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February 9, 2009

Mr. Brian Rakvica
Bureau of Corrective Actions
Nevada Department of Environmental Protection
2030 East Flamingo Road, Suite 230
Las Vegas, Nevada 89119

**Re: Progress Report – Fourth Quarter 2008
Soil Vapor Extraction Remedial Action
Montrose Chemical Corporation, Henderson, Nevada**

Dear Mr. Rakvica:

On behalf of Montrose Chemical Corporation (Montrose), Earth Tech AECOM (Earth Tech) submits this Fourth Quarter 2008 Progress Report for the soil vapor extraction (SVE) remedial action at the above-referenced Henderson Site (Figures 1 and 2). SVE operations continued throughout the fourth quarter of 2008 with interruptions occurring October 22-28 (stack photo-ionization detector [PID] repair) and December 2-29 (electrical power supply). During this quarter, the SVE system operated for 1,285 hours (Table 1 and Figure 5) and removed approximately 10,546 pounds of vapor-phase total non-methane organic carbon (TNMOC) contaminants (Tables 3 and 4).

The format and calculations used in this progress report are consistent with: (1) the approach previously established with Nevada Department of Environmental Protection (NDEP) and reported in *Progress Report – First Quarter of 2007*, May 9, 2007; (2) NDEP comment letter dated August 14, 2006; (3) the *Revised SVE Data Evaluation Work Plan*, January 17, 2007, and (4) NDEP comment letter dated June 12, 2008. If you have any questions regarding this progress report, please contact me at (562) 951-2212 or Mr. Paul Sundberg at (209) 474-3617.

Sincerely,

EARTH TECH AECOM

Brian Dean, CEM
Senior Program Director

cc: Dr. Marysia Skorska – NDEP, Las Vegas, NV (hard copy and electronic copy)
Mr. Joe Kelly – Montrose Chemical, Bainbridge Island, WA
Mr. Joel Mack – Latham & Watkins, San Diego, CA
Mr. Kelly Richardson – Latham & Watkins, San Diego, CA (electronic copy)
Mr. Paul Sundberg – Stockton, CA (electronic copy)

Attachments:

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- Figure 2 – Site Layout
- Figure 3 – SVE Treatment System Configuration
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Appendices

- Appendix A – Detailed Records of Run Time and Other Field Data for the Fourth Quarter of 2008 (On CD)
- Appendix B – Laboratory Reports for October, November, and December 2008 (on CD)
- Appendix C – Monthly Mass Removal Calculations for the Fourth Quarter of 2008; Soil Vapor Flow Rate Calculations for Vapor Extraction Wells for the Fourth Quarter of 2008

Certified Environmental Manager (CEM) Statement

This document is a progress report for the soil vapor extraction (SVE) remedial action conducted during the fourth quarter of 2008 at the former Montrose Chemical Corporation site in Henderson, Nevada.

For the services provided and described in this document, the following language is from 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.

EARTH TECH AECOM

Brian Dean, C.E.M.
Nevada C.E.M. 2077 (Exp 03/01/09)
Date Signed: February 9, 2009

Introduction

This *Fourth Quarter 2008 Progress Report* is for the soil vapor extraction (SVE) remedial action at the Montrose Chemical Corporation (Montrose) Henderson Site (Figures 1 and 2). The purpose of the SVE remedial action is to remove volatile chemicals from permeable vadose zone soils beneath the Former Montrose Plant Site. Prior soil investigations indicated the presence of elevated concentrations of volatile and semi-volatile organic compounds (VOCs and SVOCs) within these soils. An SVE pilot test conducted in August 2003 demonstrated the feasibility of the technology to remove these chemicals from the permeable vadose zone soils.

Although investigations of the environmental conditions were not yet complete and a remedial alternatives study had not yet been performed for the Henderson Site, an interim remedial action was initiated in 2004 with the intent of removing a substantial portion of these chemicals from the subsurface soils. An *SVE Work Plan* for this interim remedial action was prepared and submitted to the Nevada Department of Environmental Protection (NDEP) on April 1, 2004. Following NDEP review of the work plan, construction of the SVE system began in August 2004 and was completed in September 2004. The SVE treatment system configuration is illustrated on Figure 3 and the as-built piping and instrumentation diagram of the SVE system is shown on figure 4.

The SVE system was initially started up on September 7, 2004. Limited and intermittent operation of the SVE system continued through the first quarter of 2005 as part of the startup and testing activities. Long-term SVE operations were initiated on April 7, 2005, and continued through the third quarter of 2008. Through the third quarter of 2008, the SVE system has operated for a total of 19,745 hours and has removed an estimated 141,080 pounds (Table 4) of vapor-phase contaminants as total non-methane organic carbon (TNMOCs).

