US Ecology

Beatty, Nevada
RCRA Permit Application

Volume 1 of 2

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USEcologyNevada

RCRA Permit Application

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OMB# 2050-0024; Expires 11/30/2011

SEND COMPLETED FORM TO: The Appropriate State or Regional Office.

United States Environmental Protection Agency
RCRA SUBTITLE C SITE IDENTIFICATION FORM

1. Reason for Submittal

MARK ALL BOX(ES) THAT APPLY

Reason for Submittal:

- ☐ To provide an Initial Notification (first time submitting site identification information / to obtain an EPA ID number for this location)
- ☐ To provide a Subsequent Notification (to update site identification information for this location)
- ☐ As a component of a First RCRA Hazardous Waste Part A Permit Application
- ☒ As a component of a Revised RCRA Hazardous Waste Part A Permit Application (Amendment #_____)
- ☐ As a component of the Hazardous Waste Report (If marked, see sub-bullet below)
  - ☐ Site was a TSD facility and/or generator of ≥1,000 kg of hazardous waste, >1 kg of acute hazardous waste, or >100 kg of acute hazardous waste spill cleanup in one or more months of the report year (or State equivalent LQG regulations)

2. Site EPA ID Number

EPA ID Number N V T 3 3 0 0 1 0 0 0 0

3. Site Name

Name: US Ecology Nevada

4. Site Location Information

Street Address: Highway 95, 11 miles south of Beatty

City, Town, or Village: Beatty | **County:** Nye

State: Nevada | **Country:** USA | **Zip Code:** 89003

5. Site Land Type ☐ Private ☐ County ☐ District ☐ Federal ☐ Tribal ☐ Municipal ☒ State ☐ Other

6. NAICS Code(s) for the Site (at least 5-digit codes)

A. 5 6 2 2 1 1 | C. | B. | D.

7. Site Mailing Address

Street or P.O. Box: PO Box 578

City, Town, or Village: Beatty

State: Nevada | **Country:** USA | **Zip Code:** 89003

8. Site Contact Person

First Name: Robert | **MI:** L | **Last:** Marchand

Title: General Manager

Street or P.O. Box: PO Box 578

City, Town or Village: Beatty

State: Nevada | **Country:** USA | **Zip Code:** 89003

Email: bmarchand@usecology.com

Phone: (775) 553-2203 | **Ext.:** 104 | **Fax:**

9. Legal Owner and Operator of the Site

A. Name of Site's Legal Owner: Sate of Nevada | **Date Became Owner:** 01/01/1970

Owner Type: ☐ Private ☐ County ☐ District ☐ Federal ☐ Tribal ☐ Municipal ☒ State ☐ Other

Street or P.O. Box: 901 S. Stewart Street

City, Town, or Village: Carson City | **Phone:** (775) 687-4670

State: Nevada | **Country:** USA | **Zip Code:** 89701

B. Name of Site's Operator: US Ecology Nevada | **Date Became Operator:** 01/01/1962

Operator Type: ☒ Private ☐ County ☐ District ☐ Federal ☐ Tribal ☐ Municipal ☐ State ☐ Other

EPA ID Number N V T 3 3 0 0 1 0 0 0 0 | OMB#: 2050-0024; Expires 11/30/2011

10. Type of Regulated Waste Activity (at your site)
Mark "Yes" or "No" for all current activities (as of the date submitting the form); complete any additional boxes as instructed.

A. Hazardous Waste Activities; Complete all parts 1-7.

Y ☒ N ☐ **1. Generator of Hazardous Waste**
If "Yes", mark only one of the following – a, b, or c.

- ☒ a. LQG: Generates, in any calendar month, 1,000 kg/mo (2,200 lbs./mo.) or more of hazardous waste; **or** Generates, in any calendar month, or accumulates at any time, more than 1 kg/mo (2.2 lbs./mo) of acute hazardous waste; **or** Generates, in any calendar month, **or** accumulates at any time, more than 100 kg/mo (220 lbs./mo) of acute hazardous spill cleanup material.
- ☐ b. SQG: 100 to 1,000 kg/mo (220 – 2,200 lbs./mo) of non-acute hazardous waste.
- ☐ c. CESQG: Less than 100 kg/mo (220 lbs./mo) of non-acute hazardous waste.

If "Yes" above, indicate other generator activities.

Y ☐ N ☒ d. Short-Term Generator (generate from a short-term or one-time event and not from on-going processes). If "Yes", provide an explanation in the Comments section.

☒ N ☐ e. United States Importer of Hazardous Waste

Y ☐ N ☒ f. Mixed Waste (hazardous and radioactive) Generator

Y ☐ N ☒ **2. Transporter of Hazardous Waste**
If "Yes", mark all that apply.
- ☐ a. Transporter
- ☐ b. Transfer Facility (at your site)

Y ☒ N ☐ **3. Treater, Storer, or Disposer of Hazardous Waste** Note: A hazardous waste permit is required for these activities.

Y ☐ N ☒ **4. Recycler of Hazardous Waste**

Y ☐ N ☒ **5. Exempt Boiler and/or Industrial Furnace**
If "Yes", mark all that apply.
- ☐ a. Small Quantity On-site Burner Exemption
- ☐ b. Smelting, Melting, and Refining Furnace Exemption

Y ☐ N ☒ **6. Underground Injection Control**

Y ☒ N ☐ **7. Receives Hazardous Waste from Off-site**

B. Universal Waste Activities; Complete all parts 1-2.

Y ☐ N ☒ **1. Large Quantity Handler of Universal Waste (you accumulate 5,000 kg or more) [refer to your State regulations to determine what is regulated]. Indicate types of universal waste managed at your site. If "Yes", mark all that apply.**

- a. Batteries ☐
- b. Pesticides ☐
- c. Mercury containing equipment ☐
- d. Lamps ☐
- e. Other (specify) _____ ☐
- f. Other (specify) _____ ☐
- g. Other (specify) _____ ☐

Y ☒ N ☐ **2. Destination Facility for Universal Waste**
Note: A hazardous waste permit may be required for this activity.

C. Used Oil Activities; Complete all parts 1-4.

Y ☐ N ☒ **1. Used Oil Transporter**
If "Yes", mark all that apply.
- ☐ a. Transporter
- ☐ b. Transfer Facility (at your site)

Y ☐ N ☒ **2. Used Oil Processor and/or Re-refiner**
If "Yes", mark all that apply.
- ☐ a. Processor
- ☐ b. Re-refiner

Y ☐ N ☒ **3. Off-Specification Used Oil Burner**

Y ☐ N ☒ **4. Used Oil Fuel Marketer**
If "Yes", mark all that apply.
- ☐ a. Marketer Who Directs Shipment of Off-Specification Used Oil to Off-Specification Used Oil Burner
- ☐ b. Marketer Who First Claims the Used Oil Meets the Specifications

D. Eligible Academic Entities with Laboratories—Notification for opting into or withdrawing from managing laboratory hazardous wastes pursuant to 40 CFR Part 262 Subpart K

- You must check with your State to determine if you are eligible to manage laboratory hazardous wastes pursuant to 40 CFR Part 262 Subpart K

☐ 1. Opting into or currently operating under 40 CFR Part 262 Subpart K for the management of hazardous wastes in laboratories
See the item-by-item instructions for definitions of types of eligible academic entities. Mark all that apply:

☐ a. College or University

☐ b. Teaching Hospital that is owned by or has a formal written affiliation agreement with a college or university

☐ c. Non-profit Institute that is owned by or has a formal written affiliation agreement with a college or university

☐ 2. Withdrawing from 40 CFR Part 262 Subpart K for the management of hazardous wastes in laboratories

11. Description of Hazardous Waste

A. Waste Codes for Federally Regulated Hazardous Wastes. Please list the waste codes of the Federal hazardous wastes handled at your site. List them in the order they are presented in the regulations (e.g., D001, D003, F007, U112). Use an additional page if more spaces are needed.

See attached						

B. Waste Codes for State-Regulated (i.e., non-Federal) Hazardous Wastes. Please list the waste codes of the State-Regulated hazardous wastes handled at your site. List them in the order they are presented in the regulations. Use an additional page if more spaces are needed.

12. Notification of Hazardous Secondary Material (HSM) Activity

Y ☐ N ☒ Are you notifying under 40 CFR 260.42 that you will begin managing, are managing, or will stop managing hazardous secondary material under 40 CFR 261.2(a)(2)(ii), 40 CFR 261.4(a)(23), (24), or (25)?

If "Yes", you must fill out the Addendum to the Site Identification Form: Notification for Managing Hazardous Secondary Material.

13. Comments

USEN accepts state regulated wastes for treatment, storage and disposal. State regulated wastes are managed per NAC 444 and NRS 459.

14. Certification. I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations. For the RCRA Hazardous Waste Part A Permit Application, all owner(s) and operator(s) must sign (see 40 CFR 270.10(b) and 270.11).

Signature of legal owner, operator, or an authorized representative	Name and Official Title (type or print)	Date Signed (mm/dd/yyyy)
RL Marchand	Robert L. Marchand (General Manager)	9/22/11

Number 11 A Waste Codes for Federally Regulated Hazardous Wastes

D001	F008	K031	K109	P010	P068	P188	U037	U090	U143	U194	U364
D002	F009	K032	K110	P011	P069	P189	U038	U091	U144	U196	U367
D003	F010	K033	K111	P012	P070	P190	U039	U092	U145	U197	U372
D004	F011	K034	K112	P013	P071	P191	U041	U093	U146	U200	U373
D005	F012	K035	K113	P014	P072	P192	U042	U094	U147	U201	U387
D006	F019	K036	K114	P015	P073	P194	U043	U095	U148	U202	U389
D007	F020	K037	K115	P016	P074	P196	U044	U096	U149	U203	U394
D008	F021	K038	K116	P017	P075	P197	U045	U097	U150	U204	U395
D009	F022	K039	K117	P018	P076	P198	U046	U098	U151	U205	U404
D010	F023	K040	K118	P020	P077	P199	U047	U099	U152	U206	U409
D011	F024	K041	K123	P021	P078	P201	U048	U101	U153	U207	U410
D012	F025	K042	K124	P022	P081	P202	U049	U102	U154	U208	U411
D013	F026	K043	K125	P023	P082	P203	U050	U103	U155	U209	
D014	F027	K044	K126	P024	P084	P204	U051	U105	U156	U210	
D015	F028	K045	K131	P026	P085	P205	U052	U106	U157	U211	
D016	F032	K046	K132	P027	P087	U001	U053	U107	U158	U213	
D017	F034	K047	K136	P028	P088	U002	U055	U108	U159	U214	
D018	F035	K048	K141	P029	P089	U003	U056	U109	U160	U215	
D019	F037	K049	K142	P030	P092	U004	U057	U110	U161	U216	
D020	F038	K050	K143	P031	P093	U005	U058	U111	U162	U217	
D021	F039	K051	K144	P033	P094	U006	U059	U112	U163	U218	
D022	K001	K052	K145	P034	P095	U007	U060	U113	U164	U219	
D023	K002	K060	K147	P036	P096	U008	U061	U114	U165	U220	
D024	K003	K061	K148	P037	P097	U009	U062	U115	U166	U221	
D025	K004	K062	K149	P038	P098	U010	U063	U116	U167	U222	
D026	K005	K069	K150	P039	P099	U011	U064	U117	U168	U223	
D027	K006	K071	K151	P040	P101	U012	U066	U118	U169	U225	
D028	K007	K073	K156	P041	P102	U014	U067	U119	U170	U226	
D029	K008	K083	K157	P042	P103	U015	U068	U120	U171	U227	
D030	K009	K084	K158	P043	P104	U016	U069	U121	U172	U228	
D031	K010	K085	K159	P044	P105	U017	U070	U122	U173	U234	
D032	K011	K086	K161	P045	P106	U018	U071	U123	U174	U235	
D033	K013	K087	K169	P046	P108	U019	U072	U124	U176	U236	
D034	K014	K088	K170	P047	P109	U020	U073	U125	U177	U237	
D035	K015	K093	K171	P048	P110	U021	U074	U126	U178	U238	
D036	K016	K094	K172	P049	P111	U022	U075	U127	U179	U239	
D037	K017	K095	K174	P050	P112	U023	U076	U128	U180	U240	
D038	K018	K096	K175	P051	P113	U024	U077	U129	U181	U243	
D039	K019	K097	K176	P054	P114	U025	U078	U130	U182	U244	
D040	K020	K098	K177	P056	P115	U026	U079	U131	U183	U246	
D041	K021	K099	K178	P057	P116	U027	U080	U132	U184	U247	
D042	K022	K100	P001	P058	P118	U028	U081	U133	U185	U248	
D043	K023	K101	P002	P059	P119	U029	U082	U134	U186	U249	
F001	K024	K102	P003	P060	P120	U030	U083	U135	U187	U271	
F002	K025	K103	P004	P062	P121	U031	U084	U136	U188	U278	
F003	K026	K104	P005	P063	P122	U032	U085	U137	U189	U279	
F004	K027	K105	P006	P064	P123	U033	U086	U138	U190	U280	
F005	K028	K106	P007	P065	P127	U034	U087	U140	U191	U328	
F006	K029	K107	P008	P066	P128	U035	U088	U141	U192	U353	
F007	K030	K108	P009	P067	P185	U036	U089	U142	U193	U359	

