GROUNDWATER
Lab ID:	N009889-006		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP-MS METALS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130402A	QC Batch: 42550			PrepDate:	3/28/2013	Analyst: **CEI**
Arsenic	1.5	0.10		µg/L	1	4/2/2013 01:27 PM
Chromium	ND	1.0		µg/L	1	4/2/2013 01:27 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	CMT-1-7
Lab Order:	N009889	**Collection Date:**	3/25/2013 8:55:00 PM
Project:	Maryland Square, 103P172829.01	**Matrix:**	GROUNDWATER
Lab ID:	N009889-007		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_130331A	QC Batch: P13VW053			PrepDate:		Analyst: **QBM**
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2013 03:04 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/31/2013 03:04 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2013 03:04 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/31/2013 03:04 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/31/2013 03:04 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/31/2013 03:04 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/31/2013 03:04 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2013 03:04 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/31/2013 03:04 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2013 03:04 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2013 03:04 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	3/31/2013 03:04 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/31/2013 03:04 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2013 03:04 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/31/2013 03:04 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2013 03:04 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2013 03:04 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2013 03:04 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/31/2013 03:04 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2013 03:04 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2013 03:04 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/31/2013 03:04 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/31/2013 03:04 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/31/2013 03:04 PM
Benzene	ND	0.50		µg/L	1	3/31/2013 03:04 PM
Bromobenzene	ND	0.50		µg/L	1	3/31/2013 03:04 PM
Bromodichloromethane	ND	0.50		µg/L	1	3/31/2013 03:04 PM
Bromoform	ND	0.50		µg/L	1	3/31/2013 03:04 PM
Bromomethane	ND	0.50		µg/L	1	3/31/2013 03:04 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/31/2013 03:04 PM
Chlorobenzene	ND	0.50		µg/L	1	3/31/2013 03:04 PM
Chloroethane	ND	0.50		µg/L	1	3/31/2013 03:04 PM
Chloroform	2.3	0.50		µg/L	1	3/31/2013 03:04 PM
Chloromethane	ND	0.50		µg/L	1	3/31/2013 03:04 PM
cis-1,2-Dichloroethene	6.0	0.50		µg/L	1	3/31/2013 03:04 PM
Dibromochloromethane	ND	0.50		µg/L	1	3/31/2013 03:04 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	CMT-1-7
Lab Order:	N009889	**Collection Date:**	3/25/2013 8:55:00 PM
Project:	Maryland Square, 103P172829.01	**Matrix:**	GROUNDWATER
Lab ID:	N009889-007		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_130331A	QC Batch: P13VW053			PrepDate:		Analyst: **QBM**
Dibromomethane	ND	0.50		µg/L	1	3/31/2013 03:04 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/31/2013 03:04 PM
Ethylbenzene	ND	0.50		µg/L	1	3/31/2013 03:04 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/31/2013 03:04 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/31/2013 03:04 PM
m,p-Xylene	ND	1.0		µg/L	1	3/31/2013 03:04 PM
Methylene chloride	ND	2.0		µg/L	1	3/31/2013 03:04 PM
MTBE	ND	0.50		µg/L	1	3/31/2013 03:04 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/31/2013 03:04 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/31/2013 03:04 PM
Naphthalene	ND	0.50		µg/L	1	3/31/2013 03:04 PM
o-Xylene	ND	0.50		µg/L	1	3/31/2013 03:04 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/31/2013 03:04 PM
Styrene	ND	0.50		µg/L	1	3/31/2013 03:04 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/31/2013 03:04 PM
Tetrachloroethene	1200	25		µg/L	50	4/1/2013 02:37 PM
Toluene	ND	0.50		µg/L	1	3/31/2013 03:04 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/31/2013 03:04 PM
Trichloroethene	9.5	0.50		µg/L	1	3/31/2013 03:04 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/31/2013 03:04 PM
Vinyl chloride	ND	0.50		µg/L	1	3/31/2013 03:04 PM
Surr: 1,2-Dichloroethane-d4	99.8	56-120		%REC	1	3/31/2013 03:04 PM
Surr: 1,2-Dichloroethane-d4	100	56-120		%REC	50	4/1/2013 02:37 PM
Surr: 4-Bromofluorobenzene	95.1	80-120		%REC	1	3/31/2013 03:04 PM
Surr: 4-Bromofluorobenzene	89.6	80-120		%REC	50	4/1/2013 02:37 PM
Surr: Dibromofluoromethane	104	72-120		%REC	50	4/1/2013 02:37 PM
Surr: Dibromofluoromethane	108	72-120		%REC	1	3/31/2013 03:04 PM
Surr: Toluene-d8	97.5	80-123		%REC	50	4/1/2013 02:37 PM
Surr: Toluene-d8	98.2	80-123		%REC	1	3/31/2013 03:04 PM
ANIONS BY ION CHROMATOGRAPHY				**EPA 300.0**		
RunID: IC2_130328A	QC Batch: R88230			PrepDate:		Analyst: **QBM**
Chloride	150	25		mg/L	50	3/28/2013 07:27 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

Advanced Technology Laboratories, Inc.

ANALYTICAL RESULTS

Print Date: *04-Apr-13*

CLIENT:	Tetra Tech	**Client Sample ID:**	CMT-1-7
Lab Order:	N009889	**Collection Date:**	3/25/2013 8:55:00 PM
Project:	Maryland Square, 103P172829.01	**Matrix:**	GROUNDWATER
Lab ID:	N009889-007		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP-MS METALS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130402A	QC Batch: 42550			PrepDate:	3/28/2013	Analyst: **CEI**
Arsenic	1.8	0.10		µg/L	1	4/2/2013 01:33 PM
Chromium	ND	1.0		µg/L	1	4/2/2013 01:33 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

Advanced Technology Laboratories, Inc.

3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT:	Tetra Tech	**Client Sample ID:**	MW-20D3
Lab Order:	N009889	**Collection Date:**	3/26/2013 9:55:00 AM
Project:	Maryland Square, 103P172829.01	**Matrix:**	GROUNDWATER
Lab ID:	N009889-008		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_130331A	QC Batch: P13VW053			PrepDate:		Analyst: **QBM**
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2013 10:44 AM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/31/2013 10:44 AM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2013 10:44 AM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/31/2013 10:44 AM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/31/2013 10:44 AM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/31/2013 10:44 AM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/31/2013 10:44 AM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2013 10:44 AM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/31/2013 10:44 AM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2013 10:44 AM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2013 10:44 AM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	3/31/2013 10:44 AM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/31/2013 10:44 AM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2013 10:44 AM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/31/2013 10:44 AM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2013 10:44 AM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2013 10:44 AM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2013 10:44 AM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/31/2013 10:44 AM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2013 10:44 AM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2013 10:44 AM
2-Chlorotoluene	ND	0.50		µg/L	1	3/31/2013 10:44 AM
4-Chlorotoluene	ND	0.50		µg/L	1	3/31/2013 10:44 AM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/31/2013 10:44 AM
Benzene	ND	0.50		µg/L	1	3/31/2013 10:44 AM
Bromobenzene	ND	0.50		µg/L	1	3/31/2013 10:44 AM
Bromodichloromethane	ND	0.50		µg/L	1	3/31/2013 10:44 AM
Bromoform	ND	0.50		µg/L	1	3/31/2013 10:44 AM
Bromomethane	ND	0.50		µg/L	1	3/31/2013 10:44 AM
Carbon tetrachloride	ND	0.50		µg/L	1	3/31/2013 10:44 AM
Chlorobenzene	ND	0.50		µg/L	1	3/31/2013 10:44 AM
Chloroethane	ND	0.50		µg/L	1	3/31/2013 10:44 AM
Chloroform	ND	0.50		µg/L	1	3/31/2013 10:44 AM
Chloromethane	ND	0.50		µg/L	1	3/31/2013 10:44 AM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	3/31/2013 10:44 AM
Dibromochloromethane	ND	0.50		µg/L	1	3/31/2013 10:44 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	MW-20D3
Lab Order:	N009889	**Collection Date:**	3/26/2013 9:55:00 AM
Project:	Maryland Square, 103P172829.01	**Matrix:**	GROUNDWATER
Lab ID:	N009889-008		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS5_130331A	QC Batch: P13VW053			PrepDate:		Analyst: **QBM**
Dibromomethane	ND	0.50		µg/L	1	3/31/2013 10:44 AM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/31/2013 10:44 AM
Ethylbenzene	ND	0.50		µg/L	1	3/31/2013 10:44 AM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/31/2013 10:44 AM
Isopropylbenzene	ND	0.50		µg/L	1	3/31/2013 10:44 AM
m,p-Xylene	ND	1.0		µg/L	1	3/31/2013 10:44 AM
Methylene chloride	ND	2.0		µg/L	1	3/31/2013 10:44 AM
MTBE	ND	0.50		µg/L	1	3/31/2013 10:44 AM
n-Butylbenzene	ND	0.50		µg/L	1	3/31/2013 10:44 AM
n-Propylbenzene	ND	0.50		µg/L	1	3/31/2013 10:44 AM
Naphthalene	ND	0.50		µg/L	1	3/31/2013 10:44 AM
o-Xylene	ND	0.50		µg/L	1	3/31/2013 10:44 AM
sec-Butylbenzene	ND	0.50		µg/L	1	3/31/2013 10:44 AM
Styrene	ND	0.50		µg/L	1	3/31/2013 10:44 AM
tert-Butylbenzene	ND	0.50		µg/L	1	3/31/2013 10:44 AM
Tetrachloroethene	0.66	0.50		µg/L	1	3/31/2013 10:44 AM
Toluene	ND	0.50		µg/L	1	3/31/2013 10:44 AM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/31/2013 10:44 AM
Trichloroethene	ND	0.50		µg/L	1	3/31/2013 10:44 AM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/31/2013 10:44 AM
Vinyl chloride	ND	0.50		µg/L	1	3/31/2013 10:44 AM
Surr: 1,2-Dichloroethane-d4	102	56-120		%REC	1	3/31/2013 10:44 AM
Surr: 4-Bromofluorobenzene	93.0	80-120		%REC	1	3/31/2013 10:44 AM
Surr: Dibromofluoromethane	106	72-120		%REC	1	3/31/2013 10:44 AM
Surr: Toluene-d8	99.9	80-123		%REC	1	3/31/2013 10:44 AM
ANIONS BY ION CHROMATOGRAPHY						
		EPA 300.0				
RunID: IC2_130329A	QC Batch: R88268			PrepDate:		Analyst: **QBM**
Chloride	7.4	1.0		mg/L	2	3/29/2013 04:25 PM
ICP-MS METALS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130402A	QC Batch: 42550			PrepDate:	3/28/2013	Analyst: **CEI**
Arsenic	2.6	0.10		µg/L	1	4/2/2013 01:39 PM
Chromium	5.8	1.0		µg/L	1	4/2/2013 01:39 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N009889
Project: Maryland Square, 103P172829.01
Lab ID: N009889-009

Client Sample ID: MW-20D2
Collection Date: 3/26/2013 10:45:00 AM
Matrix: GROUNDWATER

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS5_130331A QC Batch: P13VW053 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2013 04:30 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/31/2013 04:30 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2013 04:30 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/31/2013 04:30 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/31/2013 04:30 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/31/2013 04:30 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/31/2013 04:30 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2013 04:30 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/31/2013 04:30 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2013 04:30 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2013 04:30 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	3/31/2013 04:30 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/31/2013 04:30 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2013 04:30 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/31/2013 04:30 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2013 04:30 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2013 04:30 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2013 04:30 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/31/2013 04:30 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2013 04:30 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2013 04:30 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/31/2013 04:30 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/31/2013 04:30 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/31/2013 04:30 PM
Benzene	ND	0.50		µg/L	1	3/31/2013 04:30 PM
Bromobenzene	ND	0.50		µg/L	1	3/31/2013 04:30 PM
Bromodichloromethane	ND	0.50		µg/L	1	3/31/2013 04:30 PM
Bromoform	ND	0.50		µg/L	1	3/31/2013 04:30 PM
Bromomethane	ND	0.50		µg/L	1	3/31/2013 04:30 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/31/2013 04:30 PM
Chlorobenzene	ND	0.50		µg/L	1	3/31/2013 04:30 PM
Chloroethane	ND	0.50		µg/L	1	3/31/2013 04:30 PM
Chloroform	ND	0.50		µg/L	1	3/31/2013 04:30 PM
Chloromethane	ND	0.50		µg/L	1	3/31/2013 04:30 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	3/31/2013 04:30 PM
Dibromochloromethane	ND	0.50		µg/L	1	3/31/2013 04:30 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT:	Tetra Tech	**Client Sample ID:**	MW-20D2
Lab Order:	N009889	**Collection Date:**	3/26/2013 10:45:00 AM
Project:	Maryland Square, 103P172829.01	**Matrix:**	GROUNDWATER
Lab ID:	N009889-009		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS5_130331A	QC Batch: P13VW053			PrepDate:		Analyst: **QBM**
Dibromomethane	ND	0.50		µg/L	1	3/31/2013 04:30 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/31/2013 04:30 PM
Ethylbenzene	ND	0.50		µg/L	1	3/31/2013 04:30 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/31/2013 04:30 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/31/2013 04:30 PM
m,p-Xylene	ND	1.0		µg/L	1	3/31/2013 04:30 PM
Methylene chloride	ND	2.0		µg/L	1	3/31/2013 04:30 PM
MTBE	ND	0.50		µg/L	1	3/31/2013 04:30 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/31/2013 04:30 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/31/2013 04:30 PM
Naphthalene	ND	0.50		µg/L	1	3/31/2013 04:30 PM
o-Xylene	ND	0.50		µg/L	1	3/31/2013 04:30 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/31/2013 04:30 PM
Styrene	ND	0.50		µg/L	1	3/31/2013 04:30 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/31/2013 04:30 PM
Tetrachloroethene	25	0.50		µg/L	1	3/31/2013 04:30 PM
Toluene	ND	0.50		µg/L	1	3/31/2013 04:30 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/31/2013 04:30 PM
Trichloroethene	ND	0.50		µg/L	1	3/31/2013 04:30 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/31/2013 04:30 PM
Vinyl chloride	ND	0.50		µg/L	1	3/31/2013 04:30 PM
Surr: 1,2-Dichloroethane-d4	99.2	56-120		%REC	1	3/31/2013 04:30 PM
Surr: 4-Bromofluorobenzene	92.8	80-120		%REC	1	3/31/2013 04:30 PM
Surr: Dibromofluoromethane	104	72-120		%REC	1	3/31/2013 04:30 PM
Surr: Toluene-d8	99.1	80-123		%REC	1	3/31/2013 04:30 PM
ANIONS BY ION CHROMATOGRAPHY						
		EPA 300.0				
RunID: IC2_130329A	QC Batch: R88268			PrepDate:		Analyst: **QBM**
Chloride	11	1.0		mg/L	2	3/29/2013 04:38 PM
ICP-MS METALS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130402A	QC Batch: 42550			PrepDate:	3/28/2013	Analyst: **CEI**
Arsenic	2.7	0.10		µg/L	1	4/2/2013 01:45 PM
Chromium	3.4	1.0		µg/L	1	4/2/2013 01:45 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	MW-20D1
Lab Order:	N009889	**Collection Date:**	3/26/2013 11:27:00 AM
Project:	Maryland Square, 103P172829.01	**Matrix:**	GROUNDWATER
Lab ID:	N009889-010		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_130331A	QC Batch: P13VW053			PrepDate:		Analyst: **QBM**
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2013 04:59 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/31/2013 04:59 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2013 04:59 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/31/2013 04:59 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/31/2013 04:59 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/31/2013 04:59 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/31/2013 04:59 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2013 04:59 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/31/2013 04:59 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2013 04:59 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2013 04:59 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	3/31/2013 04:59 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/31/2013 04:59 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2013 04:59 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/31/2013 04:59 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2013 04:59 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2013 04:59 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2013 04:59 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/31/2013 04:59 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2013 04:59 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2013 04:59 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/31/2013 04:59 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/31/2013 04:59 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/31/2013 04:59 PM
Benzene	ND	0.50		µg/L	1	3/31/2013 04:59 PM
Bromobenzene	ND	0.50		µg/L	1	3/31/2013 04:59 PM
Bromodichloromethane	ND	0.50		µg/L	1	3/31/2013 04:59 PM
Bromoform	ND	0.50		µg/L	1	3/31/2013 04:59 PM
Bromomethane	ND	0.50		µg/L	1	3/31/2013 04:59 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/31/2013 04:59 PM
Chlorobenzene	ND	0.50		µg/L	1	3/31/2013 04:59 PM
Chloroethane	ND	0.50		µg/L	1	3/31/2013 04:59 PM
Chloroform	ND	0.50		µg/L	1	3/31/2013 04:59 PM
Chloromethane	ND	0.50		µg/L	1	3/31/2013 04:59 PM
cis-1,2-Dichloroethene	3.6	0.50		µg/L	1	3/31/2013 04:59 PM
Dibromochloromethane	ND	0.50		µg/L	1	3/31/2013 04:59 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	MW-20D1
Lab Order:	N009889	**Collection Date:**	3/26/2013 11:27:00 AM
Project:	Maryland Square, 103P172829.01	**Matrix:**	GROUNDWATER
Lab ID:	N009889-010		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS5_130331A	QC Batch: P13VW053			PrepDate:		Analyst: **QBM**
Dibromomethane	ND	0.50		µg/L	1	3/31/2013 04:59 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/31/2013 04:59 PM
Ethylbenzene	ND	0.50		µg/L	1	3/31/2013 04:59 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/31/2013 04:59 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/31/2013 04:59 PM
m,p-Xylene	ND	1.0		µg/L	1	3/31/2013 04:59 PM
Methylene chloride	ND	2.0		µg/L	1	3/31/2013 04:59 PM
MTBE	ND	0.50		µg/L	1	3/31/2013 04:59 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/31/2013 04:59 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/31/2013 04:59 PM
Naphthalene	ND	0.50		µg/L	1	3/31/2013 04:59 PM
o-Xylene	ND	0.50		µg/L	1	3/31/2013 04:59 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/31/2013 04:59 PM
Styrene	ND	0.50		µg/L	1	3/31/2013 04:59 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/31/2013 04:59 PM
Tetrachloroethene	69	0.50		µg/L	1	3/31/2013 04:59 PM
Toluene	ND	0.50		µg/L	1	3/31/2013 04:59 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/31/2013 04:59 PM
Trichloroethene	2.8	0.50		µg/L	1	3/31/2013 04:59 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/31/2013 04:59 PM
Vinyl chloride	ND	0.50		µg/L	1	3/31/2013 04:59 PM
Surr: 1,2-Dichloroethane-d4	102	56-120		%REC	1	3/31/2013 04:59 PM
Surr: 4-Bromofluorobenzene	93.1	80-120		%REC	1	3/31/2013 04:59 PM
Surr: Dibromofluoromethane	108	72-120		%REC	1	3/31/2013 04:59 PM
Surr: Toluene-d8	100	80-123		%REC	1	3/31/2013 04:59 PM
ANIONS BY ION CHROMATOGRAPHY						
		EPA 300.0				
RunID: IC2_130328A	QC Batch: R88230			PrepDate:		Analyst: **QBM**
Chloride	190	25		mg/L	50	3/28/2013 08:05 PM
ICP-MS METALS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130402A	QC Batch: 42550			PrepDate:	3/28/2013	Analyst: **CEI**
Arsenic	14	0.10		µg/L	1	4/2/2013 01:50 PM
Chromium	21	1.0		µg/L	1	4/2/2013 01:50 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	MW-20
Lab Order:	N009889	**Collection Date:**	3/26/2013 12:56:00 PM
Project:	Maryland Square, 103P172829.01	**Matrix:**	GROUNDWATER
Lab ID:	N009889-011		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS5_130331A	QC Batch: P13VW053			PrepDate:		Analyst: **QBM**
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2013 05:28 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	3/31/2013 05:28 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	3/31/2013 05:28 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	3/31/2013 05:28 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	3/31/2013 05:28 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	3/31/2013 05:28 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	3/31/2013 05:28 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2013 05:28 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	3/31/2013 05:28 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	3/31/2013 05:28 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2013 05:28 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	3/31/2013 05:28 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	3/31/2013 05:28 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2013 05:28 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	3/31/2013 05:28 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2013 05:28 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	3/31/2013 05:28 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2013 05:28 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	3/31/2013 05:28 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	3/31/2013 05:28 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	3/31/2013 05:28 PM
2-Chlorotoluene	ND	0.50		µg/L	1	3/31/2013 05:28 PM
4-Chlorotoluene	ND	0.50		µg/L	1	3/31/2013 05:28 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	3/31/2013 05:28 PM
Benzene	ND	0.50		µg/L	1	3/31/2013 05:28 PM
Bromobenzene	ND	0.50		µg/L	1	3/31/2013 05:28 PM
Bromodichloromethane	ND	0.50		µg/L	1	3/31/2013 05:28 PM
Bromoform	ND	0.50		µg/L	1	3/31/2013 05:28 PM
Bromomethane	0.57	0.50		µg/L	1	3/31/2013 05:28 PM
Carbon tetrachloride	ND	0.50		µg/L	1	3/31/2013 05:28 PM
Chlorobenzene	ND	0.50		µg/L	1	3/31/2013 05:28 PM
Chloroethane	ND	0.50		µg/L	1	3/31/2013 05:28 PM
Chloroform	0.80	0.50		µg/L	1	3/31/2013 05:28 PM
Chloromethane	ND	0.50		µg/L	1	3/31/2013 05:28 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	3/31/2013 05:28 PM
Dibromochloromethane	ND	0.50		µg/L	1	3/31/2013 05:28 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Lab Order: N009889
Project: Maryland Square, 103P172829.01
Lab ID: N009889-011

Client Sample ID: MW-20
Collection Date: 3/26/2013 12:56:00 PM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS				**EPA 8260B**		
RunID: MS5_130331A	QC Batch: P13VW053			PrepDate:		Analyst: **QBM**
Dibromomethane	ND	0.50		µg/L	1	3/31/2013 05:28 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	3/31/2013 05:28 PM
Ethylbenzene	ND	0.50		µg/L	1	3/31/2013 05:28 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	3/31/2013 05:28 PM
Isopropylbenzene	ND	0.50		µg/L	1	3/31/2013 05:28 PM
m,p-Xylene	ND	1.0		µg/L	1	3/31/2013 05:28 PM
Methylene chloride	ND	2.0		µg/L	1	3/31/2013 05:28 PM
MTBE	ND	0.50		µg/L	1	3/31/2013 05:28 PM
n-Butylbenzene	ND	0.50		µg/L	1	3/31/2013 05:28 PM
n-Propylbenzene	ND	0.50		µg/L	1	3/31/2013 05:28 PM
Naphthalene	ND	0.50		µg/L	1	3/31/2013 05:28 PM
o-Xylene	ND	0.50		µg/L	1	3/31/2013 05:28 PM
sec-Butylbenzene	ND	0.50		µg/L	1	3/31/2013 05:28 PM
Styrene	ND	0.50		µg/L	1	3/31/2013 05:28 PM
tert-Butylbenzene	ND	0.50		µg/L	1	3/31/2013 05:28 PM
Tetrachloroethene	290	5.0		µg/L	10	4/1/2013 03:05 PM
Toluene	ND	0.50		µg/L	1	3/31/2013 05:28 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	3/31/2013 05:28 PM
Trichloroethene	1.8	0.50		µg/L	1	3/31/2013 05:28 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	3/31/2013 05:28 PM
Vinyl chloride	ND	0.50		µg/L	1	3/31/2013 05:28 PM
Surr: 1,2-Dichloroethane-d4	97.2	56-120		%REC	1	3/31/2013 05:28 PM
Surr: 1,2-Dichloroethane-d4	98.6	56-120		%REC	10	4/1/2013 03:05 PM
Surr: 4-Bromofluorobenzene	93.0	80-120		%REC	1	3/31/2013 05:28 PM
Surr: 4-Bromofluorobenzene	91.5	80-120		%REC	10	4/1/2013 03:05 PM
Surr: Dibromofluoromethane	105	72-120		%REC	10	4/1/2013 03:05 PM
Surr: Dibromofluoromethane	105	72-120		%REC	1	3/31/2013 05:28 PM
Surr: Toluene-d8	99.1	80-123		%REC	10	4/1/2013 03:05 PM
Surr: Toluene-d8	99.6	80-123		%REC	1	3/31/2013 05:28 PM
ANIONS BY ION CHROMATOGRAPHY				**EPA 300.0**		
RunID: IC2_130328A	QC Batch: R88230			PrepDate:		Analyst: **QBM**
Chloride	190	25		mg/L	50	3/28/2013 08:18 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Tetra Tech	**Client Sample ID:**	MW-20
Lab Order:	N009889	**Collection Date:**	3/26/2013 12:56:00 PM
Project:	Maryland Square, 103P172829.01	**Matrix:**	GROUNDWATER
Lab ID:	N009889-011		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP-MS METALS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130402A	QC Batch: 42550			PrepDate:	3/28/2013	Analyst: **CEI**
Arsenic	4.7	0.10		µg/L	1	4/2/2013 01:56 PM
Chromium	4.3	1.0		µg/L	1	4/2/2013 01:56 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Work Order: N009889
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 300_W_CL

Sample ID: **MB-R88230_CL**	SampType: **MBLK**	TestCode: **300_W_CL**	Units: **mg/L**	Prep Date:			RunNo: **88230**			
Client ID: **PBW**	Batch ID: **R88230**	TestNo: **EPA 300.0**		Analysis Date: **3/28/2013**			SeqNo: **1547226**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	ND	0.50									

Sample ID: **LCS-R88230_CL**	SampType: **LCS**	TestCode: **300_W_CL**	Units: **mg/L**	Prep Date:			RunNo: **88230**			
Client ID: **LCSW**	Batch ID: **R88230**	TestNo: **EPA 300.0**		Analysis Date: **3/28/2013**			SeqNo: **1547227**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	2.469	0.50	2.500	0	98.8	90	110				

Sample ID: **N009900-001DMS**	SampType: **MS**	TestCode: **300_W_CL**	Units: **mg/L**	Prep Date:			RunNo: **88230**			
Client ID: **ZZZZZZ**	Batch ID: **R88230**	TestNo: **EPA 300.0**		Analysis Date: **3/28/2013**			SeqNo: **1547229**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	353.500	25	125.0	229.5	99.2	80	120				

Sample ID: **N009900-001DMSD**	SampType: **MSD**	TestCode: **300_W_CL**	Units: **mg/L**	Prep Date:			RunNo: **88230**			
Client ID: **ZZZZZZ**	Batch ID: **R88230**	TestNo: **EPA 300.0**		Analysis Date: **3/28/2013**			SeqNo: **1547230**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	357.000	25	125.0	229.5	102	80	120	353.5	0.985	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Tetra Tech
Work Order: N009889
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 300_W_CL

Sample ID: **MB-R88268_CL**	SampType: **MBLK**	TestCode: **300_W_CL**	Units: **mg/L**	Prep Date:	RunNo: **88268**
Client ID: **PBW**	Batch ID: **R88268**	TestNo: **EPA 300.0**		Analysis Date: **3/29/2013**	SeqNo: **1548389**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	ND	0.50									

Sample ID: **LCS-R88268_CL**	SampType: **LCS**	TestCode: **300_W_CL**	Units: **mg/L**	Prep Date:	RunNo: **88268**
Client ID: **LCSW**	Batch ID: **R88268**	TestNo: **EPA 300.0**		Analysis Date: **3/29/2013**	SeqNo: **1548390**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	2.443	0.50	2.500	0	97.7	90	110				

Sample ID: **N009910-002DMS**	SampType: **MS**	TestCode: **300_W_CL**	Units: **mg/L**	Prep Date:	RunNo: **88268**
Client ID: **ZZZZZZ**	Batch ID: **R88268**	TestNo: **EPA 300.0**		Analysis Date: **3/29/2013**	SeqNo: **1548392**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	287.150	25	125.0	165.1	97.6	80	120				

Sample ID: **N009910-002DMSD**	SampType: **MSD**	TestCode: **300_W_CL**	Units: **mg/L**	Prep Date:	RunNo: **88268**
Client ID: **ZZZZZZ**	Batch ID: **R88268**	TestNo: **EPA 300.0**		Analysis Date: **3/29/2013**	SeqNo: **1548393**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	292.550	25	125.0	165.1	102	80	120	287.2	1.86	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009889
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 6020_W

Sample ID: **MB-42550**	SampType: **MBLK**	TestCode: **6020_W**	Units: **µg/L**	Prep Date: **3/28/2013**	RunNo: **88278**
Client ID: **PBW**	Batch ID: **42550**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **4/2/2013**	SeqNo: **1548699**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.10									
Chromium	ND	1.0									

Sample ID: **LCS-42550**	SampType: **LCS**	TestCode: **6020_W**	Units: **µg/L**	Prep Date: **3/28/2013**	RunNo: **88278**
Client ID: **LCSW**	Batch ID: **42550**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **4/2/2013**	SeqNo: **1548700**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	10.331	0.10	10.00	0	103	85	115				
Chromium	9.780	1.0	10.00	0	97.8	85	115				

Sample ID: **N009897-003C-MS**	SampType: **MS**	TestCode: **6020_W**	Units: **µg/L**	Prep Date: **3/28/2013**	RunNo: **88286**
Client ID: **ZZZZZZ**	Batch ID: **42550**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **4/3/2013**	SeqNo: **1549440**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	11.282	0.50	10.00	0.9317	104	75	125				
Chromium	54.635	5.0	10.00	44.47	102	75	125				

Sample ID: **N009897-003C-MSD**	SampType: **MSD**	TestCode: **6020_W**	Units: **µg/L**	Prep Date: **3/28/2013**	RunNo: **88286**
Client ID: **ZZZZZZ**	Batch ID: **42550**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **4/3/2013**	SeqNo: **1549441**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	11.628	0.50	10.00	0.9317	107	75	125	11.28	3.01	20	
Chromium	55.508	5.0	10.00	44.47	110	75	125	54.63	1.59	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009889
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130331LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88265**
Client ID: **LCSW** Batch ID: **P13VW053** TestNo: **EPA 8260B** Analysis Date: **3/31/2013** SeqNo: **1548317**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	20.650	0.50	20.00	0	103	74	122				
1,1,1-Trichloroethane	20.280	0.50	20.00	0	101	65	120				
1,1,2,2-Tetrachloroethane	19.270	0.50	20.00	0	96.4	80	120				
1,1,2-Trichloroethane	19.250	0.50	20.00	0	96.2	80	120				
1,1-Dichloroethane	18.360	0.50	20.00	0	91.8	80	120				
1,1-Dichloroethene	21.770	0.50	20.00	0	109	80	120				
1,1-Dichloropropene	19.310	0.50	20.00	0	96.6	80	120				
1,2,3-Trichlorobenzene	22.540	0.50	20.00	0	113	80	124				
1,2,3-Trichloropropane	18.780	0.50	20.00	0	93.9	80	120				
1,2,4-Trichlorobenzene	22.370	0.50	20.00	0	112	80	126				
1,2,4-Trimethylbenzene	20.500	0.50	20.00	0	103	80	123				
1,2-Dibromo-3-chloropropane	21.090	1.0	20.00	0	105	70	120				
1,2-Dibromoethane	19.870	0.50	20.00	0	99.4	80	120				
1,2-Dichlorobenzene	21.720	0.50	20.00	0	109	80	120				
1,2-Dichloroethane	19.590	0.50	20.00	0	98.0	80	120				
1,2-Dichloropropane	17.700	0.50	20.00	0	88.5	80	120				
1,3,5-Trimethylbenzene	20.710	0.50	20.00	0	104	80	121				
1,3-Dichlorobenzene	21.290	0.50	20.00	0	106	80	120				
1,3-Dichloropropane	19.140	0.50	20.00	0	95.7	80	120				
1,4-Dichlorobenzene	21.200	0.50	20.00	0	106	80	120				
2,2-Dichloropropane	20.580	0.50	20.00	0	103	54	120				
2-Chlorotoluene	20.020	0.50	20.00	0	100	80	122				
4-Chlorotoluene	19.790	0.50	20.00	0	99.0	80	120				
4-Isopropyltoluene	20.900	0.50	20.00	0	104	80	122				
Benzene	19.240	0.50	20.00	0	96.2	80	120				
Bromobenzene	21.630	0.50	20.00	0	108	80	120				
Bromodichloromethane	20.270	0.50	20.00	0	101	70	120				
Bromoform	23.450	0.50	20.00	0	117	66	120				
Bromomethane	26.980	0.50	20.00	0	135	48	155				
Carbon tetrachloride	22.110	0.50	20.00	0	111	60	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009889
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130331LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88265**
Client ID: **LCSW** Batch ID: **P13VW053** TestNo: **EPA 8260B** Analysis Date: **3/31/2013** SeqNo: **1548317**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	20.460	0.50	20.00	0	102	80	120				
Chloroethane	20.190	0.50	20.00	0	101	62	147				
Chloroform	19.830	0.50	20.00	0	99.2	80	120				
Chloromethane	13.780	0.50	20.00	0	68.9	63	121				
cis-1,2-Dichloroethene	19.420	0.50	20.00	0	97.1	80	120				
Dibromochloromethane	21.500	0.50	20.00	0	108	67	123				
Dibromomethane	19.720	0.50	20.00	0	98.6	80	120				
Dichlorodifluoromethane	16.310	0.50	20.00	0	81.6	70	121				
Ethylbenzene	19.550	0.50	20.00	0	97.8	80	120				
Hexachlorobutadiene	22.200	0.50	20.00	0	111	80	123				
Isopropylbenzene	20.640	0.50	20.00	0	103	80	121				
m,p-Xylene	39.510	1.0	40.00	0	98.8	80	120				
Methylene chloride	18.800	2.0	20.00	0	94.0	75	120				
MTBE	18.100	0.50	20.00	0	90.5	70	120				
n-Butylbenzene	20.730	0.50	20.00	0	104	80	129				
n-Propylbenzene	20.080	0.50	20.00	0	100	80	122				
Naphthalene	22.360	0.50	20.00	0	112	73	127				
o-Xylene	19.700	0.50	20.00	0	98.5	80	120				
sec-Butylbenzene	20.400	0.50	20.00	0	102	80	120				
Styrene	20.660	0.50	20.00	0	103	80	120				
tert-Butylbenzene	20.750	0.50	20.00	0	104	80	120				
Tetrachloroethene	20.430	0.50	20.00	0	102	80	121				
Toluene	19.640	0.50	20.00	0	98.2	80	120				
trans-1,2-Dichloroethene	19.820	0.50	20.00	0	99.1	80	120				
Trichloroethene	20.670	0.50	20.00	0	103	80	120				
Trichlorofluoromethane	22.420	0.50	20.00	0	112	71	148				
Vinyl chloride	16.850	0.50	20.00	0	84.2	80	120				
Surr: 1,2-Dichloroethane-d4	23.850		25.00		95.4	56	120				
Surr: 4-Bromofluorobenzene	23.880		25.00		95.5	80	120				
Surr: Dibromofluoromethane	25.290		25.00		101	72	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009889
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130331LCS**	SampType: **LCS**	TestCode: **8260_WP_LL**	Units: **µg/L**	Prep Date:	RunNo: **88265**
Client ID: **LCSW**	Batch ID: **P13VW053**	TestNo: **EPA 8260B**		Analysis Date: **3/31/2013**	SeqNo: **1548317**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Toluene-d8	24.830		25.00		99.3	80	123				

Sample ID: **P130331LCSD**	SampType: **LCSD**	TestCode: **8260_WP_LL**	Units: **µg/L**	Prep Date:	RunNo: **88265**
Client ID: **LCSS02**	Batch ID: **P13VW053**	TestNo: **EPA 8260B**		Analysis Date: **3/31/2013**	SeqNo: **1548318**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	20.550	0.50	20.00	0	103	74	122	20.65	0.485	20	
1,1,1-Trichloroethane	20.070	0.50	20.00	0	100	65	120	20.28	1.04	20	
1,1,2,2-Tetrachloroethane	19.300	0.50	20.00	0	96.5	80	120	19.27	0.156	20	
1,1,2-Trichloroethane	19.140	0.50	20.00	0	95.7	80	120	19.25	0.573	20	
1,1-Dichloroethane	18.240	0.50	20.00	0	91.2	80	120	18.36	0.656	20	
1,1-Dichloroethene	20.790	0.50	20.00	0	104	80	120	21.77	4.61	20	
1,1-Dichloropropene	19.430	0.50	20.00	0	97.2	80	120	19.31	0.620	20	
1,2,3-Trichlorobenzene	22.640	0.50	20.00	0	113	80	124	22.54	0.443	20	
1,2,3-Trichloropropane	19.040	0.50	20.00	0	95.2	80	120	18.78	1.37	20	
1,2,4-Trichlorobenzene	21.870	0.50	20.00	0	109	80	126	22.37	2.26	20	
1,2,4-Trimethylbenzene	20.420	0.50	20.00	0	102	80	123	20.50	0.391	20	
1,2-Dibromo-3-chloropropane	21.910	1.0	20.00	0	110	70	120	21.09	3.81	20	
1,2-Dibromoethane	20.080	0.50	20.00	0	100	80	120	19.87	1.05	20	
1,2-Dichlorobenzene	21.480	0.50	20.00	0	107	80	120	21.72	1.11	20	
1,2-Dichloroethane	19.820	0.50	20.00	0	99.1	80	120	19.59	1.17	20	
1,2-Dichloropropane	17.590	0.50	20.00	0	88.0	80	120	17.70	0.623	20	
1,3,5-Trimethylbenzene	20.460	0.50	20.00	0	102	80	121	20.71	1.21	20	
1,3-Dichlorobenzene	21.360	0.50	20.00	0	107	80	120	21.29	0.328	20	
1,3-Dichloropropane	19.160	0.50	20.00	0	95.8	80	120	19.14	0.104	20	
1,4-Dichlorobenzene	20.900	0.50	20.00	0	104	80	120	21.20	1.43	20	
2,2-Dichloropropane	19.560	0.50	20.00	0	97.8	54	120	20.58	5.08	20	
2-Chlorotoluene	19.730	0.50	20.00	0	98.6	80	122	20.02	1.46	20	
4-Chlorotoluene	19.990	0.50	20.00	0	100	80	120	19.79	1.01	20	
4-Isopropyltoluene	20.840	0.50	20.00	0	104	80	122	20.90	0.287	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike/Surrogate outside of limits due to matrix interference
- DO Surrogate Diluted Out
- Calculations are based on raw values