SVE System Run Time during Fourth Quarter of 2008

The run time of the SVE system was determined from the electronic data recorded by the programmable logic controller (PLC). The electronic SVE system data were logged once every 10 minutes; therefore, the run time determined in this manner is accurate to 10 minutes. Detailed records of the SVE system run time are provided in Tables A-2 through A-4 in Appendix A, summarized in Table 1, and tabulated below:

Month / Year	Run Time (hours)	Percent of Total Available Run Time (%)
October 2008	539	72
November 2008	677	94
December 2008	69	9
Total	1,285	58

The SVE system ran for a total of 1,285 hours during the fourth quarter of 2008. The SVE system run time is shown graphically by month in Figure 5. The SVE system run time for October and December 2008 was affected by two interruptions described as follows:

- On October 22, the stack PID (VAT-300) faulted due to sample pump failure. The stack PID was removed and shipped to RAE Systems for repair on October 23. Following repair, the stack PID was re-installed and tested, and routine SVE operations were resumed on October 28.
- On December 2, the electrical power supply to the SVE system was interrupted by Olin Chlor-Alkali plant-related activities. Electrical power was restored to the SVE system on December 29, and routine SVE operations were resumed that same day.

The standard operating procedure for the SVE system is to operate until elevated soil vapor concentrations are observed passing through the second carbon vessel in series, indicating that the treatment capacity of the carbon in the two lead vessels has been spent. Vapor contaminant concentrations are measured at sample valves SV-08 through SV-13 approximately three times a week using a handheld MiniRAE 2000 PID, as illustrated on Figure 4. The field measurements taken using the handheld PID are the basis for determining contaminant saturation of the two lead vessels. Once the two lead vessels are saturated, the SVE system is turned off pending replacement of the spent carbon. Following carbon replacement, the configuration of the carbon vessels is changed and routine SVE operations are resumed (Figure 3). During the fourth quarter of 2008, routine carbon change-outs were conducted on the following dates:

- October 8, 2008
- October 17, 2008
- November 5, 2008
- November 19, 2008
- December 2, 2008

The saturation time for the two lead vessels was between 8 and 13 days during the fourth quarter of 2008. SVE operations during the fourth quarter of 2008 are summarized in Table 1.

Soil Vapor Flow Rate

The SVE flow rate is determined from the data recorded by the PLC. The undiluted inlet flow from the well field is measured using a resistance temperature detector (RTD)-type flow sensor (Fluid Components, Inc., Model ST98). Information regarding this flow sensor was submitted to NDEP on April 8, 2005. Because the flow sensor is calibrated in the factory using National Institute of Standards and Technology NIST-certified bench-scale equipment, it provides flow in units of standard cubic feet per minute (scfm) and is accurate to within 1 percent of the reading. The RTD flow indicator sensor is identified as FI-101 on Figure 4. The temperature and pressure data of the influent soil vapor were collected at temperature indicator TI-101 and pressure indicator PI-101, respectively, (Figure 4) and are provided in Appendix A.

To calculate the average flow rates for the month, the flow rates were logged at FI-101 every 10 minutes and averaged over the run time intervals as shown in Tables A-2 through A-4 in Appendix A. The time-weighted average soil vapor flow rates during the fourth quarter of 2008 are shown below, in Table 1, and on Figure 6.

Month / Year	Average Flow Rate ^a (scfm)
October 2008	448
November 2008	400
December 2008	365
Fourth Quarter 2008	418

^a Time-weighted average

Although the eight SVE wells are capable of flowing at more than 700 scfm at full vacuum, the SVE flow rate from the wells was intentionally adjusted for purposes of managing the VOC mass removal and carbon spending rate (see Tables A-2 through A-4 and Appendix C). SVE flow rate adjustments were made by isolating low-concentration wells from vacuum and by introducing make-up dilution air (ambient air) to control the vacuum applied to the wells. Only five of the SVE wells (VEW-2, -4, -5, -6, and -7) were operated continuously throughout the fourth quarter of 2008. Wells VEW-1, -3, and -4S were inactive throughout the fourth quarter of 2008 due to low VOC concentrations in soil vapor and to increase the VOC mass loading rate to the carbon. The SVE flow rate and VOC mass loading rate were adjusted to allow approximately 8 to 13 days to fully saturate the carbon in the two lead adsorber vessels. During the fourth quarter of 2008, the average inlet flow rate ranged between 305 and 491 scfm, as shown in Table 1.