EPA ID Number | N | V | T | 3 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |

OMB#: 2050-0024; Expires 01/31/2017

United States Environmental Protection Agency

HAZARDOUS WASTE PERMIT INFORMATION FORM

RECEIVED
JUL 15 2015
NDEP BWM

1. Facility Permit Contact	**First Name:** Robert	**MI:** L	**Last Name:** Marchand
	Contact Title: General Manager		
	Phone: 775.553.2203	**Ext.:** 4104	**Email:** bob.marchand@usecology.com
2. Facility Permit Contact Mailing Address	**Street or P.O. Box:** PO Box 578		
	City, Town, or Village: Beatty		
	State: Nevada		
	Country: USA	**Zip Code:** 89003	
3. Operator Mailing Address and Telephone Number	**Street or P.O. Box:** PO Box 578		
	City, Town, or Village: Beatty		
	State: Nevada	**Phone:** 775.553.2203	
	Country: USA	**Zip Code:** 89003	
4. Facility Existence Date	**Facility Existence Date (mm/dd/yyyy):** 01/01/1970		

5. Other Environmental Permits

A. Facility Type (Enter code)	B. Permit Number													C. Description
R	N	E	V	H	W	0	0	2	5					NDEP - HAZARDOUS WASTE PERMIT
P	A	P	4	9	5	3	-	0	1	8	4	.	3	NDEP - STATE AIR PERMIT
E	N	V	T	3	3	0	0	1	0	0	0	0		EPA REGION IX - TSCA PERMIT
E	P	3	3	0	-	1	3	-	0	0	3	3	8	DEPT OF AGRICULTURE - SOIL PERMIT
E	N	V	R	5	0	0	0	0						NDEP - STORM WATER PERMIT

6. Nature of Business: The facility provides treatment, storage, and disposal for RCRA, non-hazardous, and TSCA regulated wastes. Treatment options include, stabilization, neutralization, solidification, chemical oxidation, encapsulation, and deactivation.

7. Process Codes and Design Capacities – Enter information in the Section on Form Page 3

A. PROCESS CODE – Enter the code from the list of process codes below that best describes each process to be used at the facility. If more lines are needed, attach a separate sheet of paper with the additional information. For "other" processes (i.e., D99, S99, T04 and X99), describe the process (including its design capacity) in the space provided in Item 8.

B. PROCESS DESIGN CAPACITY – For each code entered in Item 7.A; enter the capacity of the process.

1. **AMOUNT – Enter the amount. In a case where design capacity is not applicable (such as in a closure/post-closure or enforcement action) enter the total amount of waste for that process.**
2. **UNIT OF MEASURE – For each amount entered in Item 7.B(1), enter the code in Item 7.B(2) from the list of unit of measure codes below that describes the unit of measure used. Select only from the units of measure in this list.**

C. PROCESS TOTAL NUMBER OF UNITS – Enter the total number of units for each corresponding process code.

Process Code	Process	Appropriate Unit of Measure for Process Design Capacity
	Disposal	
D79	Underground Injection Well Disposal	Gallons; Liters; Gallons Per Day; or Liters Per Day
D80	Landfill	Acre-feet; Hectares-meter; Acres; Cubic Meters; Hectares; Cubic Yards
D81	Land Treatment	Acres or Hectares
D82	Ocean Disposal	Gallons Per Day or Liters Per Day
D83	Surface Impoundment Disposal	Gallons; Liters; Cubic Meters; or Cubic Yards
D99	Other Disposal	Any Unit of Measure Listed Below
	Storage	
S01	Container	Gallons; Liters; Cubic Meters; or Cubic Yards
S02	Tank Storage	Gallons; Liters; Cubic Meters; or Cubic Yards
S03	Waste Pile	Cubic Yards or Cubic Meters
S04	Surface Impoundment	Gallons; Liters; Cubic Meters; or Cubic Yards
S05	Drip Pad	Gallons; Liters; Cubic Meters; Hectares; or Cubic Yards
S06	Containment Building Storage	Cubic Yards or Cubic Meters
S99	Other Storage	Any Unit of Measure Listed Below
	Treatment	
T01	Tank Treatment	Gallons Per Day; Liters Per Day
T02	Surface Impoundment	Gallons Per Day; Liters Per Day
T03	Incinerator	Short Tons Per Hour; Metric Tons Per Hour; Gallons Per Hour; Liters Per Hour; BTUs Per Hour; Pounds Per Hour; Short Tons Per Day; Kilograms Per Hour; Gallons Per Day; Metric Tons Per Hour; or Million BTU Per Hour
T04	Other Treatment	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Short Tons Per Day; BTUs Per Hour; Gallons Per Day; Liters Per Hour; or Million BTU Per Hour
T80	Boiler	Gallons; Liters; Gallons Per Hour; Liters Per Hour; BTUs Per Hour; or Million BTU Per Hour

Process Code	Process	Appropriate Unit of Measure for Process Design Capacity
	Treatment (Continued)	**(for T81 – T94)**
T81	Cement Kiln	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; BTU Per Hour; Liters Per Hour; Kilograms Per Hour; or Million BTU Per Hour
T82	Lime Kiln	
T83	Aggregate Kiln	
T84	Phosphate Kiln	
T85	Coke Oven	
T86	Blast Furnace	
T87	Smelting, Melting, or Refining Furnace	
T88	Titanium Dioxide Chloride Oxidation Reactor	
T89	Methane Reforming Furnace	
T90	Pulping Liquor Recovery Furnace	
T91	Combustion Device Used in the Recovery of Sulfur Values from Spent Sulfuric Acid	
T92	Halogen Acid Furnaces	
T93	Other Industrial Furnaces Listed in 40 CFR 260.10	
T94	Containment Building Treatment	Cubic Yards; Cubic Meters; Short Tons Per Hour; Gallons Per Hour; Liters Per Hour; BTU Per Hour; Pounds Per Hour; Short Tons Per Day; Kilograms Per Hour; Metric Tons Per Day; Gallons Per Day; Liters Per Day; Metric Tons Per Hour; or Million BTU Per Hour
	Miscellaneous (Subpart X)	
X01	Open Burning/Open Detonation	Any Unit of Measure Listed Below
X02	Mechanical Processing	Short Tons Per Hour; Metric Tons Per Hour; Short Tons Per Day; Metric Tons Per Day; Pounds Per Hour; Kilograms Per Hour; Gallons Per Hour; Liters Per Hour; or Gallons Per Day
X03	Thermal Unit	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; BTU Per Hour; or Million BTU Per Hour
X04	Geologic Repository	Cubic Yards; Cubic Meters; Acre-feet; Hectare-meter; Gallons; or Liters
X99	Other Subpart X	Any Unit of Measure Listed Below

Unit of Measure	Unit of Measure Code
Gallons	G
Gallons Per Hour	E
Gallons Per Day	U
Liters	L
Liters Per Hour	H
Liters Per Day	V
Short Tons Per Hour	D
Short Tons Per Day	N
Metric Tons Per Hour	W
Metric Tons Per Day	S
Pounds Per Hour	J
Kilograms Per Hour	X
Million BTU Per Hour	X
Cubic Yards	Y
Cubic Meters	C
Acres	B
Acre-feet	A
Hectares	Q
Hectare-meter	F
BTU Per Hour	I

EPA ID Number | N | V | T | 3 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |

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7. Process Codes and Design Capacities (Continued)

EXAMPLE FOR COMPLETING Item 7 (shown in line number X-1 below): A facility has a storage tank, which can hold 533.788 gallons.

Line Number		A. Process Code (From list above)			B. PROCESS DESIGN CAPACITY		C. Process Total Number of Units	For Official Use Only					
					(1) Amount (Specify)	(2) Unit of Measure							
X	1	S	0	2	533.788	G	001						
	1	S	0	1	6,299	Y	04						
	2	S	0	2	25,000	G	04						
	3	T	0	1	10,000	U	01						
	4	T	0	1	686,000	U	05						
	5	D	8	0	1,660,000	Y	01						
	6												
	7												
	8												
	9												
1	0												
1	1												
1	2												
1	3												

Note: If you need to list more than 13 process codes, attach an additional sheet(s) with the information in the same format as above. Number the line sequentially, taking into account any lines that will be used for "other" process (i.e., D99, S99, T04, and X99) in Item 8.

8. Other Processes (Follow instructions from Item 7 for D99, S99, T04, and X99 process codes)

Line Number (Enter #s in sequence with Item 7)		A. Process Code (From list above)			B. PROCESS DESIGN CAPACITY		C. Process Total Number of Units	For Official Use Only					
					(1) Amount (Specify)	(2) Unit of Measure							
X	2	T	0	4	100.00	U	001						

9. Description of Hazardous Wastes - Enter Information in the Sections on Form Page 5

A. EPA HAZARDOUS WASTE NUMBER – Enter the four-digit number from 40 CFR, Part 261 Subpart D of each listed hazardous waste you will handle. For hazardous wastes which are not listed in 40 CFR, Part 261 Subpart D, enter the four-digit number(s) from 40 CFR Part 261, Subpart C that describes the characteristics and/or the toxic contaminants of those hazardous wastes.

B. ESTIMATED ANNUAL QUANTITY – For each listed waste entered in Item 9.A, estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in Item 9.A, estimate the total annual quantity of all the non-listed waste(s) that will be handled which possess that characteristic or contaminant.

C. UNIT OF MEASURE – For each quantity entered in Item 9.B, enter the unit of measure code. Units of measure which must be used and the appropriate codes are:

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS	P	KILOGRAMS	K
TONS	T	METRIC TONS	M

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure, taking into account the appropriate density or specific gravity of the waste.

D. PROCESSES

1. PROCESS CODES:

For listed hazardous waste: For each listed hazardous waste entered in Item 9.A, select the code(s) from the list of process codes contained in Items 7.A and 8.A on page 3 to indicate all the processes that will be used to store, treat, and/or dispose of all listed hazardous wastes.