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009889
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130331LCSD** SampType: **LCSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88265**
Client ID: **LCSS02** Batch ID: **P13VW053** TestNo: **EPA 8260B** Analysis Date: **3/31/2013** SeqNo: **1548318**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	18.950	0.50	20.00	0	94.8	80	120	19.24	1.52	20	
Bromobenzene	21.140	0.50	20.00	0	106	80	120	21.63	2.29	20	
Bromodichloromethane	20.730	0.50	20.00	0	104	70	120	20.27	2.24	20	
Bromoform	23.570	0.50	20.00	0	118	66	120	23.45	0.510	20	
Bromomethane	27.320	0.50	20.00	0	137	48	155	26.98	1.25	20	
Carbon tetrachloride	21.780	0.50	20.00	0	109	60	120	22.11	1.50	20	
Chlorobenzene	20.470	0.50	20.00	0	102	80	120	20.46	0.0489	20	
Chloroethane	21.490	0.50	20.00	0	107	62	147	20.19	6.24	20	
Chloroform	19.580	0.50	20.00	0	97.9	80	120	19.83	1.27	20	
Chloromethane	13.430	0.50	20.00	0	67.2	63	121	13.78	2.57	20	
cis-1,2-Dichloroethene	19.380	0.50	20.00	0	96.9	80	120	19.42	0.206	20	
Dibromochloromethane	21.910	0.50	20.00	0	110	67	123	21.50	1.89	20	
Dibromomethane	19.610	0.50	20.00	0	98.0	80	120	19.72	0.559	20	
Dichlorodifluoromethane	15.750	0.50	20.00	0	78.8	70	121	16.31	3.49	20	
Ethylbenzene	19.690	0.50	20.00	0	98.4	80	120	19.55	0.714	20	
Hexachlorobutadiene	22.360	0.50	20.00	0	112	80	123	22.20	0.718	20	
Isopropylbenzene	20.230	0.50	20.00	0	101	80	121	20.64	2.01	20	
m,p-Xylene	39.870	1.0	40.00	0	99.7	80	120	39.51	0.907	20	
Methylene chloride	18.090	2.0	20.00	0	90.4	75	120	18.80	3.85	20	
MTBE	18.250	0.50	20.00	0	91.2	70	120	18.10	0.825	20	
n-Butylbenzene	20.370	0.50	20.00	0	102	80	129	20.73	1.75	20	
n-Propylbenzene	19.960	0.50	20.00	0	99.8	80	122	20.08	0.599	20	
Naphthalene	22.060	0.50	20.00	0	110	73	127	22.36	1.35	20	
o-Xylene	19.780	0.50	20.00	0	98.9	80	120	19.70	0.405	20	
sec-Butylbenzene	20.210	0.50	20.00	0	101	80	120	20.40	0.936	20	
Styrene	20.570	0.50	20.00	0	103	80	120	20.66	0.437	20	
tert-Butylbenzene	20.800	0.50	20.00	0	104	80	120	20.75	0.241	20	
Tetrachloroethene	20.290	0.50	20.00	0	101	80	121	20.43	0.688	20	
Toluene	19.450	0.50	20.00	0	97.3	80	120	19.64	0.972	20	
trans-1,2-Dichloroethene	19.260	0.50	20.00	0	96.3	80	120	19.82	2.87	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009889
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130331LCSD**	SampType: **LCSD**	TestCode: **8260_WP_LL**	Units: **µg/L**	Prep Date:	RunNo: **88265**
Client ID: **LCSS02**	Batch ID: **P13VW053**	TestNo: **EPA 8260B**		Analysis Date: **3/31/2013**	SeqNo: **1548318**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Trichloroethene	20.280	0.50	20.00	0	101	80	120	20.67	1.90	20	
Trichlorofluoromethane	21.940	0.50	20.00	0	110	71	148	22.42	2.16	20	
Vinyl chloride	16.970	0.50	20.00	0	84.8	80	120	16.85	0.710	20	
Surr: 1,2-Dichloroethane-d4	24.060		25.00		96.2	56	120		0		
Surr: 4-Bromofluorobenzene	24.550		25.00		98.2	80	120		0		
Surr: Dibromofluoromethane	24.900		25.00		99.6	72	120		0		
Surr: Toluene-d8	24.660		25.00		98.6	80	123		0		

Sample ID: **P130331MB2**	SampType: **MBLK**	TestCode: **8260_WP_LL**	Units: **µg/L**	Prep Date:	RunNo: **88265**
Client ID: **PBW**	Batch ID: **P13VW053**	TestNo: **EPA 8260B**		Analysis Date: **3/31/2013**	SeqNo: **1548319**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	0.50									
1,1,1-Trichloroethane	ND	0.50									
1,1,2,2-Tetrachloroethane	ND	0.50									
1,1,2-Trichloroethane	ND	0.50									
1,1-Dichloroethane	ND	0.50									
1,1-Dichloroethene	ND	0.50									
1,1-Dichloropropene	ND	0.50									
1,2,3-Trichlorobenzene	ND	0.50									
1,2,3-Trichloropropane	ND	0.50									
1,2,4-Trichlorobenzene	ND	0.50									
1,2,4-Trimethylbenzene	ND	0.50									
1,2-Dibromo-3-chloropropane	ND	1.0									
1,2-Dibromoethane	ND	0.50									
1,2-Dichlorobenzene	ND	0.50									
1,2-Dichloroethane	ND	0.50									
1,2-Dichloropropane	ND	0.50									
1,3,5-Trimethylbenzene	ND	0.50									
1,3-Dichlorobenzene	ND	0.50									

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits
- Calculations are based on raw values
- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Tetra Tech
Work Order: N009889
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130331MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88265**
Client ID: **PBW** Batch ID: **P13VW053** TestNo: **EPA 8260B** Analysis Date: **3/31/2013** SeqNo: **1548319**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,3-Dichloropropane	ND	0.50									
1,4-Dichlorobenzene	ND	0.50									
2,2-Dichloropropane	ND	0.50									
2-Chlorotoluene	ND	0.50									
4-Chlorotoluene	ND	0.50									
4-Isopropyltoluene	ND	0.50									
Benzene	ND	0.50									
Bromobenzene	ND	0.50									
Bromodichloromethane	ND	0.50									
Bromoform	ND	0.50									
Bromomethane	ND	0.50									
Carbon tetrachloride	ND	0.50									
Chlorobenzene	ND	0.50									
Chloroethane	ND	0.50									
Chloroform	ND	0.50									
Chloromethane	ND	0.50									
cis-1,2-Dichloroethene	ND	0.50									
Dibromochloromethane	ND	0.50									
Dibromomethane	ND	0.50									
Dichlorodifluoromethane	ND	0.50									
Ethylbenzene	ND	0.50									
Hexachlorobutadiene	ND	0.50									
Isopropylbenzene	ND	0.50									
m,p-Xylene	ND	1.0									
Methylene chloride	ND	2.0									
MTBE	ND	0.50									
n-Butylbenzene	ND	0.50									
n-Propylbenzene	ND	0.50									
Naphthalene	ND	0.50									
o-Xylene	ND	0.50									

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009889
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130331MB2**	SampType: **MBLK**	TestCode: **8260_WP_LL**	Units: **µg/L**	Prep Date:	RunNo: **88265**
Client ID: **PBW**	Batch ID: **P13VW053**	TestNo: **EPA 8260B**		Analysis Date: **3/31/2013**	SeqNo: **1548319**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
sec-Butylbenzene	ND	0.50									
Styrene	ND	0.50									
tert-Butylbenzene	ND	0.50									
Tetrachloroethene	ND	0.50									
Toluene	ND	0.50									
trans-1,2-Dichloroethene	ND	0.50									
Trichloroethene	ND	0.50									
Trichlorofluoromethane	ND	0.50									
Vinyl chloride	ND	0.50									
Surr: 1,2-Dichloroethane-d4	25.150		25.00		101	56	120				
Surr: 4-Bromofluorobenzene	23.480		25.00		93.9	80	120				
Surr: Dibromofluoromethane	26.070		25.00		104	72	120				
Surr: Toluene-d8	24.980		25.00		99.9	80	123				

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
- E Value above quantitation range
- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

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3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009889
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130401LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88267**
Client ID: **LCSW** Batch ID: **P13VW054** TestNo: **EPA 8260B** Analysis Date: **4/1/2013** SeqNo: **1548362**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	20.760	0.50	20.00	0	104	74	122				
1,1,1-Trichloroethane	20.180	0.50	20.00	0	101	65	120				
1,1,2,2-Tetrachloroethane	18.890	0.50	20.00	0	94.4	80	120				
1,1,2-Trichloroethane	18.830	0.50	20.00	0	94.2	80	120				
1,1-Dichloroethane	17.520	0.50	20.00	0	87.6	80	120				
1,1-Dichloroethene	21.130	0.50	20.00	0	106	80	120				
1,1-Dichloropropene	19.020	0.50	20.00	0	95.1	80	120				
1,2,3-Trichlorobenzene	22.020	0.50	20.00	0	110	80	124				
1,2,3-Trichloropropane	18.080	0.50	20.00	0	90.4	80	120				
1,2,4-Trichlorobenzene	21.260	0.50	20.00	0	106	80	126				
1,2,4-Trimethylbenzene	19.860	0.50	20.00	0	99.3	80	123				
1,2-Dibromo-3-chloropropane	20.640	1.0	20.00	0	103	70	120				
1,2-Dibromoethane	19.670	0.50	20.00	0	98.4	80	120				
1,2-Dichlorobenzene	21.180	0.50	20.00	0	106	80	120				
1,2-Dichloroethane	19.180	0.50	20.00	0	95.9	80	120				
1,2-Dichloropropane	17.090	0.50	20.00	0	85.4	80	120				
1,3,5-Trimethylbenzene	20.060	0.50	20.00	0	100	80	121				
1,3-Dichlorobenzene	20.910	0.50	20.00	0	105	80	120				
1,3-Dichloropropane	18.880	0.50	20.00	0	94.4	80	120				
1,4-Dichlorobenzene	20.540	0.50	20.00	0	103	80	120				
2,2-Dichloropropane	20.300	0.50	20.00	0	102	54	120				
2-Chlorotoluene	19.470	0.50	20.00	0	97.4	80	122				
4-Chlorotoluene	19.320	0.50	20.00	0	96.6	80	120				
4-Isopropyltoluene	20.320	0.50	20.00	0	102	80	122				
Benzene	18.820	0.50	20.00	0	94.1	80	120				
Bromobenzene	20.920	0.50	20.00	0	105	80	120				
Bromodichloromethane	19.780	0.50	20.00	0	98.9	70	120				
Bromoform	23.700	0.50	20.00	0	118	66	120				
Bromomethane	27.670	0.50	20.00	0	138	48	155				
Carbon tetrachloride	21.640	0.50	20.00	0	108	60	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009889
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130401LCS** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88267**
Client ID: **LCSW** Batch ID: **P13VW054** TestNo: **EPA 8260B** Analysis Date: **4/1/2013** SeqNo: **1548362**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	19.980	0.50	20.00	0	99.9	80	120				
Chloroethane	20.620	0.50	20.00	0	103	62	147				
Chloroform	19.720	0.50	20.00	0	98.6	80	120				
Chloromethane	12.830	0.50	20.00	0	64.2	63	121				
cis-1,2-Dichloroethene	18.990	0.50	20.00	0	95.0	80	120				
Dibromochloromethane	21.830	0.50	20.00	0	109	67	123				
Dibromomethane	19.740	0.50	20.00	0	98.7	80	120				
Dichlorodifluoromethane	15.170	0.50	20.00	0	75.8	70	121				
Ethylbenzene	19.180	0.50	20.00	0	95.9	80	120				
Hexachlorobutadiene	22.630	0.50	20.00	0	113	80	123				
Isopropylbenzene	19.730	0.50	20.00	0	98.6	80	121				
m,p-Xylene	39.160	1.0	40.00	0	97.9	80	120				
Methylene chloride	18.070	2.0	20.00	0	90.4	75	120				
MTBE	17.910	0.50	20.00	0	89.6	70	120				
n-Butylbenzene	20.300	0.50	20.00	0	102	80	129				
n-Propylbenzene	19.320	0.50	20.00	0	96.6	80	122				
Naphthalene	21.790	0.50	20.00	0	109	73	127				
o-Xylene	19.520	0.50	20.00	0	97.6	80	120				
sec-Butylbenzene	19.850	0.50	20.00	0	99.2	80	120				
Styrene	20.520	0.50	20.00	0	103	80	120				
tert-Butylbenzene	20.230	0.50	20.00	0	101	80	120				
Tetrachloroethene	20.100	0.50	20.00	0	101	80	121				
Toluene	19.590	0.50	20.00	0	98.0	80	120				
trans-1,2-Dichloroethene	19.310	0.50	20.00	0	96.6	80	120				
Trichloroethene	19.760	0.50	20.00	0	98.8	80	120				
Trichlorofluoromethane	22.140	0.50	20.00	0	111	71	148				
Vinyl chloride	17.030	0.50	20.00	0	85.2	80	120				
Surr: 1,2-Dichloroethane-d4	24.430		25.00		97.7	56	120				
Surr: 4-Bromofluorobenzene	24.610		25.00		98.4	80	120				
Surr: Dibromofluoromethane	25.400		25.00		102	72	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009889
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130401LCS**	SampType: **LCS**	TestCode: **8260_WP_LL**	Units: **µg/L**	Prep Date:	RunNo: **88267**
Client ID: **LCSW**	Batch ID: **P13VW054**	TestNo: **EPA 8260B**		Analysis Date: **4/1/2013**	SeqNo: **1548362**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Toluene-d8	25.370		25.00		101	80	123				

Sample ID: **P130401LCSD**	SampType: **LCSD**	TestCode: **8260_WP_LL**	Units: **µg/L**	Prep Date:	RunNo: **88267**
Client ID: **LCSS02**	Batch ID: **P13VW054**	TestNo: **EPA 8260B**		Analysis Date: **4/1/2013**	SeqNo: **1548363**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	21.020	0.50	20.00	0	105	74	122	20.76	1.24	20	
1,1,1-Trichloroethane	19.320	0.50	20.00	0	96.6	65	120	20.18	4.35	20	
1,1,2,2-Tetrachloroethane	19.060	0.50	20.00	0	95.3	80	120	18.89	0.896	20	
1,1,2-Trichloroethane	18.570	0.50	20.00	0	92.8	80	120	18.83	1.39	20	
1,1-Dichloroethane	17.370	0.50	20.00	0	86.9	80	120	17.52	0.860	20	
1,1-Dichloroethene	21.070	0.50	20.00	0	105	80	120	21.13	0.284	20	
1,1-Dichloropropene	19.240	0.50	20.00	0	96.2	80	120	19.02	1.15	20	
1,2,3-Trichlorobenzene	22.140	0.50	20.00	0	111	80	124	22.02	0.543	20	
1,2,3-Trichloropropane	19.020	0.50	20.00	0	95.1	80	120	18.08	5.07	20	
1,2,4-Trichlorobenzene	21.560	0.50	20.00	0	108	80	126	21.26	1.40	20	
1,2,4-Trimethylbenzene	20.050	0.50	20.00	0	100	80	123	19.86	0.952	20	
1,2-Dibromo-3-chloropropane	21.790	1.0	20.00	0	109	70	120	20.64	5.42	20	
1,2-Dibromoethane	19.680	0.50	20.00	0	98.4	80	120	19.67	0.0508	20	
1,2-Dichlorobenzene	21.140	0.50	20.00	0	106	80	120	21.18	0.189	20	
1,2-Dichloroethane	20.030	0.50	20.00	0	100	80	120	19.18	4.34	20	
1,2-Dichloropropane	17.510	0.50	20.00	0	87.6	80	120	17.09	2.43	20	
1,3,5-Trimethylbenzene	19.990	0.50	20.00	0	100	80	121	20.06	0.350	20	
1,3-Dichlorobenzene	20.580	0.50	20.00	0	103	80	120	20.91	1.59	20	
1,3-Dichloropropane	18.860	0.50	20.00	0	94.3	80	120	18.88	0.106	20	
1,4-Dichlorobenzene	20.500	0.50	20.00	0	103	80	120	20.54	0.195	20	
2,2-Dichloropropane	19.770	0.50	20.00	0	98.8	54	120	20.30	2.65	20	
2-Chlorotoluene	19.340	0.50	20.00	0	96.7	80	122	19.47	0.670	20	
4-Chlorotoluene	19.590	0.50	20.00	0	98.0	80	120	19.32	1.39	20	
4-Isopropyltoluene	20.490	0.50	20.00	0	102	80	122	20.32	0.833	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike/Surrogate outside of limits due to matrix interference
- DO Surrogate Diluted Out
- Calculations are based on raw values

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009889
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130401LCSD** SampType: **LCSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88267**
Client ID: **LCSS02** Batch ID: **P13VW054** TestNo: **EPA 8260B** Analysis Date: **4/1/2013** SeqNo: **1548363**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	18.770	0.50	20.00	0	93.8	80	120	18.82	0.266	20	
Bromobenzene	20.830	0.50	20.00	0	104	80	120	20.92	0.431	20	
Bromodichloromethane	19.840	0.50	20.00	0	99.2	70	120	19.78	0.303	20	
Bromoform	23.320	0.50	20.00	0	117	66	120	23.70	1.62	20	
Bromomethane	26.640	0.50	20.00	0	133	48	155	27.67	3.79	20	
Carbon tetrachloride	20.990	0.50	20.00	0	105	60	120	21.64	3.05	20	
Chlorobenzene	20.270	0.50	20.00	0	101	80	120	19.98	1.44	20	
Chloroethane	20.560	0.50	20.00	0	103	62	147	20.62	0.291	20	
Chloroform	19.120	0.50	20.00	0	95.6	80	120	19.72	3.09	20	
Chloromethane	12.720	0.50	20.00	0	63.6	63	121	12.83	0.861	20	
cis-1,2-Dichloroethene	18.730	0.50	20.00	0	93.6	80	120	18.99	1.38	20	
Dibromochloromethane	21.980	0.50	20.00	0	110	67	123	21.83	0.685	20	
Dibromomethane	19.180	0.50	20.00	0	95.9	80	120	19.74	2.88	20	
Dichlorodifluoromethane	14.570	0.50	20.00	0	72.9	70	121	15.17	4.03	20	
Ethylbenzene	19.560	0.50	20.00	0	97.8	80	120	19.18	1.96	20	
Hexachlorobutadiene	22.710	0.50	20.00	0	114	80	123	22.63	0.353	20	
Isopropylbenzene	19.910	0.50	20.00	0	99.6	80	121	19.73	0.908	20	
m,p-Xylene	39.120	1.0	40.00	0	97.8	80	120	39.16	0.102	20	
Methylene chloride	17.580	2.0	20.00	0	87.9	75	120	18.07	2.75	20	
MTBE	17.990	0.50	20.00	0	90.0	70	120	17.91	0.446	20	
n-Butylbenzene	20.240	0.50	20.00	0	101	80	129	20.30	0.296	20	
n-Propylbenzene	19.530	0.50	20.00	0	97.6	80	122	19.32	1.08	20	
Naphthalene	22.080	0.50	20.00	0	110	73	127	21.79	1.32	20	
o-Xylene	19.520	0.50	20.00	0	97.6	80	120	19.52	0	20	
sec-Butylbenzene	19.560	0.50	20.00	0	97.8	80	120	19.85	1.47	20	
Styrene	20.250	0.50	20.00	0	101	80	120	20.52	1.32	20	
tert-Butylbenzene	20.180	0.50	20.00	0	101	80	120	20.23	0.247	20	
Tetrachloroethene	19.940	0.50	20.00	0	99.7	80	121	20.10	0.799	20	
Toluene	19.370	0.50	20.00	0	96.9	80	120	19.59	1.13	20	
trans-1,2-Dichloroethene	19.510	0.50	20.00	0	97.6	80	120	19.31	1.03	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
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CLIENT: Tetra Tech
Work Order: N009889
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130401LCSD**	SampType: **LCSD**	TestCode: **8260_WP_LL**	Units: **µg/L**	Prep Date:	RunNo: **88267**
Client ID: **LCSS02**	Batch ID: **P13VW054**	TestNo: **EPA 8260B**		Analysis Date: **4/1/2013**	SeqNo: **1548363**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Trichloroethene	19.950	0.50	20.00	0	99.8	80	120	19.76	0.957	20	
Trichlorofluoromethane	21.850	0.50	20.00	0	109	71	148	22.14	1.32	20	
Vinyl chloride	16.510	0.50	20.00	0	82.6	80	120	17.03	3.10	20	
Surr: 1,2-Dichloroethane-d4	24.700		25.00		98.8	56	120		0		
Surr: 4-Bromofluorobenzene	24.360		25.00		97.4	80	120		0		
Surr: Dibromofluoromethane	24.630		25.00		98.5	72	120		0		
Surr: Toluene-d8	25.080		25.00		100	80	123		0		

Sample ID: **P130401MB2**	SampType: **MBLK**	TestCode: **8260_WP_LL**	Units: **µg/L**	Prep Date:	RunNo: **88267**
Client ID: **PBW**	Batch ID: **P13VW054**	TestNo: **EPA 8260B**		Analysis Date: **4/1/2013**	SeqNo: **1548364**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	0.50									
1,1,1-Trichloroethane	ND	0.50									
1,1,2,2-Tetrachloroethane	ND	0.50									
1,1,2-Trichloroethane	ND	0.50									
1,1-Dichloroethane	ND	0.50									
1,1-Dichloroethene	ND	0.50									
1,1-Dichloropropene	ND	0.50									
1,2,3-Trichlorobenzene	ND	0.50									
1,2,3-Trichloropropane	ND	0.50									
1,2,4-Trichlorobenzene	ND	0.50									
1,2,4-Trimethylbenzene	ND	0.50									
1,2-Dibromo-3-chloropropane	ND	1.0									
1,2-Dibromoethane	ND	0.50									
1,2-Dichlorobenzene	ND	0.50									
1,2-Dichloroethane	ND	0.50									
1,2-Dichloropropane	ND	0.50									
1,3,5-Trimethylbenzene	ND	0.50									
1,3-Dichlorobenzene	ND	0.50									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Tetra Tech
Work Order: N009889
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130401MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88267**
Client ID: **PBW** Batch ID: **P13VW054** TestNo: **EPA 8260B** Analysis Date: **4/1/2013** SeqNo: **1548364**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,3-Dichloropropane	ND	0.50									
1,4-Dichlorobenzene	ND	0.50									
2,2-Dichloropropane	ND	0.50									
2-Chlorotoluene	ND	0.50									
4-Chlorotoluene	ND	0.50									
4-Isopropyltoluene	ND	0.50									
Benzene	ND	0.50									
Bromobenzene	ND	0.50									
Bromodichloromethane	ND	0.50									
Bromoform	ND	0.50									
Bromomethane	ND	0.50									
Carbon tetrachloride	ND	0.50									
Chlorobenzene	ND	0.50									
Chloroethane	ND	0.50									
Chloroform	ND	0.50									
Chloromethane	ND	0.50									
cis-1,2-Dichloroethene	ND	0.50									
Dibromochloromethane	ND	0.50									
Dibromomethane	ND	0.50									
Dichlorodifluoromethane	ND	0.50									
Ethylbenzene	ND	0.50									
Hexachlorobutadiene	ND	0.50									
Isopropylbenzene	ND	0.50									
m,p-Xylene	ND	1.0									
Methylene chloride	ND	2.0									
MTBE	ND	0.50									
n-Butylbenzene	ND	0.50									
n-Propylbenzene	ND	0.50									
Naphthalene	ND	0.50									
o-Xylene	ND	0.50									

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
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CLIENT: Tetra Tech
Work Order: N009889
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **P130401MB2** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88267**
Client ID: **PBW** Batch ID: **P13VW054** TestNo: **EPA 8260B** Analysis Date: **4/1/2013** SeqNo: **1548364**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
sec-Butylbenzene	ND	0.50									
Styrene	ND	0.50									
tert-Butylbenzene	ND	0.50									
Tetrachloroethene	ND	0.50									
Toluene	ND	0.50									
trans-1,2-Dichloroethene	ND	0.50									
Trichloroethene	ND	0.50									
Trichlorofluoromethane	ND	0.50									
Vinyl chloride	ND	0.50									
Surr: 1,2-Dichloroethane-d4	24.340		25.00		97.4	56	120				
Surr: 4-Bromofluorobenzene	22.740		25.00		91.0	80	120				
Surr: Dibromofluoromethane	25.560		25.00		102	72	120				
Surr: Toluene-d8	25.050		25.00		100	80	123				

Sample ID: **N009901-004ADUP** SampType: **DUP** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88267**
Client ID: **ZZZZZZ** Batch ID: **P13VW054** TestNo: **EPA 8260B** Analysis Date: **4/1/2013** SeqNo: **1548372**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	0.50						0	0	20	
1,1,1-Trichloroethane	ND	0.50						0	0	20	
1,1,2,2-Tetrachloroethane	ND	0.50						0	0	20	
1,1,2-Trichloroethane	ND	0.50						0	0	20	
1,1-Dichloroethane	ND	0.50						0	0	20	
1,1-Dichloroethene	ND	0.50						0	0	20	
1,1-Dichloropropene	ND	0.50						0	0	20	
1,2,3-Trichlorobenzene	ND	0.50						0	0	20	
1,2,3-Trichloropropane	ND	0.50						0	0	20	
1,2,4-Trichlorobenzene	ND	0.50						0	0	20	
1,2,4-Trimethylbenzene	ND	0.50						0	0	20	
1,2-Dibromo-3-chloropropane	ND	1.0						0	0	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N009889
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **N009901-004ADUP** SampType: **DUP** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88267**
Client ID: **ZZZZZZ** Batch ID: **P13VW054** TestNo: **EPA 8260B** Analysis Date: **4/1/2013** SeqNo: **1548372**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2-Dibromoethane	ND	0.50						0	0	20	
1,2-Dichlorobenzene	ND	0.50						0	0	20	
1,2-Dichloroethane	ND	0.50						0	0	20	
1,2-Dichloropropane	ND	0.50						0	0	20	
1,3,5-Trimethylbenzene	ND	0.50						0	0	20	
1,3-Dichlorobenzene	ND	0.50						0	0	20	
1,3-Dichloropropane	ND	0.50						0	0	20	
1,4-Dichlorobenzene	ND	0.50						0	0	20	
2,2-Dichloropropane	ND	0.50						0	0	20	
2-Chlorotoluene	ND	0.50						0	0	20	
4-Chlorotoluene	ND	0.50						0	0	20	
4-Isopropyltoluene	ND	0.50						0	0	20	
Benzene	ND	0.50						0	0	20	
Bromobenzene	ND	0.50						0	0	20	
Bromodichloromethane	ND	0.50						0	0	20	
Bromoform	ND	0.50						0	0	20	
Bromomethane	ND	0.50						0	0	20	
Carbon tetrachloride	ND	0.50						0	0	20	
Chlorobenzene	ND	0.50						0	0	20	
Chloroethane	ND	0.50						0	0	20	
Chloroform	ND	0.50						0	0	20	
Chloromethane	ND	0.50						0	0	20	
cis-1,2-Dichloroethene	ND	0.50						0	0	20	
Dibromochloromethane	ND	0.50						0	0	20	
Dibromomethane	ND	0.50						0	0	20	
Dichlorodifluoromethane	ND	0.50						0	0	20	
Ethylbenzene	ND	0.50						0	0	20	
Hexachlorobutadiene	ND	0.50						0	0	20	
Isopropylbenzene	ND	0.50						0	0	20	
m,p-Xylene	ND	1.0						0	0	20	

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike/Surrogate outside of limits due to matrix interference
- DO Surrogate Diluted Out
- Calculations are based on raw values

Advanced Technology Laboratories, Inc.
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CLIENT: Tetra Tech
Work Order: N009889
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **N009901-004ADUP** SampType: **DUP** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **88267**
Client ID: **ZZZZZZ** Batch ID: **P13VW054** TestNo: **EPA 8260B** Analysis Date: **4/1/2013** SeqNo: **1548372**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methylene chloride	ND	2.0						0	0	20	
MTBE	ND	0.50						0	0	20	
n-Butylbenzene	ND	0.50						0	0	20	
n-Propylbenzene	ND	0.50						0	0	20	
Naphthalene	0.880	0.50						0.7000	22.8	20	R
o-Xylene	ND	0.50						0	0	20	
sec-Butylbenzene	ND	0.50						0	0	20	
Styrene	ND	0.50						0	0	20	
tert-Butylbenzene	ND	0.50						0	0	20	
Tetrachloroethene	ND	0.50						0	0	20	
Toluene	ND	0.50						0	0	20	
trans-1,2-Dichloroethene	ND	0.50						0	0	20	
Trichloroethene	0.990	0.50						1.030	3.96	20	
Trichlorofluoromethane	ND	0.50						0	0	20	
Vinyl chloride	ND	0.50						0	0	20	
Surr: 1,2-Dichloroethane-d4	25.810		25.00		103	56	120		0		
Surr: 4-Bromofluorobenzene	23.150		25.00		92.6	80	120		0		
Surr: Dibromofluoromethane	26.410		25.00		106	72	120		0		
Surr: Toluene-d8	24.360		25.00		97.4	80	123		0		

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CHAIN OF CUSTODY RECORD

Page 1 of 1

Advanced Technology Laboratories, Inc.
3151-3153 W. Post Rd.
Las Vegas, NV 89118
Tel:(702) 307-2659•Fax:(702) 307-2691

FOR LABORATORY USE ONLY:

P.O.# 103P172829.01

Logged By: BDano Date: 3/26

Method of Transport
Client ☐
ATL INC ☑
FEDEX ☐
Other:

Sample Condition Upon Receipt
1. CHILLED 2.7°C ICE IRR Y☑ N☐ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐
3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: Tetra Tech
Attn: Rob Manriquez
Address: 1230 Columbia St #1000
City San Diego State CA Zip Code 92101
TEL:( )
FAX:( )
Project Name: Maryland Square
Project #: 103P172829.01
Sampler: I attest to the validity and authenticity of this sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action. (Printed Name) BECKI DANO (Signature)

Relinquished by: (Signature and Printed name) BECKI DANO Date: 3/26 Time: 1357 Received by: (Signature and Printed name) Date: 3/26/13 Time: 1357
Relinquished by: (Signature and Printed name) Date: Time: Received by: (Signature and Printed name) Date: Time:
Relinquished by: (Signature and Printed name) Date: Time: Received by: (Signature and Printed name) Date: Time:

I hereby authorize ATL INC to perform the work indicated below:
Project Mgr/Submitter:
BECKI DANO 3/26
Print Name Date
Signature

Send Report To:
Attn: Rob Manriquez
Co: Tetra Tech
Address: 1230 Columbia St #1000
City San Diego State CA Zip 92101

Bill To:
Attn: Same
Co:
Address:
City State Zip

Special Instructions/Comments:
email results when ready
Becki.Dano@tetratech.com
Chit.Christian@tetratech.com
Liz.Medve@tetratech.com

Sample/Records-Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.
Storage Fees (applies when storage is requested):
- Sample : $ 2.00 / sample / mo (after 45 days)
- Records : $ 1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested: 8260B (VOC); 8260B (BTEX),(MTBE); 8015B (GRO); 8015B (DRO),(Motor Oil/ORO); RCRA8 (6010B/7000); Metals Cr As; Gross Alpha; Chlorides

SPECIFY APPROPRIATE MATRIX: SOIL; WATER; GROUND WATER; WASTEWATER

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample I.D. / Location	Date	Time	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	N009889-1	CMT-1-1	3/25	1141	E	5	multi		
	-2	CMT-1-2	3/25	1300	E	5	multi		
	-3	CMT-1-3	3/25	1445	E	5	multi		
	-4	CMT-1-4	3/25	1623	E	5	multi		
	-5	CMT-1-5	3/25	1800	E	5	multi		
	-6	CMT-1-6	3/25	1915	E	5	multi		
	-7	CMT-1-7	3/25	2055	E	5	multi		
	-8	MW-20D3	3/26	0955	E	5	multi		
	-9	MW-20D2	3/26	1045	E	5	multi		
	-10	MW-20D1	3/26	1127	E	5	multi		

QA/QC
RTNE ☐
CT ☐
RWQCB ☐
LEVEL IV
OTHER

•TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: ☐ A= Overnight ≤ 24 hr ☐ B= Emergency Next workday ☐ C= Critical 2 Workdays ☐ D= Urgent 3 Workdays ☐ E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories, Inc.
3151-3153 W. Post Rd.
Las Vegas, NV 89118
Tel:(702) 307-2659•Fax:(702) 307-2691

FOR LABORATORY USE ONLY:

P.O.# 103P1728290/

Logged By: DDem Date: 3/26

Method of Transport
Client ☐
ATL INC ☐
FEDEX ☐
Other:

Sample Condition Upon Receipt

1. CHILLED	Y☐ N☐	4. SEALED	Y☐ N☐		
2. HEADSPACE (VOA)	Y☐ N☐	5. # OF SPLS MATCH COC	Y☐ N☐		
3. CONTAINER INTACT	Y☐ N☐	6. PRESERVED	Y☐ N☐		

Client: Tetra Tech
Address: 1230 Columbia St #1100
TEL:( )
Attn: Rob Manrique
City San Diego State CA Zip Code 92101
FAX:( )
Project Name: Maryland Square
Project #: 103P1728290
Sampler: BECKI DANO

I attest to the validity and authenticity of this sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action.

(Printed Name) BECKI DANO
(Signature)

Relinquished by: (Signature and Printed name) BECKI DANO	Date: 3/26/13	Time: 1357	Received by: (Signature and Printed name)		Date: 3/26/13	Time: 1357
Relinquished by: (Signature and Printed name)	Date:	Time:	Received by: (Signature and Printed name)		Date:	Time:
Relinquished by: (Signature and Printed name)	Date:	Time:	Received by: (Signature and Printed name)		Date:	Time:

I hereby authorize ATL INC to perform the work indicated below:
Project Mgr/Submitter:
BECKI DANO 3/26
Print Name Date
Signature

Send Report To:
Attn: Rob Manrique
Co: Tetra Tech
Address: 1230 Columbia St #1100
City San Diego State CA Zip 92101

Bill To:
Attn:
Co: Same
Address:
City State Zip

Special Instructions/Comments:
See Pg 1

Sample/Records-Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $ 2.00 / sample / mo (after 45 days)
- Records : $ 1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested

SPECIFY APPROPRIATE MATRIX

PRESERVATION

QA/QC
RTNE ☐
CT ☐
RWQCB ☐
LEVEL IV
OTHER

ITEM	LAB USE ONLY: Batch # / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8260B (VOC)	8260B (BTEX),(MTBE)	8015B (GRO)	8015B (DRO),(Motor Oil/ORO)	RCRA8 (6010B/7000)	Methods	Dissolved Metals Chloride	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	REMARKS
	N009889-11	MW-20	3/26	1250	X				X	X	X		X			E	5	mulli	

•TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: ☐ A= Overnight ≤ 24 hr ☐ B= Emergency Next workday ☐ C= Critical 2 Workdays ☐ D= Urgent 3 Workdays ☐ E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives:
H=HCl N=HNO_3 S=H_2SO_4 C=4°C
Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter

Advanced Technology Laboratories, Inc.

Please review the checklist below. Any NO signifies non-compliance. Any non-compliance will be noted and must be understood as having an impact on the quality of the data. All tests will be performed as requested regardless of any compliance issues.

If you have any questions or further instruction, please contact our Project Coordinator at (702) 307-2659.