Chemical Concentrations in Soil Vapor

Inlet soil vapor samples were collected on a monthly basis and analyzed for the following constituents:

- VOCs by United States Environmental Protection Agency (USEPA) Method TO-15¹; standard broad suite plus a specific tentatively identified compound (TIC), cyclohexanone; and the top five TICs; and
- TNMOCs and fixed gases by USEPA Methods 25C and 3C.

As indicated in the *Revised Progress Report for the Second Quarter 2005* (Earth Tech, March 2006), the analytical method for VOCs was changed from USEPA Method TO-14 to TO-15 because the broad suite analyte list for Method TO-15 includes certain chemicals of interest related to carbon overheating conditions, including acetone and some ketones. For the same reason, cyclohexanone was added as a specific TIC to the VOC analysis because this chemical (a member of the ketone chemical class) is known to have adverse temperature reactions with activated carbon. Also, the top five TICs were requested by Montrose in addition to the broad suite chemicals and the specific TIC (cyclohexanone).

Analysis of inlet soil vapor samples for SVOCs by USEPA TO-13 was discontinued during the first quarter of 2007. SVOCs uniquely identified by that method represented less than 0.5 percent of the estimated chemical mass removed. Consequently, Montrose requested the SVOC vapor analysis be discontinued in correspondence dated January 30, 2007, which was subsequently approved by NDEP in correspondence dated February 1, 2007.

¹ TO = Toxic Organics

Routine monthly inlet and outlet soil vapor samples were collected on October 29, November 20, and December 31, 2008. Progress soil vapor samples were collected from each of the eight individual SVE wells (VEW-1 through VEW-7 and VEW-4S) on either January 7 or 26, 2009. All VOC and TNMOC samples were collected in pre-evacuated Summa[®] canisters. The inlet (SV-08) and outlet (SV-13) sampling locations are identified on Figure 4. The fourth quarter 2008 vapor samples were analyzed by Air Technology Laboratories in City of Industry, California. The results are shown in Tables 2A and 2B, and copies of laboratory reports are provided in Appendix B. Individual inlet vapor contaminant concentrations with a TNMOC comparison are graphed versus time on Figure 7.

No TICs were detected in the October, November, or December 2008 inlet vapor samples. Only broad-suite VOC vapor contaminants were detected during the fourth quarter of 2008. No ketones, cyclohexanone, or other chemicals known to have high heats of adsorption/reaction (with carbon) were detected in the inlet vapor samples.² No vinyl chloride, methylene chloride, or other chemicals known to have low carbon adsorption efficiencies were detected in the inlet vapor samples. All vapor contaminants detected during the fourth quarter of 2008 can be effectively treated using granular activated carbon.

Inlet Contaminant Concentrations Using Field PID

Soil vapors were extracted from sample valve SV-08 (Figure 4), and the concentrations of vapor-phase contaminants were measured in the field using a handheld PID calibrated to isobutylene. During the fourth quarter of 2008, inlet soil vapor contaminant concentrations ranged from a low of 2,786 parts per million volume (ppmv) on December 31 to a peak of 5,360 ppmv on October 13. The average inlet vapor contaminant concentrations in October, November, and December 2008 were between 3,653 and 4,875 ppmv as shown in Table A-1 of Appendix A. The aforementioned field PID concentrations are uncorrected for contaminant type and are higher than the true concentrations (correction factor is approximately 0.44). Inlet field PID concentrations, soil vapor temperatures, and pressures (vacuum) measured at TI-101 and PI-101 are provided in Appendix A.

Outlet Contaminant Concentrations – Laboratory Results

Outlet vapor samples collected on October 29, November 20, and December 31, 2008, were analyzed for VOCs by USEPA Method TO-15 and for TNMOC by USEPA Method 25C. The results are shown in Table 2A. All outlet chemical concentrations are significantly below Clark County Air District permit limits. A removal efficiency equal to or greater than 99.99 percent was achieved for all chemicals detected in the inlet vapor samples. No TICs were detected during USEPA Method TO-15 analysis of the outlet vapor samples collected during the fourth quarter of 2008.

Waste Management

Spent Carbon – Approximately 50,000 pounds of spent carbon was generated during the fourth quarter of 2008. Two loads of spent carbon generated during the third and fourth quarters of 2008, totaling 86,020 pounds, were transported for off-site disposal (thermal treatment and landfilling) to the US Ecology Class I facility in Beatty, Nevada.