For non-listed waste: For each characteristic or toxic contaminant entered in Item 9.A, select the code(s) from the list of process codes contained in Items 7.A and 8.A on page 3 to indicate all the processes that will be used to store, treat, and/or dispose of all the non-listed hazardous wastes that possess that characteristic or toxic contaminant.

NOTE: THREE SPACES ARE PROVIDED FOR ENTERING PROCESS CODES. IF MORE ARE NEEDED:

1. **Enter the first two as described above.**
2. **Enter "000" in the extreme right box of Item 9.D(1).**
3. **Use additional sheet, enter line number from previous sheet, and enter additional code(s) in Item 9.E.**

2. PROCESS DESCRIPTION: If code is not listed for a process that will be used, describe the process in Item 9.D(2) or in Item 9.E(2).

NOTE: HAZARDOUS WASTES DESCRIBED BY MORE THAN ONE EPA HAZARDOUS WASTE NUMBER – Hazardous wastes that can be described by more than one EPA Hazardous Waste Number shall be described on the form as follows:

1. **Select one of the EPA Hazardous Waste Numbers and enter it in Item 9.A. On the same line complete Items 9.B, 9.C, and 9.D by estimating the total annual quantity of the waste and describing all the processes to be used to store, treat, and/or dispose of the waste.**
2. **In Item 9.A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In Item 9.D.2 on that line enter "included with above" and make no other entries on that line.**
3. **Repeat step 2 for each EPA Hazardous Waste Number that can be used to describe the hazardous waste.**

EXAMPLE FOR COMPLETING Item 9 (shown in line numbers X-1, X-2, X-3, and X-4 below) – A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operations. In addition, the facility will treat and dispose of three non-listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

Line Number		A. EPA Hazardous Waste No. (Enter code)				B. Estimated Annual Qty of Waste	C. Unit of Measure (Enter code)	D. PROCESSES									
								(1) PROCESS CODES (Enter Code)									(2) PROCESS DESCRIPTION (If code is not entered in 9.D(1))
X	1	K	0	5	4	900	P	T	0	3	D	8	0				
X	2	D	0	0	2	400	P	T	0	3	D	8	0				
X	3	D	0	0	1	100	P	T	0	3	D	8	0				
X	4	D	0	0	2												Included With Above

9. Description of Hazardous Wastes ***(Continued. Use additional sheet(s) as necessary; number pages as 5a, etc.)***

Line Number		A. EPA Hazardous Waste No. (Enter code)				B. Estimated Annual Qty of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter Code)									D. PROCESSES (2) PROCESS DESCRIPTION (If code is not entered in 9.D(1))
	1	D	0	0	1	1,000	T	S	0	1	T	0	1	D	8	0	
	2	D	0	0	2	10,000	T	S	0	1	T	0	1	D	8	0	
	3	D	0	0	3	10	T	S	0	1	T	0	1	D	8	0	
	4	D	0	0	4	20,000	T	S	0	1	T	0	1	D	8	0	
	5	D	0	0	5	20,000	T	S	0	1	T	0	1	D	8	0	
	6	D	0	0	6	10,000	T	S	0	1	T	0	1	D	8	0	
	7	D	0	0	7	25,000	T	S	0	1	T	0	1	D	8	0	
	8	D	0	0	8	25,000	T	S	0	1	T	0	1	D	8	0	
	9	D	0	0	9	200	T	S	0	1	T	0	1	D	8	0	
1	0	D	0	1	0	100	T	S	0	1	T	0	1	D	8	0	
1	1	D	0	1	1	100	T	S	0	1	T	0	1	D	8	0	
1	2	D	0	1	2	1	T	S	0	1	T	0	1	D	8	0	
1	3	D	0	1	3	1	T	S	0	1	T	0	1	D	8	0	
1	4	D	0	1	4	1	T	S	0	1	T	0	1	D	8	0	
1	5	D	0	1	5	1	T	S	0	1	T	0	1	D	8	0	
1	6	D	0	1	6	1	T	S	0	1	T	0	1	D	8	0	
1	7	D	0	1	7	1	T	S	0	1	T	0	1	D	8	0	
1	8	D	0	1	8	100	T	S	0	1	T	0	1	D	8	0	
1	9	D	0	1	9	25	T	S	0	1	T	0	1	D	8	0	
2	0	D	0	2	0	1	T	S	0	1	T	0	1	D	8	0	
2	1	D	0	2	1	5	T	S	0	1	T	0	1	D	8	0	
2	2	D	0	2	2	5	T	S	0	1	T	0	1	D	8	0	
2	3	D	0	2	3	1	T	S	0	1	T	0	1	D	8	0	
2	4	D	0	2	4	1	T	S	0	1	T	0	1	D	8	0	
2	5	D	0	2	5	1	T	S	0	1	T	0	1	D	8	0	
2	6	D	0	2	6	1	T	S	0	1	T	0	1	D	8	0	
2	7	D	0	2	7	2	T	S	0	1	T	0	1	D	8	0	
2	8	D	0	2	8	10	T	S	0	1	T	0	1	D	8	0	
2	9	D	0	2	9	10	T	S	0	1	T	0	1	D	8	0	
3	0	D	0	3	0	1	T	S	0	1	T	0	1	D	8	0	
3	1	D	0	3	1	1	T	S	0	1	T	0	1	D	8	0	
3	2	D	0	3	2	1	T	S	0	1	T	0	1	D	8	0	
3	3	D	0	3	3	1	T	S	0	1	T	0	1	D	8	0	
3	4	D	0	3	4	1	T	S	0	1	T	0	1	D	8	0	
3	5	D	0	3	5	5	T	S	0	1	T	0	1	D	8	0	
3	6	D	0	3	6	1	T	S	0	1	T	0	1	D	8	0	

EPA ID Number | N | V | T | 3 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | OMB#: 2050-0034; Expires 7/31/2012

9. Description of Hazardous Wastes ***(Continued. Use additional sheet(s) as necessary; number pages as 5a, etc.)***

Line Number		A. EPA Hazardous Waste No. (Enter code)				B. Estimated Annual Qty of Waste	C. Unit of Measure (Enter code)	D. PROCESSES									
								(1) PROCESS CODES (Enter Code)									(2) PROCESS DESCRIPTION (If code is not entered in 9.D.1)
3	7	D	0	3	7	1	T	S	0	1	T	0	1	D	8	0	
3	8	D	0	3	8	1	T	S	0	1	T	0	1	D	8	0	
3	9	D	0	3	9	10	T	S	0	1	T	0	1	D	8	0	
4	0	D	0	4	0	10	T	S	0	1	T	0	1	D	8	0	
4	1	D	0	4	1	1	T	S	0	1	T	0	1	D	8	0	
4	2	D	0	4	2	1	T	S	0	1	T	0	1	D	8	0	
4	3	D	0	4	3	2	T	S	0	1	T	0	1	D	8	0	
4	4	F	0	0	1	5	T	S	0	1	T	0	1	D	8	0	
4	5	F	0	0	2	50	T	S	0	1	T	0	1	D	8	0	
4	6	F	0	0	3	5	T	S	0	1	T	0	1	D	8	0	
4	7	F	0	0	4	1	T	S	0	1	T	0	1	D	8	0	
4	8	F	0	0	5	1	T	S	0	1	T	0	1	D	8	0	
4	9	F	0	0	6	10,000	T	S	0	1	T	0	1	D	8	0	
5	0	F	0	0	7	5,000	T	S	0	1	T	0	1	D	8	0	
5	1	F	0	0	8	1,000	T	S	0	1	T	0	1	D	8	0	
5	2	F	0	0	9	500	T	S	0	1	T	0	1	D	8	0	
5	3	F	0	1	0	500	T	S	0	1	T	0	1	D	8	0	
5	4	F	0	1	1	100	T	S	0	1	T	0	1	D	8	0	
5	5	F	0	1	2	100	T	S	0	1	T	0	1	D	8	0	
5	6	F	0	1	9	1,000	T	S	0	1	T	0	1	D	8	0	
5	7	F	0	2	0	0.1	T	S	0	1	T	0	1	D	8	0	
5	8	F	0	2	1	0.1	T	S	0	1	T	0	1	D	8	0	
5	9	F	0	2	2	0.1	T	S	0	1	T	0	1	D	8	0	
6	0	F	0	2	3	0.1	T	S	0	1	T	0	1	D	8	0	
6	1	F	0	2	4	0.1	T	S	0	1	T	0	1	D	8	0	
6	2	F	0	2	5	0.1	T	S	0	1	T	0	1	D	8	0	
6	3	F	0	2	6	0.1	T	S	0	1	T	0	1	D	8	0	
6	4	F	0	2	7	0.1	T	S	0	1	T	0	1	D	8	0	
6	5	F	0	2	8	0.1	T	S	0	1	T	0	1	D	8	0	
6	6	F	0	3	2	1	T	S	0	1	T	0	1	D	8	0	
6	7	F	0	3	4	0.5	T	S	0	1	T	0	1	D	8	0	
6	8	F	0	3	5	5	T	S	0	1	T	0	1	D	8	0	
6	9	F	0	3	7	500	T	S	0	1	T	0	1	D	8	0	
7	0	F	0	3	9	500	T	S	0	1	T	0	1	D	8	0	
7	1	K	0	0	1	1	T	S	0	1	T	0	1	D	8	0	
7	2	K	0	0	2	1	T	S	0	1	T	0	1	D	8	0	

EPA ID Number | N | V | T | 3 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | OMB#: 2050-0034; Expires 7/31/2012

9. Description of Hazardous Wastes ***(Continued. Use additional sheet(s) as necessary; number pages as 5a, etc.)***

Line Number		A. EPA Hazardous Waste No. (Enter code)				B. Estimated Annual Qty of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter Code)									D. PROCESSES (2) PROCESS DESCRIPTION (If code is not entered in 9.D.1)
7	3	K	0	0	3	1	T	S	0	1	T	0	1	D	8	0	
7	4	K	0	0	4	1	T	S	0	1	T	0	1	D	8	0	
7	5	K	0	0	5	1	T	S	0	1	T	0	1	D	8	0	
7	6	K	0	0	6	1	T	S	0	1	T	0	1	D	8	0	
7	7	K	0	0	7	1	T	S	0	1	T	0	1	D	8	0	
7	8	K	0	0	8	1	T	S	0	1	T	0	1	D	8	0	
7	9	K	0	0	9	1	T	S	0	1	T	0	1	D	8	0	
8	0	K	0	1	0	1	T	S	0	1	T	0	1	D	8	0	
8	1	K	0	1	1	1	T	S	0	1	T	0	1	D	8	0	
8	2	K	0	1	3	1	T	S	0	1	T	0	1	D	8	0	
8	3	K	0	1	4	1	T	S	0	1	T	0	1	D	8	0	
8	4	K	0	1	5	1	T	S	0	1	T	0	1	D	8	0	
8	5	K	0	1	6	1	T	S	0	1	T	0	1	D	8	0	
8	6	K	0	1	7	1	T	S	0	1	T	0	1	D	8	0	
8	7	K	0	1	8	1	T	S	0	1	T	0	1	D	8	0	
8	8	K	0	1	9	1	T	S	0	1	T	0	1	D	8	0	
8	9	K	0	2	0	1	T	S	0	1	T	0	1	D	8	0	
9	0	K	0	2	1	1	T	S	0	1	T	0	1	D	8	0	
9	1	K	0	2	2	1	T	S	0	1	T	0	1	D	8	0	
9	2	K	0	2	3	1	T	S	0	1	T	0	1	D	8	0	
9	3	K	0	2	4	1	T	S	0	1	T	0	1	D	8	0	
9	4	K	0	2	5	0.1	T	S	0	1	T	0	1	D	8	0	
9	5	K	0	2	6	0.1	T	S	0	1	T	0	1	D	8	0	
9	6	K	0	2	7	0.1	T	S	0	1	T	0	1	D	8	0	
9	7	K	0	2	8	1	T	S	0	1	T	0	1	D	8	0	
9	8	K	0	2	9	1	T	S	0	1	T	0	1	D	8	0	
9	9	K	0	3	0	0.1	T	S	0	1	T	0	1	D	8	0	
0	0	K	0	3	1	0.1	T	S	0	1	T	0	1	D	8	0	
0	1	K	0	3	2	0.1	T	S	0	1	T	0	1	D	8	0	
0	2	K	0	3	3	0.1	T	S	0	1	T	0	1	D	8	0	
0	3	K	0	3	4	0.1	T	S	0	1	T	0	1	D	8	0	
0	4	K	0	3	5	1	T	S	0	1	T	0	1	D	8	0	
0	5	K	0	3	6	0.1	T	S	0	1	T	0	1	D	8	0	
0	6	K	0	3	7	0.1	T	S	0	1	T	0	1	D	8	0	
0	7	K	0	3	8	0.1	T	S	0	1	T	0	1	D	8	0	
0	8	K	0	3	9	0.1	T	S	0	1	T	0	1	D	8	0	