Cooler Received/Opened On:	3/26/2013	Workorder:	N009889
Rep sample Temp (Deg C):	2.7	IR Gun ID:	1
Temp Blank:	☐ Yes ☑ No		
Carrier name:	ATL		
Last 4 digits of Tracking No.:	NA	Packing Material Used:	None
Cooling process:	☑ Ice ☐ Ice Pack ☐ Dry Ice ☐ Other ☐ None		

Sample Receipt Checklist

1. Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
2. Custody seals intact, signed, dated on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
3. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
4. Chain of custody present?	Yes ☑	No ☐	
5. Sampler's name present in COC?	Yes ☑	No ☐	
6. Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
7. Chain of custody agrees with sample labels?	Yes ☑	No ☐	
8. Samples in proper container/bottle?	Yes ☑	No ☐	
9. Sample containers intact?	Yes ☑	No ☐	
10. Sufficient sample volume for indicated test?	Yes ☑	No ☐	
11. All samples received within holding time?	Yes ☑	No ☐	
12. Temperature of rep sample or Temp Blank within acceptable limit?	Yes ☑	No ☐	NA ☐
13. Water - VOA vials have zero headspace?	Yes ☑	No ☐	NA ☐
14. Water - pH acceptable upon receipt? Example: pH > 12 for (CN,S); pH<2 for Metals	Yes ☑	No ☐	NA ☐
15. Did the bottle labels indicate correct preservatives used?	Yes ☑	No ☐	NA ☐
16. Were there Non-Conformance issues at login?	Yes ☐	No ☐	NA ☑
Was Client notified?	Yes ☐	No ☐	NA ☑

Comments:

Checklist Completed B MBC MBC 3/27/13

Reviewed By:

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories, Inc.
3151-3153 W. Post Rd.
Las Vegas, NV 89118
Tel:(702) 307-2659•Fax:(702) 307-2691

FOR LABORATORY USE ONLY:

P.O.# 103P172829.01

Logged By: BDano Date: 4-23

Method of Transport
Client ☐
ATL INC ☐
FEDEX ☐
Other:

Sample Condition Upon Receipt
1. CHILLED 4.4°C ICE IR #1 Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐
3. CONTAINER INTACT Y☐ N☐
4. SEALED Y☐ N☐
5. # OF SPLS MATCH COC Y☐ N☐
6. PRESERVED Y☐ N☐

Client: TetraTech
Attn: Rob Munriquez
Address: 1230 Columbia St #1000
City San Diego State CA Zip Code 92101
TEL:( )
FAX:( )

Project Name: Mayflower Square
Project #: 103P172829.01
Sampler: (Printed Name) BDano (Signature)
I attest to the validity and authenticity of this sample. I am aware that tampering with or intentionally mislabelling the sample location, date or time of collection is considered fraud and may be grounds for legal action.

Relinquished by: (Signature and Printed name) BECKI DANO	Date: 4/24	Time: 1021	Received by: (Signature and Printed name) MERCATUS	Date: 4/24/13	Time: 1021
Relinquished by: (Signature and Printed name)	Date:	Time:	Received by: (Signature and Printed name)	Date:	Time:
Relinquished by: (Signature and Printed name)	Date:	Time:	Received by: (Signature and Printed name)	Date:	Time:

I hereby authorize ATL INC to perform the work indicated below:
Project Mgr/Submitter:
BECKI DANO (Print Name) 4-23 (Date)
(Signature)

Send Report To:
Attn: Rob Munriquez
Co: TetraTech
Address: 1230 Columbia St #1000
City San Diego State CA Zip 92101

Bill To:
Attn:
Co: Same
Address:
City State Zip

Special Instructions/Comments:
email when ready to:
Becki.Dano@tetratech.com
Lisa.Medve@tetratech.com
Chit.Christian@tetratech.com

Sample/Records-Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $ 2.00 / sample / mo (after 45 days)
- Records : $ 1.00 / ATL workorder / mo (after 1 year)

QA/QC
RTNE ☐
CT ☐
RWQCB ☐
LEVEL IV ____
OTHER ____

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8260B (VOC)	8260B (BTEX), (MTBE)	8015B (GRO)	8015B (DRO), (Motor Oil/ORO)	RCRA8 (6010B/7000)	Chloride	Metals (Pb, Cr)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	N0101087-1	MW-20	4/23	0942	X					X	X			1		E	5	mult		
	-2	MW-20D1		1037	X					X	X			X		E	5	mult		
	-3	MW-20D2		1125	X					X	X			X		E	5	mult		
	-4	MW-20D3		1225	X					X	X			X		E	5	mult		
	-5	CMT-1-1		1445	X					X	X			X		E	5	mult		
	-6	CMT-1-2		1545	X					X	X			X		E	5	mult		
	-7	CMT-1-3		1620	X					X	X			X		E	5	mult		
	-8	CMT-1-4		1705	X					X	X			X		E	5	mult		
	-9	CMT-1-5		1745	X					X	X			X		E	5	mult		
	-10	CMT-1-6		1820	X					X	X			X		E	5	mult		

•TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: ☐ A= Overnight ≤ 24 hr ☐ B= Emergency Next workday ☐ C= Critical 2 Workdays ☐ D= Urgent 3 Workdays ☐ E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives:
H=HCl N=HNO_3 S=H_2SO_4 C=4°C
Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories, Inc.
3151-3153 W. Post Rd.
Las Vegas, NV 89118
Tel:(702) 307-2659•Fax:(702) 307-2691

FOR LABORATORY USE ONLY:

P.O.# 103P172829.01

Logged By: BDano Date: 4-23

Method of Transport
Client ☐
ATL INC ☐
FEDEX ☐
Other:

Sample Condition Upon Receipt

1. CHILLED	Y☐ N☐	4. SEALED	Y☐ N☐		
2. HEADSPACE (VOA)	Y☐ N☐	5. # OF SPLS MATCH COC	Y☐ N☐		
3. CONTAINER INTACT	Y☐ N☐	6. PRESERVED	Y☐ N☐		

Client: Tetra Tech
Attn: Rob Manager
Address: 1230 Columbia St #1000
City San Diego State CA Zip Code 92101
TEL:( )
FAX:( )

Project Name: Maryland Sewer Project #: 103P172829.01 Sampler: *I attest to the validity and authenticity of this sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action.* (Printed Name) BECKI DANO (Signature)

Relinquished by: (Signature and Printed name) BECKI DANO	Date: 4/24	Time: 1021	Received by: (Signature and Printed name) [illegible]	Date: 4/24/13	Time: 1021
Relinquished by: (Signature and Printed name)	Date:	Time:	Received by: (Signature and Printed name)	Date:	Time:
Relinquished by: (Signature and Printed name)	Date:	Time:	Received by: (Signature and Printed name)	Date:	Time:

I hereby authorize ATL INC to perform the work indicated below:
Project Mgr/Submitter:
Becki Dano 4-23
Print Name Date
Signature

Send Report To:
Attn: Rob Manager
Co: Tetra Tech
Address: 1230 Columbia St #1000
City San Diego State CA Zip 92101

Bill To:
Attn:
Co: Same
Address:
City State Zip

Special Instructions/Comments:
See page 1

11 total Samples

Sample/Records-Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $ 2.00 / sample / mo (after 45 days)
- Records : $ 1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested: 8260B (VOC); 8260B (BTEX), (MTBE); 8015B (GRO); 8015B (DRO),(Motor Oil/ORO); RCRA8 (6010B/7000); Filtered; Preserved (Lab); SPECIFY APPROPRIATE MATRIX: SOIL; WATER; GROUND WATER; WASTEWATER; TAT; Container(s) # / Type; PRESERVATION

QA/QC
RTNE ☐
CT ☐
RWQCB ☐
LEVEL IV
OTHER

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8260B (VOC)	8260B (BTEX), (MTBE)	8015B (GRO)	8015B (DRO),(Motor Oil/ORO)	RCRA8 (6010B/7000)	Filtered	Preserved (Lab)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	N010108-11	MW-1-7	4/23	1800	X			X	X					X		2	5	multi		
				1854																

•TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: ☐ A= Overnight ≤ 24 hr ☐ B= Emergency Next workday ☐ C= Critical 2 Workdays ☐ D= Urgent 3 Workdays ☐ E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter

Advanced Technology Laboratories, Inc.

Please review the checklist below. Any NO signifies non-compliance. Any non-compliance will be noted and must be understood as having an impact on the quality of the data. All tests will be performed as requested regardless of any compliance issues.

If you have any questions or further instruction, please contact our Project Coordinator at (702) 307-2659.

Cooler Received/Opened On:	4/24/2013	Workorder:	N010108
Rep sample Temp (Deg C):	4.4	IR Gun ID:	1
Temp Blank:	☐ Yes ☑ No		
Carrier name:	Client		
Last 4 digits of Tracking No.:	NA	Packing Material Used:	None
Cooling process:	☑ Ice ☐ Ice Pack ☐ Dry Ice ☐ Other ☐ None		

Sample Receipt Checklist

1. Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
2. Custody seals intact, signed, dated on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
3. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
4. Chain of custody present?	Yes ☑	No ☐	
5. Sampler's name present in COC?	Yes ☑	No ☐	
6. Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
7. Chain of custody agrees with sample labels?	Yes ☑	No ☐	
8. Samples in proper container/bottle?	Yes ☑	No ☐	
9. Sample containers intact?	Yes ☑	No ☐	
10. Sufficient sample volume for indicated test?	Yes ☑	No ☐	
11. All samples received within holding time?	Yes ☑	No ☐	
12. Temperature of rep sample or Temp Blank within acceptable limit?	Yes ☑	No ☐	NA ☐
13. Water - VOA vials have zero headspace?	Yes ☑	No ☐	NA ☐
14. Water - pH acceptable upon receipt? Example: pH > 12 for (CN,S); pH<2 for Metals	Yes ☑	No ☐	NA ☐
15. Did the bottle labels indicate correct preservatives used?	Yes ☑	No ☐	NA ☐
16. Were there Non-Conformance issues at login?	Yes ☐	No ☐	NA ☑
Was Client notified?	Yes ☐	No ☐	NA ☑

Comments:

Checklist Completed B MBC MBC 4/24/13

Reviewed By:

May 06, 2013

Rob Manriquez
Tetra Tech
1230 Columbia Street, Suite 1000
San Diego, CA 92101

TEL: (858) 527-8803
FAX:

CA-ELAP No.: 2676
NV Cert. No.: NV-009222007A

Workorder No.: N010153

RE: Maryland Square, 103P172829.01

Attention: Rob Manriquez

Enclosed are the results for sample(s) received on May 02, 2013 by Advanced Technology Laboratories, Inc. . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (702) 307-2659 if I can be of further assistance to your company.

Sincerely,

Jose Tenorio Jr.
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories - Las Vegas.

CLIENT: Tetra Tech
Project: Maryland Square, 103P172829.01
Lab Order: N010153

CASE NARRATIVE

SAMPLE RECEIVING/GENERAL COMMENTS:

Samples were received intact with proper chain of custody documentation.

Cooler temperature and sample preservation were verified upon receipt of samples if applicable.

Information on sample receipt conditions including discrepancies can be found in attached Sample Receipt Checklist Form.

Samples were analyzed within method holding time.

Analytical Comments for EPA 6010B:

Matrix Spike (MS) and /or Matrix Spike Duplicate (MSD) are outside recovery criteria for Chromium since the analyte concentration in the sample is disproportionate to the spike level. The associated Laboratory Control Sample (LCS) recovery was acceptable.

Analytical Comments for EPA 8260B:

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) are outside recovery criteria for some analytes possibly due to matrix interference. The associated Laboratory Control Sample (LCS) recovery was acceptable.

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-001

Client Sample ID: CMT-1-1
Collection Date: 5/1/2013 10:14:00 AM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
			EPA 8260B			
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	5/3/2013 06:33 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
2-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
4-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Benzene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Bromobenzene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Bromodichloromethane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Bromoform	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Bromomethane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Carbon tetrachloride	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Chlorobenzene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Chloroethane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Chloroform	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Chloromethane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Dibromochloromethane	ND	0.50		µg/L	1	5/3/2013 06:33 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-001

Client Sample ID: CMT-1-1
Collection Date: 5/1/2013 10:14:00 AM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
Dibromomethane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Ethylbenzene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Isopropylbenzene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
m,p-Xylene	ND	1.0		µg/L	1	5/3/2013 06:33 PM
Methylene chloride	ND	2.0		µg/L	1	5/3/2013 06:33 PM
MTBE	ND	0.50		µg/L	1	5/3/2013 06:33 PM
n-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
n-Propylbenzene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Naphthalene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
o-Xylene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
sec-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Styrene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
tert-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Tetrachloroethene	1.2	0.50		µg/L	1	5/3/2013 06:33 PM
Toluene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Trichloroethene	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Vinyl chloride	ND	0.50		µg/L	1	5/3/2013 06:33 PM
Surr: 1,2-Dichloroethane-d4	99.6	70-127		%REC	1	5/3/2013 06:33 PM
Surr: 4-Bromofluorobenzene	95.8	80-120		%REC	1	5/3/2013 06:33 PM
Surr: Dibromofluoromethane	96.8	73-128		%REC	1	5/3/2013 06:33 PM
Surr: Toluene-d8	98.7	80-120		%REC	1	5/3/2013 06:33 PM
ANIONS BY ION CHROMATOGRAPHY						
		EPA 300.0				
RunID: IC2_130505A	QC Batch: R88729			PrepDate:		Analyst: **QBM**
Chloride	180	25		mg/L	50	5/5/2013 12:51 PM
ICP-MS METALS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130503A	QC Batch: 42878			PrepDate:	5/2/2013	Analyst: **CEI**
Arsenic	5.9	0.10		µg/L	1	5/3/2013 04:53 PM
Chromium	210	5.0		µg/L	5	5/3/2013 06:54 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-002

Client Sample ID: CMT-1-2
Collection Date: 5/1/2013 11:24:00 AM
Matrix: GROUNDWATER

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS1_130503A QC Batch: D13VW016 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	5/3/2013 05:25 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
2-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
4-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Benzene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Bromobenzene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Bromodichloromethane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Bromoform	2.2	0.50		µg/L	1	5/3/2013 05:25 PM
Bromomethane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Carbon tetrachloride	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Chlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Chloroethane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Chloroform	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Chloromethane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Dibromochloromethane	ND	0.50		µg/L	1	5/3/2013 05:25 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-002

Client Sample ID: CMT-1-2
Collection Date: 5/1/2013 11:24:00 AM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
Dibromomethane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Ethylbenzene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Isopropylbenzene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
m,p-Xylene	ND	1.0		µg/L	1	5/3/2013 05:25 PM
Methylene chloride	ND	2.0		µg/L	1	5/3/2013 05:25 PM
MTBE	ND	0.50		µg/L	1	5/3/2013 05:25 PM
n-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
n-Propylbenzene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Naphthalene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
o-Xylene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
sec-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Styrene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
tert-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Tetrachloroethene	2.3	0.50		µg/L	1	5/3/2013 05:25 PM
Toluene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Trichloroethene	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Vinyl chloride	ND	0.50		µg/L	1	5/3/2013 05:25 PM
Surr: 1,2-Dichloroethane-d4	97.7	70-127		%REC	1	5/3/2013 05:25 PM
Surr: 4-Bromofluorobenzene	96.3	80-120		%REC	1	5/3/2013 05:25 PM
Surr: Dibromofluoromethane	97.7	73-128		%REC	1	5/3/2013 05:25 PM
Surr: Toluene-d8	96.9	80-120		%REC	1	5/3/2013 05:25 PM
ANIONS BY ION CHROMATOGRAPHY						
		EPA 300.0				
RunID: IC2_130505A	QC Batch: R88729			PrepDate:		Analyst: **QBM**
Chloride	170	25		mg/L	50	5/5/2013 01:16 PM
ICP-MS METALS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130503A	QC Batch: 42878			PrepDate:	5/2/2013	Analyst: **CEI**
Arsenic	3.5	0.10		µg/L	1	5/3/2013 04:59 PM
Chromium	25	1.0		µg/L	1	5/3/2013 04:59 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-003

Client Sample ID: CMT-1-3
Collection Date: 5/1/2013 12:19:00 PM
Matrix: GROUNDWATER

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS1_130503A | QC Batch: D13VW016 | PrepDate: | Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	5/3/2013 11:28 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
2-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
4-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Benzene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Bromobenzene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Bromodichloromethane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Bromoform	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Bromomethane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Carbon tetrachloride	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Chlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Chloroethane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Chloroform	0.78	0.50		µg/L	1	5/3/2013 11:28 PM
Chloromethane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Dibromochloromethane	ND	0.50		µg/L	1	5/3/2013 11:28 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-003

Client Sample ID: CMT-1-3
Collection Date: 5/1/2013 12:19:00 PM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
Dibromomethane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Ethylbenzene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Isopropylbenzene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
m,p-Xylene	ND	1.0		µg/L	1	5/3/2013 11:28 PM
Methylene chloride	ND	2.0		µg/L	1	5/3/2013 11:28 PM
MTBE	ND	0.50		µg/L	1	5/3/2013 11:28 PM
n-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
n-Propylbenzene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Naphthalene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
o-Xylene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
sec-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Styrene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
tert-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Tetrachloroethene	96	0.50		µg/L	1	5/3/2013 11:28 PM
Toluene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Trichloroethene	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Vinyl chloride	ND	0.50		µg/L	1	5/3/2013 11:28 PM
Surr: 1,2-Dichloroethane-d4	112	70-127		%REC	1	5/3/2013 11:28 PM
Surr: 4-Bromofluorobenzene	96.9	80-120		%REC	1	5/3/2013 11:28 PM
Surr: Dibromofluoromethane	104	73-128		%REC	1	5/3/2013 11:28 PM
Surr: Toluene-d8	98.2	80-120		%REC	1	5/3/2013 11:28 PM
ANIONS BY ION CHROMATOGRAPHY						
		EPA 300.0				
RunID: IC2_130505A	QC Batch: R88729			PrepDate:		Analyst: **QBM**
Chloride	170	25		mg/L	50	5/5/2013 01:54 PM
ICP-MS METALS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130503A	QC Batch: 42878			PrepDate:	5/2/2013	Analyst: **CEI**
Arsenic	3.3	0.10		µg/L	1	5/3/2013 05:05 PM
Chromium	38	1.0		µg/L	1	5/3/2013 05:05 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-004

Client Sample ID: CMT-1-4
Collection Date: 5/1/2013 12:59:00 PM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	5/3/2013 11:06 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
2-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
4-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Benzene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Bromobenzene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Bromodichloromethane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Bromoform	4.7	0.50		µg/L	1	5/3/2013 11:06 PM
Bromomethane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Carbon tetrachloride	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Chlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Chloroethane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Chloroform	0.80	0.50		µg/L	1	5/3/2013 11:06 PM
Chloromethane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Dibromochloromethane	ND	0.50		µg/L	1	5/3/2013 11:06 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-004

Client Sample ID: CMT-1-4
Collection Date: 5/1/2013 12:59:00 PM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
Dibromomethane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Ethylbenzene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Isopropylbenzene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
m,p-Xylene	ND	1.0		µg/L	1	5/3/2013 11:06 PM
Methylene chloride	ND	2.0		µg/L	1	5/3/2013 11:06 PM
MTBE	ND	0.50		µg/L	1	5/3/2013 11:06 PM
n-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
n-Propylbenzene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Naphthalene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
o-Xylene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
sec-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Styrene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
tert-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Tetrachloroethene	78	0.50		µg/L	1	5/3/2013 11:06 PM
Toluene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Trichloroethene	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Vinyl chloride	ND	0.50		µg/L	1	5/3/2013 11:06 PM
Surr: 1,2-Dichloroethane-d4	113	70-127		%REC	1	5/3/2013 11:06 PM
Surr: 4-Bromofluorobenzene	97.7	80-120		%REC	1	5/3/2013 11:06 PM
Surr: Dibromofluoromethane	106	73-128		%REC	1	5/3/2013 11:06 PM
Surr: Toluene-d8	97.2	80-120		%REC	1	5/3/2013 11:06 PM
ANIONS BY ION CHROMATOGRAPHY						
		EPA 300.0				
RunID: IC2_130505A	QC Batch: R88729			PrepDate:		Analyst: **QBM**
Chloride	170	25		mg/L	50	5/5/2013 02:07 PM
ICP-MS METALS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130503A	QC Batch: 42878			PrepDate:	5/2/2013	Analyst: **CEI**
Arsenic	2.7	0.10		µg/L	1	5/3/2013 05:10 PM
Chromium	47	1.0		µg/L	1	5/3/2013 05:10 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-005

Client Sample ID: CMT-1-5
Collection Date: 5/1/2013 1:46:00 PM
Matrix: GROUNDWATER

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS1_130503A QC Batch: D13VW016 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	5/3/2013 10:44 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
2-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
4-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Benzene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Bromobenzene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Bromodichloromethane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Bromoform	4.6	0.50		µg/L	1	5/3/2013 10:44 PM
Bromomethane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Carbon tetrachloride	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Chlorobenzene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Chloroethane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Chloroform	0.82	0.50		µg/L	1	5/3/2013 10:44 PM
Chloromethane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Dibromochloromethane	ND	0.50		µg/L	1	5/3/2013 10:44 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference
- DO Surrogate Diluted Out
- E Value above quantitation range
- ND Not Detected at the Reporting Limit

Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-005

Client Sample ID: CMT-1-5
Collection Date: 5/1/2013 1:46:00 PM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
Dibromomethane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Ethylbenzene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Isopropylbenzene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
m,p-Xylene	ND	1.0		µg/L	1	5/3/2013 10:44 PM
Methylene chloride	ND	2.0		µg/L	1	5/3/2013 10:44 PM
MTBE	ND	0.50		µg/L	1	5/3/2013 10:44 PM
n-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
n-Propylbenzene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Naphthalene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
o-Xylene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
sec-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Styrene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
tert-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Tetrachloroethene	79	0.50		µg/L	1	5/3/2013 10:44 PM
Toluene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Trichloroethene	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Vinyl chloride	ND	0.50		µg/L	1	5/3/2013 10:44 PM
Surr: 1,2-Dichloroethane-d4	116	70-127		%REC	1	5/3/2013 10:44 PM
Surr: 4-Bromofluorobenzene	99.6	80-120		%REC	1	5/3/2013 10:44 PM
Surr: Dibromofluoromethane	108	73-128		%REC	1	5/3/2013 10:44 PM
Surr: Toluene-d8	97.8	80-120		%REC	1	5/3/2013 10:44 PM
ANIONS BY ION CHROMATOGRAPHY						
		EPA 300.0				
RunID: IC2_130505A	QC Batch: R88729			PrepDate:		Analyst: **QBM**
Chloride	170	25		mg/L	50	5/5/2013 02:58 PM
ICP-MS METALS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130503A	QC Batch: 42878			PrepDate:	5/2/2013	Analyst: **CEI**
Arsenic	3.1	0.10		µg/L	1	5/3/2013 05:16 PM
Chromium	41	1.0		µg/L	1	5/3/2013 05:16 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-006

Client Sample ID: CMT-1-6
Collection Date: 5/1/2013 2:36:00 PM
Matrix: GROUNDWATER

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS1_130503A QC Batch: D13VW016 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,1-Dichloroethane	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,1-Dichloroethene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,1-Dichloropropene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	5/4/2013 12:13 AM
1,2-Dibromoethane	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,2-Dichloroethane	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,2-Dichloropropane	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,3-Dichloropropane	ND	0.50		µg/L	1	5/4/2013 12:13 AM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
2,2-Dichloropropane	ND	0.50		µg/L	1	5/4/2013 12:13 AM
2-Chlorotoluene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
4-Chlorotoluene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
4-Isopropyltoluene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Benzene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Bromobenzene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Bromodichloromethane	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Bromoform	7.5	0.50		µg/L	1	5/4/2013 12:13 AM
Bromomethane	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Carbon tetrachloride	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Chlorobenzene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Chloroethane	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Chloroform	1.5	0.50		µg/L	1	5/4/2013 12:13 AM
Chloromethane	ND	0.50		µg/L	1	5/4/2013 12:13 AM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Dibromochloromethane	ND	0.50		µg/L	1	5/4/2013 12:13 AM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-006

Client Sample ID: CMT-1-6
Collection Date: 5/1/2013 2:36:00 PM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
			EPA 8260B			
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
Dibromomethane	0.59	0.50		µg/L	1	5/4/2013 12:13 AM
Dichlorodifluoromethane	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Ethylbenzene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Hexachlorobutadiene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Isopropylbenzene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
m,p-Xylene	ND	1.0		µg/L	1	5/4/2013 12:13 AM
Methylene chloride	ND	2.0		µg/L	1	5/4/2013 12:13 AM
MTBE	ND	0.50		µg/L	1	5/4/2013 12:13 AM
n-Butylbenzene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
n-Propylbenzene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Naphthalene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
o-Xylene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
sec-Butylbenzene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Styrene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
tert-Butylbenzene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Tetrachloroethene	430	5.0		µg/L	10	5/3/2013 08:49 PM
Toluene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Trichloroethene	1.1	0.50		µg/L	1	5/4/2013 12:13 AM
Trichlorofluoromethane	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Vinyl chloride	ND	0.50		µg/L	1	5/4/2013 12:13 AM
Surr: 1,2-Dichloroethane-d4	111	70-127		%REC	1	5/4/2013 12:13 AM
Surr: 1,2-Dichloroethane-d4	102	70-127		%REC	10	5/3/2013 08:49 PM
Surr: 4-Bromofluorobenzene	97.8	80-120		%REC	1	5/4/2013 12:13 AM
Surr: 4-Bromofluorobenzene	96.2	80-120		%REC	10	5/3/2013 08:49 PM
Surr: Dibromofluoromethane	105	73-128		%REC	1	5/4/2013 12:13 AM
Surr: Dibromofluoromethane	100	73-128		%REC	10	5/3/2013 08:49 PM
Surr: Toluene-d8	98.6	80-120		%REC	10	5/3/2013 08:49 PM
Surr: Toluene-d8	96.0	80-120		%REC	1	5/4/2013 12:13 AM
ANIONS BY ION CHROMATOGRAPHY						
			EPA 300.0			
RunID: IC2_130505A	QC Batch: R88729			PrepDate:		Analyst: **QBM**
Chloride	170	25		mg/L	50	5/5/2013 03:10 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Tetra Tech	**Client Sample ID:**	CMT-1-6
Lab Order:	N010153	**Collection Date:**	5/1/2013 2:36:00 PM
Project:	Maryland Square, 103P172829.01	**Matrix:**	GROUNDWATER
Lab ID:	N010153-006		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP-MS METALS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130503A	QC Batch: 42878			PrepDate:	5/2/2013	Analyst: **CEI**
Arsenic	2.7	0.10		µg/L	1	5/3/2013 05:21 PM
Chromium	12	1.0		µg/L	1	5/3/2013 05:21 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-007

Client Sample ID: CMT-1-7
Collection Date: 5/1/2013 3:11:00 PM
Matrix: GROUNDWATER

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS1_130503A QC Batch: D13VW016 PrepDate: Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,1-Dichloroethane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,1-Dichloroethene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,1-Dichloropropene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	5/4/2013 01:23 AM
1,2-Dibromoethane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,2-Dichloroethane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,2-Dichloropropane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,3-Dichloropropane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
2,2-Dichloropropane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
2-Chlorotoluene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
4-Chlorotoluene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
4-Isopropyltoluene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Benzene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Bromobenzene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Bromodichloromethane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Bromoform	1.9	0.50		µg/L	1	5/4/2013 01:23 AM
Bromomethane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Carbon tetrachloride	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Chlorobenzene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Chloroethane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Chloroform	2.5	0.50		µg/L	1	5/4/2013 01:23 AM
Chloromethane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
cis-1,2-Dichloroethene	5.0	0.50		µg/L	1	5/4/2013 01:23 AM
Dibromochloromethane	ND	0.50		µg/L	1	5/4/2013 01:23 AM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-007

Client Sample ID: CMT-1-7
Collection Date: 5/1/2013 3:11:00 PM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
			EPA 8260B			
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
Dibromomethane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Dichlorodifluoromethane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Ethylbenzene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Hexachlorobutadiene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Isopropylbenzene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
m,p-Xylene	ND	1.0		µg/L	1	5/4/2013 01:23 AM
Methylene chloride	ND	2.0		µg/L	1	5/4/2013 01:23 AM
MTBE	ND	0.50		µg/L	1	5/4/2013 01:23 AM
n-Butylbenzene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
n-Propylbenzene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Naphthalene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
o-Xylene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
sec-Butylbenzene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Styrene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
tert-Butylbenzene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Tetrachloroethene	1200	25		µg/L	50	5/3/2013 09:35 PM
Toluene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Trichloroethene	6.8	0.50		µg/L	1	5/4/2013 01:23 AM
Trichlorofluoromethane	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Vinyl chloride	ND	0.50		µg/L	1	5/4/2013 01:23 AM
Surr: 1,2-Dichloroethane-d4	116	70-127		%REC	1	5/4/2013 01:23 AM
Surr: 1,2-Dichloroethane-d4	103	70-127		%REC	50	5/3/2013 09:35 PM
Surr: 4-Bromofluorobenzene	96.2	80-120		%REC	1	5/4/2013 01:23 AM
Surr: 4-Bromofluorobenzene	95.3	80-120		%REC	50	5/3/2013 09:35 PM
Surr: Dibromofluoromethane	107	73-128		%REC	1	5/4/2013 01:23 AM
Surr: Dibromofluoromethane	99.6	73-128		%REC	50	5/3/2013 09:35 PM
Surr: Toluene-d8	99.8	80-120		%REC	50	5/3/2013 09:35 PM
Surr: Toluene-d8	92.9	80-120		%REC	1	5/4/2013 01:23 AM
ANIONS BY ION CHROMATOGRAPHY						
			EPA 300.0			
RunID: IC2_130505A	QC Batch: R88729			PrepDate:		Analyst: **QBM**
Chloride	160	25		mg/L	50	5/5/2013 03:23 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-007

Client Sample ID: CMT-1-7
Collection Date: 5/1/2013 3:11:00 PM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP-MS METALS						
EPA 3010A				**EPA 6020**		
RunID: ICP7_130503A	QC Batch: 42878			PrepDate:	5/2/2013	Analyst: **CEI**
Arsenic	2.7	0.10		µg/L	1	5/3/2013 05:27 PM
Chromium	2.0	1.0		µg/L	1	5/3/2013 05:27 PM

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-008

Client Sample ID: MW-20D1
Collection Date: 5/1/2013 3:57:00 PM
Matrix: GROUNDWATER

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS1_130503A | QC Batch: D13VW016 | PrepDate: | Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	5/3/2013 05:48 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
2-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
4-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Benzene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Bromobenzene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Bromodichloromethane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Bromoform	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Bromomethane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Carbon tetrachloride	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Chlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Chloroethane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Chloroform	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Chloromethane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Dibromochloromethane	ND	0.50		µg/L	1	5/3/2013 05:48 PM

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-008

Client Sample ID: MW-20D1
Collection Date: 5/1/2013 3:57:00 PM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
Dibromomethane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Ethylbenzene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Isopropylbenzene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
m,p-Xylene	ND	1.0		µg/L	1	5/3/2013 05:48 PM
Methylene chloride	ND	2.0		µg/L	1	5/3/2013 05:48 PM
MTBE	ND	0.50		µg/L	1	5/3/2013 05:48 PM
n-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
n-Propylbenzene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Naphthalene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
o-Xylene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
sec-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Styrene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
tert-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Tetrachloroethene	3.7	0.50		µg/L	1	5/3/2013 05:48 PM
Toluene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Trichloroethene	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Vinyl chloride	ND	0.50		µg/L	1	5/3/2013 05:48 PM
Surr: 1,2-Dichloroethane-d4	102	70-127		%REC	1	5/3/2013 05:48 PM
Surr: 4-Bromofluorobenzene	98.3	80-120		%REC	1	5/3/2013 05:48 PM
Surr: Dibromofluoromethane	99.0	73-128		%REC	1	5/3/2013 05:48 PM
Surr: Toluene-d8	98.6	80-120		%REC	1	5/3/2013 05:48 PM
ANIONS BY ION CHROMATOGRAPHY						
		EPA 300.0				
RunID: IC2_130505A	QC Batch: R88729			PrepDate:		Analyst: **QBM**
Chloride	110	10		mg/L	20	5/5/2013 03:35 PM
ICP-MS METALS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130503A	QC Batch: 42878			PrepDate: 5/2/2013		Analyst: **CEI**
Arsenic	13	0.10		µg/L	1	5/3/2013 05:32 PM
Chromium	70	1.0		µg/L	1	5/3/2013 05:32 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-009

Client Sample ID: MW-20D2
Collection Date: 5/1/2013 4:35:00 PM
Matrix: GROUNDWATER

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS1_130503A | QC Batch: D13VW016 | PrepDate: | Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	5/3/2013 06:10 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
2-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
4-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Benzene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Bromobenzene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Bromodichloromethane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Bromoform	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Bromomethane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Carbon tetrachloride	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Chlorobenzene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Chloroethane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Chloroform	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Chloromethane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Dibromochloromethane	ND	0.50		µg/L	1	5/3/2013 06:10 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT:	Tetra Tech	**Client Sample ID:**	MW-20D2
Lab Order:	N010153	**Collection Date:**	5/1/2013 4:35:00 PM
Project:	Maryland Square, 103P172829.01	**Matrix:**	GROUNDWATER
Lab ID:	N010153-009		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
Dibromomethane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Ethylbenzene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Isopropylbenzene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
m,p-Xylene	ND	1.0		µg/L	1	5/3/2013 06:10 PM
Methylene chloride	ND	2.0		µg/L	1	5/3/2013 06:10 PM
MTBE	ND	0.50		µg/L	1	5/3/2013 06:10 PM
n-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
n-Propylbenzene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Naphthalene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
o-Xylene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
sec-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Styrene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
tert-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Tetrachloroethene	1.1	0.50		µg/L	1	5/3/2013 06:10 PM
Toluene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Trichloroethene	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Vinyl chloride	ND	0.50		µg/L	1	5/3/2013 06:10 PM
Surr: 1,2-Dichloroethane-d4	101	70-127		%REC	1	5/3/2013 06:10 PM
Surr: 4-Bromofluorobenzene	99.2	80-120		%REC	1	5/3/2013 06:10 PM
Surr: Dibromofluoromethane	98.5	73-128		%REC	1	5/3/2013 06:10 PM
Surr: Toluene-d8	97.7	80-120		%REC	1	5/3/2013 06:10 PM
ANIONS BY ION CHROMATOGRAPHY						
		EPA 300.0				
RunID: IC2_130505A	QC Batch: R88729			PrepDate:		Analyst: **QBM**
Chloride	22	5.0		mg/L	10	5/5/2013 03:48 PM
ICP-MS METALS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130503A	QC Batch: 42878			PrepDate:	5/2/2013	Analyst: **CEI**
Arsenic	1.7	0.10		µg/L	1	5/3/2013 06:01 PM
Chromium	27	1.0		µg/L	1	5/3/2013 06:01 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-010

Client Sample ID: MW-20D3
Collection Date: 5/1/2013 5:25:00 PM
Matrix: GROUNDWATER

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS1_130503A | QC Batch: D13VW016 | PrepDate: | Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	5/3/2013 04:40 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
2-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
4-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Benzene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Bromobenzene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Bromodichloromethane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Bromoform	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Bromomethane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Carbon tetrachloride	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Chlorobenzene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Chloroethane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Chloroform	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Chloromethane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Dibromochloromethane	ND	0.50		µg/L	1	5/3/2013 04:40 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT:	Tetra Tech	**Client Sample ID:**	MW-20D3
Lab Order:	N010153	**Collection Date:**	5/1/2013 5:25:00 PM
Project:	Maryland Square, 103P172829.01	**Matrix:**	GROUNDWATER
Lab ID:	N010153-010		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
Dibromomethane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Ethylbenzene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Isopropylbenzene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
m,p-Xylene	ND	1.0		µg/L	1	5/3/2013 04:40 PM
Methylene chloride	ND	2.0		µg/L	1	5/3/2013 04:40 PM
MTBE	ND	0.50		µg/L	1	5/3/2013 04:40 PM
n-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
n-Propylbenzene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Naphthalene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
o-Xylene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
sec-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Styrene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
tert-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Tetrachloroethene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Toluene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Trichloroethene	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Vinyl chloride	ND	0.50		µg/L	1	5/3/2013 04:40 PM
Surr: 1,2-Dichloroethane-d4	97.6	70-127		%REC	1	5/3/2013 04:40 PM
Surr: 4-Bromofluorobenzene	96.8	80-120		%REC	1	5/3/2013 04:40 PM
Surr: Dibromofluoromethane	96.4	73-128		%REC	1	5/3/2013 04:40 PM
Surr: Toluene-d8	96.7	80-120		%REC	1	5/3/2013 04:40 PM
ANIONS BY ION CHROMATOGRAPHY						
		EPA 300.0				
RunID: IC2_130505A	QC Batch: R88729			PrepDate:		Analyst: **QBM**
Chloride	5.9	2.5		mg/L	5	5/5/2013 04:01 PM
ICP-MS METALS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130503A	QC Batch: 42878			PrepDate:	5/2/2013	Analyst: **CEI**
Arsenic	2.7	0.10		µg/L	1	5/3/2013 06:06 PM
Chromium	8.4	1.0		µg/L	1	5/3/2013 06:06 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-011

Client Sample ID: MW-20
Collection Date: 5/2/2013 9:12:00 AM
Matrix: GROUNDWATER

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS1_130503A | QC Batch: D13VW016 | PrepDate: | Analyst: **QBM**

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,1-Dichloroethane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,1-Dichloroethene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,1-Dichloropropene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	5/4/2013 01:00 AM
1,2-Dibromoethane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,2-Dichloroethane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,2-Dichloropropane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,3-Dichloropropane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
2,2-Dichloropropane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
2-Chlorotoluene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
4-Chlorotoluene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
4-Isopropyltoluene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Benzene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Bromobenzene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Bromodichloromethane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Bromoform	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Bromomethane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Carbon tetrachloride	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Chlorobenzene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Chloroethane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Chloroform	1.1	0.50		µg/L	1	5/4/2013 01:00 AM
Chloromethane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Dibromochloromethane	ND	0.50		µg/L	1	5/4/2013 01:00 AM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-011