² 2-Butanone (MEK) and 4-methyl-2-pentanone (MIBK) were detected at concentrations of 0.019 ppmv and 0.0030 ppmv, respectively, in the December 31, 2008 effluent sample.

Moisture Condensate – With ambient temperatures dropping, a total of 5.5 drums or approximately 275 gallons of moisture condensate was generated during the fourth quarter of 2008. Four of the drums were transported for off-site treatment (incineration) at the Clean Harbors facility in Aragonite, Utah, during the fourth quarter of 2008. The remaining 75 gallons generated at the end of December 2008 was transported for off-site treatment in January.

Non-routine Activities and Carbon Temperatures

All SVE operation and maintenance activities were routine during the fourth quarter of 2008, except for the two interruptions occurring October 22-28 (stack PID repair) and December 2-29 (electrical power supply). Contaminant concentrations at the stack were zero or close to zero throughout the quarter and were significantly below Clark County Department of Air Quality Management permit limits. Carbon temperatures were within normal operating ranges throughout the fourth quarter of 2008. No overheating of the carbon occurred at any time, either during vapor treatment or during replacement of the spent carbon.

Mass Removal of Soil Vapor Contaminants

Soil vapor contaminant mass removal was estimated using the methods submitted to NDEP in an email dated February 14, 2006 (Mass Removal Calculation – see Appendix C). NDEP verbally indicated concurrence with this methodology on that same day. Mass removal estimates for soil vapor contaminant constituents are presented in Table 3, with detailed calculations provided in Appendix C. Graphs of mass removed and cumulative mass removed versus time are provided on Figures 8 and 9, respectively.

The mass of VOCs and SVOCs removed during the fourth quarter of 2008 is quantified using USEPA Method TO-15. Mass and cumulative mass removed during the fourth quarter of 2008 are also calculated for TNMOC by USEPA Method 25C. The estimated mass removed for all vapor contaminants during the fourth quarter of 2008 is summarized in Table 3 and as follows:

Vapor Contaminant	Total Mass Removed (pounds)
VOCs by USEPA TO-15	
Benzene	1,953
Carbon Tetrachloride	646
Chlorobenzene	13,130
Chloroform	1,129
Subtotal for VOCs by TO-15	16,858
SVOCs by USEPA TO-15	
1,2-Dichlorobenzene	1,332
1,3-Dichlorobenzene	0
1,4-Dichlorobenzene	2,585
Subtotal for SVOCs by TO-15	3,917
VOCs/SVOCs by TO-15	20,775
TNMOC as Hexane by USEPA 25C	10,546

Quarterly Data from Individual SVE Wells and Vapor Monitoring Points

Quarterly data were collected individually from all SVE wells and vapor monitoring points on January 7, 2009, and are provided in Table C-4 in Appendix C. The vapor flow rate, temperature, vacuum, and concentration were measured at the individual SVE wells. The vacuum and vapor concentration were measured at the monitoring points. The vapor concentrations were measured using the handheld field PID on January 07, 2009. Field PID readings from all eight SVE wells ranged from 825 ppmv (VEW-4S) to 5,130 ppmv (VEW-5). These field concentrations are uncorrected for contaminant type and are higher than the true concentrations (correction factor is approximately 0.44).

Quarterly vapor samples were collected individually from all eight SVE wells on January 7, 2009. The vapor samples were collected in Summa[®] canisters and analyzed for VOCs by USEPA Method TO-15 and for TNMOC and fixed gases by USEPA Method 25C. However, the Summa[®] canister containing the vapor sample from well VEW-3 was found to have leaked (unable to hold pressure), thereby compromising the integrity of the vapor sample. Therefore, a new quarterly progress soil vapor sample was collected from well VEW-3 on January 26, 2009.

Analytical results for the SVE well vapor samples are provided in Table 2B. The results are compared with prior quarterly results for each of the eight SVE wells on Figures 10 through 17. Concentration trends for each of the eight SVE wells are plotted for each contaminant type on Figures 19 through 26 as requested by NDEP in its February 28, 2007, comment letter (Comment No. 3), with the SVE wells arranged in order from north (VEW-1 and -7) to south (VEW-5). With the exception of the three dichlorobenzene isomers, these concentration graphs indicate a general increasing trend from north to south (i.e., the highest concentrations occur at VEW-4, -5, and -6). Copies of the analytical reports for the individual well samples are provided in Appendix B.