EPA ID Number | N | V | T | 3 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |

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9. Description of Hazardous Wastes ***(Continued. Use additional sheet(s) as necessary; number pages as 5a, etc.)***

Line Number		A. EPA Hazardous Waste No. (Enter code)				B. Estimated Annual Qty of Waste	C. Unit of Measure (Enter code)	D. PROCESSES									
								(1) PROCESS CODES (Enter Code)									(2) PROCESS DESCRIPTION (If code is not entered in 9.D.1)
0	9	K	0	4	0	0.1	T	S	0	1	T	0	1	D	8	0	
1	0	K	0	4	1	0.1	T	S	0	1	T	0	1	D	8	0	
1	1	K	0	4	2	0.1	T	S	0	1	T	0	1	D	8	0	
1	2	K	0	4	3	0.1	T	S	0	1	T	0	1	D	8	0	
1	3	K	0	4	4	0.1	T	S	0	1	T	0	1	D	8	0	
1	4	K	0	4	5	0.1	T	S	0	1	T	0	1	D	8	0	
1	5	K	0	4	6	0.1	T	S	0	1	T	0	1	D	8	0	
1	6	K	0	4	7	0.1	T	S	0	1	T	0	1	D	8	0	
1	7	K	0	4	8	0.1	T	S	0	1	T	0	1	D	8	0	
1	8	K	0	4	9	1	T	S	0	1	T	0	1	D	8	0	
1	9	K	0	5	0	100	T	S	0	1	T	0	1	D	8	0	
2	0	K	0	5	1	100	T	S	0	1	T	0	1	D	8	0	
2	1	K	0	5	2	100	T	S	0	1	T	0	1	D	8	0	
2	2	K	0	6	0	1	T	S	0	1	T	0	1	D	8	0	
2	3	K	0	6	1	250	T	S	0	1	T	0	1	D	8	0	
2	4	K	0	6	2	200	T	S	0	1	T	0	1	D	8	0	
2	5	K	0	6	9	250	T	S	0	1	T	0	1	D	8	0	
2	6	K	0	7	1	0.1	T	S	0	1	T	0	1	D	8	0	
2	7	K	0	7	3	0.1	T	S	0	1	T	0	1	D	8	0	
2	8	K	0	8	3	0.1	T	S	0	1	T	0	1	D	8	0	
2	9	K	0	8	4	0.1	T	S	0	1	T	0	1	D	8	0	
3	0	K	0	8	5	0.1	T	S	0	1	T	0	1	D	8	0	
3	1	K	0	8	6	0.1	T	S	0	1	T	0	1	D	8	0	
3	2	K	0	8	7	0.1	T	S	0	1	T	0	1	D	8	0	
3	3	K	0	8	8	0.1	T	S	0	1	T	0	1	D	8	0	
3	4	K	0	9	3	0.1	T	S	0	1	T	0	1	D	8	0	
3	5	K	0	9	4	0.1	T	S	0	1	T	0	1	D	8	0	
3	6	K	0	9	5	0.1	T	S	0	1	T	0	1	D	8	0	
3	7	K	0	9	6	0.1	T	S	0	1	T	0	1	D	8	0	
3	8	K	0	9	7	0.1	T	S	0	1	T	0	1	D	8	0	
3	9	K	0	9	8	0.1	T	S	0	1	T	0	1	D	8	0	
4	0	K	0	9	9	0.1	T	S	0	1	T	0	1	D	8	0	
4	1	K	1	0	0	0.1	T	S	0	1	T	0	1	D	8	0	
4	2	K	1	0	1	0.1	T	S	0	1	T	0	1	D	8	0	
4	3	K	1	0	2	0.1	T	S	0	1	T	0	1	D	8	0	
4	4	K	1	0	3	0.1	T	S	0	1	T	0	1	D	8	0	

EPA ID Number | N | V | T | 3 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |

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9. Description of Hazardous Wastes ***(Continued. Use additional sheet(s) as necessary; number pages as 5a, etc.)***

Line Number		A. EPA Hazardous Waste No. (Enter code)				B. Estimated Annual Qty of Waste	C. Unit of Measure (Enter code)	D. PROCESSES									
								(1) PROCESS CODES (Enter Code)									(2) PROCESS DESCRIPTION (If code is not entered in 9.D.1)
4	5	K	1	0	4	0.1	T	S	0	1	T	0	1	D	8	0	
4	6	K	1	0	5	0.1	T	S	0	1	T	0	1	D	8	0	
4	7	K	1	0	6	0.1	T	S	0	1	T	0	1	D	8	0	
4	8	K	1	0	7	0.1	T	S	0	1	T	0	1	D	8	0	
4	9	K	1	0	8	0.1	T	S	0	1	T	0	1	D	8	0	
5	0	K	1	0	9	0.1	T	S	0	1	T	0	1	D	8	0	
5	1	K	1	1	0	0.1	T	S	0	1	T	0	1	D	8	0	
5	2	K	1	1	1	0.1	T	S	0	1	T	0	1	D	8	0	
5	3	K	1	1	2	0.1	T	S	0	1	T	0	1	D	8	0	
5	4	K	1	1	3	0.1	T	S	0	1	T	0	1	D	8	0	
5	5	K	1	1	4	0.1	T	S	0	1	T	0	1	D	8	0	
5	6	K	1	1	5	0.1	T	S	0	1	T	0	1	D	8	0	
5	7	K	1	1	6	0.1	T	S	0	1	T	0	1	D	8	0	
5	8	K	1	1	7	0.1	T	S	0	1	T	0	1	D	8	0	
5	9	K	1	1	8	0.1	T	S	0	1	T	0	1	D	8	0	
6	0	K	1	2	3	0.1	T	S	0	1	T	0	1	D	8	0	
6	1	K	1	2	4	0.1	T	S	0	1	T	0	1	D	8	0	
6	2	K	1	2	5	0.1	T	S	0	1	T	0	1	D	8	0	
6	3	K	1	2	6	0.1	T	S	0	1	T	0	1	D	8	0	
6	4	K	1	3	1	0.1	T	S	0	1	T	0	1	D	8	0	
6	5	K	1	3	2	0.1	T	S	0	1	T	0	1	D	8	0	
6	6	K	1	3	6	0.1	T	S	0	1	T	0	1	D	8	0	
6	7	K	1	4	1	0.1	T	S	0	1	T	0	1	D	8	0	
6	8	K	1	4	2	0.1	T	S	0	1	T	0	1	D	8	0	
6	9	K	1	4	3	0.1	T	S	0	1	T	0	1	D	8	0	
7	0	K	1	4	4	0.1	T	S	0	1	T	0	1	D	8	0	
7	1	K	1	4	5	0.1	T	S	0	1	T	0	1	D	8	0	
7	2	K	1	4	7	0.1	T	S	0	1	T	0	1	D	8	0	
7	3	K	1	4	8	0.1	T	S	0	1	T	0	1	D	8	0	
7	4	K	1	4	9	0.1	T	S	0	1	T	0	1	D	8	0	
7	5	K	1	5	1	0.1	T	S	0	1	T	0	1	D	8	0	
7	6	K	1	5	6	0.1	T	S	0	1	T	0	1	D	8	0	
7	7	K	1	5	7	0.1	T	S	0	1	T	0	1	D	8	0	
7	8	K	1	5	8	0.1	T	S	0	1	T	0	1	D	8	0	
7	9	K	1	5	9	0.1	T	S	0	1	T	0	1	D	8	0	
8	0	K	1	6	1	0.1	T	S	0	1	T	0	1	D	8	0	

EPA ID Number | N | V | T | 3 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |

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9. Description of Hazardous Wastes ***(Continued. Use additional sheet(s) as necessary; number pages as 5a, etc.)***

Line Number		A. EPA Hazardous Waste No. (Enter code)				B. Estimated Annual Qty of Waste	C. Unit of Measure (Enter code)	D. PROCESSES									
								(1) PROCESS CODES (Enter Code)									(2) PROCESS DESCRIPTION (If code is not entered in 9.D.1)
8	1	K	1	6	9	500	T	S	0	1	T	0	1	D	8	0	
8	2	K	1	7	0	500	T	S	0	1	T	0	1	D	8	0	
8	3	K	1	7	1	500	T	S	0	1	T	0	1	D	8	0	
8	4	K	1	7	2	1000	T	S	0	1	T	0	1	D	8	0	
8	5	K	1	7	4	0.1	T	S	0	1	T	0	1	D	8	0	
8	6	K	1	7	5	0.1	T	S	0	1	T	0	1	D	8	0	
8	7	K	1	7	6	0.1	T	S	0	1	T	0	1	D	8	0	
8	8	K	1	7	7	0.1	T	S	0	1	T	0	1	D	8	0	
8	9	K	1	7	8	0.1	T	S	0	1	T	0	1	D	8	0	
9	0	K	1	8	1	0.1	T	S	0	1	T	0	1	D	8	0	
9	1	P	0	0	1	0.1	T	S	0	1	T	0	1	D	8	0	
9	2	P	0	0	2	0.1	T	S	0	1	T	0	1	D	8	0	
9	3	P	0	0	3	0.1	T	S	0	1	T	0	1	D	8	0	
9	4	P	0	0	4	0.1	T	S	0	1	T	0	1	D	8	0	
9	5	P	0	0	5	0.1	T	S	0	1	T	0	1	D	8	0	
9	6	P	0	0	6	0.1	T	S	0	1	T	0	1	D	8	0	
9	7	P	0	0	7	0.1	T	S	0	1	T	0	1	D	8	0	
9	8	P	0	0	8	0.1	T	S	0	1	T	0	1	D	8	0	
9	9	P	0	0	9	0.1	T	S	0	1	T	0	1	D	8	0	
2 0	0	P	0	1	0	1	T	S	0	1	T	0	1	D	8	0	
0	1	P	0	1	1	1	T	S	0	1	T	0	1	D	8	0	
0	2	P	0	1	2	1	T	S	0	1	T	0	1	D	8	0	
0	3	P	0	1	3	0.5	T	S	0	1	T	0	1	D	8	0	
0	4	P	0	1	4	0.1	T	S	0	1	T	0	1	D	8	0	
0	5	P	0	1	5	0.1	T	S	0	1	T	0	1	D	8	0	
0	6	P	0	1	6	0.1	T	S	0	1	T	0	1	D	8	0	
0	7	P	0	1	7	0.1	T	S	0	1	T	0	1	D	8	0	
0	8	P	0	1	8	0.1	T	S	0	1	T	0	1	D	8	0	
0	9	P	0	2	0	0.1	T	S	0	1	T	0	1	D	8	0	
1	0	P	0	2	1	0.1	T	S	0	1	T	0	1	D	8	0	
1	1	P	0	2	2	0.1	T	S	0	1	T	0	1	D	8	0	
1	2	P	0	2	3	0.1	T	S	0	1	T	0	1	D	8	0	
1	3	P	0	2	4	0.1	T	S	0	1	T	0	1	D	8	0	
1	4	P	0	2	6	0.1	T	S	0	1	T	0	1	D	8	0	
1	5	P	0	2	7	0.1	T	S	0	1	T	0	1	D	8	0	
1	6	P	0	2	8	0.1	T	S	0	1	T	0	1	D	8	0	