Client Sample ID: MW-20
Collection Date: 5/2/2013 9:12:00 AM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
			EPA 8260B			
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
Dibromomethane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Dichlorodifluoromethane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Ethylbenzene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Hexachlorobutadiene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Isopropylbenzene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
m,p-Xylene	ND	1.0		µg/L	1	5/4/2013 01:00 AM
Methylene chloride	ND	2.0		µg/L	1	5/4/2013 01:00 AM
MTBE	ND	0.50		µg/L	1	5/4/2013 01:00 AM
n-Butylbenzene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
n-Propylbenzene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Naphthalene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
o-Xylene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
sec-Butylbenzene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Styrene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
tert-Butylbenzene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Tetrachloroethene	470	10		µg/L	20	5/3/2013 09:13 PM
Toluene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Trichloroethene	1.4	0.50		µg/L	1	5/4/2013 01:00 AM
Trichlorofluoromethane	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Vinyl chloride	ND	0.50		µg/L	1	5/4/2013 01:00 AM
Surr: 1,2-Dichloroethane-d4	113	70-127		%REC	1	5/4/2013 01:00 AM
Surr: 1,2-Dichloroethane-d4	104	70-127		%REC	20	5/3/2013 09:13 PM
Surr: 4-Bromofluorobenzene	96.9	80-120		%REC	1	5/4/2013 01:00 AM
Surr: 4-Bromofluorobenzene	92.2	80-120		%REC	20	5/3/2013 09:13 PM
Surr: Dibromofluoromethane	105	73-128		%REC	1	5/4/2013 01:00 AM
Surr: Dibromofluoromethane	99.2	73-128		%REC	20	5/3/2013 09:13 PM
Surr: Toluene-d8	98.7	80-120		%REC	20	5/3/2013 09:13 PM
Surr: Toluene-d8	94.3	80-120		%REC	1	5/4/2013 01:00 AM
ANIONS BY ION CHROMATOGRAPHY						
			EPA 300.0			
RunID: IC2_130505A	QC Batch: R88729			PrepDate:		Analyst: **QBM**
Chloride	200	25		mg/L	50	5/5/2013 04:13 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-011

Client Sample ID: MW-20
Collection Date: 5/2/2013 9:12:00 AM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ICP-MS METALS						
EPA 3010A				**EPA 6020**		
RunID: ICP7_130503A	QC Batch: 42878			PrepDate:	5/2/2013	Analyst: **CEI**
Arsenic	4.0	0.10		µg/L	1	5/3/2013 06:21 PM
Chromium	2.7	1.0		µg/L	1	5/3/2013 06:21 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT:	Tetra Tech	**Client Sample ID:**	MW-19
Lab Order:	N010153	**Collection Date:**	5/2/2013 11:42:00 AM
Project:	Maryland Square, 103P172829.01	**Matrix:**	GROUNDWATER
Lab ID:	N010153-012		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
PERMANGANATE BY COLORIMETRY						
		COLORIMETRIC				
RunID: WETCHEM_130503E	QC Batch: R88719			PrepDate:		Analyst: **JT**
Permanganate as KMnO4	ND	1.00		mg/L	1	5/3/2013
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,1-Dichloroethane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,1-Dichloroethene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,1-Dichloropropene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	5/4/2013 12:37 AM
1,2-Dibromoethane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,2-Dichloroethane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,2-Dichloropropane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,3-Dichloropropane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
2,2-Dichloropropane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
2-Chlorotoluene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
4-Chlorotoluene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
4-Isopropyltoluene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Benzene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Bromobenzene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Bromodichloromethane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Bromoform	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Bromomethane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Carbon tetrachloride	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Chlorobenzene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Chloroethane	ND	0.50		µg/L	1	5/4/2013 12:37 AM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-012

Client Sample ID: MW-19
Collection Date: 5/2/2013 11:42:00 AM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 8260B						
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
Chloroform	2.2	0.50		µg/L	1	5/4/2013 12:37 AM
Chloromethane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Dibromochloromethane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Dibromomethane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Dichlorodifluoromethane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Ethylbenzene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Hexachlorobutadiene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Isopropylbenzene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
m,p-Xylene	ND	1.0		µg/L	1	5/4/2013 12:37 AM
Methylene chloride	ND	2.0		µg/L	1	5/4/2013 12:37 AM
MTBE	ND	0.50		µg/L	1	5/4/2013 12:37 AM
n-Butylbenzene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
n-Propylbenzene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Naphthalene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
o-Xylene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
sec-Butylbenzene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Styrene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
tert-Butylbenzene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Tetrachloroethene	810	5.0		µg/L	10	5/3/2013 08:04 PM
Toluene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Trichloroethene	2.2	0.50		µg/L	1	5/4/2013 12:37 AM
Trichlorofluoromethane	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Vinyl chloride	ND	0.50		µg/L	1	5/4/2013 12:37 AM
Surr: 1,2-Dichloroethane-d4	114	70-127		%REC	1	5/4/2013 12:37 AM
Surr: 1,2-Dichloroethane-d4	103	70-127		%REC	10	5/3/2013 08:04 PM
Surr: 4-Bromofluorobenzene	95.9	80-120		%REC	1	5/4/2013 12:37 AM
Surr: 4-Bromofluorobenzene	93.9	80-120		%REC	10	5/3/2013 08:04 PM
Surr: Dibromofluoromethane	108	73-128		%REC	1	5/4/2013 12:37 AM
Surr: Dibromofluoromethane	98.2	73-128		%REC	10	5/3/2013 08:04 PM
Surr: Toluene-d8	98.2	80-120		%REC	10	5/3/2013 08:04 PM
Surr: Toluene-d8	97.4	80-120		%REC	1	5/4/2013 12:37 AM
DISSOLVED METALS BY ICP						
EPA 3010A				**EPA 6010B**		
RunID: ICP2_130503B	QC Batch: 42881			PrepDate: 5/2/2013		Analyst: **CEI**

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-012

Client Sample ID: MW-19
Collection Date: 5/2/2013 11:42:00 AM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
DISSOLVED METALS BY ICP						
EPA 3010A / **EPA 6010B**						
RunID: ICP2_130503B QC Batch: 42881 PrepDate: 5/2/2013 Analyst: **CEI**						
Potassium	41	2.5		mg/L	5	5/3/2013 12:10 PM
DISSOLVED METALS BY ICP-MS						
EPA 3010A / **EPA 6020**						
RunID: ICP7_130503A QC Batch: 42878 PrepDate: 5/2/2013 Analyst: **CEI**						
Arsenic	2.7	0.10		µg/L	1	5/3/2013 06:26 PM
Chromium	9.7	1.0		µg/L	1	5/3/2013 06:26 PM
Manganese	460	2.5		µg/L	5	5/6/2013 08:26 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-013

Client Sample ID: MW-19D1
Collection Date: 5/2/2013 10:52:00 AM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
PERMANGANATE BY COLORIMETRY						
		COLORIMETRIC				
RunID: WETCHEM_130503E	QC Batch: R88719			PrepDate:		Analyst: **JT**
Permanganate as KMnO4	ND	1.00		mg/L	1	5/3/2013
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	5/3/2013 11:51 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
2-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
4-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Benzene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Bromobenzene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Bromodichloromethane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Bromoform	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Bromomethane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Carbon tetrachloride	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Chlorobenzene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Chloroethane	ND	0.50		µg/L	1	5/3/2013 11:51 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-013

Client Sample ID: MW-19D1
Collection Date: 5/2/2013 10:52:00 AM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 8260B						
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
Chloroform	0.59	0.50		µg/L	1	5/3/2013 11:51 PM
Chloromethane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Dibromochloromethane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Dibromomethane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Ethylbenzene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Isopropylbenzene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
m,p-Xylene	ND	1.0		µg/L	1	5/3/2013 11:51 PM
Methylene chloride	ND	2.0		µg/L	1	5/3/2013 11:51 PM
MTBE	ND	0.50		µg/L	1	5/3/2013 11:51 PM
n-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
n-Propylbenzene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Naphthalene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
o-Xylene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
sec-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Styrene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
tert-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Tetrachloroethene	99	0.50		µg/L	1	5/3/2013 11:51 PM
Toluene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Trichloroethene	0.54	0.50		µg/L	1	5/3/2013 11:51 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Vinyl chloride	ND	0.50		µg/L	1	5/3/2013 11:51 PM
Surr: 1,2-Dichloroethane-d4	114	70-127		%REC	1	5/3/2013 11:51 PM
Surr: 4-Bromofluorobenzene	97.0	80-120		%REC	1	5/3/2013 11:51 PM
Surr: Dibromofluoromethane	104	73-128		%REC	1	5/3/2013 11:51 PM
Surr: Toluene-d8	98.4	80-120		%REC	1	5/3/2013 11:51 PM
DISSOLVED METALS BY ICP						
EPA 3010A				**EPA 6010B**		
RunID: ICP2_130503B	QC Batch: 42881			PrepDate:	5/2/2013	Analyst: **CEI**
Potassium	9.7	2.5		mg/L	5	5/3/2013 12:13 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-013

Client Sample ID: MW-19D1
Collection Date: 5/2/2013 10:52:00 AM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
DISSOLVED METALS BY ICP-MS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130503A	QC Batch: 42878			PrepDate:	5/2/2013	Analyst: **CEI**
Arsenic	2.1	0.10		µg/L	1	5/3/2013 06:32 PM
Chromium	1.9	1.0		µg/L	1	5/3/2013 06:32 PM
Manganese	11	0.50		µg/L	1	5/3/2013 06:32 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-014

Client Sample ID: MW-19I
Collection Date: 5/2/2013 10:05:00 AM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
PERMANGANATE BY COLORIMETRY						
		COLORIMETRIC				
RunID: WETCHEM_130503E	QC Batch: R88719			PrepDate:		Analyst: **JT**
Permanganate as KMnO4	68.4	5.00		mg/L	5	5/3/2013
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,1,1-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,1,2-Trichloroethane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,1-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,1-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,1-Dichloropropene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,2,3-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,2,3-Trichloropropane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,2,4-Trichlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,2,4-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	1	5/3/2013 05:02 PM
1,2-Dibromoethane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,2-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,2-Dichloroethane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,3,5-Trimethylbenzene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,3-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,3-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
1,4-Dichlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
2,2-Dichloropropane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
2-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
4-Chlorotoluene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
4-Isopropyltoluene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Benzene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Bromobenzene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Bromodichloromethane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Bromoform	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Bromomethane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Carbon tetrachloride	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Chlorobenzene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Chloroethane	ND	0.50		µg/L	1	5/3/2013 05:02 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- S Spike/Surrogate outside of limits due to matrix interference
- Results are wet unless otherwise specified
- DO Surrogate Diluted Out

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-014

Client Sample ID: MW-19I
Collection Date: 5/2/2013 10:05:00 AM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
EPA 8260B						
RunID: MS1_130503A	QC Batch: D13VW016			PrepDate:		Analyst: **QBM**
Chloroform	2.1	0.50		µg/L	1	5/3/2013 05:02 PM
Chloromethane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
cis-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Dibromochloromethane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Dibromomethane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Dichlorodifluoromethane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Ethylbenzene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Hexachlorobutadiene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Isopropylbenzene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
m,p-Xylene	ND	1.0		µg/L	1	5/3/2013 05:02 PM
Methylene chloride	ND	2.0		µg/L	1	5/3/2013 05:02 PM
MTBE	ND	0.50		µg/L	1	5/3/2013 05:02 PM
n-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
n-Propylbenzene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Naphthalene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
o-Xylene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
sec-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Styrene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
tert-Butylbenzene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Tetrachloroethene	0.61	0.50		µg/L	1	5/3/2013 05:02 PM
Toluene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
trans-1,2-Dichloroethene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Trichloroethene	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Trichlorofluoromethane	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Vinyl chloride	ND	0.50		µg/L	1	5/3/2013 05:02 PM
Surr: 1,2-Dichloroethane-d4	105	70-127		%REC	1	5/3/2013 05:02 PM
Surr: 4-Bromofluorobenzene	94.5	80-120		%REC	1	5/3/2013 05:02 PM
Surr: Dibromofluoromethane	99.7	73-128		%REC	1	5/3/2013 05:02 PM
Surr: Toluene-d8	98.0	80-120		%REC	1	5/3/2013 05:02 PM
DISSOLVED METALS BY ICP						
EPA 3010A				**EPA 6010B**		
RunID: ICP2_130503B	QC Batch: 42881			PrepDate:	5/2/2013	Analyst: **CEI**
Potassium	21	2.5		mg/L	5	5/3/2013 12:16 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Tetra Tech
Lab Order: N010153
Project: Maryland Square, 103P172829.01
Lab ID: N010153-014

Client Sample ID: MW-19I
Collection Date: 5/2/2013 10:05:00 AM
Matrix: GROUNDWATER

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
DISSOLVED METALS BY ICP-MS						
	EPA 3010A			**EPA 6020**		
RunID: ICP7_130503A	QC Batch: 42878			PrepDate:	5/2/2013	Analyst: **CEI**
Arsenic	1.2	0.10		µg/L	1	5/3/2013 06:37 PM
Chromium	43	1.0		µg/L	1	5/3/2013 06:37 PM
Manganese	20000	100		µg/L	200	5/3/2013 07:44 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Tetra Tech	**Client Sample ID:**	PT-Water
Lab Order:	N010153	**Collection Date:**	5/2/2013 12:40:00 PM
Project:	Maryland Square, 103P172829.01	**Matrix:**	WATER
Lab ID:	N010153-015		

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
		EPA 8260B				
RunID: MS1_130504A	QC Batch: D13VW017			PrepDate:		Analyst: **QBM**
Tetrachloroethene	22	2.5		µg/L	5	5/4/2013 09:51 PM
Trichloroethene	ND	2.5		µg/L	5	5/4/2013 09:51 PM
Surr: 1,2-Dichloroethane-d4	95.1	70-127		%REC	5	5/4/2013 09:51 PM
Surr: 4-Bromofluorobenzene	87.0	80-120		%REC	5	5/4/2013 09:51 PM
Surr: Dibromofluoromethane	92.0	73-128		%REC	5	5/4/2013 09:51 PM
Surr: Toluene-d8	88.9	80-120		%REC	5	5/4/2013 09:51 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out
E	Value above quantitation range
ND	Not Detected at the Reporting Limit
	Results are wet unless otherwise specified

CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 300_W_CL

Sample ID: **MB-R88729_CL**	SampType: **MBLK**	TestCode: **300_W_CL**	Units: **mg/L**	Prep Date:	RunNo: **88729**
Client ID: **PBW**	Batch ID: **R88729**	TestNo: **EPA 300.0**		Analysis Date: **5/5/2013**	SeqNo: **1569241**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	ND	0.50									

Sample ID: **LCS-R88729_CL**	SampType: **LCS**	TestCode: **300_W_CL**	Units: **mg/L**	Prep Date:	RunNo: **88729**
Client ID: **LCSW**	Batch ID: **R88729**	TestNo: **EPA 300.0**		Analysis Date: **5/5/2013**	SeqNo: **1569242**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	2.456	0.50	2.500	0	98.2	90	110				

Sample ID: **N010153-001BDUP**	SampType: **DUP**	TestCode: **300_W_CL**	Units: **mg/L**	Prep Date:	RunNo: **88729**
Client ID: **ZZZZZZ**	Batch ID: **R88729**	TestNo: **EPA 300.0**		Analysis Date: **5/5/2013**	SeqNo: **1569244**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	180.350	25						180.2	0.111	20	

Sample ID: **N010153-002BMS**	SampType: **MS**	TestCode: **300_W_CL**	Units: **mg/L**	Prep Date:	RunNo: **88729**
Client ID: **ZZZZZZ**	Batch ID: **R88729**	TestNo: **EPA 300.0**		Analysis Date: **5/5/2013**	SeqNo: **1569246**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	299.500	25	125.0	171.1	103	80	120				

Sample ID: **N010153-002BMSD**	SampType: **MSD**	TestCode: **300_W_CL**	Units: **mg/L**	Prep Date:	RunNo: **88729**
Client ID: **ZZZZZZ**	Batch ID: **R88729**	TestNo: **EPA 300.0**		Analysis Date: **5/5/2013**	SeqNo: **1569247**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	296.750	25	125.0	171.1	101	80	120	299.5	0.922	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 300_W_CL

Sample ID: **N010153-004BMS** SampType: **MS** TestCode: **300_W_CL** Units: **mg/L** Prep Date: RunNo: **88729**
Client ID: **ZZZZZZ** Batch ID: **R88729** TestNo: **EPA 300.0** Analysis Date: **5/5/2013** SeqNo: **1569250**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	293.150	25	125.0	169.5	98.9	80	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_WD

Sample ID: **MB-42881**	SampType: **MBLK**	TestCode: **6010_WD**	Units: **mg/L**	Prep Date: **5/2/2013**	RunNo: **88731**
Client ID: **PBW**	Batch ID: **42881**	TestNo: **EPA 6010B**	**EPA 3010A**	Analysis Date: **5/3/2013**	SeqNo: **1569286**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Potassium	0.013	0.50									

Sample ID: **LCS-42881**	SampType: **LCS**	TestCode: **6010_WD**	Units: **mg/L**	Prep Date: **5/2/2013**	RunNo: **88731**
Client ID: **LCSW**	Batch ID: **42881**	TestNo: **EPA 6010B**	**EPA 3010A**	Analysis Date: **5/3/2013**	SeqNo: **1569287**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Potassium	18.233	0.50	20.00	0	91.2	85	115				

Sample ID: **N010153-012C-MS**	SampType: **MS**	TestCode: **6010_WD**	Units: **mg/L**	Prep Date: **5/2/2013**	RunNo: **88731**
Client ID: **ZZZZZZ**	Batch ID: **42881**	TestNo: **EPA 6010B**	**EPA 3010A**	Analysis Date: **5/3/2013**	SeqNo: **1569293**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Potassium	63.506	2.5	20.00	41.28	111	75	125				

Sample ID: **N010153-012C-MSD**	SampType: **MSD**	TestCode: **6010_WD**	Units: **mg/L**	Prep Date: **5/2/2013**	RunNo: **88731**
Client ID: **ZZZZZZ**	Batch ID: **42881**	TestNo: **EPA 6010B**	**EPA 3010A**	Analysis Date: **5/3/2013**	SeqNo: **1569294**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Potassium	63.826	2.5	20.00	41.28	113	75	125	63.51	0.502	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

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Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 6020_DIS

Sample ID: **MB-42878**	SampType: **MBLK**	TestCode: **6020_DIS**	Units: **µg/L**	Prep Date: **5/2/2013**	RunNo: **88722**
Client ID: **PBW**	Batch ID: **42878**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **5/3/2013**	SeqNo: **1568730**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.10									
Chromium	ND	1.0									
Manganese	ND	0.50									

Sample ID: **LCS-42878**	SampType: **LCS**	TestCode: **6020_DIS**	Units: **µg/L**	Prep Date: **5/2/2013**	RunNo: **88722**
Client ID: **LCSW**	Batch ID: **42878**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **5/3/2013**	SeqNo: **1568731**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	9.235	0.10	10.00	0	92.3	85	115				
Chromium	8.807	1.0	10.00	0	88.1	85	115				
Manganese	93.008	0.50	100.0	0	93.0	85	115				

Sample ID: **N010153-001C-MS**	SampType: **MS**	TestCode: **6020_DIS**	Units: **µg/L**	Prep Date: **5/2/2013**	RunNo: **88722**
Client ID: **ZZZZZZ**	Batch ID: **42878**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **5/3/2013**	SeqNo: **1568748**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	16.915	0.10	10.00	5.929	110	75	125				
Manganese	97.954	0.50	100.0	0	98.0	75	125				

Sample ID: **N010153-001C-MSD**	SampType: **MSD**	TestCode: **6020_DIS**	Units: **µg/L**	Prep Date: **5/2/2013**	RunNo: **88722**
Client ID: **ZZZZZZ**	Batch ID: **42878**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **5/3/2013**	SeqNo: **1568749**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	16.470	0.10	10.00	5.929	105	75	125	16.91	2.66	20	
Manganese	96.119	0.50	100.0	0	96.1	75	125	97.95	1.89	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

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Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 6020_DIS

Sample ID: **N010153-001C-MS**	SampType: **MS**	TestCode: **6020_DIS**	Units: **µg/L**	Prep Date: **5/2/2013**	RunNo: **88722**
Client ID: **ZZZZZZ**	Batch ID: **42878**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **5/3/2013**	SeqNo: **1568754**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	212.697	5.0	10.00	206.9	57.5	75	125				S

Sample ID: **N010153-001C-MSD**	SampType: **MSD**	TestCode: **6020_DIS**	Units: **µg/L**	Prep Date: **5/2/2013**	RunNo: **88722**
Client ID: **ZZZZZZ**	Batch ID: **42878**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **5/3/2013**	SeqNo: **1568755**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	210.747	5.0	10.00	206.9	38.0	75	125	212.7	0.921	20	S

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

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Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 6020_W

Sample ID: **MB-42878**	SampType: **MBLK**	TestCode: **6020_W**	Units: **µg/L**	Prep Date: **5/2/2013**	RunNo: **88722**
Client ID: **PBW**	Batch ID: **42878**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **5/3/2013**	SeqNo: **1568646**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.10									
Chromium	ND	1.0									

Sample ID: **LCS-42878**	SampType: **LCS**	TestCode: **6020_W**	Units: **µg/L**	Prep Date: **5/2/2013**	RunNo: **88722**
Client ID: **LCSW**	Batch ID: **42878**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **5/3/2013**	SeqNo: **1568647**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	9.235	0.10	10.00	0	92.3	85	115				
Chromium	8.807	1.0	10.00	0	88.1	85	115				

Sample ID: **N010153-001C-MS**	SampType: **MS**	TestCode: **6020_W**	Units: **µg/L**	Prep Date: **5/2/2013**	RunNo: **88722**
Client ID: **ZZZZZZ**	Batch ID: **42878**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **5/3/2013**	SeqNo: **1568664**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	16.915	0.10	10.00	5.929	110	75	125				

Sample ID: **N010153-001C-MSD**	SampType: **MSD**	TestCode: **6020_W**	Units: **µg/L**	Prep Date: **5/2/2013**	RunNo: **88722**
Client ID: **ZZZZZZ**	Batch ID: **42878**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **5/3/2013**	SeqNo: **1568665**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	16.470	0.10	10.00	5.929	105	75	125	16.91	2.66	20	

Sample ID: **N010153-001C-MS**	SampType: **MS**	TestCode: **6020_W**	Units: **µg/L**	Prep Date: **5/2/2013**	RunNo: **88722**
Client ID: **ZZZZZZ**	Batch ID: **42878**	TestNo: **EPA 6020**	**EPA 3010A**	Analysis Date: **5/3/2013**	SeqNo: **1568670**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	212.697	5.0	10.00	206.9	57.5	75	125				S

Qualifiers:

- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- DO Surrogate Diluted Out
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- R RPD outside accepted recovery limits

Calculations are based on raw values

- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference

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ANALYTICAL QC SUMMARY REPORT

TestCode: 6020_W

Sample ID: **N010153-001C-MSD**	SampType: **MSD**	TestCode: **6020_W**	Units: **µg/L**		Prep Date: **5/2/2013**			RunNo: **88722**	
Client ID: **ZZZZZZ**	Batch ID: **42878**	TestNo: **EPA 6020**	**EPA 3010A**		Analysis Date: **5/3/2013**			SeqNo: **1568671**	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	210.747	5.0	10.00	206.9	38.0	75	125	212.7	0.921	20	S

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

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Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260WATERP

Sample ID: **D130503LCS** SampType: **LCS** TestCode: **8260WATERP** Units: **µg/L** Prep Date: RunNo: **88727**
Client ID: **LCSW** Batch ID: **D13VW016** TestNo: **EPA 8260B** Analysis Date: **5/3/2013** SeqNo: **1569141**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	21.490	0.50	20.00	0	107	77	127				
1,1,1-Trichloroethane	21.770	0.50	20.00	0	109	74	122				
1,1,2,2-Tetrachloroethane	20.740	0.50	20.00	0	104	70	128				
1,1,2-Trichloroethane	20.650	0.50	20.00	0	103	73	120				
1,1-Dichloroethane	20.790	0.50	20.00	0	104	72	120				
1,1-Dichloroethene	21.120	0.50	20.00	0	106	69	125				
1,1-Dichloropropene	21.190	0.50	20.00	0	106	80	120				
1,2,3-Trichlorobenzene	21.940	0.50	20.00	0	110	80	126				
1,2,3-Trichloropropane	21.510	0.50	20.00	0	108	68	126				
1,2,4-Trichlorobenzene	21.450	0.50	20.00	0	107	80	125				
1,2,4-Trimethylbenzene	22.140	0.50	20.00	0	111	80	124				
1,2-Dibromo-3-chloropropane	22.080	1.0	20.00	0	110	66	129				
1,2-Dibromoethane	21.210	0.50	20.00	0	106	78	120				
1,2-Dichlorobenzene	21.020	0.50	20.00	0	105	80	120				
1,2-Dichloroethane	20.950	0.50	20.00	0	105	79	120				
1,2-Dichloropropane	21.010	0.50	20.00	0	105	75	120				
1,3,5-Trimethylbenzene	22.460	0.50	20.00	0	112	80	122				
1,3-Dichlorobenzene	20.660	0.50	20.00	0	103	80	120				
1,3-Dichloropropane	20.980	0.50	20.00	0	105	80	120				
1,4-Dichlorobenzene	20.310	0.50	20.00	0	102	80	120				
2,2-Dichloropropane	21.540	0.50	20.00	0	108	61	151				
2-Chlorotoluene	21.780	0.50	20.00	0	109	80	120				
4-Chlorotoluene	21.670	0.50	20.00	0	108	80	120				
4-Isopropyltoluene	23.440	0.50	20.00	0	117	80	122				
Benzene	20.830	0.50	20.00	0	104	80	120				
Bromobenzene	21.040	0.50	20.00	0	105	80	120				
Bromodichloromethane	21.220	0.50	20.00	0	106	79	123				
Bromoform	19.370	0.50	20.00	0	96.9	65	141				
Bromomethane	19.990	0.50	20.00	0	100	13	175				
Carbon tetrachloride	22.030	0.50	20.00	0	110	71	136				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

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CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260WATERP

Sample ID: **D130503LCS** SampType: **LCS** TestCode: **8260WATERP** Units: **µg/L** Prep Date: RunNo: **88727**
Client ID: **LCSW** Batch ID: **D13VW016** TestNo: **EPA 8260B** Analysis Date: **5/3/2013** SeqNo: **1569141**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	20.730	0.50	20.00	0	104	80	120				
Chloroethane	21.490	0.50	20.00	0	107	63	137				
Chloroform	20.220	0.50	20.00	0	101	71	120				
Chloromethane	20.570	0.50	20.00	0	103	35	145				
cis-1,2-Dichloroethene	21.090	0.50	20.00	0	105	74	120				
Dibromochloromethane	21.670	0.50	20.00	0	108	74	127				
Dibromomethane	21.050	0.50	20.00	0	105	80	120				
Dichlorodifluoromethane	21.140	0.50	20.00	0	106	67	123				
Ethylbenzene	20.880	0.50	20.00	0	104	80	120				
Hexachlorobutadiene	22.160	0.50	20.00	0	111	80	120				
Isopropylbenzene	22.710	0.50	20.00	0	114	80	120				
m,p-Xylene	43.710	1.0	40.00	0	109	80	120				
Methylene chloride	18.900	2.0	20.00	0	94.5	63	126				
MTBE	20.400	0.50	20.00	0	102	68	119				
n-Butylbenzene	23.250	0.50	20.00	0	116	80	121				
n-Propylbenzene	22.500	0.50	20.00	0	112	80	120				
Naphthalene	22.480	0.50	20.00	0	112	74	131				
o-Xylene	22.250	0.50	20.00	0	111	80	120				
sec-Butylbenzene	23.220	0.50	20.00	0	116	80	120				
Styrene	22.990	0.50	20.00	0	115	80	120				
tert-Butylbenzene	22.790	0.50	20.00	0	114	80	120				
Tetrachloroethene	21.390	0.50	20.00	0	107	80	120				
Toluene	20.290	0.50	20.00	0	101	80	120				
trans-1,2-Dichloroethene	21.200	0.50	20.00	0	106	74	120				
Trichloroethene	20.800	0.50	20.00	0	104	80	120				
Trichlorofluoromethane	22.390	0.50	20.00	0	112	67	135				
Vinyl chloride	20.840	0.50	20.00	0	104	72	120				
Surr: 1,2-Dichloroethane-d4	26.020		25.00		104	70	127				
Surr: 4-Bromofluorobenzene	25.450		25.00		102	80	120				
Surr: Dibromofluoromethane	25.240		25.00		101	73	128				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
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ANALYTICAL QC SUMMARY REPORT

TestCode: 8260WATERP

Sample ID: **D130503LCS**	SampType: **LCS**	TestCode: **8260WATERP**	Units: **µg/L**	Prep Date:	RunNo: **88727**
Client ID: **LCSW**	Batch ID: **D13VW016**	TestNo: **EPA 8260B**		Analysis Date: **5/3/2013**	SeqNo: **1569141**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Toluene-d8	25.020		25.00		100	80	120				

Sample ID: **N010153-010AMS**	SampType: **MS**	TestCode: **8260WATERP**	Units: **µg/L**	Prep Date:	RunNo: **88727**
Client ID: **ZZZZZZ**	Batch ID: **D13VW016**	TestNo: **EPA 8260B**		Analysis Date: **5/3/2013**	SeqNo: **1569142**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	17.770	0.50	20.00	0	88.8	67	135				
1,1,1-Trichloroethane	20.200	0.50	20.00	0	101	67	131				
1,1,2,2-Tetrachloroethane	14.120	0.50	20.00	0	70.6	67	131				
1,1,2-Trichloroethane	19.670	0.50	20.00	0	98.4	73	120				
1,1-Dichloroethane	19.880	0.50	20.00	0	99.4	69	124				
1,1-Dichloroethene	19.160	0.50	20.00	0	95.8	65	128				
1,1-Dichloropropene	19.270	0.50	20.00	0	96.4	79	120				
1,2,3-Trichlorobenzene	14.780	0.50	20.00	0	73.9	79	124				S
1,2,3-Trichloropropane	14.130	0.50	20.00	0	70.6	64	123				
1,2,4-Trichlorobenzene	15.170	0.50	20.00	0	75.8	79	124				S
1,2,4-Trimethylbenzene	15.830	0.50	20.00	0	79.2	61	135				
1,2-Dibromo-3-chloropropane	13.980	1.0	20.00	0	69.9	52	140				
1,2-Dibromoethane	19.260	0.50	20.00	0	96.3	70	122				
1,2-Dichlorobenzene	14.860	0.50	20.00	0	74.3	80	120				S
1,2-Dichloroethane	19.590	0.50	20.00	0	98.0	75	122				
1,2-Dichloropropane	20.280	0.50	20.00	0	101	73	120				
1,3,5-Trimethylbenzene	15.960	0.50	20.00	0	79.8	74	124				
1,3-Dichlorobenzene	14.870	0.50	20.00	0	74.4	80	120				S
1,3-Dichloropropane	16.950	0.50	20.00	0	84.8	78	120				
1,4-Dichlorobenzene	14.580	0.50	20.00	0	72.9	80	120				S
2,2-Dichloropropane	21.340	0.50	20.00	0	107	51	154				
2-Chlorotoluene	15.610	0.50	20.00	0	78.0	79	120				S
4-Chlorotoluene	15.540	0.50	20.00	0	77.7	80	120				S
4-Isopropyltoluene	16.180	0.50	20.00	0	80.9	80	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
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CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260WATERP

Sample ID: **N010153-010AMS** SampType: **MS** TestCode: **8260WATERP** Units: **µg/L** Prep Date: RunNo: **88727**
Client ID: **ZZZZZZ** Batch ID: **D13VW016** TestNo: **EPA 8260B** Analysis Date: **5/3/2013** SeqNo: **1569142**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	19.730	0.50	20.00	0	98.6	72	122				
Bromobenzene	15.240	0.50	20.00	0	76.2	80	120				S
Bromodichloromethane	20.430	0.50	20.00	0	102	72	130				
Bromoform	15.450	0.50	20.00	0	77.2	49	155				
Bromomethane	19.720	0.50	20.00	0	98.6	11	165				
Carbon tetrachloride	19.770	0.50	20.00	0	98.8	60	145				
Chlorobenzene	16.910	0.50	20.00	0	84.6	80	120				
Chloroethane	20.270	0.50	20.00	0	101	53	145				
Chloroform	20.170	0.50	20.00	0	101	66	130				
Chloromethane	19.690	0.50	20.00	0	98.4	40	137				
cis-1,2-Dichloroethene	20.370	0.50	20.00	0	102	73	120				
Dibromochloromethane	17.880	0.50	20.00	0	89.4	60	137				
Dibromomethane	19.250	0.50	20.00	0	96.2	78	120				
Dichlorodifluoromethane	19.470	0.50	20.00	0	97.4	57	128				
Ethylbenzene	16.740	0.50	20.00	0	83.7	80	120				
Hexachlorobutadiene	14.480	0.50	20.00	0	72.4	74	120				S
Isopropylbenzene	15.710	0.50	20.00	0	78.6	80	120				S
m,p-Xylene	34.900	1.0	40.00	0	87.2	80	120				
Methylene chloride	18.000	2.0	20.00	0	90.0	59	125				
MTBE	18.870	0.50	20.00	0	94.4	62	125				
n-Butylbenzene	16.200	0.50	20.00	0	81.0	80	122				
n-Propylbenzene	15.780	0.50	20.00	0	78.9	79	120				S
Naphthalene	14.270	0.50	20.00	0	71.4	65	130				
o-Xylene	17.940	0.50	20.00	0	89.7	80	120				
sec-Butylbenzene	15.840	0.50	20.00	0	79.2	80	120				S
Styrene	18.580	0.50	20.00	0	92.9	50	138				
tert-Butylbenzene	15.530	0.50	20.00	0	77.7	80	120				S
Tetrachloroethene	17.060	0.50	20.00	0	85.3	76	120				
Toluene	19.120	0.50	20.00	0	95.6	78	120				
trans-1,2-Dichloroethene	19.790	0.50	20.00	0	99.0	72	122				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260WATERP

Sample ID: **N010153-010AMS** SampType: **MS** TestCode: **8260WATERP** Units: **µg/L** Prep Date: RunNo: **88727**
Client ID: **ZZZZZZ** Batch ID: **D13VW016** TestNo: **EPA 8260B** Analysis Date: **5/3/2013** SeqNo: **1569142**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Trichloroethene	19.090	0.50	20.00	0	95.4	76	120				
Trichlorofluoromethane	20.090	0.50	20.00	0	100	53	148				
Vinyl chloride	19.420	0.50	20.00	0	97.1	67	120				
Surr: 1,2-Dichloroethane-d4	24.600		25.00		98.4	70	127				
Surr: 4-Bromofluorobenzene	21.100		25.00		84.4	80	120				
Surr: Dibromofluoromethane	24.970		25.00		99.9	73	128				
Surr: Toluene-d8	23.990		25.00		96.0	80	120				

Sample ID: **N010153-010AMSD** SampType: **MSD** TestCode: **8260WATERP** Units: **µg/L** Prep Date: RunNo: **88727**
Client ID: **ZZZZZZ** Batch ID: **D13VW016** TestNo: **EPA 8260B** Analysis Date: **5/3/2013** SeqNo: **1569143**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	19.230	0.50	20.00	0	96.2	67	135	17.77	7.89	20	
1,1,1-Trichloroethane	19.660	0.50	20.00	0	98.3	67	131	20.20	2.71	20	
1,1,2,2-Tetrachloroethane	15.770	0.50	20.00	0	78.8	67	131	14.12	11.0	20	
1,1,2-Trichloroethane	20.520	0.50	20.00	0	103	73	120	19.67	4.23	20	
1,1-Dichloroethane	19.440	0.50	20.00	0	97.2	69	124	19.88	2.24	20	
1,1-Dichloroethene	18.100	0.50	20.00	0	90.5	65	128	19.16	5.69	20	
1,1-Dichloropropene	18.510	0.50	20.00	0	92.6	79	120	19.27	4.02	20	
1,2,3-Trichlorobenzene	15.670	0.50	20.00	0	78.4	79	124	14.78	5.85	20	S
1,2,3-Trichloropropane	15.530	0.50	20.00	0	77.7	64	123	14.13	9.44	20	
1,2,4-Trichlorobenzene	15.740	0.50	20.00	0	78.7	79	124	15.17	3.69	20	S
1,2,4-Trimethylbenzene	11.910	0.50	20.00	0	59.6	61	135	15.83	28.3	20	SR
1,2-Dibromo-3-chloropropane	15.820	1.0	20.00	0	79.1	52	140	13.98	12.3	20	
1,2-Dibromoethane	20.740	0.50	20.00	0	104	70	122	19.26	7.40	20	
1,2-Dichlorobenzene	15.420	0.50	20.00	0	77.1	80	120	14.86	3.70	20	S
1,2-Dichloroethane	20.070	0.50	20.00	0	100	75	122	19.59	2.42	20	
1,2-Dichloropropane	20.290	0.50	20.00	0	101	73	120	20.28	0.0493	20	
1,3,5-Trimethylbenzene	12.360	0.50	20.00	0	61.8	74	124	15.96	25.4	20	SR
1,3-Dichlorobenzene	15.170	0.50	20.00	0	75.8	80	120	14.87	2.00	20	S