The percentage reduction or increase in vapor contaminant concentrations is provided below as requested by NDEP in its comment letter dated August 14, 2006. A reduction in concentration from the previous quarter is shown with a “-” prefix. An increase in the contaminant concentration from the previous quarter is shown with a “+” prefix. The average percent change over the last quarter for the six vapor contaminants listed is also provided in the table below.

Vapor Contaminant	Percent Change Since Third Quarter of 2008							
	VEW-1	VEW-2	VEW-3	VEW-4	VEW-4S ^a	VEW-5	VEW-6	VEW-7
Benzene	-20%	-14%	-100%	-17%	+89%	-8%	+37%	+13%
Carbon Tetrachloride	NA	NA	-3%	-17%	NA	-24%	+54%	NA
Chlorobenzene	-38%	-10%	-45%	-52%	+215%	-51%	+20%	+1%
Chloroform	NA	-15%	-17%	-25%	-56%	-23%	+63%	+13%
1,2-Dichlorobenzene	-21%	-14%	+250%	+31%	+552%	-100%	+14%	-3%
1,4-Dichlorobenzene	-21%	-13%	+194%	0%	+531%	-85%	+27%	+0%
Average	-25%	-13%	+47%	-13%	+266%	-49%	+36%	+5%

Notes:

+ = Increase in concentration from third quarter 2008 to fourth quarter 2008

- = Decrease in concentration from third quarter 2008 to fourth quarter 2008

NA = not applicable; vapor contaminant was not detected during either quarter

Arithmetic average is shown (not weighted on concentration)

^a 1,2-Dichlorobenzene increased from 2.3 to 15 ppmv, and 1,4-dichlorobenzene increased from 6.5 to 41 ppmv during the fourth quarter of 2008

During the fourth quarter of 2008, the vapor contaminant concentrations at wells VEW-1, -2, -4, and -5 decreased between 13% and 49% over the prior quarter, although well VEW-1 was inactive throughout the fourth quarter of 2008. The vapor contaminant concentrations at wells VEW-3, -4S, -6, and -7 increased between 5% and 266% over the prior quarter, although wells VEW-3 and VEW-4S were inactive throughout the fourth quarter of 2008. Although the percentage increase in some contaminant concentrations at well VEW-4S was high, contaminant concentrations at this well remain low. For example, 1,2-dichlorobenzene concentration at VEW-4S increased from 2.3 to 15 ppmv during the fourth quarter of 2008 (a 552% increase).

The percent reduction in soil vapor contaminant concentrations from baseline conditions to the fourth quarter of 2008 are summarized as follows:

Vapor Contaminant	Percent Reduction in Concentration Since Baseline Conditions							
	VEW-1 ^a	VEW-2 ^a	VEW-3 ^a	VEW-4 ^a	VEW-4S	VEW-5	VEW-6	VEW-7
Benzene	> 99%	> 99%	100%	98%	96%	87%	56%	61%
Carbon Tetrachloride	100%	100%	> 99%	99%	100%	88%	65%	100%
Chlorobenzene	90%	96%	91%	92%	77%	83%	+56%	44%
Chloroform	100%	99%	99%	99%	82%	93%	56%	47%
TNMOC/TGNMO	92%	93%	97%	95%	74%	65%	+11%	22%

VEW-1 through VEW-4 baseline conditions were measured in September 2004.

VEW-4S through VEW-7 baseline conditions were measured in November 2007.

^a September 2004 baseline samples were analyzed for Total Gaseous Non-Methane Organics (TGNMO); converted to units of ppmv as hexane by dividing TGNMO concentration (in ppmv as methane) by 6.

+ = Increase in concentration from baseline conditions to fourth quarter 2008.

Vapor Well Flow Rates: Soil vapor flow rates were measured at each of the extraction wells on January 7, 2009, using a TSI velocity meter. The vapor flow rates from each well are provided in Table C-4 of Appendix C. Soil vapor flow rates from the five active wells ranged from 43 scfm at VEW-5 to 108 scfm at VEW-6. On January 7, each of the five active wells contributed between 14 percent and 36 percent of the total soil vapor flow. Wells VEW-1, -3, and -4S were inactive during the fourth quarter 2008, and therefore, no soil vapor flow is reported for these wells. As requested by NDEP in its comment letter dated August 14, 2006, the vapor flow rates for each well are graphed as a percentage of the total flow on the day of testing versus time on Figure 18.