EPA ID Number | N | V | T | 3 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |

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9. Description of Hazardous Wastes ***(Continued. Use additional sheet(s) as necessary; number pages as 5a, etc.)***

Line Number		A. EPA Hazardous Waste No. (Enter code)				B. Estimated Annual Qty of Waste	C. Unit of Measure (Enter code)	D. PROCESSES									
								(1) PROCESS CODES (Enter Code)									(2) PROCESS DESCRIPTION (If code is not entered in 9.D.1)
1	7	P	0	2	9	1	T	S	0	1	T	0	1	D	8	0	
1	8	P	0	3	0	25	T	S	0	1	T	0	1	D	8	0	
1	9	P	0	3	1	0.1	T	S	0	1	T	0	1	D	8	0	
2	0	P	0	3	3	0.1	T	S	0	1	T	0	1	D	8	0	
2	1	P	0	3	4	0.1	T	S	0	1	T	0	1	D	8	0	
2	2	P	0	3	6	0.1	T	S	0	1	T	0	1	D	8	0	
2	3	P	0	3	7	0.1	T	S	0	1	T	0	1	D	8	0	
2	4	P	0	3	8	0.1	T	S	0	1	T	0	1	D	8	0	
2	5	P	0	3	9	0.1	T	S	0	1	T	0	1	D	8	0	
2	6	P	0	4	0	0.1	T	S	0	1	T	0	1	D	8	0	
2	7	P	0	4	1	0.1	T	S	0	1	T	0	1	D	8	0	
2	8	P	0	4	2	0.1	T	S	0	1	T	0	1	D	8	0	
2	9	P	0	4	3	0.1	T	S	0	1	T	0	1	D	8	0	
3	0	P	0	4	4	0.1	T	S	0	1	T	0	1	D	8	0	
3	1	P	0	4	5	0.1	T	S	0	1	T	0	1	D	8	0	
3	2	P	0	4	6	0.1	T	S	0	1	T	0	1	D	8	0	
3	3	P	0	4	7	0.1	T	S	0	1	T	0	1	D	8	0	
3	4	P	0	4	8	0.1	T	S	0	1	T	0	1	D	8	0	
3	5	P	0	5	0	0.1	T	S	0	1	T	0	1	D	8	0	
3	6	P	0	5	1	1	T	S	0	1	T	0	1	D	8	0	
3	7	P	0	5	4	0.1	T	S	0	1	T	0	1	D	8	0	
3	8	P	0	5	6	0.1	T	S	0	1	T	0	1	D	8	0	
3	9	P	0	5	7	0.1	T	S	0	1	T	0	1	D	8	0	
4	0	P	0	5	8	0.1	T	S	0	1	T	0	1	D	8	0	
4	1	P	0	5	9	0.1	T	S	0	1	T	0	1	D	8	0	
4	2	P	0	6	0	0.1	T	S	0	1	T	0	1	D	8	0	
4	3	P	0	6	2	0.1	T	S	0	1	T	0	1	D	8	0	
4	4	P	0	6	3	0.1	T	S	0	1	T	0	1	D	8	0	
4	5	P	0	6	4	0.1	T	S	0	1	T	0	1	D	8	0	
4	6	P	0	6	5	0.1	T	S	0	1	T	0	1	D	8	0	
4	7	P	0	6	6	0.1	T	S	0	1	T	0	1	D	8	0	
4	8	P	0	6	7	0.1	T	S	0	1	T	0	1	D	8	0	
4	9	P	0	6	8	0.1	T	S	0	1	T	0	1	D	8	0	
5	0	P	0	6	9	0.1	T	S	0	1	T	0	1	D	8	0	
5	1	P	0	7	0	0.1	T	S	0	1	T	0	1	D	8	0	
5	2	P	0	7	1	0.1	T	S	0	1	T	0	1	D	8	0	

EPA ID Number | N | V | T | 3 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |

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9. Description of Hazardous Wastes ***(Continued. Use additional sheet(s) as necessary; number pages as 5a, etc.)***

Line Number		A. EPA Hazardous Waste No. (Enter code)				B. Estimated Annual Qty of Waste	C. Unit of Measure (Enter code)	D. PROCESSES									
								(1) PROCESS CODES (Enter Code)									(2) PROCESS DESCRIPTION (If code is not entered in 9.D.1)
5	3	P	0	7	2	0.1	T	S	0	1	T	0	1	D	8	0	
5	4	P	0	7	3	0.1	T	S	0	1	T	0	1	D	8	0	
5	5	P	0	7	4	0.1	T	S	0	1	T	0	1	D	8	0	
5	6	P	0	7	5	0.1	T	S	0	1	T	0	1	D	8	0	
5	7	P	0	7	6	0.1	T	S	0	1	T	0	1	D	8	0	
5	8	P	0	7	7	0.1	T	S	0	1	T	0	1	D	8	0	
5	9	P	0	7	8	0.1	T	S	0	1	T	0	1	D	8	0	
6	0	P	0	8	1	0.1	T	S	0	1	T	0	1	D	8	0	
6	1	P	0	8	2	0.1	T	S	0	1	T	0	1	D	8	0	
6	2	P	0	8	5	0.1	T	S	0	1	T	0	1	D	8	0	
6	3	P	0	8	7	0.1	T	S	0	1	T	0	1	D	8	0	
6	4	P	0	8	8	0.1	T	S	0	1	T	0	1	D	8	0	
6	5	P	0	8	9	0.1	T	S	0	1	T	0	1	D	8	0	
6	6	P	0	9	2	0.1	T	S	0	1	T	0	1	D	8	0	
6	7	P	0	9	3	0.1	T	S	0	1	T	0	1	D	8	0	
6	8	P	0	9	4	0.1	T	S	0	1	T	0	1	D	8	0	
6	9	P	0	9	5	0.1	T	S	0	1	T	0	1	D	8	0	
7	0	P	0	9	6	0.1	T	S	0	1	T	0	1	D	8	0	
7	1	P	0	9	7	0.1	T	S	0	1	T	0	1	D	8	0	
7	2	P	0	9	8	1	T	S	0	1	T	0	1	D	8	0	
7	3	P	0	9	9	0.1	T	S	0	1	T	0	1	D	8	0	
7	4	P	1	0	1	0.1	T	S	0	1	T	0	1	D	8	0	
7	5	P	1	0	2	0.1	T	S	0	1	T	0	1	D	8	0	
7	6	P	1	0	3	0.1	T	S	0	1	T	0	1	D	8	0	
7	7	P	1	0	4	0.5	T	S	0	1	T	0	1	D	8	0	
7	8	P	1	0	6	5	T	S	0	1	T	0	1	D	8	0	
7	9	P	1	0	8	0.1	T	S	0	1	T	0	1	D	8	0	
8	0	P	1	0	9	0.1	T	S	0	1	T	0	1	D	8	0	
8	1	P	1	1	0	0.1	T	S	0	1	T	0	1	D	8	0	
8	2	P	1	1	1	0.1	T	S	0	1	T	0	1	D	8	0	
8	3	P	1	1	2	0.1	T	S	0	1	T	0	1	D	8	0	
8	4	P	1	1	3	0.1	T	S	0	1	T	0	1	D	8	0	
8	5	P	1	1	4	0.1	T	S	0	1	T	0	1	D	8	0	
8	6	P	1	1	5	0.1	T	S	0	1	T	0	1	D	8	0	
8	7	P	1	1	6	0.1	T	S	0	1	T	0	1	D	8	0	
8	8	P	1	1	8	0.1	T	S	0	1	T	0	1	D	8	0	

EPA ID Number | N | V | T | 3 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | OMB#: 2050-0034; Expires 7/31/2012

9. Description of Hazardous Wastes ***(Continued. Use additional sheet(s) as necessary; number pages as 5a, etc.)***

Line Number		A. EPA Hazardous Waste No. (Enter code)				B. Estimated Annual Qty of Waste	C. Unit of Measure (Enter code)	D. PROCESSES									
								(1) PROCESS CODES (Enter Code)									(2) PROCESS DESCRIPTION (If code is not entered in 9.D.1)
8	9	P	1	1	9	0.5	T	S	0	1	T	0	1	D	8	0	
9	0	P	1	2	0	0.5	T	S	0	1	T	0	1	D	8	0	
9	1	P	1	2	1	0.5	T	S	0	1	T	0	1	D	8	0	
9	2	P	1	2	2	0.1	T	S	0	1	T	0	1	D	8	0	
9	3	P	1	2	3	0.1	T	S	0	1	T	0	1	D	8	0	
9	4	P	1	2	7	0.1	T	S	0	1	T	0	1	D	8	0	
9	5	P	1	2	8	0.1	T	S	0	1	T	0	1	D	8	0	
9	6	P	1	8	5	0.1	T	S	0	1	T	0	1	D	8	0	
9	7	P	1	8	8	0.1	T	S	0	1	T	0	1	D	8	0	
9	8	P	1	8	9	0.1	T	S	0	1	T	0	1	D	8	0	
9	9	P	1	9	0	0.1	T	S	0	1	T	0	1	D	8	0	
3 0	0	P	1	9	1	0.1	T	S	0	1	T	0	1	D	8	0	
0	1	P	1	9	2	0.1	T	S	0	1	T	0	1	D	8	0	
0	2	P	1	9	4	0.1	T	S	0	1	T	0	1	D	8	0	
0	3	P	1	9	6	0.1	T	S	0	1	T	0	1	D	8	0	
0	4	P	1	9	7	0.1	T	S	0	1	T	0	1	D	8	0	
0	5	P	1	9	8	0.1	T	S	0	1	T	0	1	D	8	0	
0	6	P	1	9	9	0.1	T	S	0	1	T	0	1	D	8	0	
0	7	P	2	0	1	0.1	T	S	0	1	T	0	1	D	8	0	
0	8	P	2	0	2	1	T	S	0	1	T	0	1	D	8	0	
0	9	P	2	0	3	0.1	T	S	0	1	T	0	1	D	8	0	
1	0	P	2	0	4	0.1	T	S	0	1	T	0	1	D	8	0	
1	1	P	2	0	5	0.1	T	S	0	1	T	0	1	D	8	0	
1	2	U	0	0	1	0.1	T	S	0	1	T	0	1	D	8	0	
1	3	0	0	0	2	0.5	T	S	0	1	T	0	1	D	8	0	
1	4	U	0	0	3	0.1	T	S	0	1	T	0	1	D	8	0	
1	5	U	0	0	4	0.1	T	S	0	1	T	0	1	D	8	0	
1	6	U	0	0	5	0.1	T	S	0	1	T	0	1	D	8	0	
1	7	U	0	0	6	0.1	T	S	0	1	T	0	1	D	8	0	
1	8	U	0	0	7	0.1	T	S	0	1	T	0	1	D	8	0	
1	9	U	0	0	8	0.1	T	S	0	1	T	0	1	D	8	0	
2	0	U	0	0	9	0.1	T	S	0	1	T	0	1	D	8	0	
2	1	U	0	1	0	0.1	T	S	0	1	T	0	1	D	8	0	
2	2	U	0	1	1	0.1	T	S	0	1	T	0	1	D	8	0	
2	3	U	0	1	2	0.1	T	S	0	1	T	0	1	D	8	0	
2	4	U	0	1	4	0.1	T	S	0	1	T	0	1	D	8	0	