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260WATERP

Sample ID: **N010153-010AMSD** SampType: **MSD** TestCode: **8260WATERP** Units: **µg/L** Prep Date: RunNo: **88727**
Client ID: **ZZZZZZ** Batch ID: **D13VW016** TestNo: **EPA 8260B** Analysis Date: **5/3/2013** SeqNo: **1569143**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,3-Dichloropropane	19.180	0.50	20.00	0	95.9	78	120	16.95	12.3	20	
1,4-Dichlorobenzene	14.990	0.50	20.00	0	75.0	80	120	14.58	2.77	20	S
2,2-Dichloropropane	20.570	0.50	20.00	0	103	51	154	21.34	3.67	20	
2-Chlorotoluene	15.170	0.50	20.00	0	75.8	79	120	15.61	2.86	20	S
4-Chlorotoluene	15.660	0.50	20.00	0	78.3	80	120	15.54	0.769	20	S
4-Isopropyltoluene	15.190	0.50	20.00	0	76.0	80	120	16.18	6.31	20	S
Benzene	19.600	0.50	20.00	0	98.0	72	122	19.73	0.661	20	
Bromobenzene	15.560	0.50	20.00	0	77.8	80	120	15.24	2.08	20	S
Bromodichloromethane	20.240	0.50	20.00	0	101	72	130	20.43	0.934	20	
Bromoform	17.310	0.50	20.00	0	86.6	49	155	15.45	11.4	20	
Bromomethane	19.740	0.50	20.00	0	98.7	11	165	19.72	0.101	20	
Carbon tetrachloride	19.450	0.50	20.00	0	97.3	60	145	19.77	1.63	20	
Chlorobenzene	18.260	0.50	20.00	0	91.3	80	120	16.91	7.68	20	
Chloroethane	19.940	0.50	20.00	0	99.7	53	145	20.27	1.64	20	
Chloroform	19.540	0.50	20.00	0	97.7	66	130	20.17	3.17	20	
Chloromethane	19.900	0.50	20.00	0	99.5	40	137	19.69	1.06	20	
cis-1,2-Dichloroethene	20.260	0.50	20.00	0	101	73	120	20.37	0.541	20	
Dibromochloromethane	19.900	0.50	20.00	0	99.5	60	137	17.88	10.7	20	
Dibromomethane	20.360	0.50	20.00	0	102	78	120	19.25	5.60	20	
Dichlorodifluoromethane	19.080	0.50	20.00	0	95.4	57	128	19.47	2.02	20	
Ethylbenzene	17.730	0.50	20.00	0	88.6	80	120	16.74	5.74	20	
Hexachlorobutadiene	14.220	0.50	20.00	0	71.1	74	120	14.48	1.81	20	S
Isopropylbenzene	15.470	0.50	20.00	0	77.4	80	120	15.71	1.54	20	S
m,p-Xylene	34.540	1.0	40.00	0	86.4	80	120	34.90	1.04	20	
Methylene chloride	18.170	2.0	20.00	0	90.9	59	125	18.00	0.940	20	
MTBE	20.020	0.50	20.00	0	100	62	125	18.87	5.91	20	
n-Butylbenzene	15.720	0.50	20.00	0	78.6	80	122	16.20	3.01	20	S
n-Propylbenzene	15.330	0.50	20.00	0	76.7	79	120	15.78	2.89	20	S
Naphthalene	14.630	0.50	20.00	0	73.2	65	130	14.27	2.49	20	
o-Xylene	18.190	0.50	20.00	0	91.0	80	120	17.94	1.38	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260WATERP

Sample ID: **N010153-010AMSD** SampType: **MSD** TestCode: **8260WATERP** Units: **µg/L** Prep Date: RunNo: **88727**
Client ID: **ZZZZZZ** Batch ID: **D13VW016** TestNo: **EPA 8260B** Analysis Date: **5/3/2013** SeqNo: **1569143**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
sec-Butylbenzene	15.420	0.50	20.00	0	77.1	80	120	15.84	2.69	20	S
Styrene	12.590	0.50	20.00	0	63.0	50	138	18.58	38.4	20	R
tert-Butylbenzene	15.520	0.50	20.00	0	77.6	80	120	15.53	0.0644	20	S
Tetrachloroethene	17.890	0.50	20.00	0	89.4	76	120	17.06	4.75	20	
Toluene	18.600	0.50	20.00	0	93.0	78	120	19.12	2.76	20	
trans-1,2-Dichloroethene	18.870	0.50	20.00	0	94.4	72	122	19.79	4.76	20	
Trichloroethene	18.640	0.50	20.00	0	93.2	76	120	19.09	2.39	20	
Trichlorofluoromethane	19.560	0.50	20.00	0	97.8	53	148	20.09	2.67	20	
Vinyl chloride	19.250	0.50	20.00	0	96.2	67	120	19.42	0.879	20	
Surr: 1,2-Dichloroethane-d4	25.270		25.00		101	70	127		0		
Surr: 4-Bromofluorobenzene	23.030		25.00		92.1	80	120		0		
Surr: Dibromofluoromethane	25.150		25.00		101	73	128		0		
Surr: Toluene-d8	23.260		25.00		93.0	80	120		0		

Sample ID: **D130503MB2** SampType: **MBLK** TestCode: **8260WATERP** Units: **µg/L** Prep Date: RunNo: **88727**
Client ID: **PBW** Batch ID: **D13VW016** TestNo: **EPA 8260B** Analysis Date: **5/3/2013** SeqNo: **1569144**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	0.50									
1,1,1-Trichloroethane	ND	0.50									
1,1,2,2-Tetrachloroethane	ND	0.50									
1,1,2-Trichloroethane	ND	0.50									
1,1-Dichloroethane	ND	0.50									
1,1-Dichloroethene	ND	0.50									
1,1-Dichloropropene	ND	0.50									
1,2,3-Trichlorobenzene	ND	0.50									
1,2,3-Trichloropropane	ND	0.50									
1,2,4-Trichlorobenzene	ND	0.50									
1,2,4-Trimethylbenzene	ND	0.50									
1,2-Dibromo-3-chloropropane	ND	1.0									

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260WATERP

Sample ID: **D130503MB2** SampType: **MBLK** TestCode: **8260WATERP** Units: **µg/L** Prep Date: RunNo: **88727**
Client ID: **PBW** Batch ID: **D13VW016** TestNo: **EPA 8260B** Analysis Date: **5/3/2013** SeqNo: **1569144**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2-Dibromoethane	ND	0.50									
1,2-Dichlorobenzene	ND	0.50									
1,2-Dichloroethane	ND	0.50									
1,2-Dichloropropane	ND	0.50									
1,3,5-Trimethylbenzene	ND	0.50									
1,3-Dichlorobenzene	ND	0.50									
1,3-Dichloropropane	ND	0.50									
1,4-Dichlorobenzene	ND	0.50									
2,2-Dichloropropane	ND	0.50									
2-Chlorotoluene	ND	0.50									
4-Chlorotoluene	ND	0.50									
4-Isopropyltoluene	ND	0.50									
Benzene	ND	0.50									
Bromobenzene	ND	0.50									
Bromodichloromethane	ND	0.50									
Bromoform	ND	0.50									
Bromomethane	ND	0.50									
Carbon tetrachloride	ND	0.50									
Chlorobenzene	ND	0.50									
Chloroethane	ND	0.50									
Chloroform	ND	0.50									
Chloromethane	ND	0.50									
cis-1,2-Dichloroethene	ND	0.50									
Dibromochloromethane	ND	0.50									
Dibromomethane	ND	0.50									
Dichlorodifluoromethane	ND	0.50									
Ethylbenzene	ND	0.50									
Hexachlorobutadiene	ND	0.50									
Isopropylbenzene	ND	0.50									
m,p-Xylene	ND	1.0									

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
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CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260WATERP

Sample ID: **D130503MB2** SampType: **MBLK** TestCode: **8260WATERP** Units: **µg/L** Prep Date: RunNo: **88727**
Client ID: **PBW** Batch ID: **D13VW016** TestNo: **EPA 8260B** Analysis Date: **5/3/2013** SeqNo: **1569144**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methylene chloride	ND	2.0									
MTBE	ND	0.50									
n-Butylbenzene	ND	0.50									
n-Propylbenzene	ND	0.50									
Naphthalene	ND	0.50									
o-Xylene	ND	0.50									
sec-Butylbenzene	ND	0.50									
Styrene	ND	0.50									
tert-Butylbenzene	ND	0.50									
Tetrachloroethene	ND	0.50									
Toluene	ND	0.50									
trans-1,2-Dichloroethene	ND	0.50									
Trichloroethene	ND	0.50									
Trichlorofluoromethane	ND	0.50									
Vinyl chloride	ND	0.50									
Surr: 1,2-Dichloroethane-d4	23.780		25.00		95.1	70	127				
Surr: 4-Bromofluorobenzene	23.930		25.00		95.7	80	120				
Surr: Dibromofluoromethane	23.620		25.00		94.5	73	128				
Surr: Toluene-d8	24.610		25.00		98.4	80	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

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CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260WATERP

Sample ID: **D130504LCS** SampType: **LCS** TestCode: **8260WATERP** Units: **µg/L** Prep Date: RunNo: **88734**
Client ID: **LCSW** Batch ID: **D13VW017** TestNo: **EPA 8260B** Analysis Date: **5/4/2013** SeqNo: **1569479**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	21.190	0.50	20.00	0	106	77	127				
1,1,2,2-Tetrachloroethane	21.040	0.50	20.00	0	105	70	128				
1,1,2-Trichloroethane	20.810	0.50	20.00	0	104	73	120				
1,2,3-Trichloropropane	21.940	0.50	20.00	0	110	68	126				
1,2,4-Trichlorobenzene	18.810	0.50	20.00	0	94.1	80	125				
1,2-Dibromoethane	19.990	0.50	20.00	0	100	78	120				
1,2-Dichlorobenzene	19.780	0.50	20.00	0	98.9	80	120				
1,2-Dichloroethane	22.190	0.50	20.00	0	111	79	120				
1,2-Dichloropropane	20.810	0.50	20.00	0	104	75	120				
1,3-Dichlorobenzene	19.690	0.50	20.00	0	98.4	80	120				
1,3-Dichloropropane	20.940	0.50	20.00	0	105	80	120				
2,2-Dichloropropane	23.510	0.50	20.00	0	118	61	151				
2-Chlorotoluene	21.870	0.50	20.00	0	109	80	120				
Benzene	20.690	0.50	20.00	0	103	80	120				
Bromobenzene	19.600	0.50	20.00	0	98.0	80	120				
Bromodichloromethane	22.280	0.50	20.00	0	111	79	123				
Bromoform	18.720	0.50	20.00	0	93.6	65	141				
Bromomethane	23.480	0.50	20.00	0	117	13	175				
Carbon tetrachloride	22.830	0.50	20.00	0	114	71	136				
Chloroethane	24.150	0.50	20.00	0	121	63	137				
Chloromethane	22.160	0.50	20.00	0	111	35	145				
Dibromochloromethane	21.360	0.50	20.00	0	107	74	127				
Dibromomethane	21.180	0.50	20.00	0	106	80	120				
Dichlorodifluoromethane	22.640	0.50	20.00	0	113	67	123				
Ethylbenzene	21.110	0.50	20.00	0	106	80	120				
Hexachlorobutadiene	19.750	0.50	20.00	0	98.8	80	120				
Isopropylbenzene	22.120	0.50	20.00	0	111	80	120				
m,p-Xylene	43.980	1.0	40.00	0	110	80	120				
Methylene chloride	18.930	2.0	20.00	0	94.6	63	126				
MTBE	19.990	0.50	20.00	0	100	68	119				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260WATERP

Sample ID: **D130504LCS** SampType: **LCS** TestCode: **8260WATERP** Units: **µg/L** Prep Date: RunNo: **88734**
Client ID: **LCSW** Batch ID: **D13VW017** TestNo: **EPA 8260B** Analysis Date: **5/4/2013** SeqNo: **1569479**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
n-Propylbenzene	22.380	0.50	20.00	0	112	80	120				
sec-Butylbenzene	22.620	0.50	20.00	0	113	80	120				
Styrene	22.090	0.50	20.00	0	110	80	120				
tert-Butylbenzene	21.910	0.50	20.00	0	110	80	120				
Toluene	20.070	0.50	20.00	0	100	80	120				
trans-1,2-Dichloroethene	20.590	0.50	20.00	0	103	74	120				
Trichloroethene	19.040	0.50	20.00	0	95.2	80	120				
Trichlorofluoromethane	25.630	0.50	20.00	0	128	67	135				
Vinyl chloride	22.950	0.50	20.00	0	115	72	120				
Surr: 1,2-Dichloroethane-d4	27.970		25.00		112	70	127				
Surr: 4-Bromofluorobenzene	25.070		25.00		100	80	120				
Surr: Dibromofluoromethane	25.930		25.00		104	73	128				

Sample ID: **N010107-003GMS** SampType: **MS** TestCode: **8260WATERP** Units: **µg/L** Prep Date: RunNo: **88734**
Client ID: **ZZZZZZ** Batch ID: **D13VW017** TestNo: **EPA 8260B** Analysis Date: **5/4/2013** SeqNo: **1569480**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	20.920	0.50	20.00	0	105	67	135				
1,1,1-Trichloroethane	22.130	0.50	20.00	0	111	67	131				
1,1,2-Trichloroethane	21.190	0.50	20.00	0	106	73	120				
1,1-Dichloroethane	21.250	0.50	20.00	0	106	69	124				
1,1-Dichloroethene	22.710	0.50	20.00	0	114	65	128				
1,1-Dichloropropene	20.080	0.50	20.00	0	100	79	120				
1,2,4-Trichlorobenzene	18.900	0.50	20.00	0	94.5	79	124				
1,2,4-Trimethylbenzene	21.370	0.50	20.00	0	107	61	135				
1,2-Dibromo-3-chloropropane	20.760	1.0	20.00	0	104	52	140				
1,2-Dichloroethane	21.800	0.50	20.00	0	109	75	122				
1,2-Dichloropropane	20.960	0.50	20.00	0	105	73	120				
1,3-Dichlorobenzene	19.420	0.50	20.00	0	97.1	80	120				
1,3-Dichloropropane	20.720	0.50	20.00	0	104	78	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260WATERP

Sample ID: **N010107-003GMS** SampType: **MS** TestCode: **8260WATERP** Units: **µg/L** Prep Date: RunNo: **88734**
Client ID: **ZZZZZZ** Batch ID: **D13VW017** TestNo: **EPA 8260B** Analysis Date: **5/4/2013** SeqNo: **1569480**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
2,2-Dichloropropane	23.310	0.50	20.00	0	117	51	154				
2-Chlorotoluene	21.220	0.50	20.00	0	106	79	120				
4-Chlorotoluene	21.100	0.50	20.00	0	106	80	120				
4-Isopropyltoluene	21.590	0.50	20.00	0	108	80	120				
Benzene	20.000	0.50	20.00	0	100	72	122				
Bromodichloromethane	22.250	0.50	20.00	0	111	72	130				
Bromoform	18.950	0.50	20.00	0	94.8	49	155				
Bromomethane	22.650	0.50	20.00	0	113	11	165				
Carbon tetrachloride	21.290	0.50	20.00	0	106	60	145				
Chlorobenzene	19.470	0.50	20.00	0	97.4	80	120				
Chloroform	21.730	0.50	20.00	0	109	66	130				
Chloromethane	22.050	0.50	20.00	0	110	40	137				
cis-1,2-Dichloroethene	41.900	0.50	20.00	20.22	108	73	120				
Dibromochloromethane	22.090	0.50	20.00	0	110	60	137				
Dichlorodifluoromethane	21.770	0.50	20.00	0	109	57	128				
Ethylbenzene	20.220	0.50	20.00	0	101	80	120				
Hexachlorobutadiene	18.150	0.50	20.00	0	90.8	74	120				
m,p-Xylene	42.000	1.0	40.00	0	105	80	120				
MTBE	20.940	0.50	20.00	0	105	62	125				
n-Butylbenzene	21.820	0.50	20.00	0	109	80	122				
n-Propylbenzene	21.350	0.50	20.00	0	107	79	120				
Naphthalene	19.080	0.50	20.00	0	95.4	65	130				
sec-Butylbenzene	21.170	0.50	20.00	0	106	80	120				
Tetrachloroethene	41.290	0.50	20.00	21.54	98.8	76	120				
trans-1,2-Dichloroethene	20.710	0.50	20.00	0.6500	100	72	122				
Trichloroethene	34.530	0.50	20.00	15.17	96.8	76	120				
Surr: 1,2-Dichloroethane-d4	27.950		25.00		112	70	127				
Surr: Dibromofluoromethane	25.840		25.00		103	73	128				
Surr: Toluene-d8	23.440		25.00		93.8	80	120				

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260WATERP

Sample ID: **N010107-003GMSD** SampType: **MSD** TestCode: **8260WATERP** Units: **µg/L** Prep Date: RunNo: **88734**
Client ID: **ZZZZZZ** Batch ID: **D13VW017** TestNo: **EPA 8260B** Analysis Date: **5/4/2013** SeqNo: **1569481**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	22.110	0.50	20.00	0	111	67	135	20.92	5.53	20	
1,1,2,2-Tetrachloroethane	21.790	0.50	20.00	0	109	67	131	21.20	2.74	20	
1,1,2-Trichloroethane	21.610	0.50	20.00	0	108	73	120	21.19	1.96	20	
1,1-Dichloroethane	22.050	0.50	20.00	0	110	69	124	21.25	3.70	20	
1,1-Dichloroethene	22.050	0.50	20.00	0	110	65	128	22.71	2.95	20	
1,1-Dichloropropene	20.380	0.50	20.00	0	102	79	120	20.08	1.48	20	
1,2,3-Trichlorobenzene	19.650	0.50	20.00	0	98.2	79	124	19.22	2.21	20	
1,2,3-Trichloropropane	21.820	0.50	20.00	0	109	64	123	21.22	2.79	20	
1,2,4-Trimethylbenzene	14.660	0.50	20.00	0	73.3	61	135	21.37	37.2	20	R
1,2-Dibromo-3-chloropropane	20.740	1.0	20.00	0	104	52	140	20.76	0.0964	20	
1,2-Dibromoethane	21.440	0.50	20.00	0	107	70	122	20.68	3.61	20	
1,2-Dichlorobenzene	20.440	0.50	20.00	0	102	80	120	19.98	2.28	20	
1,2-Dichloroethane	22.610	0.50	20.00	0	113	75	122	21.80	3.65	20	
1,3,5-Trimethylbenzene	17.620	0.50	20.00	0	88.1	74	124	21.27	18.8	20	
1,4-Dichlorobenzene	20.080	0.50	20.00	0	100	80	120	19.34	3.75	20	
2-Chlorotoluene	21.590	0.50	20.00	0	108	79	120	21.22	1.73	20	
4-Chlorotoluene	21.890	0.50	20.00	0	109	80	120	21.10	3.68	20	
Benzene	20.800	0.50	20.00	0	104	72	122	20.00	3.92	20	
Bromobenzene	20.480	0.50	20.00	0	102	80	120	19.46	5.11	20	
Bromodichloromethane	22.780	0.50	20.00	0	114	72	130	22.25	2.35	20	
Bromomethane	23.010	0.50	20.00	0	115	11	165	22.65	1.58	20	
Chlorobenzene	20.200	0.50	20.00	0	101	80	120	19.47	3.68	20	
Chloroethane	24.230	0.50	20.00	0	121	53	145	23.71	2.17	20	
Chloromethane	22.000	0.50	20.00	0	110	40	137	22.05	0.227	20	
cis-1,2-Dichloroethene	41.760	0.50	20.00	20.22	108	73	120	41.90	0.335	20	
Dibromochloromethane	22.350	0.50	20.00	0	112	60	137	22.09	1.17	20	
Dibromomethane	21.510	0.50	20.00	0	108	78	120	21.26	1.17	20	
Ethylbenzene	20.410	0.50	20.00	0	102	80	120	20.22	0.935	20	
Isopropylbenzene	21.340	0.50	20.00	0	107	80	120	21.00	1.61	20	
m,p-Xylene	40.020	1.0	40.00	0	100	80	120	42.00	4.83	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260WATERP

Sample ID: **N010107-003GMSD** SampType: **MSD** TestCode: **8260WATERP** Units: **µg/L** Prep Date: RunNo: **88734**
Client ID: **ZZZZZZ** Batch ID: **D13VW017** TestNo: **EPA 8260B** Analysis Date: **5/4/2013** SeqNo: **1569481**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
MTBE	21.280	0.50	20.00	0	106	62	125	20.94	1.61	20	
n-Butylbenzene	22.050	0.50	20.00	0	110	80	122	21.82	1.05	20	
Naphthalene	16.870	0.50	20.00	0	84.4	65	130	19.08	12.3	20	
o-Xylene	20.810	0.50	20.00	0	104	80	120	21.27	2.19	20	
Styrene	11.030	0.50	20.00	0	55.2	50	138	21.58	64.7	20	R
Tetrachloroethene	39.270	0.50	20.00	21.54	88.7	76	120	41.29	5.01	20	
trans-1,2-Dichloroethene	21.110	0.50	20.00	0.6500	102	72	122	20.71	1.91	20	
Trichloroethene	33.460	0.50	20.00	15.17	91.4	76	120	34.53	3.15	20	
Vinyl chloride	22.230	0.50	20.00	0	111	67	120	22.12	0.496	20	
Surr: 1,2-Dichloroethane-d4	29.000		25.00		116	70	127		0		
Surr: 4-Bromofluorobenzene	25.720		25.00		103	80	120		0		
Surr: Dibromofluoromethane	26.920		25.00		108	73	128		0		

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CLIENT: Tetra Tech
Work Order: N010153
Project: Maryland Square, 103P172829.01

ANALYTICAL QC SUMMARY REPORT

TestCode: PERMANGANATE

Sample ID: **MB-R88719**	SampType: **MBLK**	TestCode: **PERMANGAN**	Units: **mg/L**	Prep Date:	RunNo: **88719**
Client ID: **PBW**	Batch ID: **R88719**	TestNo: **Colorimetric**		Analysis Date: **5/3/2013**	SeqNo: **1568616**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Permanganate as KMnO4	ND	1.00									

Sample ID: **LCS-R88719**	SampType: **LCS**	TestCode: **PERMANGAN**	Units: **mg/L**	Prep Date:	RunNo: **88719**
Client ID: **LCSW**	Batch ID: **R88719**	TestNo: **Colorimetric**		Analysis Date: **5/3/2013**	SeqNo: **1568617**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Permanganate as KMnO4	21.500	1.00	20.00	0	108	80	120				

Sample ID: **N010153-014B-MS**	SampType: **MS**	TestCode: **PERMANGAN**	Units: **mg/L**	Prep Date:	RunNo: **88719**
Client ID: **ZZZZZZ**	Batch ID: **R88719**	TestNo: **Colorimetric**		Analysis Date: **5/3/2013**	SeqNo: **1568621**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Permanganate as KMnO4	174.750	5.00	100.0	68.40	106	80	120				

Sample ID: **N010153-014B-MSD**	SampType: **MSD**	TestCode: **PERMANGAN**	Units: **mg/L**	Prep Date:	RunNo: **88719**
Client ID: **ZZZZZZ**	Batch ID: **R88719**	TestNo: **Colorimetric**		Analysis Date: **5/3/2013**	SeqNo: **1568622**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Permanganate as KMnO4	175.850	5.00	100.0	68.40	107	80	120	174.8	0.627	20	

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out
E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values
H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

Advanced Technology Laboratories, Inc.
3151 W. Post Rd Las Vegas, NV 89118 Tel: 702-307-2659 Fax: 702-307-2691

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories, Inc.
3151-3153 W. Post Rd.
Las Vegas, NV 89118
Tel:(702) 307-2659•Fax:(702) 307-2691

FOR LABORATORY USE ONLY:

P.O.# 1038172829.01

Logged By: B. Dano Date: 5-1/2-13

Method of Transport
Client ☐
ATL INC ☐
FEDEX ☐
Other: ____

Sample Condition Upon Receipt
1. CHILLED 3.8 IR Y☑ N☐ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐
3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: Tetra Tech
Attn: Rob Manriquez
Address: 1230 Columbia St #1100
City San Diego State CA Zip Code 92101
TEL:( )
FAX:( )
Project Name: Maryland Square Project #: 1038172829.01
Sampler: I attest to the validity and authenticity of this sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action. (Printed Name) BECKI DANO (Signature)

Relinquished by: (Signature and Printed name)	BECKI DANO	Date: 5/2/13	Time: 1249	Received by: (Signature and Printed name)	HERSEY SMYAS	Date: 5/2/13	Time: 1249
Relinquished by: (Signature and Printed name)	HERSEY SMYAS	Date: 5/2/13	Time: 1315	Received by: (Signature and Printed name)	HERSEY SMYAS	Date: 5/2/13	Time: 1315
Relinquished by: (Signature and Printed name)		Date:	Time:	Received by: (Signature and Printed name)		Date:	Time:

I hereby authorize ATL INC to perform the work indicated below:
Project Mgr/Submitter:
BECKI DANO 5/2/13
Print Name Date
Signature

Send Report To:
Attn: Rob Manriquez
Co: Tetra Tech
Address: 1230 Columbia St #1100
City San Diego State CA Zip 92101

Bill To:
Attn: Dano
Co:
Address:
City State Zip

Special Instructions/Comments:
Email when ready to
chit.christan@tetratech.com
Becki.Dano@tetratech.com
Lisa.medus@tetratech.com

Sample/Records-Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $ 2.00 / sample / mo (after 45 days)
- Records : $ 1.00 / ATL workorder / mo (after 1 year)

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8260B (VOC)	8260B (BTEX),(MTBE)	8015B (GRO)	8015B (DRO),(Motor Oil/ORO)	RCRA8 (6010B/7000)	Arsenic	Mercury (CAM 17)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	N010153-1	CMT-1-1	5/1	1014	X					X	X			X			C	5	mi/lf		
	-2	CMT-1-2	5/1	1124	X					X	X			X			C	5	mi/lf		
	-3	CMT-1-3	5/1	1219	X					X	X			X			C	5	mi/lf		
	-4	CMT-1-4	5/1	1259	X					X	X			X			C	5	mi/lf		
	-5	CMT-1-5	5/1	1346	X					X	X			X			C	5	mi/lf		
	-6	CMT-1-6	5/1	1436	X					X	X			X			C	5	mi/lf		
	-7	CMT-1-7	5/1	1511	X					X	X			X			C	5	mi/lf		
	-8	MW-20D1	5/1	1557	X					X	X			X			C	5	mi/lf		
	-9	MW-20D2	5/1	1635	X					X	X			X			C	5	mi/lf		
	-10	MW-20D3	5/1	1725	X					X	X			X			C	5	mi/lf		

QA/QC: RTNE ☐ CT ☐ RWQCB ☐ LEVEL IV ____ OTHER ____

•TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: ☐ A= Overnight ≤ 24 hr ☐ B= Emergency Next workday ☐ C= Critical 2 Workdays ☐ D= Urgent 3 Workdays ☐ E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter

CHAIN OF CUSTODY RECORD

Advanced Technology Laboratories, Inc.
3151-3153 W. Post Rd.
Las Vegas, NV 89118
Tel:(702) 307-2659•Fax:(702) 307-2691

FOR LABORATORY USE ONLY:

P.O.# 103P172829.01
Logged By: BDANO Date: 5-1/2-13

Method of Transport
Client ☐
ATL INC ☐
FEDEX ☐
Other:

Sample Condition Upon Receipt
1. CHILLED 3.8 | 1.2 Y☒ N☐ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐
3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Client: Tetra Tech
Attn: Rob Munriquez
Address: 1230 Columbia St #1000
City San Diego State CA Zip Code 92101
TEL:( )
FAX:( )

Project Name: Mumland Square Project #: 103P172829.01
Sampler: Becki DANO
I attest to the validity and authenticity of this sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action. (Printed Name) (Signature)

Relinquished by: (Signature and Printed name) Becki DANO	Date: 5/2/13	Time: 1459	Received by: (Signature and Printed name) Hersey SAYLES	Date: 5/2/13	Time: 1459
Relinquished by: (Signature and Printed name) Hersey SAYLES	Date: 5/2/13	Time: 1315	Received by: (Signature and Printed name) Hersey SAYLES	Date: 5/2/13	Time: 1315
Relinquished by: (Signature and Printed name)	Date:	Time:	Received by: (Signature and Printed name)	Date:	Time:

I hereby authorize ATL INC to perform the work indicated below:
Project Mgr/Submitter: Becki DANO 5/2/13
Print Name Date
Signature

Send Report To:
Attn: Rob Munriquez
Co: Tetra Tech
Address: 1230 Columbia St #1000
City San Diego State CA Zip 92101

Bill To:
Attn:
Co:
Address:
City State Zip

Special Instructions/Comments:
See page 1

Sample/Records-Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

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- Records : $ 1.00 / ATL workorder / mo (after 1 year)

ITEM	LAB USE ONLY: Batch #: Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8260B (VOC)	8260B (BTEX),(MTBE)	8015B (GRO)	8015B (DRO),(Motor Oil/ORO)	RCRA8 (6010B/7000)	CAM17 Metals (Dissolved)	Perchlorate (Dissolved)	Dissolved Methane, Ethane, Ethene (RSK-175 Mod)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	K1010153-11	MW-2D	5/2	0917	X					X	X	X		W			C	5	mv/a		
	-12	MW-19	5/2	1142	X					X	X	X		W			C	5	mv/a		
	-13	MW-19D1	5/2	1052	X					X	X	X		W			C	5	mv/a		
	-14	MW-19I	5/2	1005	X					X	X	X		W			C	5	mv/a		
	-15	PT-WATER	5/2	1240	X									W	X	X	C	3	mv/a		ICE ONLY

QA/QC: RTNE ☐ CT ☐ RWQCB ☐ LEVEL IV ☐ OTHER

•TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: ☐ A= Overnight ≤ 24 hr ☐ B= Emergency Next workday ☐ C= Critical 2 Workdays ☐ D= Urgent 3 Workdays ☐ E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter

Advanced Technology Laboratories, Inc.

Please review the checklist below. Any NO signifies non-compliance. Any non-compliance will be noted and must be understood as having an impact on the quality of the data. All tests will be performed as requested regardless of any compliance issues.

If you have any questions or further instruction, please contact our Project Coordinator at (702) 307-2659.

Cooler Received/Opened On:	5/2/2013	Workorder:	N010153
Rep sample Temp (Deg C):	3.8	IR Gun ID:	1
Temp Blank:	☐ Yes ☑ No		
Carrier name:	ATL		
Last 4 digits of Tracking No.:	N/A	Packing Material Used:	None
Cooling process:	☑ Ice ☐ Ice Pack ☐ Dry Ice ☐ Other ☐ None		

Sample Receipt Checklist

1. Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
2. Custody seals intact, signed, dated on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
3. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
4. Chain of custody present?	Yes ☑	No ☐	
5. Sampler's name present in COC?	Yes ☑	No ☐	
6. Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
7. Chain of custody agrees with sample labels?	Yes ☑	No ☐	
8. Samples in proper container/bottle?	Yes ☑	No ☐	
9. Sample containers intact?	Yes ☑	No ☐	
10. Sufficient sample volume for indicated test?	Yes ☑	No ☐	
11. All samples received within holding time?	Yes ☑	No ☐	
12. Temperature of rep sample or Temp Blank within acceptable limit?	Yes ☑	No ☐	NA ☐
13. Water - VOA vials have zero headspace?	Yes ☑	No ☐	NA ☐
14. Water - pH acceptable upon receipt? Example: pH > 12 for (CN,S); pH<2 for Metals	Yes ☑	No ☐	NA ☐
15. Did the bottle labels indicate correct preservatives used?	Yes ☑	No ☐	NA ☐
16. Were there Non-Conformance issues at login?	Yes ☐	No ☐	NA ☑
Was Client notified?	Yes ☐	No ☐	NA ☑

Comments:

Checklist Completed B MBC MBC 5/2/13

Reviewed By:

ATTACHMENTS 1 THROUGH 6 PROVIDED ON CD

1 - Bench Scale Reports

2 - Vendor Field and Product Data

3 - Analytical Results

4 - Geotechnical Reports

5 - Cascade Injection Logs

6 - PulseOx O&M Logs

PTS Laboratories, Inc.

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

COMPANY	Tetra Tech, Inc.
ADDRESS / CITY / ZIP CODE	1230 Columbia St. Ste 1000 San Diego, CA 92101
PROJECT MANAGER	ROB MANRIQUEZ
PROJECT NAME / PHONE NUMBER	MSSC Site (Addl. Vertic. Delin) 619-321-8748
PROJECT NUMBER / FAX NUMBER	103P172828.01 619-525-7186
SITE LOCATION	LAS VEGAS
SAMPLER SIGNATURE	V. Prilepin

ANALYSIS REQUEST

SAMPLE ID NUMBER	DATE	TIME	DEPTH, FT	NUMBER OF SAMPLES	SOIL PROPERTIES PACKAGE	HYDRAULIC CONDUCTIVITY PACKAGE	PORE FLUID SATURATIONS PACKAGE	TCEQ/TNRCC PROPERTIES PACKAGE	CAPILLARITY PACKAGE	FLUID PROPERTIES PACKAGE	PHOTOLOG: CORE PHOTOGRAPHY	MOISTURE CONTENT, ASTM D2216	POROSITY: TOTAL, API RP40	POROSITY: EFFECTIVE, ASTM D425M	SPECIFIC GRAVITY, ASTM D854	BULK DENSITY (DRY), API RP40 or ASTM D2937	AIR PERMEABILITY, API RP40	HYDRAULIC CONDUCTIVITY, EPA9100, API RP40, D5084	GRAIN SIZE DISTRIBUTION, ASTM D422/4464M	TOC: WALKLEY-BLACK	ATTERBERG LIMITS, ASTM D4318				
✓ TTMW6D02SS81	1/18/13	13:25	80-81			X													X	X					
✓ TTMW6D01SS71	1/18/13	8:20	70-71			X													X	X					

PO#

TURNAROUND TIME
24 HOURS ☐ 5 DAYS ☐
48 HOURS ☐ NORMAL ☐
72 HOURS ☐
OTHER: _____

SAMPLE INTEGRITY (CHECK):
INTACT ____ ON ICE ____

PTS QUOTE NO.

PTS FILE: 43055

COMMENTS

> 37.6 °F

1. RELINQUISHED BY	2. RECEIVED BY	3. RELINQUISHED BY	4. RECEIVED BY
V. Prilepin	G Richards	Geo Richards	
COMPANY: Tetra Tech, Inc.	COMPANY: Tetratech DC	COMPANY: Tetratech	COMPANY: PTS LABS
DATE: 1/21/13 TIME: 17:10	DATE: 1/21/13 TIME: 1710	DATE: 1/22/13 TIME: 1300	DATE: 1/23/13 TIME: 1005

PTS Laboratories, Inc.

Tetra Tech, Inc.
PTS File No: 43055

PARTICLE SIZE SUMMARY

(METHODOLOGY: ASTM D422)

PROJECT NAME: MSSC Site (Addl. Vertic. Delin.)
PROJECT NO: 103P172828.01

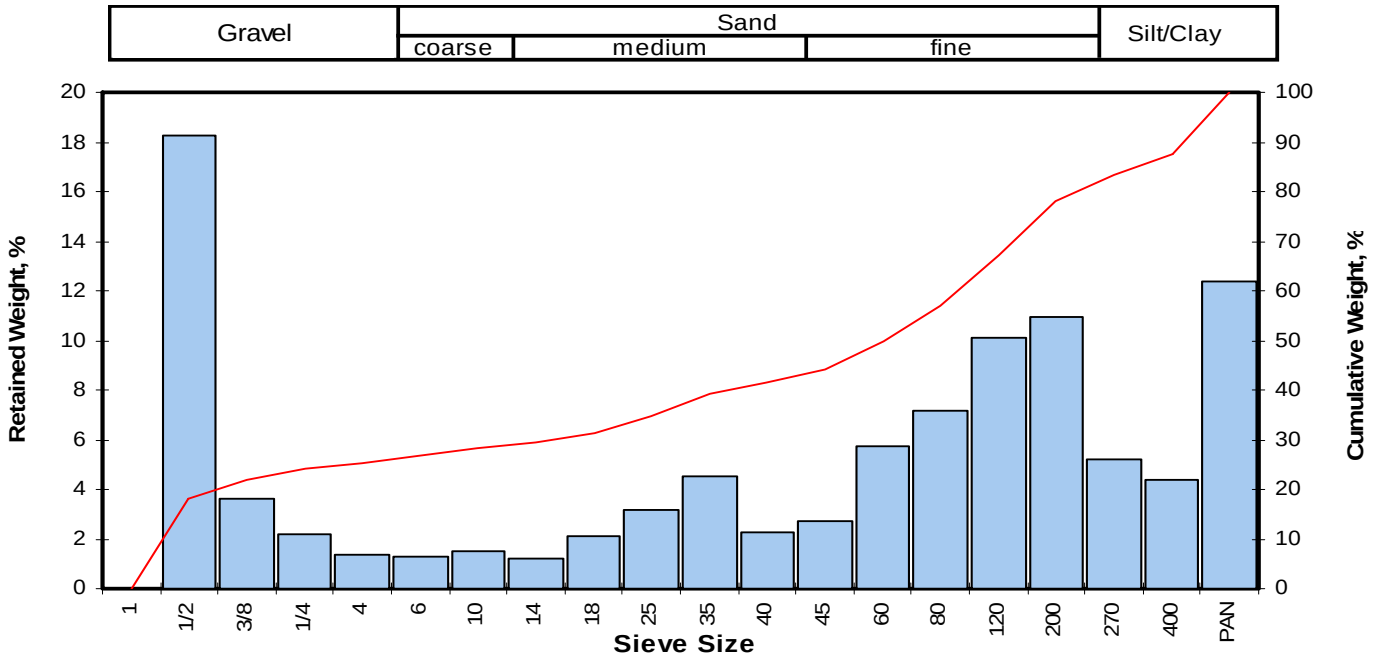
Sample ID	Depth, ft.	Description USCS/ASTM (1)	Median Grain Size, mm	Particle Size Distribution, wt. percent				
				Gravel	Sand Size			Silt/Clay
					Coarse	Medium	Fine	
TTMW6D02SS81	80-81	Coarse sand	0.248	25.38	2.77	13.26	36.63	21.96
TTMW6D01SS71	70-71	Coarse sand	0.150	29.40	1.74	7.67	27.54	33.65

(1) based on Mean fromTrask

PTS Laboratories, Inc.