Vapor Monitoring Points: A handheld vacuum gauge was used at each monitoring point to collect vacuum influence data, and the field PID (MiniRAE 2000) was used to monitor static wellhead concentrations. Static wellhead concentrations at vapor monitoring points VMP-1 through VMP-3 were measured on January 7, 2009. There were minimal differences between conditions in the shallow monitoring points (VMP-1S through VMP-3S) and those present in the deep monitoring points (VMP-1D through VMP-3D). Field PID readings in the shallow monitoring points ranged from 5 to 11 ppmv, while the field PID readings in the deep monitoring points ranged from 8 to 19 ppmv. These field concentrations are uncorrected for contaminant type and are higher than the true concentrations (correction factor is approximately 0.44). The vacuum influence at VMP-2S/D (1.2 inches of water) was slightly lower than the vacuum influence at VMP-1S/D and VMP-3S/D (1.4 inches of water). VMP-1S/D and VMP-3S/D are both located in closer proximity to active extraction wells (VEW-2 and VEW-7). The vacuum influence in the shallow and deep monitoring points at each location was identical (e.g., 1.4 inches of water at both VMP-1S and -1D). Vapor monitoring point locations are shown on Figure 2.

Action Items for the First Quarter of 2009

Action Item No. 1: Continue Routine SVE Operations

Routine SVE operations will continue during the first quarter of 2009. The performance of the active SVE wells will be monitored closely, and the contaminant mass loading rate will be manually adjusted to fully saturate the two lead vessels within 10 to 14 days. Wells VEW-1, -3, and -4S will remain inactive during the first quarter of 2009, and the soil vapor flow from wells VEW-2 and VEW-7 will remain partially restricted to focus SVE operations on wells VEW-4, -5, and -6. The carbon temperatures will continue to be monitored closely to ensure that heat build-up within the vessels is not occurring. Monthly inlet and outlet vapor samples will be collected, and quarterly data will be collected from the individual wells in March 2009.

Earth Tech References

SVE Work Plan, April 1, 2004
Revised Progress Report for the Second Quarter 2005, March 3, 2006
Progress Report – Third and Fourth Quarters 2005, June 9, 2006
Progress Report – First Quarter of 2006, June 15, 2006
Progress Report – Second Quarter of 2006, July 28, 2006
NDEP Comments on Quarterly Progress Reports, August 14, 2006
Soil Vapor Extraction Data Evaluation Work Plan, August 30, 2006
Responses to NDEP Comments on the Quarterly Progress Reports, November 7, 2006
Progress Report – Third Quarter of 2006, November 7, 2006
Revised Soil Vapor Extraction Data Evaluation Work Plan, January 17, 2007
NDEP Comments on Revised Data Evaluation Work Plan, January 29, 2007
Earth Tech E-mail Correspondence, Monthly Vapor Analysis for SVOCs by TO-13, January 30, 2006
NDEP E-mail Correspondence, Monthly Vapor Analysis for SVOCs by TO-13, February 1, 2007
Progress Report – Fourth Quarter of 2006, February 2, 2007
NDEP Comments on Third and Fourth Quarter 2006 Progress Reports, February 28, 2007
Progress Report – First Quarter of 2007, May 9, 2007
Progress Report – Second Quarter of 2007, August 17, 2007
Proposed Cooling Water Piping Drawings, August 31, 2007
NDEP Concurrence of the Proposed Cooling Water Piping Drawings, September 6, 2007
SVE Expansion Work Plan, September 10, 2007
NDEP Concurrence of the SVE Expansion Work Plan, September 12, 2007
NDEP Concurrence of Second Quarter 2007 Progress Report, September 13, 2007
Progress Report – Third Quarter of 2007, November 20, 2007
NDEP Concurrence of Third Quarter 2007 Progress Report, December 11, 2007
Progress Report – Fourth Quarter of 2007, February 4, 2008
NDEP Concurrence of Fourth Quarter 2007 Progress Report, February 13, 2008
Progress Report – First Quarter of 2008, May 6, 2008
NDEP Comments on First Quarter 2008 Progress Report, June 12, 2008
Response to NDEP Comments on First Quarter 2008 Progress Report, July 11, 2008
NDEP Concurrence of Montrose's Response to NDEP Comments on First Quarter 2008 Progress Report, July 16, 2008
Progress Report – Second Quarter of 2008, August 11, 2008
NDEP Concurrence of Montrose's Response to NDEP Comments on Second Quarter 2008 Progress Report, September 25, 2008

Progress Report – Third Quarter of 2008, November 7, 2008
NDEP Concurrence of Montrose's Response to NDEP Comments on Third Quarter 2008 Progress Report, November 18, 2008