EPA ID Number | N | V | T | 3 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |

OMB#: 2050-0034; Expires 7/31/2012

9. Description of Hazardous Wastes ***(Continued. Use additional sheet(s) as necessary; number pages as 5a, etc.)***

Line Number		A. EPA Hazardous Waste No. (Enter code)				B. Estimated Annual Qty of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter Code)									D. PROCESSES (2) PROCESS DESCRIPTION (If code is not entered in 9.D.1)
2	5	U	0	1	5	0.1	T	S	0	1	T	0	1	D	8	0	
2	6	U	0	1	6	0.1	T	S	0	1	T	0	1	D	8	0	
2	7	U	0	1	7	0.1	T	S	0	1	T	0	1	D	8	0	
2	8	U	0	1	8	0.1	T	S	0	1	T	0	1	D	8	0	
2	9	U	0	1	9	0.1	T	S	0	1	T	0	1	D	8	0	
3	0	U	0	2	0	0.1	T	S	0	1	T	0	1	D	8	0	
3	1	U	0	2	1	0.1	T	S	0	1	T	0	1	D	8	0	
3	2	U	0	2	2	0.1	T	S	0	1	T	0	1	D	8	0	
3	3	U	0	2	3	0.1	T	S	0	1	T	0	1	D	8	0	
3	4	U	0	2	4	0.1	T	S	0	1	T	0	1	D	8	0	
3	5	U	0	2	5	0.1	T	S	0	1	T	0	1	D	8	0	
3	6	U	0	2	6	0.1	T	S	0	1	T	0	1	D	8	0	
3	7	U	0	2	7	0.1	T	S	0	1	T	0	1	D	8	0	
3	8	U	0	2	8	0.1	T	S	0	1	T	0	1	D	8	0	
3	9	U	0	2	9	0.1	T	S	0	1	T	0	1	D	8	0	
4	0	U	0	3	0	0.1	T	S	0	1	T	0	1	D	8	0	
4	1	U	0	3	1	0.1	T	S	0	1	T	0	1	D	8	0	
4	2	U	0	3	2	0.1	T	S	0	1	T	0	1	D	8	0	
4	3	U	0	3	3	0.1	T	S	0	1	T	0	1	D	8	0	
4	4	U	0	3	4	0.1	T	S	0	1	T	0	1	D	8	0	
4	5	U	0	3	5	0.1	T	S	0	1	T	0	1	D	8	0	
4	6	U	0	3	6	0.5	T	S	0	1	T	0	1	D	8	0	
4	7	U	0	3	7	0.5	T	S	0	1	T	0	1	D	8	0	
4	8	U	0	3	8	0.1	T	S	0	1	T	0	1	D	8	0	
4	9	U	0	3	9	0.1	T	S	0	1	T	0	1	D	8	0	
5	0	U	0	4	1	0.1	T	S	0	1	T	0	1	D	8	0	
5	1	U	0	4	2	0.1	T	S	0	1	T	0	1	D	8	0	
5	2	U	0	4	3	0.5	T	S	0	1	T	0	1	D	8	0	
5	3	U	0	4	4	0.5	T	S	0	1	T	0	1	D	8	0	
5	4	U	0	4	5	0.1	T	S	0	1	T	0	1	D	8	0	
5	5	U	0	4	6	0.1	T	S	0	1	T	0	1	D	8	0	
5	6	U	0	4	7	0.1	T	S	0	1	T	0	1	D	8	0	
5	7	U	0	4	8	0.1	T	S	0	1	T	0	1	D	8	0	
5	8	U	0	4	9	0.1	T	S	0	1	T	0	1	D	8	0	
5	9	U	0	5	0	0.1	T	S	0	1	T	0	1	D	8	0	
6	0	U	0	5	1	0.5	T	S	0	1	T	0	1	D	8	0	

EPA ID Number | N | V | T | 3 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | OMB#: 2050-0034; Expires 7/31/2012

9. Description of Hazardous Wastes *(Continued. Use additional sheet(s) as necessary; number pages as 5a, etc.)*

Line Number		A. EPA Hazardous Waste No. (Enter code)				B. Estimated Annual Qty of Waste	C. Unit of Measure (Enter code)	D. PROCESSES									
								(1) PROCESS CODES (Enter Code)									(2) PROCESS DESCRIPTION (If code is not entered in 9.D.1)
6	1	U	0	5	2	0.1	T	S	0	1	T	0	1	D	8	0	
6	2	U	0	5	3	0.1	T	S	0	1	T	0	1	D	8	0	
6	3	U	0	5	5	0.1	T	S	0	1	T	0	1	D	8	0	
6	4	U	0	5	6	0.1	T	S	0	1	T	0	1	D	8	0	
6	5	U	0	5	7	0.1	T	S	0	1	T	0	1	D	8	0	
6	6	U	0	5	8	0.1	T	S	0	1	T	0	1	D	8	0	
6	7	U	0	5	9	0.1	T	S	0	1	T	0	1	D	8	0	
6	8	U	0	6	0	5	T	S	0	1	T	0	1	D	8	0	
6	9	U	0	6	1	5	T	S	0	1	T	0	1	D	8	0	
7	0	U	0	6	2	0.1	T	S	0	1	T	0	1	D	8	0	
7	1	U	0	6	3	0.1	T	S	0	1	T	0	1	D	8	0	
7	2	U	0	6	4	0.1	T	S	0	1	T	0	1	D	8	0	
7	3	U	0	6	6	0.1	T	S	0	1	T	0	1	D	8	0	
7	4	U	0	6	7	0.1	T	S	0	1	T	0	1	D	8	0	
7	5	U	0	6	8	0.1	T	S	0	1	T	0	1	D	8	0	
7	6	U	0	6	9	0.1	T	S	0	1	T	0	1	D	8	0	
7	7	U	0	7	0	0.1	T	S	0	1	T	0	1	D	8	0	
7	8	U	0	7	1	0.1	T	S	0	1	T	0	1	D	8	0	
7	9	U	0	7	2	0.1	T	S	0	1	T	0	1	D	8	0	
8	0	U	0	7	3	0.1	T	S	0	1	T	0	1	D	8	0	
8	1	U	0	7	4	0.1	T	S	0	1	T	0	1	D	8	0	
8	2	U	0	7	5	0.1	T	S	0	1	T	0	1	D	8	0	
8	3	U	0	7	6	0.5	T	S	0	1	T	0	1	D	8	0	
8	4	U	0	7	7	0.5	T	S	0	1	T	0	1	D	8	0	
8	5	U	0	7	8	0.5	T	S	0	1	T	0	1	D	8	0	
8	6	U	0	7	9	0.5	T	S	0	1	T	0	1	D	8	0	
8	7	U	0	8	0	0.5	T	S	0	1	T	0	1	D	8	0	
8	8	U	0	8	1	0.5	T	S	0	1	T	0	1	D	8	0	
8	9	U	0	8	2	0.5	T	S	0	1	T	0	1	D	8	0	
9	0	U	0	8	3	0.1	T	S	0	1	T	0	1	D	8	0	
9	1	U	0	8	4	0.1	T	S	0	1	T	0	1	D	8	0	
9	2	U	0	8	5	0.1	T	S	0	1	T	0	1	D	8	0	
9	3	U	0	8	6	0.1	T	S	0	1	T	0	1	D	8	0	
9	4	U	0	8	7	0.1	T	S	0	1	T	0	1	D	8	0	
9	5	U	0	8	8	0.1	T	S	0	1	T	0	1	D	8	0	
9	6	U	0	8	9	0.1	T	S	0	1	T	0	1	D	8	0	

EPA ID Number | N | V | T | 3 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | OMB#: 2050-0034; Expires 7/31/2012

9. Description of Hazardous Wastes ***(Continued. Use additional sheet(s) as necessary; number pages as 5a, etc.)***

Line Number		A. EPA Hazardous Waste No. (Enter code)				B. Estimated Annual Qty of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter Code)									D. PROCESSES (2) PROCESS DESCRIPTION (If code is not entered in 9.D.1)
9	7	U	0	9	0	0.1	T	S	0	1	T	0	1	D	8	0	
9	8	U	0	9	1	0.1	T	S	0	1	T	0	1	D	8	0	
9	9	U	0	9	2	0.1	T	S	0	1	T	0	1	D	8	0	
4 0	0	U	0	9	3	0.1	T	S	0	1	T	0	1	D	8	0	
0	1	U	0	9	4	0.1	T	S	0	1	T	0	1	D	8	0	
0	2	U	0	9	5	0.1	T	S	0	1	T	0	1	D	8	0	
0	3	U	0	9	6	0.1	T	S	0	1	T	0	1	D	8	0	
0	4	U	0	9	7	0.1	T	S	0	1	T	0	1	D	8	0	
0	5	U	0	9	8	0.1	T	S	0	1	T	0	1	D	8	0	
0	6	U	0	9	9	0.1	T	S	0	1	T	0	1	D	8	0	
0	7	U	1	0	1	0.1	T	S	0	1	T	0	1	D	8	0	
0	8	U	1	0	2	0.1	T	S	0	1	T	0	1	D	8	0	
0	9	U	1	0	3	0.1	T	S	0	1	T	0	1	D	8	0	
1	0	U	1	0	5	0.1	T	S	0	1	T	0	1	D	8	0	
1	1	U	1	0	6	0.1	T	S	0	1	T	0	1	D	8	0	
1	2	U	1	0	7	0.1	T	S	0	1	T	0	1	D	8	0	
1	3	U	1	0	8	0.1	T	S	0	1	T	0	1	D	8	0	
1	4	U	1	0	9	0.1	T	S	0	1	T	0	1	D	8	0	
1	5	U	1	1	0	0.1	T	S	0	1	T	0	1	D	8	0	
1	6	U	1	1	1	0.1	T	S	0	1	T	0	1	D	8	0	
1	7	U	1	1	2	0.1	T	S	0	1	T	0	1	D	8	0	
1	8	U	1	1	3	0.1	T	S	0	1	T	0	1	D	8	0	
1	9	U	1	1	4	0.1	T	S	0	1	T	0	1	D	8	0	
2	0	U	1	1	5	0.1	T	S	0	1	T	0	1	D	8	0	
2	1	U	1	1	6	0.1	T	S	0	1	T	0	1	D	8	0	
2	2	U	1	1	7	0.1	T	S	0	1	T	0	1	D	8	0	
2	3	U	1	1	8	0.1	T	S	0	1	T	0	1	D	8	0	
2	4	U	1	1	9	0.1	T	S	0	1	T	0	1	D	8	0	
2	5	U	1	2	0	0.1	T	S	0	1	T	0	1	D	8	0	
2	6	U	1	2	1	0.1	T	S	0	1	T	0	1	D	8	0	
2	7	U	1	2	2	0.2	T	S	0	1	T	0	1	D	8	0	
2	8	U	1	2	3	0.5	T	S	0	1	T	0	1	D	8	0	
2	9	U	1	2	4	0.1	T	S	0	1	T	0	1	D	8	0	
3	0	U	1	2	5	0.1	T	S	0	1	T	0	1	D	8	0	
3	1	U	1	2	6	0.1	T	S	0	1	T	0	1	D	8	0	
3	2	U	1	2	7	0.1	T	S	0	1	T	0	1	D	8	0	