Particle Size Analysis - ASTM D422M

Client:	Tetra Tech, Inc.	**PTS File No:**	43055
Project:	MSSC Site (Addl. Vertic. Delin.)	**Sample ID:**	TTMW6D02SS81
Project No:	103P172828.01	**Depth, ft:**	80-81



Opening		Phi of	U.S. Sieve	Sample Weight	Incremental Weight,	Cumulative Weight,
Inches	Millimeters	Screen	No.	grams	percent	percent
0.9844	25.002	-4.64	1	0.00	0.00	0.00
0.4922	12.501	-3.64	1/2	14.48	18.29	18.29
0.3740	9.500	-3.25	3/8	2.84	3.59	21.88
0.2500	6.351	-2.67	1/4	1.72	2.17	24.05
0.1873	4.757	-2.25	4	1.05	1.33	25.38
0.1324	3.364	-1.75	6	0.99	1.25	26.63
0.0787	2.000	-1.00	10	1.20	1.52	28.15
0.0557	1.414	-0.50	14	0.98	1.24	29.38
0.0394	1.000	0.00	18	1.66	2.10	31.48
0.0278	0.707	0.50	25	2.48	3.13	34.61
0.0197	0.500	1.00	35	3.60	4.55	39.16
0.0166	0.420	1.25	40	1.78	2.25	41.41
0.0139	0.354	1.50	45	2.13	2.69	44.10
0.0098	0.250	2.00	60	4.56	5.76	49.86
0.0070	0.177	2.50	80	5.66	7.15	57.01
0.0049	0.125	3.00	120	7.99	10.09	67.10
0.0029	0.074	3.75	200	8.66	10.94	78.04
0.0021	0.053	4.25	270	4.12	5.20	83.25
0.0015	0.037	4.75	400	3.46	4.37	87.62
			PAN	9.80	12.38	100.00
TOTALS				79.16	100.00	100.00

Cumulative Weight Percent greater than

Weight percent	Phi Value	Particle Size Inches	Particle Size Millimeters
5	-4.37	0.8145	20.687
10	-4.10	0.6739	17.116
16	-3.77	0.5368	13.636
25	-2.37	0.2034	5.166
40	1.09	0.0185	0.469
50	2.01	0.0098	0.248
60	2.65	0.0063	0.160
75	3.54	0.0034	0.086
84	4.34	0.0019	0.050
90			
95			

Measure	Trask	Inman	Folk-Ward
Median, phi	2.01	2.01	2.01
Median, in.	0.0098	0.0098	0.0098
Median, mm	0.248	0.248	0.248
Mean, phi	-1.39	0.28	0.86
Mean, in.	0.1034	0.0324	0.0217
Mean, mm	2.626	0.822	0.551
Sorting	7.755	4.053	
Skewness	2.683	-0.426	
Kurtosis			

Grain Size Description (ASTM-USCS Scale)	Coarse sand (based on Mean from Trask)

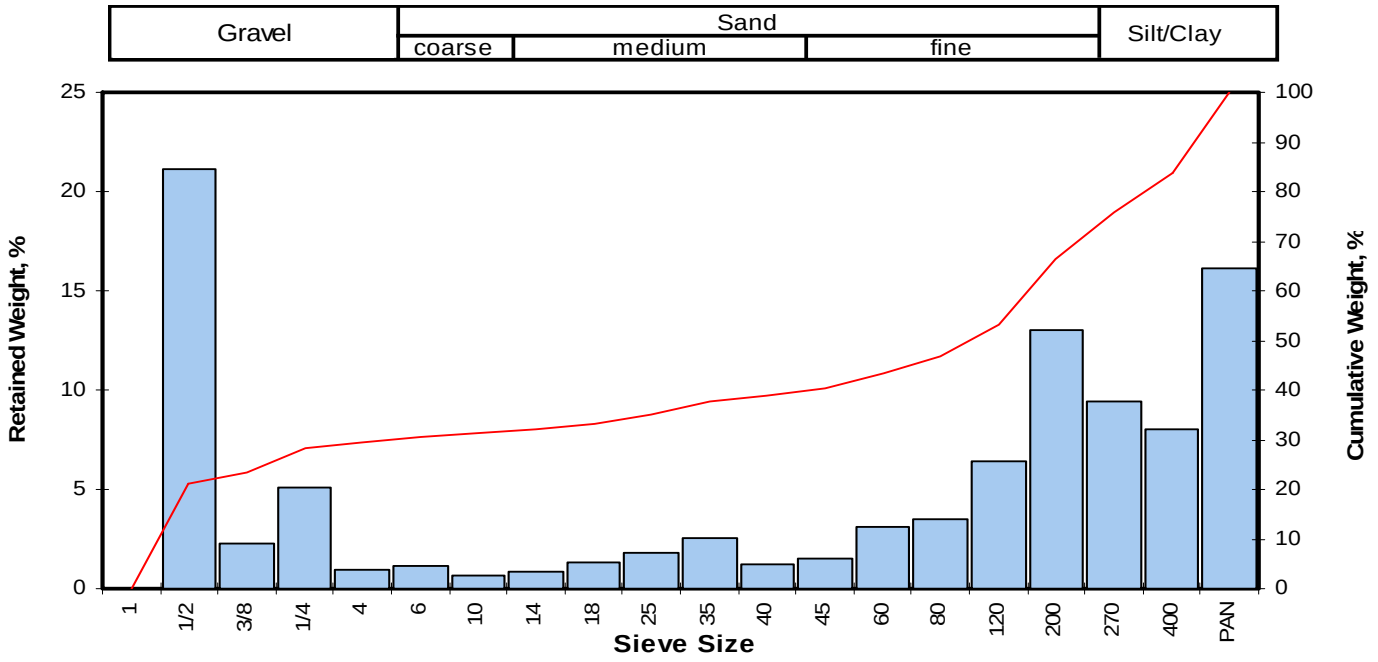
Description	Retained on Sieve #	Weight Percent
Gravel	4	25.38
Coarse Sand	10	2.77
Medium Sand	40	13.26
Fine Sand	200	36.63
Silt/Clay	<200	21.96
	Total	100

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PTS Laboratories, Inc.

Particle Size Analysis - ASTM D422M

Client:	Tetra Tech, Inc.	**PTS File No:**	43055
Project:	MSSC Site (Addl. Vertic. Delin.)	**Sample ID:**	TTMW6D01SS71
Project No:	103P172828.01	**Depth, ft:**	70-71



Opening Inches	Opening Millimeters	Phi of Screen	U.S. Sieve No.	Sample Weight grams	Incremental Weight, percent	Cumulative Weight, percent
0.9844	25.002	-4.64	1	0.00	0.00	0.00
0.4922	12.501	-3.64	1/2	15.78	21.16	21.16
0.3740	9.500	-3.25	3/8	1.66	2.23	23.39
0.2500	6.351	-2.67	1/4	3.79	5.08	28.47
0.1873	4.757	-2.25	4	0.69	0.93	29.40
0.1324	3.364	-1.75	6	0.83	1.11	30.51
0.0787	2.000	-1.00	10	0.47	0.63	31.14
0.0557	1.414	-0.50	14	0.63	0.84	31.98
0.0394	1.000	0.00	18	0.95	1.27	33.26
0.0278	0.707	0.50	25	1.34	1.80	35.05
0.0197	0.500	1.00	35	1.87	2.51	37.56
0.0166	0.420	1.25	40	0.93	1.25	38.81
0.0139	0.354	1.50	45	1.14	1.53	40.34
0.0098	0.250	2.00	60	2.32	3.11	43.45
0.0070	0.177	2.50	80	2.58	3.46	46.91
0.0049	0.125	3.00	120	4.81	6.45	53.36
0.0029	0.074	3.75	200	9.69	12.99	66.35
0.0021	0.053	4.25	270	7.07	9.48	75.83
0.0015	0.037	4.75	400	6.01	8.06	83.89
			PAN	12.01	16.11	100.00
TOTALS				74.57	100.00	100.00

Cumulative Weight Percent greater than			
Weight percent	Phi Value	Particle Size Inches	Particle Size Millimeters
5	-4.41	0.8356	21.225
10	-4.17	0.7094	18.019
16	-3.89	0.5828	14.804
25	-3.06	0.3292	8.361
40	1.44	0.0145	0.367
50	2.74	0.0059	0.150
60	3.38	0.0038	0.096
75	4.21	0.0021	0.054
84	4.72	0.0015	0.038
90			
95			

Measure	Trask	Inman	Folk-Ward
Median, phi	2.74	2.74	2.74
Median, in.	0.0059	0.0059	0.0059
Median, mm	0.150	0.150	0.150
Mean, phi	-2.07	0.42	1.19
Mean, in.	0.1657	0.0295	0.0173
Mean, mm	4.208	0.750	0.438
Sorting	12.422	4.303	
Skewness	4.495	-0.540	
Kurtosis			

Grain Size Description (ASTM-USCS Scale)	Coarse sand (based on Mean from Trask)

Description	Retained on Sieve #	Weight Percent
Gravel	4	29.40
Coarse Sand	10	1.74
Medium Sand	40	7.67
Fine Sand	200	27.54
Silt/Clay	<200	33.65
	Total	100

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PTS File No: 43055
Client: Tetra Tech, Inc.

PTS Laboratories

PHYSICAL PROPERTIES DATA - HYDRAULIC CONDUCTIVITY PACKAGE

PROJECT NAME: MSSC Site (Addl. Vertic. Delin.)
PROJECT NO: 103P172828.01

		METHODS:	API RP 40 / ASTM D2216	API RP 40		API RP 40		API RP 40	API RP 40; EPA 9100	
									25 PSI CONFINING STRESS	
SAMPLE ID.	DEPTH, ft.	SAMPLE ORIENTATION (1)	MOISTURE CONTENT, % weight	DENSITY		POROSITY, %Vb (2)		TOTAL PORE FLUID SATURATIONS (3), % Pv	EFFECTIVE (4,5) PERMEABILITY TO WATER, millidarcy	HYDRAULIC CONDUCTIVITY (4,5), cm/s
				DRY BULK, g/cc	GRAIN, g/cc	TOTAL	AIR FILLED			
TTMW6D02SS81	80-81	V	60.8	0.88	2.60	66.2	12.7	80.8	3.21	3.10E-06
TTMW6D01SS71	70-71	V	44.8	1.08	2.62	58.8	10.5	82.0	4.86	4.66E-06

(1) Sample Orientation: H = horizontal; V = vertical; R = remold (2) Total Porosity = no pore fluids in place; all interconnected pore channels; Air Filled = pore channels not occupied by pore fluids (3) Water = 0.9996 g/cc (4) Native State or Effective = With as-received pore fluids in place (5) Permeability to water and hydraulic conductivity measured at saturated conditions; Vb = Bulk Volume, cc; Pv = Pore Volume, cc; ND = Not Detected

PTS File No: 43055
Client: Tetra Tech, Inc.

ORGANIC CARBON DATA - TOC (foc)

(METHODOLOGY: WALKLEY-BLACK)

PROJECT NAME: MSSC Site (Addl. Vertic. Delin.)
PROJECT NO: 103P172828.01

SAMPLE ID.	DEPTH, ft.	ANALYSIS DATE	ANALYSIS TIME	SAMPLE MATRIX	TOTAL ORGANIC CARBON, mg/kg	FRACTION ORGANIC CARBON, g/g
TTMW6D02SS81	80-81	20130201	1130	SOIL	450	4.50E-04
TTMW6D01SS71	70-71	20130201	1130	SOIL	270	2.70E-04
Blank	N/A	20130201	1130	BLANK	ND	ND
SRM D079-542	N/A	20130201	1130	SRM	3410	3.41E-03
				Reporting Limit:	100	1.00E-04

QC DATA

SRM ID/Lot No.	REC (%)	Control Limits	Certified Concentration mg/kg	QC Performance Acceptance Limits, mg/kg Lower	Upper
SRM D079-542	100	75-125	3400	2550	4250

ND = Not Detected

PTS Laboratories, Inc.

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

COMPANY: TETRA TECH EM Inc

ADDRESS: 1230 Columbia St., Ste 1000 CITY: San Diego, CA ZIP CODE: 92101

PROJECT MANAGER: Rob Manriquez

PROJECT NAME: MSSC Site Vertical Delineation PHONE NUMBER:

PROJECT NUMBER: 103172824.01 FAX NUMBER:

SITE LOCATION: LAS VEGAS

SAMPLER SIGNATURE: V. PRILEPIN

PO#:

TURNAROUND TIME
24 HOURS ☐ 5 DAYS ☐
48 HOURS ☐ NORMAL ☒
72 HOURS ☐
OTHER: _____

SAMPLE INTEGRITY (CHECK):
INTACT ✓ ON ICE ✓ ~~cooler~~ Ram No ICE

PTS QUOTE NO.:

PTS FILE: 42556

SAMPLE ID NUMBER	DATE	TIME	DEPTH, FT	NUMBER OF SAMPLES	SOIL PROPERTIES PACKAGE	HYDRAULIC CONDUCTIVITY PACKAGE	PORE FLUID SATURATIONS PACKAGE	TCEQ/TNRCC PROPERTIES PACKAGE	CAPILLARITY PACKAGE	FLUID PROPERTIES PACKAGE	PHOTOLOG: CORE PHOTOGRAPHY	MOISTURE CONTENT, ASTM D2216	POROSITY: TOTAL, API RP40	POROSITY: EFFECTIVE, ASTM D425M	SPECIFIC GRAVITY, ASTM D854	BULK DENSITY (DRY), API RP40 or ASTM D2937	AIR PERMEABILITY, API RP40	HYDRAULIC CONDUCTIVITY, EPA9100, API RP40, D5084	GRAIN SIZE DISTRIBUTION, ASTM D422/4464M	TOC: WALKLEY-BLACK	ATTERBERG LIMITS, ASTM D4318	COMMENTS
TTEW1Ø1555	7/26/12	5:55	51-52			X													X	X		

1. RELINQUISHED BY	2. RECEIVED BY	3. RELINQUISHED BY	4. RECEIVED BY
V. Prilepin	B Dano	B Dano	
COMPANY: Tetra Tech EM Inc.	COMPANY: Titan Tech	COMPANY: Tetra Tech	COMPANY: PTS Labs Inc
DATE: 7/26/12 TIME: 7:40	DATE: 7/26 TIME: 740	DATE: 7/31/12 TIME: 17:30	DATE: 8/1/12 TIME: 1621

PTS File No: 42556
Client: Tetra Tech EM Inc.

PTS Laboratories

PHYSICAL PROPERTIES DATA - HYDRAULIC CONDUCTIVITY PACKAGE

PROJECT NAME: MSSC Site (Vertical Delin.)
PROJECT NO: 103P172824.01

		METHODS:	API RP 40 / ASTM D2216	API RP 40		API RP 40		API RP 40	API RP 40; EPA 9100	
									25 PSI CONFINING STRESS	
SAMPLE ID.	DEPTH, ft.	SAMPLE ORIENTATION (1)	MOISTURE CONTENT, % weight	DENSITY		POROSITY, %Vb (2)		TOTAL PORE FLUID SATURATIONS (3), % Pv	EFFECTIVE (4,5) PERMEABILITY TO WATER, millidarcy	HYDRAULIC CONDUCTIVITY (4,5), cm/s
				DRY BULK, g/cc	GRAIN, g/cc	TOTAL	AIR FILLED			
TTEW101SS51	52	V	17.3	1.66	2.67	37.8	9.1	75.9	4.87	4.84E-06

(1) Sample Orientation: H = horizontal; V = vertical; R = remold (2) Total Porosity = no pore fluids in place; all interconnected pore channels; Air Filled = pore channels not occupied by pore fluids (3) Water = 0.9996 g/cc (4) Native State or Effective = With as-received pore fluids in place (5) Permeability to water and hydraulic conductivity measured at saturated conditions; Vb = Bulk Volume, cc; Pv = Pore Volume, cc; ND = Not Detected

PTS Laboratories, Inc.

Tetra Tech EM Inc.
PTS File No: 42556

PARTICLE SIZE SUMMARY

(METHODOLOGY: ASTM D422/D4464M)

PROJECT NAME: MSSC Site (Vertical Delin.)
PROJECT NO: 103P172824.01

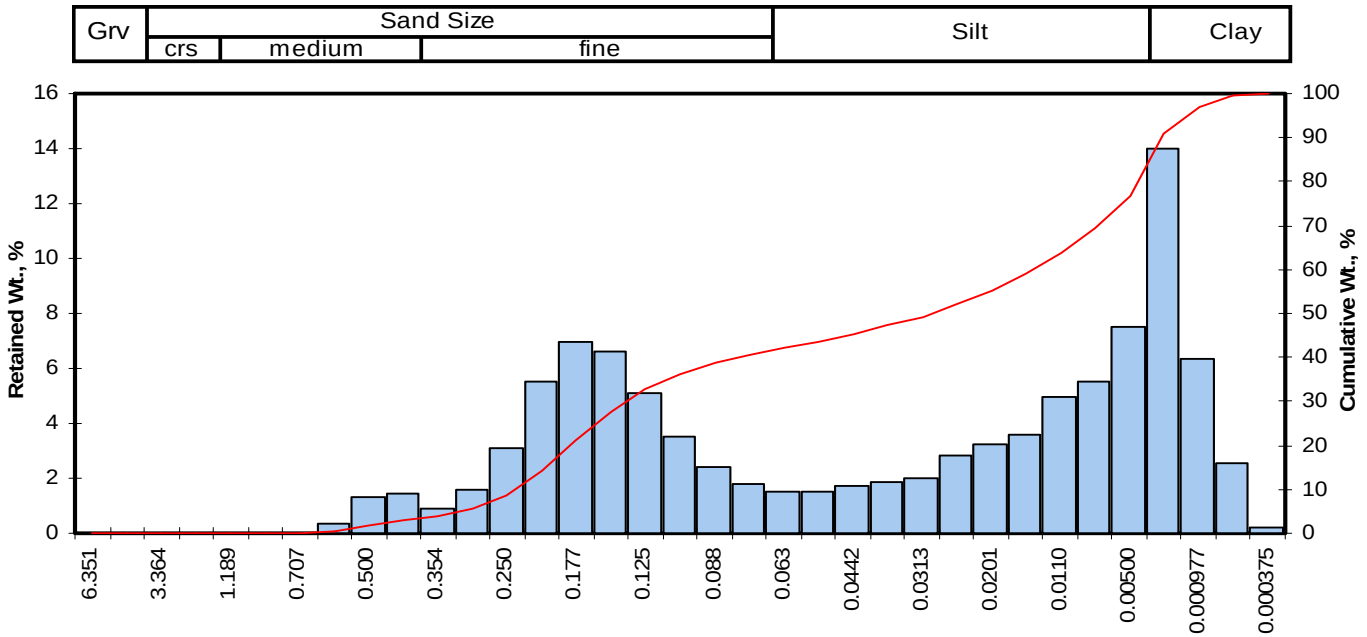
Sample ID	Depth, ft.	Mean Grain Size Description (1)	Median Grain Size mm	Particle Size Distribution, wt. percent						Silt & Clay
				Gravel	Sand Size			Silt	Clay	
					Coarse	Medium	Fine			
TTEW101SS51	51-52	Fine sand	0.029	0.00	0.00	3.07	37.53	36.23	23.17	59.40

(1) Based on Mean from Trask

PTS Laboratories, Inc.

Particle Size Analysis - ASTM D4464M

Client:	Tetra Tech EM Inc.	**PTS File No:**	42556
Project:	MSSC Site (Vertical Delin.)	**Sample ID:**	TTEW101SS51
Project No:	103P172824.01	**Depth, ft:**	51-52



Opening		Phi of	U.S.	Sample Weight,	Increment Weight,	Cumulative Weight,
Inches	Millimeters	Screen	No.	grams	percent	percent
0.2500	6.351	-2.67	1/4	0.00	0.00	0.00
0.1873	4.757	-2.25	4	0.00	0.00	0.00
0.1324	3.364	-1.75	6	0.00	0.00	0.00
0.0787	2.000	-1.00	10	0.00	0.00	0.00
0.0468	1.189	-0.25	16	0.00	0.00	0.00
0.0331	0.841	0.25	20	0.00	0.00	0.00
0.0278	0.707	0.50	25	0.02	0.02	0.02
0.0234	0.595	0.75	30	0.34	0.34	0.36
0.0197	0.500	1.00	35	1.29	1.29	1.65
0.0166	0.420	1.25	40	1.42	1.42	3.07
0.0139	0.354	1.50	45	0.91	0.91	3.98
0.0117	0.297	1.75	50	1.57	1.57	5.55
0.0098	0.250	2.00	60	3.09	3.09	8.63
0.0083	0.210	2.25	70	5.53	5.53	14.16
0.0070	0.177	2.50	80	6.99	6.99	21.15
0.0059	0.149	2.75	100	6.62	6.62	27.77
0.0049	0.125	3.00	120	5.10	5.10	32.87
0.0041	0.105	3.25	140	3.55	3.55	36.42
0.0035	0.088	3.50	170	2.42	2.42	38.84
0.0029	0.074	3.75	200	1.76	1.76	40.60
0.0025	0.063	4.00	230	1.51	1.51	42.11
0.0021	0.053	4.25	270	1.55	1.55	43.66
0.00174	0.0442	4.50	325	1.72	1.72	45.38
0.00146	0.0372	4.75	400	1.84	1.84	47.22
0.00123	0.0313	5.00	450	1.98	1.98	49.20
0.000986	0.0250	5.32	500	2.86	2.86	52.06
0.000790	0.0201	5.64	635	3.25	3.25	55.31
0.000615	0.0156	6.00		3.59	3.59	58.90
0.000435	0.0110	6.50		4.95	4.95	63.85
0.000308	0.00781	7.00		5.49	5.49	69.33
0.000197	0.00500	7.65		7.50	7.50	76.83
0.000077	0.00195	9.00		14.00	14.00	90.83
0.000038	0.000977	10.00		6.36	6.36	97.19
0.000019	0.000488	11.00		2.58	2.58	99.77
0.000015	0.000375	11.38		0.23	0.23	100.00
TOTALS				**100.00**	**100.00**	**100.00**

Cumulative Weight Percent greater than			
Weight	Phi	Particle Size	
percent	Value	Inches	Millimeters
5	1.66	0.0124	0.316
10	2.06	0.0094	0.240
16	2.32	0.0079	0.201
25	2.65	0.0063	0.160
40	3.66	0.0031	0.079
50	5.09	0.0012	0.029
60	6.11	0.0006	0.014
75	7.49	0.0002	0.006
84	8.34	0.0001	0.003
90	8.92	0.0001	0.002
95	9.66	0.0000	0.001

Measure	Trask	Inman	Folk-Ward
Median, phi	5.09	5.09	5.09
Median, in.	0.0012	0.0012	0.0012
Median, mm	0.029	0.029	0.029
Mean, phi	3.60	5.33	5.25
Mean, in.	0.0033	0.0010	0.0010
Mean, mm	0.083	0.025	0.026
Sorting	5.355	3.012	2.717
Skewness	1.016	0.079	0.111
Kurtosis	0.325	0.327	0.676
Grain Size Description (ASTM-USCS Scale)		Fine sand (based on Mean from Trask)	

Description	Retained on Sieve #	Weight Percent
Gravel	4	0.00
Coarse Sand	10	0.00
Medium Sand	40	3.07
Fine Sand	200	37.53
Silt	>0.005 mm	36.23
Clay	<0.005 mm	23.17
	Total	**100**

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Fax: (562) 907-3610

PTS File No: 42556
Client: Tetra Tech EM Inc.

ORGANIC CARBON DATA - TOC (foc)

(METHODOLOGY: WALKLEY-BLACK)

PROJECT NAME: MSSC Site (Vertical Delin.)
PROJECT NO: 103P172824.01

SAMPLE ID.	DEPTH, ft.	ANALYSIS DATE	ANALYSIS TIME	SAMPLE MATRIX	TOTAL ORGANIC CARBON, mg/kg	FRACTION ORGANIC CARBON, g/g
TTEW101SS51	51-52	20120810	1600	SOIL	660	6.60E-04
Blank	N/A	20120810	1600	BLANK	ND	ND
SRM D077-542	N/A	20120810	1600	SRM	4100	4.10E-03
				Reporting Limit:	100	1.00E-04

QC DATA

SRM ID/Lot No.	REC (%)	Control Limits	Certified Concentration mg/kg	QC Performance Acceptance Limits, mg/kg Lower	Upper
D077-542	106	75-125	3850	2888	4813

ND = Not Detected

PTS Laboratories, Inc.

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

COMPANY: Tetra Tech EM Inc.

ADDRESS: 1230 COLUMBIA ST. STE 1000, CITY: San Diego, ZIP CODE: CA 92101

PROJECT MANAGER: ROB MANRIQUEZ

PROJECT NAME: MSSC SITE (VERTICAL DELIN.) PHONE NUMBER: 619-321-6748

PROJECT NUMBER: 103P172824.01 FAX NUMBER: 619-525-7186

SITE LOCATION: LAS VEGAS

SAMPLER SIGNATURE: V. PRILEPIN

PO#:

TURNAROUND TIME: 24 HOURS ☐ 5 DAYS ☐ 48 HOURS ☐ NORMAL ☒ 72 HOURS ☐ OTHER: _____

SAMPLE INTEGRITY (CHECK): INTACT X ON ICE ____

PTS QUOTE NO.:

PTS FILE: 42543

ANALYSIS REQUEST

SAMPLE ID NUMBER	DATE	TIME	DEPTH, FT	NUMBER OF SAMPLES	SOIL PROPERTIES PACKAGE	HYDRAULIC CONDUCTIVITY PACKAGE	PORE FLUID SATURATIONS PACKAGE	TCEQ/TNRCC PROPERTIES PACKAGE	CAPILLARITY PACKAGE	FLUID PROPERTIES PACKAGE	PHOTOLOG: CORE PHOTOGRAPHY	MOISTURE CONTENT, ASTM D2216	POROSITY: TOTAL, API RP40	POROSITY: EFFECTIVE, ASTM D425M	SPECIFIC GRAVITY, ASTM D854	BULK DENSITY (DRY), API RP40 or ASTM D2937	AIR PERMEABILITY, API RP40	HYDRAULIC CONDUCTIVITY, EPA9100, API RP40, D5084	GRAIN SIZE DISTRIBUTION, ASTM D422/4464M	TOC: WALKLEY-BLACK	ATTERBERG LIMITS, ASTM D4318	COMMENTS
TTEW201SS42	7/19/12	14:25	42-44			X													XX			
TTMW400ISS36	7/23/12	16:20	36-38			X													XX			

1. RELINQUISHED BY	2. RECEIVED BY	3. RELINQUISHED BY	4. RECEIVED BY
V. PRILEPIN			
COMPANY: Tetra Tech EM Inc	COMPANY: TetraTech	COMPANY: TetraTech	COMPANY: PTS Labs Inc
DATE: 7/24/12 TIME: 15:25	DATE: 7-24-12 TIME: 1525	DATE: 7/24-12 TIME:	DATE: 7/25/12 TIME: 1337

PARTICLE SIZE SUMMARY

(METHODOLOGY: ASTM D422/D4464M)

PROJECT NAME: MSSC Site (Vertical Delin.)
PROJECT NO: 103P172824.01

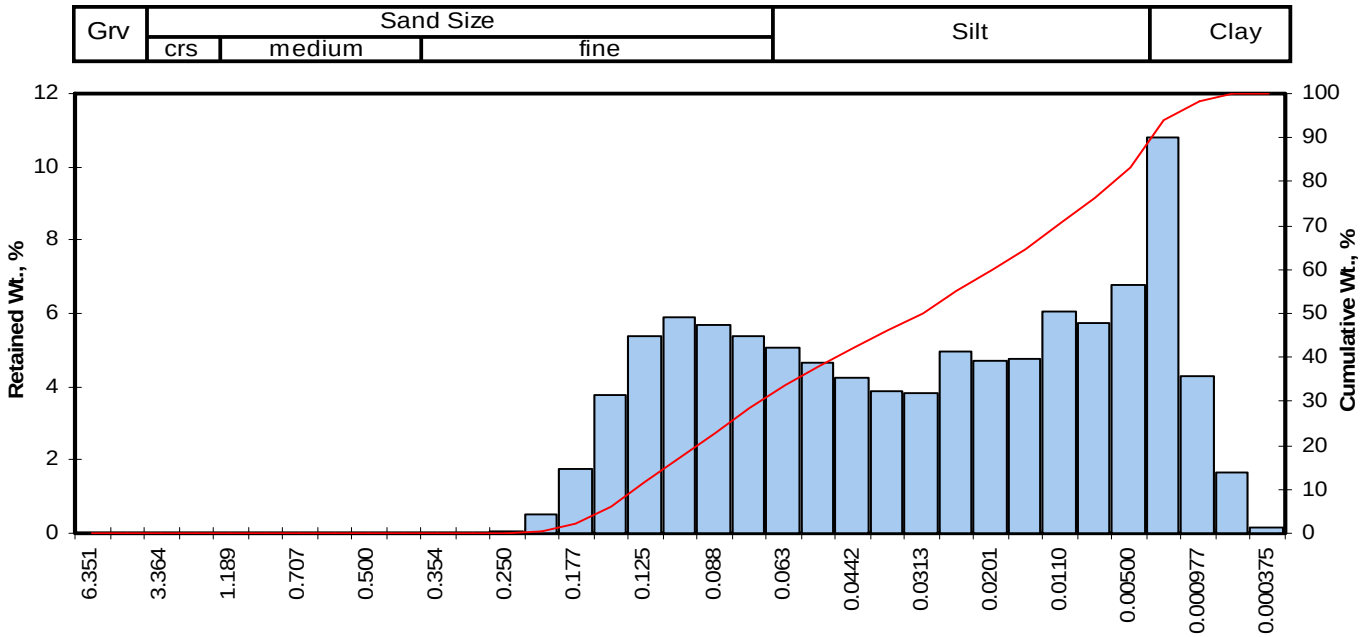
Sample ID	Depth, ft.	Mean Grain Size Description (1)	Median Grain Size mm	Particle Size Distribution, wt. percent						Silt & Clay
				Gravel	Sand Size			Silt	Clay	
					Coarse	Medium	Fine			
TTEW201SS42	43.6	Silt	0.031	0.00	0.00	0.00	28.37	54.75	16.88	71.63
TTMW4001SS36	37.6	Fine sand	0.145	2.69	0.81	20.28	39.49	(2)	(2)	36.73

(1) Based on Mean from Trask
(2) Mechanical sieve does not differentiate silt/clay fractions

PTS Laboratories, Inc.

Particle Size Analysis - ASTM D4464M

Client:	Tetra Tech EM Inc.	**PTS File No:**	42543
Project:	MSSC Site (Vertical Delin.)	**Sample ID:**	TTEW201SS42
Project No:	103P172824.01	**Depth, ft:**	43.6



Opening		Phi of	U.S.	Sample	Increment	Cumulative
Inches	Millimeters	Screen	No.	Weight, grams	Weight, percent	Weight, percent
0.2500	6.351	-2.67	1/4	0.00	0.00	0.00
0.1873	4.757	-2.25	4	0.00	0.00	0.00
0.1324	3.364	-1.75	6	0.00	0.00	0.00
0.0787	2.000	-1.00	10	0.00	0.00	0.00
0.0468	1.189	-0.25	16	0.00	0.00	0.00
0.0331	0.841	0.25	20	0.00	0.00	0.00
0.0278	0.707	0.50	25	0.00	0.00	0.00
0.0234	0.595	0.75	30	0.00	0.00	0.00
0.0197	0.500	1.00	35	0.00	0.00	0.00
0.0166	0.420	1.25	40	0.00	0.00	0.00
0.0139	0.354	1.50	45	0.00	0.00	0.00
0.0117	0.297	1.75	50	0.00	0.00	0.00
0.0098	0.250	2.00	60	0.05	0.05	0.05
0.0083	0.210	2.25	70	0.50	0.50	0.55
0.0070	0.177	2.50	80	1.76	1.76	2.31
0.0059	0.149	2.75	100	3.77	3.77	6.08
0.0049	0.125	3.00	120	5.36	5.36	11.44
0.0041	0.105	3.25	140	5.89	5.89	17.33
0.0035	0.088	3.50	170	5.69	5.69	23.01
0.0029	0.074	3.75	200	5.36	5.36	28.37
0.0025	0.063	4.00	230	5.07	5.07	33.44
0.0021	0.053	4.25	270	4.68	4.68	38.12
0.00174	0.0442	4.50	325	4.22	4.22	42.34
0.00146	0.0372	4.75	400	3.90	3.90	46.23
0.00123	0.0313	5.00	450	3.85	3.85	50.08
0.000986	0.0250	5.32	500	4.95	4.95	55.03
0.000790	0.0201	5.64	635	4.73	4.73	59.76
0.000615	0.0156	6.00		4.77	4.77	64.53
0.000435	0.0110	6.50		6.08	6.08	70.60
0.000308	0.00781	7.00		5.75	5.75	76.35
0.000197	0.00500	7.65		6.77	6.77	83.12
0.000077	0.00195	9.00		10.80	10.80	93.91
0.000038	0.000977	10.00		4.31	4.31	98.22
0.000019	0.000488	11.00		1.64	1.64	99.86
0.000015	0.000375	11.38		0.14	0.14	100.00
TOTALS				**100.00**	**100.00**	**100.00**

Cumulative Weight Percent greater than

Weight percent	Phi Value	Particle Size Inches	Particle Size Millimeters
5	2.68	0.0062	0.156
10	2.93	0.0052	0.131
16	3.19	0.0043	0.109
25	3.59	0.0033	0.083
40	4.36	0.0019	0.049
50	4.99	0.0012	0.031
60	5.66	0.0008	0.020
75	6.88	0.0003	0.008
84	7.76	0.0002	0.005
90	8.51	0.0001	0.003
95	9.25	0.0001	0.002

Measure	Trask	Inman	Folk-Ward
Median, phi	4.99	4.99	4.99
Median, in.	0.0012	0.0012	0.0012
Median, mm	0.031	0.031	0.031
Mean, phi	4.45	5.47	5.31
Mean, in.	0.0018	0.0009	0.0010
Mean, mm	0.046	0.022	0.025
Sorting	3.127	2.281	2.137
Skewness	0.845	0.210	0.253
Kurtosis	0.290	0.441	0.819
Grain Size Description (ASTM-USCS Scale)		Silt (based on Mean from Trask)	

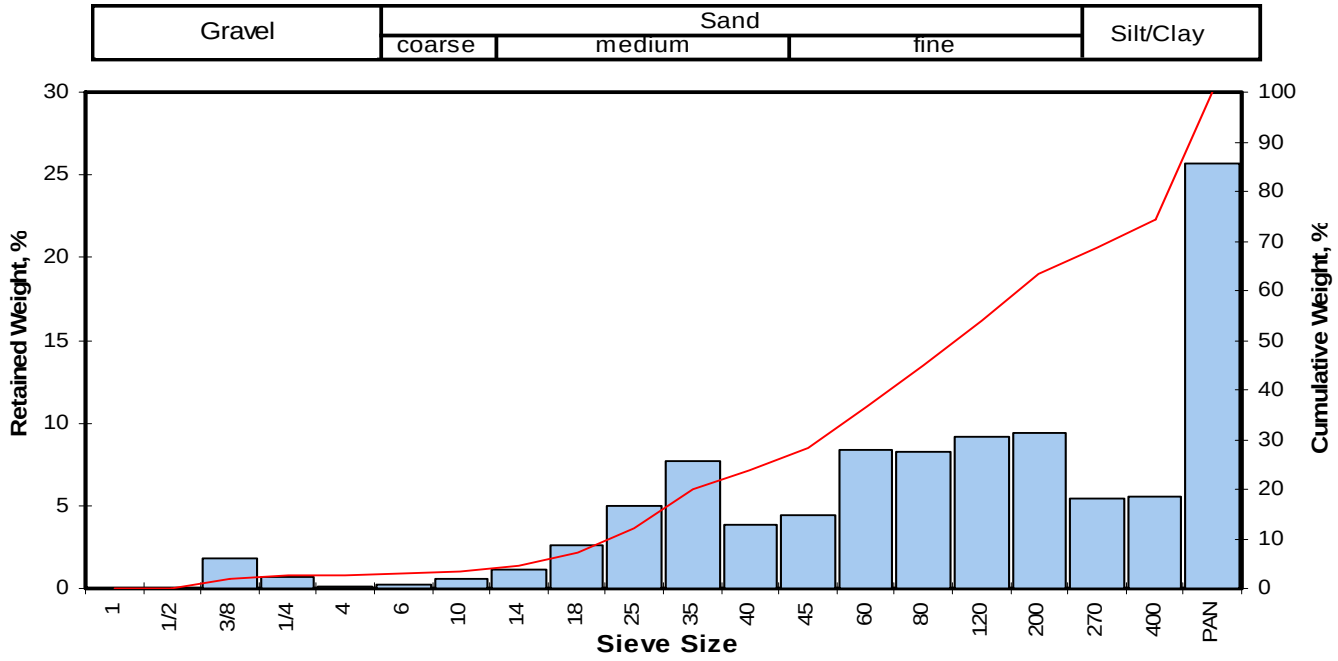
Description	Retained on Sieve #	Weight Percent
Gravel	4	0.00
Coarse Sand	10	0.00
Medium Sand	40	0.00
Fine Sand	200	28.37
Silt	>0.005 mm	54.75
Clay	<0.005 mm	16.88
	Total	**100**

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Particle Size Analysis - ASTM D422M

Client:	Tetra Tech EM Inc.	**PTS File No:**	42543
Project:	MSSC Site (Vertical Delin.)	**Sample ID:**	TTMW4001SS36
Project No:	103P172824.01	**Depth, ft:**	37.6



Opening		Phi of	U.S. Sieve	Sample Weight	Incremental Weight,	Cumulative Weight,
Inches	Millimeters	Screen	No.	grams	percent	percent
0.9844	25.002	-4.64	1	0.00	0.00	0.00
0.4922	12.501	-3.64	1/2	0.00	0.00	0.00
0.3740	9.500	-3.25	3/8	1.26	1.85	1.85
0.2500	6.351	-2.67	1/4	0.46	0.68	2.53
0.1873	4.757	-2.25	4	0.11	0.16	2.69
0.1324	3.364	-1.75	6	0.13	0.19	2.88
0.0787	2.000	-1.00	10	0.42	0.62	3.49
0.0557	1.414	-0.50	14	0.74	1.09	4.58
0.0394	1.000	0.00	18	1.76	2.58	7.16
0.0278	0.707	0.50	25	3.39	4.98	12.14
0.0197	0.500	1.00	35	5.27	7.74	19.88
0.0166	0.420	1.25	40	2.65	3.89	23.77
0.0139	0.354	1.50	45	3.02	4.43	28.20
0.0098	0.250	2.00	60	5.67	8.32	36.53
0.0070	0.177	2.50	80	5.60	8.22	44.75
0.0049	0.125	3.00	120	6.23	9.15	53.90
0.0029	0.074	3.75	200	6.38	9.37	63.27
0.0021	0.053	4.25	270	3.73	5.48	68.74
0.0015	0.037	4.75	400	3.79	5.56	74.31
			PAN	17.50	25.69	100.00
TOTALS				68.11	100.00	100.00

Cumulative Weight Percent greater than			
Weight	Phi	Particle Size	
percent	Value	Inches	Millimeters
5	-0.42	0.0526	1.337
10	0.28	0.0323	0.821
16	0.75	0.0234	0.595
25	1.32	0.0158	0.401
40	2.21	0.0085	0.216
50	2.79	0.0057	0.145
60	3.49	0.0035	0.089
75	4.62	0.0016	0.041
84			
90			
95			

Measure	Trask	Inman	Folk-Ward
Median, phi	2.79	2.79	2.79
Median, in.	0.0057	0.0057	0.0057
Median, mm	0.145	0.145	0.145
Mean, phi	2.18		
Mean, in.	0.0087		
Mean, mm	0.221		
Sorting	3.141		
Skewness	0.880		
Kurtosis			

Grain Size Description (ASTM-USCS Scale)	Fine sand (based on Mean from Trask)

Description	Retained on Sieve #	Weight Percent
Gravel	4	2.69
Coarse Sand	10	0.81
Medium Sand	40	20.28
Fine Sand	200	39.49
Silt/Clay	<200	36.73
	Total	100

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PTS File No: 42543
Client: Tetra Tech EM Inc.