EPA ID Number | N | V | T | 3 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |

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9. Description of Hazardous Wastes *(Continued. Use additional sheet(s) as necessary; number pages as 5a, etc.)*

Line Number		A. EPA Hazardous Waste No. (Enter code)				B. Estimated Annual Qty of Waste	C. Unit of Measure (Enter code)	D. PROCESSES									
								(1) PROCESS CODES (Enter Code)									(2) PROCESS DESCRIPTION (If code is not entered in 9.D.1)
3	3	U	1	2	8	0.1	T	S	0	1	T	0	1	D	8	0	
3	4	U	1	2	9	0.1	T	S	0	1	T	0	1	D	8	0	
3	5	U	1	3	0	0.1	T	S	0	1	T	0	1	D	8	0	
3	6	U	1	3	1	0.1	T	S	0	1	T	0	1	D	8	0	
3	7	U	1	3	2	0.1	T	S	0	1	T	0	1	D	8	0	
3	8	U	1	3	3	0.1	T	S	0	1	T	0	1	D	8	0	
3	9	U	1	3	4	1	T	S	0	1	T	0	1	D	8	0	
4	0	U	1	3	5	0.5	T	S	0	1	T	0	1	D	8	0	
4	1	U	1	3	6	0.1	T	S	0	1	T	0	1	D	8	0	
4	2	U	1	3	7	0.1	T	S	0	1	T	0	1	D	8	0	
4	3	U	1	3	8	0.1	T	S	0	1	T	0	1	D	8	0	
4	4	U	1	4	0	0.1	T	S	0	1	T	0	1	D	8	0	
4	5	U	1	4	1	0.1	T	S	0	1	T	0	1	D	8	0	
4	6	U	1	4	2	0.1	T	S	0	1	T	0	1	D	8	0	
4	7	U	1	4	3	0.1	T	S	0	1	T	0	1	D	8	0	
4	8	U	1	4	4	0.5	T	S	0	1	T	0	1	D	8	0	
4	9	U	1	4	5	0.2	T	S	0	1	T	0	1	D	8	0	
5	0	U	1	4	6	0.1	T	S	0	1	T	0	1	D	8	0	
5	1	U	1	4	7	0.1	T	S	0	1	T	0	1	D	8	0	
5	2	U	1	4	8	0.1	T	S	0	1	T	0	1	D	8	0	
5	3	U	1	4	9	0.1	T	S	0	1	T	0	1	D	8	0	
5	4	U	1	5	0	0.1	T	S	0	1	T	0	1	D	8	0	
5	5	U	1	5	1	0.5	T	S	0	1	T	0	1	D	8	0	
5	6	U	1	5	2	0.1	T	S	0	1	T	0	1	D	8	0	
5	7	U	1	5	3	0.1	T	S	0	1	T	0	1	D	8	0	
5	8	U	1	5	4	0.1	T	S	0	1	T	0	1	D	8	0	
5	9	U	1	5	5	0.1	T	S	0	1	T	0	1	D	8	0	
6	0	U	1	5	6	0.1	T	S	0	1	T	0	1	D	8	0	
6	1	U	1	5	7	0.1	T	S	0	1	T	0	1	D	8	0	
6	2	U	1	5	8	0.1	T	S	0	1	T	0	1	D	8	0	
6	3	U	1	5	9	0.1	T	S	0	1	T	0	1	D	8	0	
6	4	U	1	6	0	0.1	T	S	0	1	T	0	1	D	8	0	
6	5	U	1	6	1	0.2	T	S	0	1	T	0	1	D	8	0	
6	6	U	1	6	2	0.1	T	S	0	1	T	0	1	D	8	0	
6	7	U	1	6	3	0.1	T	S	0	1	T	0	1	D	8	0	
6	8	U	1	6	4	0.1	T	S	0	1	T	0	1	D	8	0	

EPA ID Number | N | V | T | 3 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |

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9. Description of Hazardous Wastes ***(Continued. Use additional sheet(s) as necessary; number pages as 5a, etc.)***

Line Number		A. EPA Hazardous Waste No. (Enter code)				B. Estimated Annual Qty of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter Code)									D. PROCESSES (2) PROCESS DESCRIPTION (If code is not entered in 9.D.1)
6	9	U	1	6	5	0.1	T	S	0	1	T	0	1	D	8	0	
7	0	U	1	6	6	0.1	T	S	0	1	T	0	1	D	8	0	
7	1	U	1	6	7	0.1	T	S	0	1	T	0	1	D	8	0	
7	2	U	1	6	8	0.1	T	S	0	1	T	0	1	D	8	0	
7	3	U	1	6	9	0.1	T	S	0	1	T	0	1	D	8	0	
7	4	U	1	7	0	0.1	T	S	0	1	T	0	1	D	8	0	
7	5	U	1	7	1	0.1	T	S	0	1	T	0	1	D	8	0	
7	6	U	1	7	2	0.1	T	S	0	1	T	0	1	D	8	0	
7	7	U	1	7	3	0.1	T	S	0	1	T	0	1	D	8	0	
7	8	U	1	7	4	0.1	T	S	0	1	T	0	1	D	8	0	
7	9	U	1	7	6	0.1	T	S	0	1	T	0	1	D	8	0	
8	0	U	1	7	7	0.1	T	S	0	1	T	0	1	D	8	0	
8	1	U	1	7	8	0.1	T	S	0	1	T	0	1	D	8	0	
8	2	U	1	7	9	0.1	T	S	0	1	T	0	1	D	8	0	
8	3	U	1	8	0	0.1	T	S	0	1	T	0	1	D	8	0	
8	4	U	1	8	1	0.1	T	S	0	1	T	0	1	D	8	0	
8	5	U	1	8	2	0.1	T	S	0	1	T	0	1	D	8	0	
8	6	U	1	8	3	0.1	T	S	0	1	T	0	1	D	8	0	
8	7	U	1	8	4	0.1	T	S	0	1	T	0	1	D	8	0	
8	8	U	1	8	5	0.1	T	S	0	1	T	0	1	D	8	0	
8	9	U	1	8	6	0.1	T	S	0	1	T	0	1	D	8	0	
9	0	U	1	8	7	0.1	T	S	0	1	T	0	1	D	8	0	
9	1	U	1	8	8	0.1	T	S	0	1	T	0	1	D	8	0	
9	2	U	1	8	9	0.1	T	S	0	1	T	0	1	D	8	0	
9	3	U	1	9	0	0.1	T	S	0	1	T	0	1	D	8	0	
9	4	U	1	9	1	0.1	T	S	0	1	T	0	1	D	8	0	
9	5	U	1	9	2	0.1	T	S	0	1	T	0	1	D	8	0	
9	6	U	1	9	3	0.1	T	S	0	1	T	0	1	D	8	0	
9	7	U	1	9	4	0.1	T	S	0	1	T	0	1	D	8	0	
9	8	U	1	9	6	0.1	T	S	0	1	T	0	1	D	8	0	
9	9	U	1	9	7	0.1	T	S	0	1	T	0	1	D	8	0	
5 0	0	U	2	0	0	0.1	T	S	0	1	T	0	1	D	8	0	
0	1	U	2	0	1	0.1	T	S	0	1	T	0	1	D	8	0	
0	2	U	2	0	2	0.1	T	S	0	1	T	0	1	D	8	0	
0	3	U	2	0	3	0.1	T	S	0	1	T	0	1	D	8	0	
0	4	U	2	0	4	0.1	T	S	0	1	T	0	1	D	8	0	

9. Description of Hazardous Wastes ***(Continued. Use additional sheet(s) as necessary; number pages as 5a, etc.)***

Line Number		A. EPA Hazardous Waste No. (Enter code)				B. Estimated Annual Qty of Waste	C. Unit of Measure (Enter code)	D. PROCESSES									
								(1) PROCESS CODES (Enter Code)									(2) PROCESS DESCRIPTION (If code is not entered in 9.D.1)
0	5	U	2	0	5	0.1	T	S	0	1	T	0	1	D	8	0	
0	6	U	2	0	6	0.1	T	S	0	1	T	0	1	D	8	0	
0	7	U	2	0	7	0.1	T	S	0	1	T	0	1	D	8	0	
0	8	U	2	0	8	0.1	T	S	0	1	T	0	1	D	8	0	
0	8	U	2	0	9	0.5	T	S	0	1	T	0	1	D	8	0	
0	9	U	2	1	0	0.5	T	S	0	1	T	0	1	D	8	0	
1	0	U	2	1	1	0.5	T	S	0	1	T	0	1	D	8	0	
1	1	U	2	1	3	0.1	T	S	0	1	T	0	1	D	8	0	
1	2	U	2	1	4	0.1	T	S	0	1	T	0	1	D	8	0	
1	3	U	2	1	5	0.1	T	S	0	1	T	0	1	D	8	0	
1	4	U	2	1	6	0.1	T	S	0	1	T	0	1	D	8	0	
1	5	U	2	1	7	0.1	T	S	0	1	T	0	1	D	8	0	
1	6	U	2	1	8	0.1	T	S	0	1	T	0	1	D	8	0	
1	7	U	2	1	9	0.1	T	S	0	1	T	0	1	D	8	0	
1	8	U	2	2	0	0.5	T	S	0	1	T	0	1	D	8	0	
1	9	U	2	2	1	0.1	T	S	0	1	T	0	1	D	8	0	
2	0	U	2	2	2	0.1	T	S	0	1	T	0	1	D	8	0	
2	1	U	2	2	3	0.5	T	S	0	1	T	0	1	D	8	0	
2	2	U	2	2	5	0.1	T	S	0	1	T	0	1	D	8	0	
2	3	U	2	2	6	0.5	T	S	0	1	T	0	1	D	8	0	
2	4	U	2	2	7	0.5	T	S	0	1	T	0	1	D	8	0	
2	5	U	2	2	8	0.5	T	S	0	1	T	0	1	D	8	0	
2	6	U	2	3	4	0.1	T	S	0	1	T	0	1	D	8	0	
2	7	U	2	3	5	0.1	T	S	0	1	T	0	1	D	8	0	
2	8	U	2	3	6	0.1	T	S	0	1	T	0	1	D	8	0	
2	9	U	2	3	7	0.1	T	S	0	1	T	0	1	D	8	0	
3	0	U	2	3	8	0.1	T	S	0	1	T	0	1	D	8	0	
3	1	U	2	3	9	0.5	T	S	0	1	T	0	1	D	8	0	
3	2	U	2	4	0	0.1	T	S	0	1	T	0	1	D	8	0	
3	3	U	2	4	3	0.1	T	S	0	1	T	0	1	D	8	0	
3	4	U	2	4	4	0.1	T	S	0	1	T	0	1	D	8	0	
3	5	U	2	4	6	0.1	T	S	0	1	T	0	1	D	8	0	
3	6	U	2	4	7	0.1	T	S	0	1	T	0	1	D	8	0	
3	7	U	2	4	8	0.1	T	S	0	1	T	0	1	D	8	0	
3	8	U	2	4	9	0.1	T	S	0	1	T	0	1	D	8	0	
3	9	U	2	7	1	0.1	T	S	0	1	T	0	1	D	8	0	