PTS Laboratories

PHYSICAL PROPERTIES DATA - HYDRAULIC CONDUCTIVITY PACKAGE

PROJECT NAME: MSSC Site (Vertical Delin.)
PROJECT NO: 103P172824.01

		METHODS:	API RP 40 / ASTM D2216	API RP 40		API RP 40		API RP 40	API RP 40; EPA 9100	
									25 PSI CONFINING STRESS	
SAMPLE ID.	DEPTH, ft.	SAMPLE ORIENTATION (1)	MOISTURE CONTENT, % weight	DENSITY		POROSITY, %Vb (2)		TOTAL PORE FLUID SATURATIONS (3), % Pv	EFFECTIVE (4,5) PERMEABILITY TO WATER, millidarcy	HYDRAULIC CONDUCTIVITY (4,5), cm/s
				DRY BULK, g/cc	GRAIN, g/cc	TOTAL	AIR FILLED			
TTEW201SS42	43.65	V	21.9	1.57	2.69	41.5	7.1	82.8	4.58	4.70E-06
TTMW4001SS36	37.7	V	20.5	1.52	2.69	43.5	12.4	71.5	121	1.24E-04

(1) Sample Orientation: H = horizontal; V = vertical; R = remold (2) Total Porosity = no pore fluids in place; all interconnected pore channels; Air Filled = pore channels not occupied by pore fluids (3) Water = 0.9996 g/cc (4) Native State or Effective = With as-received pore fluids in place (5) Permeability to water and hydraulic conductivity measured at saturated conditions; Vb = Bulk Volume, cc; Pv = Pore Volume, cc; ND = Not Detected

PTS File No: 42543
Client: Tetra Tech EM Inc.

ORGANIC CARBON DATA - TOC (foc)

(METHODOLOGY: WALKLEY-BLACK)

PROJECT NAME: MSSC Site (Vertical Delin.)
PROJECT NO: 103P172824.01

SAMPLE ID.	DEPTH, ft.	ANALYSIS DATE	ANALYSIS TIME	SAMPLE MATRIX	TOTAL ORGANIC CARBON, mg/kg	FRACTION ORGANIC CARBON, g/g
TTEW201SS42	43.6	20120810	1600	SOIL	530	5.30E-04
TTMW4001SS36	37.6	20120810	1600	SOIL	750	7.50E-04
Blank	N/A	20120810	1600	BLANK	ND	ND
SRM D077-542	N/A	20120810	1600	SRM	4100	4.10E-03
				Reporting Limit:	100	1.00E-04

QC DATA

SRM ID/Lot No.	REC (%)	Control Limits	Certified Concentration mg/kg	QC Performance Acceptance Limits, mg/kg Lower	Upper
D077-542	106	75-125	3850	2888	4813

ND = Not Detected

ATTACHMENTS 1 THROUGH 6 PROVIDED ON CD

1 - Bench Scale Reports

2 - Vendor Field and Product Data

3 - Analytical Results

4 - Geotechnical Reports

5 - Cascade Injection Logs

6 - PulseOx O&M Logs

CASCADE DRILLING, L.P.
LEADERS IN SAFETY
C57-938110

INJECTION POINT FIELD LOG

CLIENT/PROJECT	TETRA TECH / MARYLAND SQUARE PCE SITE BOULEVARD MALL
INJECTANT	RemOx S, POTASSIUM PERMANGANATE
EQUIPMENT	8040 DIRECT PUSH
BORING LOCATION	PIP ZONE 26-24, TOTE 1 AND 2
INJECTION CREW	JUAN, BRIAN, ARTURO, CHRIS

DATE	TIME	DEPTH (FT)	FLOW RATE (GPM)	PEAK PRESSURE (PSI)	AVERAGE PRESSURE (PSI)	TOTAL GALLONS	RESURFACED SOLUTION (GAL)	NOTES
3/12/2013	1407	24-26	4.5		10	25	0	BEGIN PUMPING TOTE 1
	1413	24-26	5		8	25	0	
	1418	24-26	5		11	25	0	
	1423	24-26	4.2		7.5	25	0	
	1429	24-26	4		7.5	25	0	
	1434	24-26	4.2		10	25	0	
	1440	24-26	5.2		15	25	0	
	1445	24-26	5		15	25	0	
	1452	24-26	5		15	25	0	
	1457	24-26	5		15	25	0	COMPLETE TOTE 1, 250 GALLONS
								CHECK SCREEN, REDEPLOY AND PREP FOR TOTE 2
	1500							
3/12/2013	1515	24-26	5.5		7.5	25	0	BEGIN PUMPING TOTE 2
	1518	24-26	6		3	25	0	
	1522	24-26	8		5	25	0	
	1526	24-26	8		6	25	0	
	1529	24-26	8		5	25	0	
	1532	24-26	8		4	25	0	
	1535	24-26	8		3.5	25	0	
	1537	24-26	8		3.5	25	0	
	1539	24-26	8		4	25	0	
	1548	24-26	8		4	25	0	COMPLETE TOTE 2, 500 GALLONS TOTAL

CASCADE DRILLING, L.P.
LEADERS IN SAFETY
C57-938110

INJECTION POINT FIELD LOG

CLIENT/PROJECT	TETRA TECH / MARYLAND SQUARE PCE SITE BOULEVARD MALL		
INJECTANT	RemOx S , POTASSIUM PERMANGANATE		
EQUIPMENT	8040 DIRECT PUSH		
BORING LOCATION	PIP ZONE 26-24, TOTE 3 AND 4	INJECTION CREW	JUAN, BRIAN, ARTURO, CHRIS

DATE	TIME	DEPTH (FT)	FLOW RATE (GPM)	PEAK PRESSURE (PSI)	AVERAGE PRESSURE (PSI)	TOTAL GALLONS	RESURFACED SOLUTION (GAL)	NOTES
3/12/2013	1548	24-26	8		5	25	0	BEGIN PUMPING TOTE 3
	1550	24-26	8		4	25	0	
	1553	24-26	8		4	25	0	
	1556	24-26	8		4	25	0	
	1559	24-26	8		3.5	25	0	
	1602	24-26	8		4	25	0	
	1605	24-26	8		4	25	0	
	1608	24-26	8		4	25	0	
	1611	24-26	8		4	25	0	
	1616	24-26	8		4	25	0	COMPLETE TOTE 3, 750 GALLONS
3/12/2013	1617	24-26	8		4	25	0	BEGIN PUMPING TOTE 4
	1620	24-26	8		3	25	0	
	1623	24-26	8		3.5	25	0	
	1626	24-26	8.5		3.5	25	0	
	1629	24-26	8		3	25	0	
	1631	24-26	8.5		3	25	0	
	1634	24-26	8.5		2.5	25	0	
	1637	24-26	8.5		2.5	25	0	
	1639	24-26	8.5		2.5	25	0	
	1646	24-26	8.5		2.5	25	0	
	1648	24-26	8.5		2.5	25	0	
	1650	24-26	8.5		2.5	25	0	COMPLETE TOTE 4, 1050 GALLONS TOTAL

CASCADE DRILLING, L.P.
LEADERS IN SAFETY
C57-938110

INJECTION POINT FIELD LOG

CLIENT/PROJECT	TETRA TECH / MARYLAND SQUARE PCE SITE BOULEVARD MALL		
INJECTANT	RemOx S, POTASSIUM PERMANGANATE		
EQUIPMENT	8040 DIRECT PUSH		
BORING LOCATION	PIP ZONE 28-26, TOTE 1 AND TOTE 2	INJECTION CREW	JUAN, BRIAN, ARTURO, CHRIS

DATE	TIME	DEPTH (FT)	FLOW RATE (GPM)	PEAK PRESSURE (PSI)	AVERAGE PRESSURE (PSI)	TOTAL GALLONS	RESURFACED SOLUTION (GAL)	NOTES
3/13/2013	0755	26-28	8.5		5	25	0	BEGIN PUMPING TOTE 1
	0800	26-28	10		5	25	0	
	0802	26-28	10		5	25	0	
	0804	26-28	10		5	25	0	
	0807	26-28	10		4	25	0	
	0809	26-28	10		2.5	25	0	
	0812	26-28	10		3	25	0	
	0815	26-28	10		3	25	0	
	0817	26-28	10		3	25	0	
	0822	26-28	10		3	25	0	COMPLETE TOTE 1, 250 GALLONS TOTAL
3/13/2013	0823	26-28	10		6	25	0	BEGIN TOTE 2
	0825	26-28	10		6	25	0	
	0827	26-28	10		5	25	0	
	0830	26-28	10		3	25	0	
	0832	26-28	10		3.5	25	0	
	0835	26-28	10		3.5	25	0	
	0837	26-28	10		3.5	25	0	
	0840	26-28	10		2.5	25	0	
	0842	26-28	10		2	25	0	
	0847	26-28	10		2.5	25	0	COMPLETE TOTE 2, 500 GALLONS TOTAL

CASCADE DRILLING, L.P.
LEADERS IN SAFETY
C57-938110

INJECTION POINT FIELD LOG

CLIENT/PROJECT	TETRA TECH / MARYLAND SQUARE PCE SITE BOULEVARD MALL		
INJECTANT	RemOx S, POTASSIUM PERMANGANATE		
EQUIPMENT	8040 DIRECT PUSH		
BORING LOCATION	PIP ZONE 28-26, TOTE 3 AND TOTE 4	INJECTION CREW	JUAN, BRIAN, ARTURO, CHRIS

DATE	TIME	DEPTH (FT)	FLOW RATE (GPM)	PEAK PRESSURE (PSI)	AVERAGE PRESSURE (PSI)	TOTAL GALLONS	RESURFACED SOLUTION (GAL)	NOTES
3/13/2013	0848	26-28	9.9		5	25	0	BEGIN PUMPING TOTE 3
	0851	26-28	10		4.5	25	0	
	0853	26-28	10		4.5	25	0	
	0855	26-28	10		4.5	25	0	
	0858	26-28	10		4.5	25	0	
	0901	26-28	10		4.5	25	0	
	0904	26-28	10		4.5	25	0	
	0906	26-28	10		4.5	25	0	
	0908	26-28	10		4.5	25	0	
	0913	26-28	10		4.5	25	0	COMPLETE TOTE 3 , 750 GALLONS TOTAL
3/13/2013	0914	26-28	10		4.5	25	0	BEGIN TOTE 4
	0916	26-28	9.8		4.5	25	0	
	0919	26-28	9.8		4.5	25	0	
	0921	26-28	9.8		4.5	25	0	
	0923	26-28	9.8		4.5	25	0	
	0925	26-28	9.8		4.5	25	0	
	0930	26-28	9.8		4.5	25	0	
	0932	26-28	9.8		4.5	25	0	
	0934	26-28	9.8		4.5	25	0	
	0939	26-28	9.8		4.5	25	0	
	0940	26-28	9.8		4.5	25	0	
	0942	26-28	9.8		4.5	25	0	COMPLETE TOTE 4, 1050 GALLONS TOTAL

CASCADE DRILLING, L.P.
LEADERS IN SAFETY
C57-938110

INJECTION POINT FIELD LOG

CLIENT/PROJECT	**TETRA TECH / MARYLAND SQUARE PCE SITE BOULEVARD MALL**
INJECTANT	RemOx S , POTASSIUM PERMANGANATE
EQUIPMENT	8040 DIRECT PUSH
BORING LOCATION	PIP ZONE 40-42, TOTE 1 AND TOTE 2
INJECTION CREW	JUAN, BRIAN, ARTURO

DATE	TIME	DEPTH (FT)	FLOW RATE (GPM)	PEAK PRESSURE (PSI)	AVERAGE PRESSURE (PSI)	TOTAL GALLONS	RESURFACED SOLUTION (GAL)	NOTES
3/18/2013	0804	40-42	4		22	25	0	BEGIN PUMPING TOTE 1
	0809	40-42	4		22	25	0	
	0815	40-42	3.6		20	25	0	
	0822	40-42	3.6		20	25	0	
	0827	40-42	3.5		20	25	0	
	0834	40-42	5		30	25	0	
	0839	40-42	5		30	25	0	
	0845	40-42	4.8		28	25	0	
	0850	40-42	4.8		30	25	0	
	0854	40-42	4.6		30	25	0	COMPLETE TOTE 1 , 250 GALLONS TOTAL
3/18/2013	0859	40-42	4		30	25	0	BEGIN TOTE 2
	0906	40-42	3		30	25	0	
	0914	40-42	3.2		30	25	0	
	0920	40-42	3.3		30	25	0	
	0927	40-42	3.3		30	25	0	
	0935	40-42	3		30	25	0	
	0942	40-42	3		30	25	0	
	0950	40-42	2.4		30	25	0	
	0959	40-42	2.4		30	25	0	
	1007	40-42	2.2		30	25	0	COMPLETE TOTE 2, 500 GALLONS TOTAL

CASCADE DRILLING, L.P.
LEADERS IN SAFETY
C57-938110

INJECTION POINT FIELD LOG

CLIENT/PROJECT	**TETRA TECH / MARYLAND SQUARE PCE SITE BOULEVARD MALL**
INJECTANT	RemOx S , POTASSIUM PERMANGANATE
EQUIPMENT	8040 DIRECT PUSH
BORING LOCATION	PIP ZONE 40-42, TOTE 3 AND TOTE 4
INJECTION CREW	JUAN, BRIAN, ARTURO

DATE	TIME	DEPTH (FT)	FLOW RATE (GPM)	PEAK PRESSURE (PSI)	AVERAGE PRESSURE (PSI)	TOTAL GALLONS	RESURFACED SOLUTION (GAL)	NOTES
3/18/2013	1016	40-42	2		30	25	0	BEGIN PUMPING TOTE 3
	1032	40-42	1		30	25	0	
	1150	40-42	6.8		9	25	0	pull screen and replace
	1156	40-42	6.8		10	25	0	
	1200	40-42	7.2		10	25	0	
	1204	40-42	7.2		10	25	0	
	1207	40-42	7.2		10	25	0	
	1210	40-42	7.2		10	25	0	
	1213	40-42	7.2		10	25	0	
	1216	40-42	7.2		10	25	0	COMPLETE TOTE 3 , 750 GALLONS TOTAL
3/18/2013	1219	40-42	7.2		10	25	0	BEGIN TOTE 4
	1224	40-42	7.3		10	25	0	
	1227	40-42	10		13	25	0	
	1230	40-42	10		14	25	0	
	1233	40-42	10		14	25	0	
	1236	40-42	10		14	25	0	
	1239	40-42	10		14	25	0	
	1241	40-42	10		13	25	0	
	1243	40-42	10		13	25	0	
	1245	40-42	10		13	25	0	
	1248	40-42	8.8		12.5	25	0	
	1251	40-42	10		10	25	0	COMPLETE TOTE 4, 1050 GALLONS TOTAL

CASCADE DRILLING, L.P.
LEADERS IN SAFETY
C57-938110

INJECTION POINT FIELD LOG

CLIENT/PROJECT	**TETRA TECH / MARYLAND SQUARE PCE SITE BOULEVARD MALL**
INJECTANT	RemOx S , POTASSIUM PERMANGANATE
EQUIPMENT	8040 DIRECT PUSH
BORING LOCATION	PIP ZONE 42-44, TOTE 1 AND TOTE 2
INJECTION CREW	JUAN, BRIAN, ARTURO

DATE	TIME	DEPTH (FT)	FLOW RATE (GPM)	PEAK PRESSURE (PSI)	AVERAGE PRESSURE (PSI)	TOTAL GALLONS	RESURFACED SOLUTION (GAL)	NOTES
3/18/2013	1309	42-44	10		17	25	0	BEGIN PUMPING TOTE 1
	1311	42-44	10		17	25	0	
	1314	42-44	10		17	25	0	
	1316	42-44	10		17	25	0	
	1319	42-44	10		17	25	0	
	1321	42-44	10		16	25	0	
	1323	42-44	10		16	25	0	
	1326	42-44	10		14	25	0	
	1328	42-44	10		14	25	0	
	1330	42-44	10		13	25	0	COMPLETE TOTE 1 , 250 GALLONS TOTAL
3/18/2013	1332	42-44	10		13	25	0	BEGIN TOTE 2
	1335	42-44	10		13	25	0	
	1338	42-44	8.5		10	25	0	
	1341	42-44	8.5		12	25	0	
	1345	42-44	10		12	25	0	
	1348	42-44	10		14	25	0	
	1350	42-44	10		14	25	0	
	1353	42-44	10		14	25	0	
	1355	42-44	10		14	25	0	
	1357	42-44	10		14	25	0	COMPLETE TOTE 2, 500 GALLONS TOTAL

CASCADE DRILLING, L.P.
LEADERS IN SAFETY
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INJECTION POINT FIELD LOG

CLIENT/PROJECT	**TETRA TECH / MARYLAND SQUARE PCE SITE BOULEVARD MALL**
INJECTANT	RemOx S , POTASSIUM PERMANGANATE
EQUIPMENT	8040 DIRECT PUSH
BORING LOCATION	PIP ZONE 42-44, TOTE 3 AND TOTE 4
INJECTION CREW	JUAN, BRIAN, ARTURO

DATE	TIME	DEPTH (FT)	FLOW RATE (GPM)	PEAK PRESSURE (PSI)	AVERAGE PRESSURE (PSI)	TOTAL GALLONS	RESURFACED SOLUTION (GAL)	NOTES
3/18/2013	1401	42-44	10		25	25	0	BEGIN PUMPING TOTE 3
	1405	42-44	10		25	25	0	
	1408	42-44	10		25	25	0	
	1410	42-44	10		25	25	0	
	1412	42-44	10		25	25	0	
	1414	42-44	10		25	25	0	
	1417	42-44	10		25	25	0	
	1419	42-44	10		25	25	0	
	1421	42-44	10		25	25	0	
	1424	42-44	10		25	25	0	COMPLETE TOTE 3 , 750 GALLONS TOTAL
3/18/2013	1426	42-44	10		25	25	0	BEGIN TOTE 4
	1429	42-44	10		25	25	0	
	1431	42-44	10		25	25	0	
	1434	42-44	10		25	25	0	
	1437	42-44	10		25	25	0	
	1440	42-44	10		25	25	0	
	1443	42-44	10		25	25	0	
	1446	42-44	10		25	25	0	
	1449	42-44	10		25	25	0	
	1452	42-44	10		25	25	0	
	1455	42-44	10		25	25	0	
	1457	42-44	10		25	25	0	COMPLETE TOTE 4, 1050 GALLONS TOTAL

CASCADE DRILLING, L.P.
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INJECTION POINT FIELD LOG

CLIENT/PROJECT	**TETRA TECH / MARYLAND SQUARE PCE SITE BOULEVARD MALL**
INJECTANT	RemOx S , POTASSIUM PERMANGANATE
EQUIPMENT	8040 DIRECT PUSH
BORING LOCATION	PIP ZONE 44-46, TOTE 3 AND TOTE 4
INJECTION CREW	JUAN, BRIAN, ARTURO

DATE	TIME	DEPTH (FT)	FLOW RATE (GPM)	PEAK PRESSURE (PSI)	AVERAGE PRESSURE (PSI)	TOTAL GALLONS	RESURFACED SOLUTION (GAL)	NOTES
3/18/2013	1604	44-46	7.5		15	25	0	BEGIN PUMPING TOTE 3
	1608	44-46	7.5		15	25	0	
	1611	44-46	7.5		15	25	0	
	1614	44-46	7.5		15	25	0	
	1617	44-46	7.5		15	25	0	
	1619	44-46	7.5		15	25	0	
	1622	44-46	7.5		15	25	0	
	1624	44-46	7.5		15	25	0	
	1627	44-46	7.5		15	25	0	
	1629	44-46	7.5		15	25	0	COMPLETE TOTE 3 , 750 GALLONS TOTAL
3/18/2013	1631	44-46	7.5		16	25	0	BEGIN TOTE 4
	1634	44-46	10		20	25	0	
	1637	44-46	10		20	25	0	
	1639	44-46	10		19	25	0	
	1642	44-46	10		18	25	0	
	1644	44-46	10		18	25	0	
	1647	44-46	10		20	25	0	
	1649	44-46	10		20	25	0	
	1651	44-46	10		20	25	0	
	1653	44-46	8.5		20	25	0	
	1656	44-46	8.5		20	25	0	
	1658	44-46	8.5		20	25	0	COMPLETE TOTE 4, 1050 GALLONS TOTAL

CASCADE DRILLING, L.P.
LEADERS IN SAFETY
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INJECTION POINT FIELD LOG

CLIENT/PROJECT	**TETRA TECH / MARYLAND SQUARE PCE SITE BOULEVARD MALL**
INJECTANT	RemOx S , POTASSIUM PERMANGANATE
EQUIPMENT	8040 DIRECT PUSH
BORING LOCATION	PIP ZONE 46-48, TOTE 1 AND TOTE 2
INJECTION CREW	JUAN, BRIAN, ARTURO

DATE	TIME	DEPTH (FT)	FLOW RATE (GPM)	PEAK PRESSURE (PSI)	AVERAGE PRESSURE (PSI)	TOTAL GALLONS	RESURFACED SOLUTION (GAL)	NOTES
3/19/2013	0757	46-48	8.5		26	25	0	BEGIN PUMPING TOTE 1
	0800	46-48	8.5		27	25	0	
	0803	46-48	8.5		26	25	0	
	0806	46-48	8.5		26	25	0	
	0809	46-48	8.5		26	25	0	
	0812	46-48	8.5		26	25	0	
	0814	46-48	8.5		25	25	0	
	0817	46-48	8.5		24	25	0	
	0819	46-48	8.5		24	25	0	
	0821	46-48	8.5		24	25	0	COMPLETE TOTE 1 , 250 GALLONS TOTAL
3/19/2013	0824	46-48	7.5		23	25	0	BEGIN TOTE 2
	0827	46-48	7		26	25	0	
	0829	46-48	7.5		27	25	0	
	0832	46-48	7.5		28	25	0	
	0835	46-48	7.5		27	25	0	
	0837	46-48	7.5		26	25	0	
	0839	46-48	7.5		24	25	0	
	0842	46-48	7.5		24	25	0	
	0844	46-48	7.5		24	25	0	
	0846	46-48	7.5		22	25	0	COMPLETE TOTE 2, 500 GALLONS TOTAL

CASCADE DRILLING, L.P.
LEADERS IN SAFETY
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INJECTION POINT FIELD LOG

CLIENT/PROJECT	**TETRA TECH / MARYLAND SQUARE PCE SITE BOULEVARD MALL**
INJECTANT	RemOx S , POTASSIUM PERMANGANATE
EQUIPMENT	8040 DIRECT PUSH
BORING LOCATION	PIP ZONE 46-48, TOTE 3 AND TOTE 4
INJECTION CREW	JUAN, BRIAN, ARTURO

DATE	TIME	DEPTH (FT)	FLOW RATE (GPM)	PEAK PRESSURE (PSI)	AVERAGE PRESSURE (PSI)	TOTAL GALLONS	RESURFACED SOLUTION (GAL)	NOTES
3/19/2013	0849	46-48	7.5		22	25	0	BEGIN PUMPING TOTE 3
	0851	46-48	7.5		22	25	0	
	0853	46-48	6		22	25	0	
	0858	46-48	7.5		22	25	0	
	0900	46-48	7.5		23	25	0	
	0902	46-48	7.5		27	25	0	
	0906	46-48	7.5		27	25	0	
	0909	46-48	7.5		26	25	0	
	0912	46-48	7.5		26	25	0	
	0914	46-48	7.5		26	25	0	COMPLETE TOTE 3 , 750 GALLONS TOTAL
3/19/2013	0917	46-48	7.5		22	25	0	BEGIN TOTE 4
	0920	46-48	6		22	25	0	
	0923	46-48	6		22	25	0	
	0926	46-48	6		22	25	0	
	0929	46-48	6		22	25	0	
	0932	46-48	5.5		27	25	0	
	0936	46-48	5.5		27	25	0	
	0938	46-48	6		30	25	0	
	0940	46-48	6		30	25	0	
	0943	46-48	6		30	25	0	
	0946	46-48	6		27	25	0	
	0948	46-48	5		27	25	0	COMPLETE TOTE 4, 1050 GALLONS TOTAL

CASCADE DRILLING, L.P.
LEADERS IN SAFETY
C57-938110

INJECTION POINT FIELD LOG

CLIENT/PROJECT	**TETRA TECH / MARYLAND SQUARE PCE SITE BOULEVARD MALL**
INJECTANT	RemOx S , POTASSIUM PERMANGANATE
EQUIPMENT	8040 DIRECT PUSH
BORING LOCATION	PIP ZONE 48-50, TOTE 1 AND TOTE 2
INJECTION CREW	JUAN, BRIAN, ARTURO

DATE	TIME	DEPTH (FT)	FLOW RATE (GPM)	PEAK PRESSURE (PSI)	AVERAGE PRESSURE (PSI)	TOTAL GALLONS	RESURFACED SOLUTION (GAL)	NOTES
3/19/2013	1028	48-50	7.5		14	25	0	BEGIN PUMPING TOTE 1
	1032	48-50	6.6		13	25	0	
	1036	48-50	10		26	25	0	
	1038	48-50	10		26	25	0	
	1040	48-50	10		26	25	0	
	1043	48-50	10		25	25	0	
	1045	48-50	10		25	25	0	
	1048	48-50	10		25	25	0	
	1050	48-50	10		25	25	0	
	1052	48-50	10		25	25	0	COMPLETE TOTE 1 , 250 GALLONS TOTAL
3/19/2013	1055	48-50	8.5		23	25	0	BEGIN TOTE 2
	1058	48-50	8.5		24	25	0	
	1100	48-50	10		25	25	0	
	1103	48-50	8.5		25	25	0	
	1106	48-50	8.5		25	25	0	
	1108	48-50	8.5		25	25	0	
	1110	48-50	8.5		25	25	0	
	1113	48-50	8.5		25	25	0	
	1115	48-50	8.5		24	25	0	
	1118	48-50	8.5		24	25	0	COMPLETE TOTE 2, 500 GALLONS TOTAL

CASCADE DRILLING, L.P.
LEADERS IN SAFETY
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INJECTION POINT FIELD LOG

CLIENT/PROJECT	**TETRA TECH / MARYLAND SQUARE PCE SITE BOULEVARD MALL**
INJECTANT	RemOx S , POTASSIUM PERMANGANATE
EQUIPMENT	8040 DIRECT PUSH
BORING LOCATION	PIP ZONE 48-50, TOTE 3 AND TOTE 4
INJECTION CREW	JUAN, BRIAN, ARTURO

DATE	TIME	DEPTH (FT)	FLOW RATE (GPM)	PEAK PRESSURE (PSI)	AVERAGE PRESSURE (PSI)	TOTAL GALLONS	RESURFACED SOLUTION (GAL)	NOTES
3/19/2013	1120	48-50	8.5		28	25	0	BEGIN PUMPING TOTE 3
	1123	48-50	8.5		30	25	0	
	1125	48-50	8.5		27	25	0	
	1128	48-50	7.5		27	25	0	
	1130	48-50	7.5		26	25	0	
	1132	48-50	7.5		26	25	0	
	1134	48-50	7.5		26	25	0	
	1137	48-50	7.5		27	25	0	
	1140	48-50	6		26	25	0	
	1144	48-50	6		22	25	0	COMPLETE TOTE 3 , 750 GALLONS TOTAL
3/19/2013	1150	48-50	10		29	25	0	BEGIN TOTE 4
	1152	48-50	10		30	25	0	
	1154	48-50	8.5		30	25	0	
	1157	48-50	8.5		30	25	0	
	1200	48-50	10		30	25	0	
	1202	48-50	10		30	25	0	
	1204	48-50	8.5		30	25	0	
	1206	48-50	8.5		26	25	0	
	1209	48-50	6		21	25	0	
	1213	48-50	8.5		30	25	0	
	1216	48-50	8.5		30	25	0	
	1219	48-50	8.5		30	25	0	COMPLETE TOTE 4, 1050 GALLONS TOTAL

CASCADE DRILLING, L.P.
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INJECTION POINT FIELD LOG

CLIENT/PROJECT	**TETRA TECH / MARYLAND SQUARE PCE SITE BOULEVARD MALL**
INJECTANT	RemOx S , POTASSIUM PERMANGANATE
EQUIPMENT	8040 DIRECT PUSH

BORING LOCATION	PIP ZONE 50-52, TOTE 1 AND TOTE 2	INJECTION CREW	JUAN, BRIAN, ARTURO

DATE	TIME	DEPTH (FT)	FLOW RATE (GPM)	PEAK PRESSURE (PSI)	AVERAGE PRESSURE (PSI)	TOTAL GALLONS	RESURFACED SOLUTION (GAL)	NOTES
3/19/2013	1306	50-52	7.5		28	25	0	BEGIN PUMPING TOTE 1
	1310	50-52	7.5		25	25	0	
	1314	50-52	7.5		28	25	0	
	1317	50-52	7.5		28	25	0	
	1321	50-52	7.7		28	25	0	
	1324	50-52	7.7		28	25	0	
	1327	50-52	7.7		28	25	0	
	1330	50-52	7.8		28	25	0	
	1333	50-52	7.9		21	25	0	
	1337	50-52	7.9		25	25	0	COMPLETE TOTE 1 , 250 GALLONS TOTAL
3/19/2013	1342	50-52	7		25	25	0	BEGIN TOTE 2
	1346	50-52	7		25	25	0	
	1350	50-52	7.5		25	25	0	
	1352	50-52	7.5		25	25	0	
	1354	50-52	7.5		25	25	0	
	1357	50-52	7.5		25	25	0	
	1401	50-52	7.5		25	25	0	
	1405	50-52	7.5		25	25	0	
	1408	50-52	7.5		25	25	0	
	1411	50-52	7.5		25	25	0	COMPLETE TOTE 2, 500 GALLONS TOTAL

CASCADE DRILLING, L.P.
LEADERS IN SAFETY
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INJECTION POINT FIELD LOG

CLIENT/PROJECT	**TETRA TECH / MARYLAND SQUARE PCE SITE BOULEVARD MALL**
INJECTANT	RemOx S , POTASSIUM PERMANGANATE
EQUIPMENT	8040 DIRECT PUSH
BORING LOCATION	PIP ZONE 50-52, TOTE 3 AND TOTE 4
INJECTION CREW	JUAN, BRIAN, ARTURO

DATE	TIME	DEPTH (FT)	FLOW RATE (GPM)	PEAK PRESSURE (PSI)	AVERAGE PRESSURE (PSI)	TOTAL GALLONS	RESURFACED SOLUTION (GAL)	NOTES
3/19/2013	1415	50-52	7.5		30	25	0	BEGIN PUMPING TOTE 3
	1418	50-52	7.5		30	25	0	
	1421	50-52	7.5		30	25	0	
	1429	50-52	7.5		30	25	0	
	1432	50-52	7.5		30	25	0	
	1435	50-52	7.5		30	25	0	
	1440	50-52	7.5		30	25	0	
	1442	50-52	7.5		30	25	0	
	1446	50-52	7.5		30	25	0	
	1144	50-52	7.5		30	25	0	COMPLETE TOTE 3 , 750 GALLONS TOTAL
3/19/2013	1450	50-52	6.7		30	25	0	BEGIN TOTE 4
	1453	50-52	5		30	25	0	
	1458	50-52	5		30	25	0	
	1503	50-52	5		30	25	0	
	1508	50-52	5		30	25	0	
	1513	50-52	5		30	25	0	
	1518	50-52	4.6		30	25	0	
	1525	50-52	4.6		30	25	0	
	1529	50-52	4.6		30	25	0	
	1534	50-52	4.6		30	25	0	
	1540	50-52	4.5		30	25	0	
	1545	50-52	4.5		30	25	0	COMPLETE TOTE 4, 1050 GALLONS TOTAL

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INJECTION POINT FIELD LOG

CLIENT/PROJECT	**TETRA TECH / MARYLAND SQUARE PCE SITE BOULEVARD MALL**
INJECTANT	RemOx S , POTASSIUM PERMANGANATE
EQUIPMENT	8040 DIRECT PUSH
BORING LOCATION	PIP ZONE 52-54, TOTE 1 AND TOTE 2
INJECTION CREW	JUAN, BRIAN, ARTURO

DATE	TIME	DEPTH (FT)	FLOW RATE (GPM)	PEAK PRESSURE (PSI)	AVERAGE PRESSURE (PSI)	TOTAL GALLONS	RESURFACED SOLUTION (GAL)	NOTES
3/20/2013	0756	52-54	7		28	25	0	BEGIN PUMPING TOTE 1
	0759	52-54	6.6		27	25	0	
	0803	52-54	6.6		25	25	0	
	0806	52-54	6.6		29	25	0	
	0810	52-54	6.6		25	25	0	
	0813	52-54	6.6		27	25	0	
	0817	52-54	6.6		27	25	0	
	0821	52-54	6.6		27	25	0	
	0824	52-54	7		28	25	0	
	0827	52-54	7		30	25	0	COMPLETE TOTE 1 , 250 GALLONS TOTAL
3/20/2013	0830	52-54	6.6		30	25	0	BEGIN TOTE 2
	0834	52-54	6.6		30	25	0	
	0838	52-54	6.6		30	25	0	
	0842	52-54	6.6		30	25	0	
	0846	52-54	6.6		30	25	0	
	0850	52-54	6.6		30	25	0	
	0854	52-54	6.6		30	25	0	
	0857	52-54	6.6		30	25	0	
	0900	52-54	6		28	25	0	
	0904	52-54	6		28	25	0	COMPLETE TOTE 2, 500 GALLONS TOTAL

CASCADE DRILLING, L.P.
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INJECTION POINT FIELD LOG

CLIENT/PROJECT	**TETRA TECH / MARYLAND SQUARE PCE SITE BOULEVARD MALL**
INJECTANT	RemOx S , POTASSIUM PERMANGANATE
EQUIPMENT	8040 DIRECT PUSH
BORING LOCATION	PIP ZONE 52-54, TOTE 3 AND TOTE 4
INJECTION CREW	JUAN, BRIAN, ARTURO

DATE	TIME	DEPTH (FT)	FLOW RATE (GPM)	PEAK PRESSURE (PSI)	AVERAGE PRESSURE (PSI)	TOTAL GALLONS	RESURFACED SOLUTION (GAL)	NOTES
3/20/2013	0908	52-54	6		30	25	0	BEGIN PUMPING TOTE 3
	0912	52-54	6		30	25	0	
	0916	52-54	6		27	25	0	
	0920	52-54	6		27	25	0	
	0925	52-54	6		30	25	0	
	0929	52-54	6		30	25	0	
	0933	52-54	6		30	25	0	
	0938	52-54	6		29	25	0	
	0943	52-54	6		29	25	0	
	0948	52-54	6		29	25	0	COMPLETE TOTE 3 , 750 GALLONS TOTAL
3/20/2013	0951	52-54	6		30	25	0	BEGIN TOTE 4
	0955	52-54	5.7		30	25	0	
	0959	52-54	5.7		30	25	0	
	1003	52-54	5.5		30	25	0	
	1008	52-54	5.5		30	25	0	
	1013	52-54	5.5		30	25	0	
	1017	52-54	5.5		30	25	0	
	1022	52-54	5.5		30	25	0	
	1027	52-54	5		30	25	0	
	1031	52-54	5		30	25	0	
	1036	52-54	5		30	25	0	
	1041	52-54	5		30	25	0	COMPLETE TOTE 4, 1050 GALLONS TOTAL

CASCADE DRILLING, L.P.
LEADERS IN SAFETY
C57-938110

INJECTION POINT FIELD LOG

CLIENT/PROJECT	**TETRA TECH / MARYLAND SQUARE PCE SITE BOULEVARD MALL**
INJECTANT	RemOx S , POTASSIUM PERMANGANATE
EQUIPMENT	8040 DIRECT PUSH
BORING LOCATION	PIP ZONE 54-56, TOTE 1 AND TOTE 2
INJECTION CREW	JUAN, BRIAN, ARTURO

DATE	TIME	DEPTH (FT)	FLOW RATE (GPM)	PEAK PRESSURE (PSI)	AVERAGE PRESSURE (PSI)	TOTAL GALLONS	RESURFACED SOLUTION (GAL)	NOTES
3/20/2013	1056	54-56	6.6		30	25	0	BEGIN PUMPING TOTE 1
	1101	54-56	6.6		30	25	0	
	1104	54-56	6.6		30	25	0	
	1108	54-56	6.6		30	25	0	
	1113	54-56	6.6		30	25	0	
	1117	54-56	6.6		30	25	0	
	1121	54-56	6.6		30	25	0	
	1124	54-56	6.6		30	25	0	
	1128	54-56	6.6		30	25	0	
	1132	54-56	6.6		30	25	0	COMPLETE TOTE 1 , 250 GALLONS TOTAL
3/20/2013	1136	54-56	6.6		30	25	0	BEGIN TOTE 2
	1143	54-56	6.3		30	25	0	
	1148	54-56	6.3		30	25	0	
	1152	54-56	6.3		30	25	0	
	1155	54-56	6		30	25	0	
	1159	54-56	6		30	25	0	
	1203	54-56	6		30	25	0	
	1207	54-56	6		30	25	0	
	1211	54-56	6		30	25	0	
	1215	54-56	6		30	25	0	COMPLETE TOTE 2, 500 GALLONS TOTAL

CASCADE DRILLING, L.P.
LEADERS IN SAFETY
C57-938110

INJECTION POINT FIELD LOG

CLIENT/PROJECT	**TETRA TECH / MARYLAND SQUARE PCE SITE BOULEVARD MALL**
INJECTANT	RemOx S , POTASSIUM PERMANGANATE
EQUIPMENT	8040 DIRECT PUSH
BORING LOCATION	PIP ZONE 54-56, TOTE 3 AND TOTE 4
INJECTION CREW	JUAN, BRIAN, ARTURO

DATE	TIME	DEPTH (FT)	FLOW RATE (GPM)	PEAK PRESSURE (PSI)	AVERAGE PRESSURE (PSI)	TOTAL GALLONS	RESURFACED SOLUTION (GAL)	NOTES
3/20/2013	1219	54-56	6		30	25	0	BEGIN PUMPING TOTE 3
	1223	54-56	6		30	25	0	
	1228	54-56	5.2		30	25	0	
	1233	54-56	5.2		30	25	0	
	1238	54-56	5.2		30	25	0	
	1243	54-56	4.2		30	25	0	
	1249	54-56	4.2		30	25	0	
	1254	54-56	4.2		30	25	0	
	1259	54-56	4.2		30	25	0	
	1304	54-56	4.2		30	25	0	COMPLETE TOTE 3 , 750 GALLONS TOTAL
3/20/2013	1309	54-56	4.2		30	25	0	BEGIN TOTE 4
	1316	54-56	4		30	25	0	
	1324	54-56	4		30	25	0	
	1331	54-56	4		30	25	0	
	1339	54-56	4		30	25	0	
	1343	54-56	4		30	25	0	
	1350	54-56	4		30	25	0	
	1355	54-56	4		30	25	0	
	1401	54-56	4		30	25	0	
	1408	54-56	4		30	25	0	
	1413	54-56	4		30	25	0	
	1419	54-56	4		25	25	0	COMPLETE TOTE 4, 1050 GALLONS TOTAL

CASCADE DRILLING, L.P.
LEADERS IN SAFETY
C57-938110

INJECTION POINT FIELD LOG

CLIENT/PROJECT	**TETRA TECH / MARYLAND SQUARE PCE SITE BOULEVARD MALL**		
INJECTANT	RemOx S , POTASSIUM PERMANGANATE		
EQUIPMENT	8040 DIRECT PUSH		
BORING LOCATION	PIP ZONE 56-58, TOTE 1 AND TOTE 2	INJECTION CREW	JUAN, BRIAN, ARTURO

DATE	TIME	DEPTH (FT)	FLOW RATE (GPM)	PEAK PRESSURE (PSI)	AVERAGE PRESSURE (PSI)	TOTAL GALLONS	RESURFACED SOLUTION (GAL)	NOTES
3/20/2013	1438	56-58	6		30	25	0	BEGIN PUMPING TOTE 1
	1442	56-58	6.6		30	25	0	
	1446	56-58	6.6		30	25	0	
	1449	56-58	6.6		30	25	0	
	1453	56-58	6.6		30	25	0	
	1457	56-58	6.6		30	25	0	
	1501	56-58	6.6		30	25	0	
	1505	56-58	6.6		30	25	0	
	1509	56-58	6.6		26	25	0	
	1513	56-58	6.6		26	25	0	COMPLETE TOTE 1 , 250 GALLONS TOTAL
3/20/2013	1516	56-58	6.6		30	25	0	BEGIN TOTE 2
	1520	56-58	6.6		30	25	0	
	1523	56-58	6.6		30	25	0	
	1527	56-58	6.6		30	25	0	
	1531	56-58	6		30	25	0	
	1534	56-58	6		30	25	0	
	1537	56-58	6		30	25	0	
	1541	56-58	6		30	25	0	
	1545	56-58	6		30	25	0	
	1550	56-58	6		30	25	0	COMPLETE TOTE 2, 500 GALLONS TOTAL

CASCADE DRILLING, L.P.
LEADERS IN SAFETY
C57-938110

INJECTION POINT FIELD LOG

CLIENT/PROJECT	**TETRA TECH / MARYLAND SQUARE PCE SITE BOULEVARD MALL**
INJECTANT	RemOx S , POTASSIUM PERMANGANATE
EQUIPMENT	8040 DIRECT PUSH
BORING LOCATION	PIP ZONE 56-58, TOTE 3 AND TOTE 4
INJECTION CREW	JUAN, BRIAN, ARTURO

DATE	TIME	DEPTH (FT)	FLOW RATE (GPM)	PEAK PRESSURE (PSI)	AVERAGE PRESSURE (PSI)	TOTAL GALLONS	RESURFACED SOLUTION (GAL)	NOTES
3/20/2013	1554	56-58	6		30	25	0	BEGIN PUMPING TOTE 3
	1558	56-58	6		30	25	0	
	1602	56-58	6.6		30	25	0	
	1606	56-58	6.6		30	25	0	
	1610	56-58	6.6		30	25	0	
	1613	56-58	6.6		30	25	0	
	1617	56-58	6.6		30	25	0	
	1621	56-58	6.6		30	25	0	
	1625	56-58	6.6		30	25	0	
	1629	56-58	6.6		30	25	0	COMPLETE TOTE 3 , 750 GALLONS TOTAL
3/20/2013	1633	56-58	6		30	25	0	BEGIN TOTE 4
	1638	56-58	6		30	25	0	
	1642	56-58	6		30	25	0	
	1646	56-58	6		30	25	0	
	1650	56-58	6		30	25	0	
	1655	56-58	6		30	25	0	
	1700	56-58	6		30	25	0	
	1705	56-58	6		30	25	0	
	1709	56-58	6		30	25	0	
	1713	56-58	6		30	25	0	
	1717	56-58	6		30	25	0	
	1721	56-58	6		30	25	0	COMPLETE TOTE 4, 1050 GALLONS TOTAL

CASCADE DRILLING, L.P.
LEADERS IN SAFETY
C57-938110

INJECTION POINT FIELD LOG

CLIENT/PROJECT	**TETRA TECH / MARYLAND SQUARE PCE SITE BOULEVARD MALL**
INJECTANT	RemOx S , POTASSIUM PERMANGANATE
EQUIPMENT	8040 DIRECT PUSH
BORING LOCATION	PIP ZONE 58-60, TOTE 1 AND TOTE 2
INJECTION CREW	JUAN, BRIAN, ARTURO

DATE	TIME	DEPTH (FT)	FLOW RATE (GPM)	PEAK PRESSURE (PSI)	AVERAGE PRESSURE (PSI)	TOTAL GALLONS	RESURFACED SOLUTION (GAL)	NOTES
3/21/2013	0758	58-60	4.4		29	25	0	BEGIN PUMPING TOTE 1
	0804	58-60	4.4		26	25	0	
	0810	58-60	4.4		27	25	0	
	0816	58-60	4.4		27	25	0	
	0822	58-60	4.4		27	25	0	
	0828	58-60	4.2		27	25	0	
	0833	58-60	4.2		27	25	0	
	0839	58-60	4.2		27	25	0	
	0844	58-60	4.2		27	25	0	
	0850	58-60	4.4		30	25	0	COMPLETE TOTE 1 , 250 GALLONS TOTAL
3/21/2013	0855	58-60	4.4		30	25	0	BEGIN TOTE 2
	0859	58-60	4.4		30	25	0	
	0904	58-60	4.4		30	25	0	
	0910	58-60	4.4		30	25	0	
	0916	58-60	4.4		30	25	0	
	0922	58-60	4.2		30	25	0	
	0928	58-60	4.2		30	25	0	
	0934	58-60	4.2		30	25	0	
	0940	58-60	4.2		30	25	0	
	0946	58-60	4.2		30	25	0	COMPLETE TOTE 2, 500 GALLONS TOTAL

CASCADE DRILLING, L.P.
LEADERS IN SAFETY
C57-938110

INJECTION POINT FIELD LOG

CLIENT/PROJECT	**TETRA TECH / MARYLAND SQUARE PCE SITE BOULEVARD MALL**		
INJECTANT	RemOx S , POTASSIUM PERMANGANATE		
EQUIPMENT	8040 DIRECT PUSH		
BORING LOCATION	PIP ZONE 58-60, TOTE 3 AND TOTE 4	INJECTION CREW	JUAN, BRIAN, ARTURO

DATE	TIME	DEPTH (FT)	FLOW RATE (GPM)	PEAK PRESSURE (PSI)	AVERAGE PRESSURE (PSI)	TOTAL GALLONS	RESURFACED SOLUTION (GAL)	NOTES
3/21/2013	0951	58-60	4.2		30	25	0	BEGIN PUMPING TOTE 3
	0955	58-60	4.2		30	25	0	
	1000	58-60	4.2		30	25	0	
	1005	58-60	4.2		30	25	0	
	1012	58-60	4		30	25	0	
	1020	58-60	4.2		30	25	0	
	1025	58-60	4		30	25	0	
	1031	58-60	4		30	25	0	
	1036	58-60	4		30	25	0	
	1042	58-60	4		30	25	0	COMPLETE TOTE 3 , 750 GALLONS TOTAL
3/21/2013	1047	58-60	4		30	25	0	BEGIN TOTE 4
	1052	58-60	4		30	25	0	
	1057	58-60	4		30	25	0	
	1104	58-60	3.75		30	25	0	
	1111	58-60	3.75		30	25	0	
	1116	58-60	3.75		30	25	0	
	1122	58-60	3.75		30	25	0	
	1129	58-60	3.75		30	25	0	
	1137	58-60	3.75		30	25	0	
	1144	58-60	3.75		29	25	0	
	1151	58-60	3.75		30	25	0	
	1158	58-60	3.75		30	25	0	COMPLETE TOTE 4, 1050 GALLONS TOTAL

ATTACHMENTS 1 THROUGH 6 PROVIDED ON CD

1 - Bench Scale Reports

2 - Vendor Field and Product Data

3 - Analytical Results

4 - Geotechnical Reports

5 - Cascade Injection Logs

6 - PulseOx O&M Logs

Maryland Square PCE Site - Boulevard Mall
3528 S. Maryland Pkwy
Las Vegas, Nevada
Project Manager: Gerald Cresap
Field Engineer: Dave Kendall
GES Job Number: 0022477-05-255

DATE: 4/4/2013 10:30 (Zone B) 13:20 (Zone A)

NAME: Dave Kendall

1. System Status

System Status on Arrival	On
System Status upon Departure	On

2. Injection Points

Injection Point	Shallow O_3		Shallow H_2O_2		Deep O_3		Deep H_2O_2	
H_2O_2 Hours	-		9.8		-		5.2	
O_2/O_3 Hours	8.4		-		9.8		-	
Air Hours	8.3		-		9.7		-	
Sequence Step	Zone A	Zone B	Zone A	Zone B	Zone A	Zone B	Zone A	Zone B
Wellhead Pressure (psi)	5.5	1.5	3.5	1.0	9.0	20.0	6.5	9.0
Injection Status	ON	OFF	OFF	ON	OFF	ON	ON	OFF

3. Ozone Injection

	units	Zone A Injection	Zone B Injection
Ozone Supply Pressure (pre-regulator)	(psi)	43	43
Ozone Injection Pressure (post-regulator)	(psi)	39	40
Ozone Gen Leg 1 Flow	(lpm)	23	21
Ozone Gen Leg 2 Flow	(lpm)	21	20
Ozone Gen Leg 3 Flow	(lpm)	26	24
O_2 Feed Tank Pressure	(psi)		
O_2 Flow to Ozone Generator	(scfh)		

4. Air Injection

	units	Zone A Injection	Zone B Injection
Air Supply Pressure (pre-regulator)	(psi)	80-120	80-120
Air Injection Pressure (post-regulator)	(psi)	48	49
Air Flow	(scfh)	180	165

5. Hydrogen Peroxide Injection

	units	Zone A Injection	Zone B Injection
Pump Speed	(spm)	360	
Stroke Length	(%)	100	
Injection Pressure	(psi)	3	10

6. OIT (Control Screen)

System Hours	11165.16	
Air Compressor Hours	12301.2	
H_2O_2 Pump Hours	11139.6	
O_3 Generator Hours	11982.7	
Chiller Hours	11713.8	
Injection Location	Well 1 (Shallow)	Well 2 (Deep)
Cycle Time (min)	180	180
O_3	180	180
H_2O_2	97	148
Air	180	180

7. Chiller

Set Point (°F)	60
Temperature (°F)	
Coolant Level	Full

8. Tank Levels

Exterior H_2O_2 Storage Tank (gal)	~340
Interior H_2O_2 Storage Tank (gal)	Full
Emergency Water (gal)	Full

9. Ozone Monitoring

Trailer	ND
OS-1 Vault	ND
Vicinity of MW-20	ND
Vicinity of MW-20D	ND
Vicinity of MW-CMT1	ND
Vicinity of SVE-1	ND

10. General Site Conditions

Fence in Place	Yes
Placards/ Signage	Yes
Fence Lock	Yes
Trailer Lock	Yes
Trailer Condition (Leaks)	Good
Safety Supplies (Eyewash, Fire Extinguisher, HASP)	Yes

11. Notes

System had been running consistently since start-up around 4:00 PM on April 3rd, 2013. Cycle times determined based on J. Cresap's instructions. Maximum pump output is 1.3 gpm.

Upper Zone = 2.1 gallons H2O2 four times per day, 2 scfm 50% duty cycle

Lower Zone = 3.2 gallons H2O2 four times per day, 3 scfm 50% duty cycle

Ozone flow rates can not be adjusted on a per-well basis. Each ozone injection point was given 50% duty cycle, but flow rates will be dependent on pressure.

It was determined on 4/5/13 that the H2O2 pump was not staying primed at current settings. Stroke length was adjusted to 70% where the pump performed sufficiently. Injection cycles were changed to 60 minute periods of O3/O2 injection with a 60 minute period of H2O2 injection in the deep well, and a 40 minute period of H2O2 injection in the shallow well. According to APT peronnel, the decrease in time between the hydrogen peroxide injection sequences (20 minutes vs the previous maximum of 83 minutes) would help keep the pump primed.

Maryland Square PCE Site - Boulevard Mall
3528 S. Maryland Pkwy
Las Vegas, Nevada
Project Manager: Gerald Cresap
Field Engineer: Dave Kendall
GES Job Number: 0022477-05-255

DATE: 4/8-4/9/2013

NAME: Dave Kendall

1. System Status

System Status on Arrival	Off
System Status upon Departure	Off

2. Injection Points

Injection Point	Shallow O_3		Shallow H_2O_2		Deep O_3		Deep H_20_2	
H_2O_2 Hours	-		58.5		-		48.6	
O_2/O_3 Hours	52.6		-		58.2		-	
Air Hours	52.1		-		58.1		-	
Sequence Step	Zone A	Zone B	Zone A	Zone B	Zone A	Zone B	Zone A	Zone B
Wellhead Pressure (psi)	7.0	2.0	2.5	8.0	10.0	25.5	12.5	15.0
Injection Status	ON	OFF	OFF	ON	OFF	ON	ON	OFF

3. Ozone Injection

	units	Zone A Injection	Zone B Injection
Ozone Supply Pressure (pre-regulator)	(psi)	44	44
Ozone Injection Pressure (post-regulator)	(psi)	40	43
Ozone Gen Leg 1 Flow	(lpm)	23	18
Ozone Gen Leg 2 Flow	(lpm)	22	20
Ozone Gen Leg 3 Flow	(lpm)	24	20
O_2 Feed Tank Pressure	(psi)	44.5	
O_2 Flow to Ozone Generator	(scfh)	170	

4. Air Injection

	units	Zone A Injection	Zone B Injection
Air Supply Pressure (pre-regulator)	(psi)	78-118	78-118
Air Injection Pressure (post-regulator)	(psi)	44	46
Air Flow	(scfh)	210	260

5. Hydrogen Peroxide Injection

	units	Zone A Injection	Zone B Injection
Pump Speed	(spm)	360	
Stroke Length	(%)	70	
Injection Pressure	(psi)	12	6

6. OIT (Control Screen)

System Hours	11766.44	
Air Compressor Hours	12392.9	
H_2O_2 Pump Hours	11229.4	
O_3 Generator Hours	12067.8	
Chiller Hours	11806.2	
Injection Location	Well 1 (Shallow)	Well 2 (Deep)
Cycle Time (min)	60	60
O_3	60	60
H_2O_2	40	60
Air	60	60

7. Chiller

Set Point (°F)	60
Temperature (°F)	59.5
Coolant Level	Full

8. Tank Levels

Exterior H_2O_2 Storage Tank (gal)	~240
Interior H_2O_2 Storage Tank (gal)	Full
Emergency Water (gal)	Full

9. Ozone Monitoring

Trailer	.11 ppm In O3 Generator
OS-1 Vault	ND
Vicinity of MW-20	ND
Vicinity of MW-20D	ND
Vicinity of MW-CMT1	ND
Vicinity of SVE-1	ND

10. General Site Conditions

Fence in Place	Yes
Placards/ Signage	Yes
Fence Lock	Yes
Trailer Lock	Yes
Trailer Condition (Leaks)	Ozone leak
Safety Supplies (Eyewash, Fire Extinguisher, HASP)	Yes

11. Notes

System had shut down at approximately 14:30 on Sunday, April 7th on an ozone detect alarm on both injection legs (Well 1 and Well 2). The site was reached on the evening of Monday April 8th and restarted. A leak could not be identified, but the air solenoid valve on the Well 2 leg (deep injection point) would not open during system restarts. It was assumed that with the air valve not opening, the leaking ozone was concentrated enough the shut the system down. The deep well ozone and hydrogen peroxide injection lines were switched from Leg 2 of the injection manifold to Leg 3 of the injection manifold. The system restarted and continued operating after the switch.

Data was collected from the system on 4/9/2013 at approximately 9:00 AM. The system had been active since 8:00 PM on 4/8/2013. The 6.5 additional hours added to the hour meter readings for the deep injection points reflect the 13 elapsed hours between when the system was restarted and when the hour meter readings were collected (O3/O2 for 60 minutes, followed by H2O2 for 60 minutes).

A leak was identified in the ozone cabinet at a connection between an electrode and the ozone generating plates. The ozone generator was shut down and a repair was attempted using 2 part epoxy to seal the gap between the ceramic casing on the electrode and a metal hex-nut used to attach it to the plates. During the repair a thermocouple attached to the ozone generator broke loose and could not be reattached. Although the system could run without the thermocouple in place, it would not be thermally protected. It was decided that the system would be left off until 4/10/13 when Mike Eichenmueller would be available to replace the broken thermocouple. The system was restarted on 4/10/13 after repairs had been made in the cabinet.

The system was shut down again on 4/11/13 after it was determined that ozone was short-circuiting up nearby wells SVE-1 and MW-20D1 and MW-20D2.

Maryland Square PCE Site - Boulevard Mall
3528 S. Maryland Pkwy
Las Vegas, Nevada
Project Manager: Gerald Cresap
Field Engineer: Dave Kendall
GES Job Number: 0022477-05-255

DATE: 4/14/2013 - 15:00 Zone A, 16:00 Zone B

NAME: Dave Kendall

1. System Status

System Status on Arrival	Off
System Status upon Departure	On

2. Injection Points

Injection Point	Shallow O_3		Shallow H_2O_2		Deep O_3		Deep H_20_2	
H_2O_2 Hours	-		86		-		78	
O_2/O_3 Hours	81.5		-		85.2		-	
Air Hours	80.7		-		84.6		-	
Sequence Step	Zone A	Zone B	Zone A	Zone B	Zone A	Zone B	Zone A	Zone B
Wellhead Pressure (psi)	3.3	1.5	2.0	2.0	9.5	21.5	8.5	15.0
Injection Status	ON	OFF	OFF	ON	OFF	ON	ON	OFF

3. Ozone Injection

	units	Zone A Injection	Zone B Injection
Ozone Supply Pressure (pre-regulator)	(psi)	39	40
Ozone Injection Pressure (post-regulator)	(psi)	26	31
Ozone Gen Leg 1 Flow	(lpm)	17	15
Ozone Gen Leg 2 Flow	(lpm)	18	18
Ozone Gen Leg 3 Flow	(lpm)	17	16
O_2 Feed Tank Pressure	(psi)	72	74
O_2 Flow to Ozone Generator	(scfh)	125	115

4. Air Injection

	units	Zone A Injection	Zone B Injection
Air Supply Pressure (pre-regulator)	(psi)	80-118	80-118
Air Injection Pressure (post-regulator)	(psi)	28	32
Air Flow	(scfh)	155	100-125

5. Hydrogen Peroxide Injection

	units	Zone A Injection	Zone B Injection
Pump Speed	(spm)	360	
Stroke Length	(%)	70	
Injection Pressure	(psi)	10	2

6. OIT (Control Screen)

System Hours	11822.16	
Air Compressor Hours	12449.5	
H_2O_2 Pump Hours	11284.9	
O_3 Generator Hours	12098.3	
Chiller Hours	11863.3	
Injection Location	Well 1 (Shallow)	Well 2 (Deep)
Cycle Time (min)	60	60
O_3	60	60
H_2O_2	40	60
Air	60	60

7. Chiller

Set Point (°F)	60
Temperature (°F)	59.8
Coolant Level	Full

8. Tank Levels

Exterior H_2O_2 Storage Tank (gal)	~130
Interior H_2O_2 Storage Tank (gal)	Full
Emergency Water (gal)	~400

9. Ozone Monitoring

Trailer	.08 ppm In O3 Generator
OS-1 Vault	ND
Vicinity of MW-20	ND
Vicinity of MW-20D	ND
Vicinity of MW-CMT1	ND
Vicinity of SVE-1	ND

10. General Site Conditions

Fence in Place	Yes
Placards/ Signage	Yes - Replaced
Fence Lock	Yes
Trailer Lock	Yes
Trailer Condition (Leaks)	Ozone leak
Safety Supplies (Eyewash, Fire Extinguisher, HASP)	Yes

11. Notes

Upon arrival at site (~11:40), removed PVC plugs used to seal wells SVE-1 and MW-20D1. Not enough thread tape was used on either plug and some threads appeared damaged. Replaced plugs with new "cleanout" style plugs and applied sufficient thread tape.

Restarted system at 12:30. Reduced ozone flowrate and air flowrate from prior setpoints. Ozone flow could only be reduced so far (~15 lpm per leg) before tripping a low flow alarm.

Refilled H2O2 tank.

Replaced missing signs on perimeter fence to maintain permit compliance.

Collected Zone A field readings at 15:00. No elevated O3 readings were detected in MW-20D1 vault or SVE-1 vault.

Small leak detected in ozone generator cabinet in same location as before (electrode). The leak appears to have slowed after the application of the epoxy with a maximum concentration of approximately 0.08 ppm immediately adjacent to the electrode. The ozone meter detected no ozone in the vicinity of the in-cabinet ozone sensor, and no ozone was detected outside of the vent (vents to interior of trailer) on the bottom of the cabinet.

Prior to leaving the site an additional round of ozone monitoring was performed in the vicinity of MW-20D1 and SVE-1. No elevated ozone concentrations were detected in either vault. After consulting with C. Christian, it was decided that the system would be left running.

Maryland Square PCE Site - Boulevard Mall
3528 S. Maryland Pkwy
Las Vegas, Nevada
Project Manager: Gerald Cresap
Field Engineer: Dave Kendall
GES Job Number: 0022477-05-255

DATE: 4/19/2013 - 10:40 Zone A, 11:40 Zone B

NAME: Dave Kendall

1. System Status

System Status on Arrival	On
System Status upon Departure	On

2. Injection Points

Injection Point	Shallow O_3		Shallow H_2O_2		Deep O_3		Deep H_2O_2	
H_2O_2 Hours	-		142.3		-		118.1	
O_2/O_3 Hours	138.1		-		141.2		-	
Air Hours	137.2		-		140.6		-	
Sequence Step	Zone A	Zone B	Zone A	Zone B	Zone A	Zone B	Zone A	Zone B
Wellhead Pressure (psi)	5.0	2.0	2.0	1.5	9.5	20.0	6.5	14.5
Injection Status	ON	OFF	OFF	ON	OFF	ON	ON	OFF

3. Ozone Injection

	units	Zone A Injection	Zone B Injection
Ozone Supply Pressure (pre-regulator)	(psi)	40	40
Ozone Injection Pressure (post-regulator)	(psi)	29	33
Ozone Gen Leg 1 Flow	(lpm)	18	16
Ozone Gen Leg 2 Flow	(lpm)	19	18
Ozone Gen Leg 3 Flow	(lpm)	19	17
O_2 Feed Tank Pressure	(psi)	70	70
O_2 Flow to Ozone Generator	(scfh)	135	120

4. Air Injection

	units	Zone A Injection	Zone B Injection
Air Supply Pressure (pre-regulator)	(psi)	78-118	78-118
Air Injection Pressure (post-regulator)	(psi)	30-32	30-33
Air Flow	(scfh)	155-165	115-135

5. Hydrogen Peroxide Injection

	units	Zone A Injection	Zone B Injection
Pump Speed	(spm)	360	
Stroke Length	(%)	70	
Injection Pressure	(psi)	8	3

6. OIT (Control Screen)

System Hours	11934.73	
Air Compressor Hours	12562.1	
H_2O_2 Pump Hours	11362.5	
O_3 Generator Hours	12210.9	
Chiller Hours	11976.1	
Injection Location	Well 1 (Shallow)	Well 2 (Deep)
Cycle Time (min)	60	60
O_3	60	60
H_2O_2	40	60
Air	60	60

7. Chiller

Set Point (°F)	60
Temperature (°F)	58.8
Coolant Level	Full

8. Tank Levels

Exterior H_2O_2 Storage Tank (gal)	~15
Interior H_2O_2 Storage Tank (gal)	Full on Depart.
Emergency Water (gal)	~400

9. Ozone Monitoring

Trailer	.07 ppm In O3 Generator
OS-1 Vault	ND
Vicinity of MW-20	ND
Vicinity of MW-20D	ND
Vicinity of MW-CMT1	ND
Vicinity of SVE-1	ND

10. General Site Conditions

Fence in Place	Yes
Placards/ Signage	Yes - Replaced
Fence Lock	Yes
Trailer Lock	Yes
Trailer Condition (Leaks)	O3 leak in gen.
Safety Supplies (Eyewash, Fire Extinguisher, HASP)	Yes

11. Notes

Upon arrival at site (~9:45), ozone odor was present in trailer. No odor was present outside of trailer, nor was ozone detected at elevated concentrations outside of trailer or in vicinity of monitoring wells.

Ozone leak in the generator cabinet was still present (~0.07 ppm).

H2O2 tank was empty on arrival. Refilled H2O2 tank and restarted injection at approximately 10:15.

Replaced missing signs on perimeter fence to maintain permit compliance.

Collected Zone A field readings at 10:40 AM and Zone B field readings at 11:40 AM.

Maryland Square PCE Site - Boulevard Mall
3528 S. Maryland Pkwy
Las Vegas, Nevada
Project Manager: Gerald Cresap
Field Engineer: Dave Kendall
GES Job Number: 0022477-05-255

DATE: 4/24/2013 - 15:30 Zone A, 16:00 Zone B

NAME: Dave Kendall

1. System Status

System Status on Arrival	Off
System Status upon Departure	On

2. Injection Points

Injection Point	Shallow O_3		Shallow H_2O_2		Deep O_3		Deep H_2O_2	
H_2O_2 Hours	-		183.4		-		138.3	
O_2/O_3 Hours	180.2		-		183		-	
Air Hours	179.3		-		182.4		-	
Sequence Step	Zone A	Zone B	Zone A	Zone B	Zone A	Zone B	Zone A	Zone B
Wellhead Pressure (psi)	6.0	0.0	1.0	0.5	10.0	21.0	7.5	15.0
Injection Status	ON	OFF	OFF	ON	OFF	ON	ON	OFF

3. Ozone Injection

	units	Zone A Injection	Zone B Injection
Ozone Supply Pressure (pre-regulator)	(psi)	40	40
Ozone Injection Pressure (post-regulator)	(psi)	30	33
Ozone Gen Leg 1 Flow	(lpm)	18	16
Ozone Gen Leg 2 Flow	(lpm)	19	19
Ozone Gen Leg 3 Flow	(lpm)	19	17
O_2 Feed Tank Pressure	(psi)	70	72
O_2 Flow to Ozone Generator	(scfh)	135	120

4. Air Injection

	units	Zone A Injection	Zone B Injection
Air Supply Pressure (pre-regulator)	(psi)	79-118	79-118
Air Injection Pressure (post-regulator)	(psi)	32-36	32-36
Air Flow	(scfh)	160-170	145-160

5. Hydrogen Peroxide Injection

	units	Zone A Injection	Zone B Injection
Pump Speed	(spm)	360	
Stroke Length	(%)	70	
Injection Pressure	(psi)	9	1

6. OIT (Control Screen)

System Hours	12015.88	
Air Compressor Hours	12645.8	
H_2O_2 Pump Hours	11423.1	
O_3 Generator Hours	12292.1	
Chiller Hours	12061.2	
Injection Location	Well 1 (Shallow)	Well 2 (Deep)
Cycle Time (min)	60	60
O_3	60	60
H_2O_2	16	24
Air	60	60

7. Chiller

Set Point (°F)	60
Temperature (°F)	62.4
Coolant Level	Full

8. Tank Levels

Exterior H_2O_2 Storage Tank (gal)	Empty
Interior H_2O_2 Storage Tank (gal)	~60% Full
Emergency Water (gal)	~400

9. Ozone Monitoring

Trailer	.04 ppm In O3 Generator
OS-1 Vault	ND
Vicinity of MW-20	ND
Vicinity of MW-20D	ND
Vicinity of MW-CMT1	ND
Vicinity of SVE-1	ND

10. General Site Conditions

Fence in Place	Yes
Placards/ Signage	Yes - Replaced
Fence Lock	Yes
Trailer Lock	Yes
Trailer Condition (Leaks)	O3 leak in gen.
Safety Supplies (Eyewash, Fire Extinguisher, HASP)	Yes

11. Notes

System was off upon arrival due to groundwater sampling performed the previous day and in preparation for an H2O2/Air sparge ROI test.

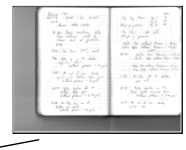
ROI testing was performed between 9:40 AM and 14:40 PM. See attached field notes for testing sequence details.

H2O2 tank was filled using peristaltic pump. Exterior tanks were completely emptied.

Replaced missing signs on perimeter fence to maintain permit compliance.

Normal system operations were resumed at 14:55.

Injection sequence was manually advanced at 15:35 to collect Zone B system readings.



Double-click to open field notes for ROI test.

Maryland Square PCE Site - Boulevard Mall
3528 S. Maryland Pkwy
Las Vegas, Nevada
Project Manager: Gerald Cresap
Field Engineer: Dave Kendall
GES Job Number: 0022477-05-255

DATE: 5/7/2013 - 5/8/2013

NAME: Dave Kendall

1. System Status

System Status on Arrival	Off
System Status upon Departure	Demobilized

2. Injection Points

Injection Point	Shallow O_3		Shallow H_2O_2		Deep O_3		Deep H_2O_2	
H_2O_2 Hours	-		219.7		-		154.8	
O_2/O_3 Hours	218.8		-		219.7		-	
Air Hours	216.3		-		218.9		-	
Sequence Step	Zone A	Zone B	Zone A	Zone B	Zone A	Zone B	Zone A	Zone B
Wellhead Pressure (psi)	-	-	-	-	-	-	-	-
Injection Status	ON	OFF	OFF	ON	OFF	ON	ON	OFF

3. Ozone Injection

	units	Zone A Injection	Zone B Injection
Ozone Supply Pressure (pre-regulator)	(psi)	-	-
Ozone Injection Pressure (post-regulator)	(psi)	-	-
Ozone Gen Leg 1 Flow	(lpm)	-	-
Ozone Gen Leg 2 Flow	(lpm)	-	-
Ozone Gen Leg 3 Flow	(lpm)	-	-
O_2 Feed Tank Pressure	(psi)	-	-
O_2 Flow to Ozone Generator	(scfh)	-	-

4. Air Injection

	units	Zone A Injection	Zone B Injection
Air Supply Pressure (pre-regulator)	(psi)	-	-
Air Injection Pressure (post-regulator)	(psi)	-	-
Air Flow	(scfh)	-	-

5. Hydrogen Peroxide Injection

	units	Zone A Injection	Zone B Injection
Pump Speed	(spm)	-	
Stroke Length	(%)	-	
Injection Pressure	(psi)	-	-

6. OIT (Control Screen)

System Hours	12089.21	
Air Compressor Hours	12723.2	
H_2O_2 Pump Hours	11475.7	
O_3 Generator Hours	12365.9	
Chiller Hours	12137.4	
Injection Location	Well 1 (Shallow)	Well 2 (Deep)
Cycle Time (min)	-	-
O_3	-	-
H_2O_2	-	-
Air	-	-

7. Chiller

Set Point (°F)	-
Temperature (°F)	-
Coolant Level	-

8. Tank Levels

Exterior H_2O_2 Storage Tank (gal)	Empty
Interior H_2O_2 Storage Tank (gal)	Emtpy
Emergency Water (gal)	~400

9. Ozone Monitoring

Trailer	-
OS-1 Vault	-
Vicinity of MW-20	-
Vicinity of MW-20D	-
Vicinity of MW-CMT1	-
Vicinity of SVE-1	-

10. General Site Conditions

Fence in Place	Yes
Placards/ Signage	-
Fence Lock	Yes
Trailer Lock	-
Trailer Condition (Leaks)	-
Safety Supplies (Eyewash, Fire Extinguisher, HASP)	-

11. Notes

System was off on arrival due to low level alarm in hydrogen peroxide tank. Injection pump was run briefly (~ 1 hour) to inject remaining quantity of H2O2.

Well heads/lines were removed, plugs were threaded into injection wells, and the well vault cover was replaced.

System trailer, chemical storage tanks, and containment berm were removed on 5/8/2013.