9. Description of Hazardous Wastes ***(Continued. Use additional sheet(s) as necessary; number pages as 5a, etc.)***

Line Number		A. EPA Hazardous Waste No. (Enter code)				B. Estimated Annual Qty of Waste	C. Unit of Measure (Enter code)	D. PROCESSES									
								(1) PROCESS CODES (Enter Code)									(2) PROCESS DESCRIPTION (If code is not entered in 9.D.1)
4	0	U	2	7	8	0.1	T	S	0	1	T	0	1	D	8	0	
4	1	U	2	7	9	0.1	T	S	0	1	T	0	1	D	8	0	
4	2	U	2	8	0	0.1	T	S	0	1	T	0	1	D	8	0	
4	3	U	3	2	8	0.1	T	S	0	1	T	0	1	D	8	0	
4	4	U	3	5	3	0.1	T	S	0	1	T	0	1	D	8	0	
4	5	U	3	5	9	0.1	T	S	0	1	T	0	1	D	8	0	
4	6	U	3	6	4	0.1	T	S	0	1	T	0	1	D	8	0	
4	7	U	3	6	7	0.1	T	S	0	1	T	0	1	D	8	0	
4	8	U	3	7	2	0.1	T	S	0	1	T	0	1	D	8	0	
4	9	U	3	7	3	0.1	T	S	0	1	T	0	1	D	8	0	
5	0	U	3	8	7	0.1	T	S	0	1	T	0	1	D	8	0	
5	1	U	3	8	9	0.1	T	S	0	1	T	0	1	D	8	0	
5	2	U	3	9	4	0.1	T	S	0	1	T	0	1	D	8	0	
5	3	U	3	9	5	0.1	T	S	0	1	T	0	1	D	8	0	
5	4	U	4	0	4	0.1	T	S	0	1	T	0	1	D	8	0	
5	5	U	4	0	9	0.1	T	S	0	1	T	0	1	D	8	0	
5	6	U	4	1	0	0.1	T	S	0	1	T	0	1	D	8	0	
5	7	U	4	1	1	0.1	T	S	0	1	T	0	1	D	8	0	

EPA ID Number | N | V | T | 3 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |

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10. Map

Attach to this application a topographical map, or other equivalent map, of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all spring, rivers, and other surface water bodies in this map area. See instructions for precise requirements.

11. Facility Drawing

All existing facilities must include a scale drawing of the facility (see instructions for more detail).

12. Photographs

All existing facilities must include photographs (aerial or ground-level) that clearly delineate all existing structures; existing storage, treatment, and disposal areas; and sites of future storage, treatment, or disposal areas (see instructions for more detail).

13. Comments

Section 7 Details:

Section 7 Line1 - SO1 - Container Storage
CMU #6 1,241 cubic yards (250,520 gallons or 5,588 55 gallon drums), CMU #7 400 cubic yard (80,778 gallons or 1,469 55 gallon drums), CMU #16 1.220 cubic yards (246,520 gallons or 4,482 55 gallon drums), and CMU #17 3,438 cubic yards (394,516 gallons or 12, 627 55 gallon drums
Total for line 1 = 6,299 cubic yards (394,516 gallons or 24,166 55 gallon drums).

Section 7 Line 2 - SO2 - Tank Storage
PCB Tanks: T-4 7,500 gallons, T-5 5,000 gallons, T-6 5,000 gallons, T-7 7,500 gallons,
Total for line 2 = 25,000 gallons

Section 7 Line 3 - T01 - Tank Treatment
Evaporation Tank (Pad): T-11 10,000 gallons/day
Total for line 3 = 10,000 gallons/day

Section 7 Line 4 - T01 - Tank Treatment
Stabilization Tanks: T-1 45,000 gallons/day, T-2 252,000 gallons/day, T-3 252, 000 gallons/day, T-18 68,500 gallons/day, and T-19 68,500 gallons/day
Total for line 4 = 686,000 gallons/day

Section 7 Line 5 - D80 Landfill Disposal
Trench 12 1.66 million cubic yards (below and above grade)
Total for line 5 = 1.66 million cubic yards

Debris Categories:
Toxicity characteristic debris
Debris contaminated with listed waste
Cyanide reactive debris
Waste PCB debris

-updated 7-15-2015

Facility Warning Signs

Facility Warning Signs

Facility Warning Signs

Facility Warning Signs

-updated 7-15-2015

Facility Photographs

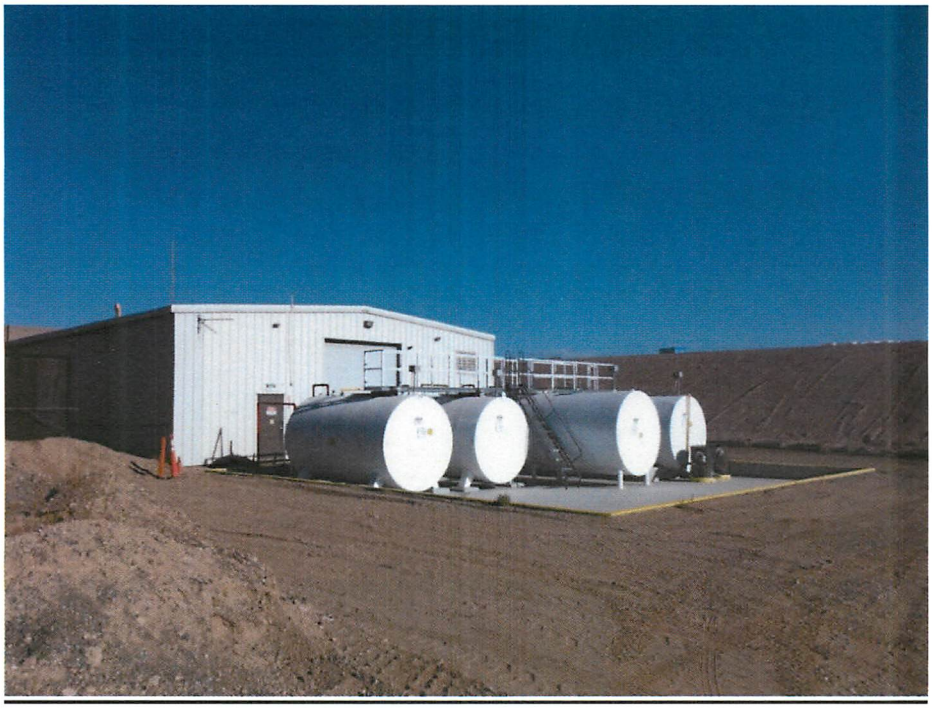

Photo 1 - PCB Tank Farm

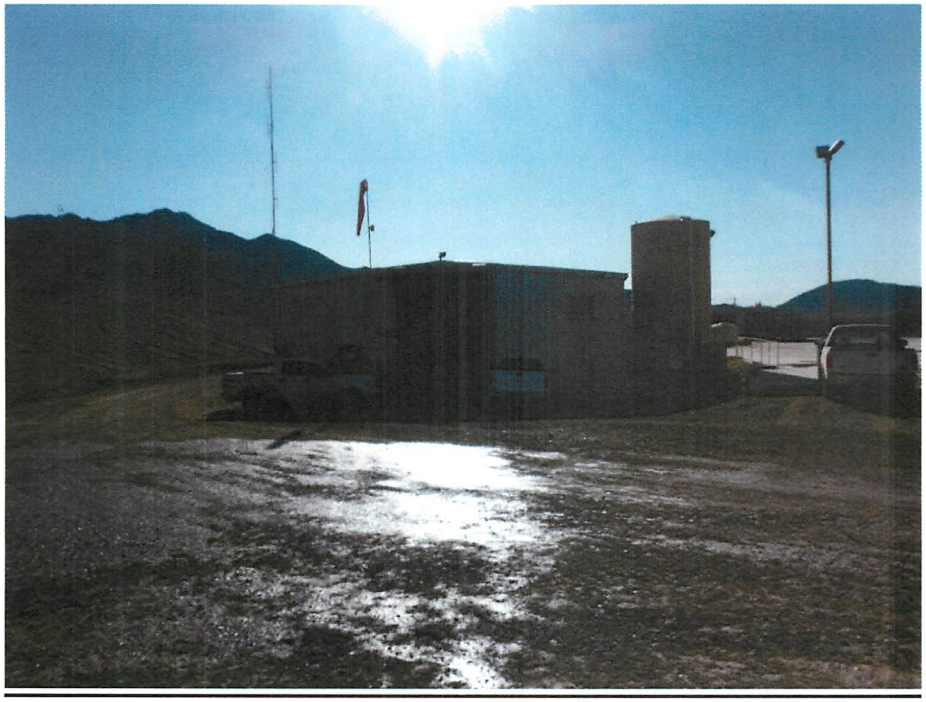

Photo 2 - PCB Building

Facility Photographs

Photo 3 – Stabilization Treatment Pans T-1, T-2, & T-3

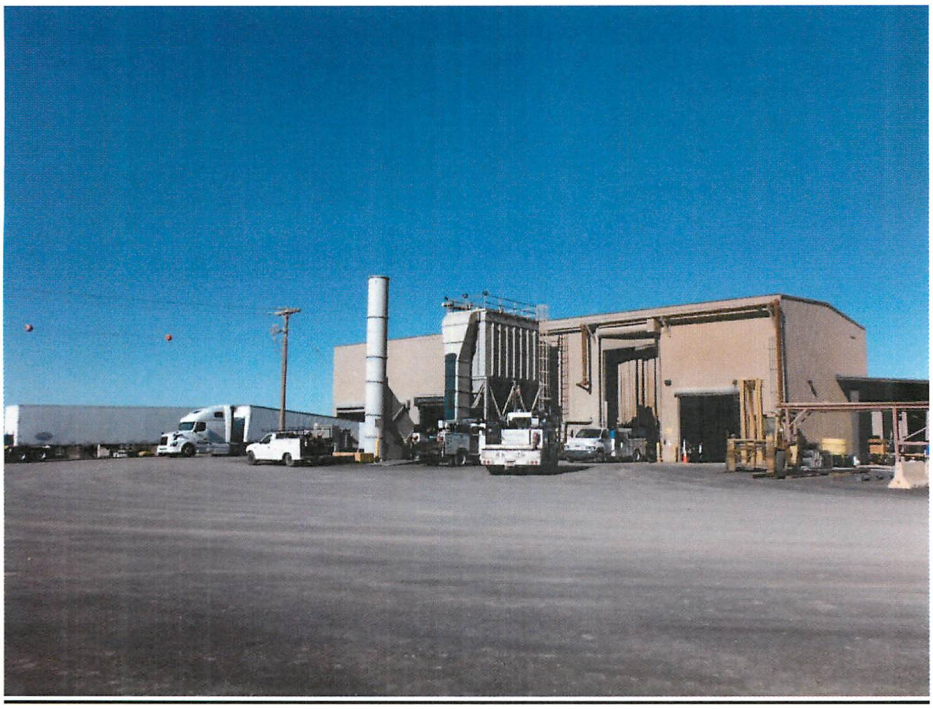

Photo 4 – Stabilization Treatment Pans 4 and 5 - T-18 & T-19

Facility Photographs

Photo 5 – CMU #7 Truck Parking Pad Area

Photo 6– CMU #16 Container Management & Stab Building

Facility Photographs

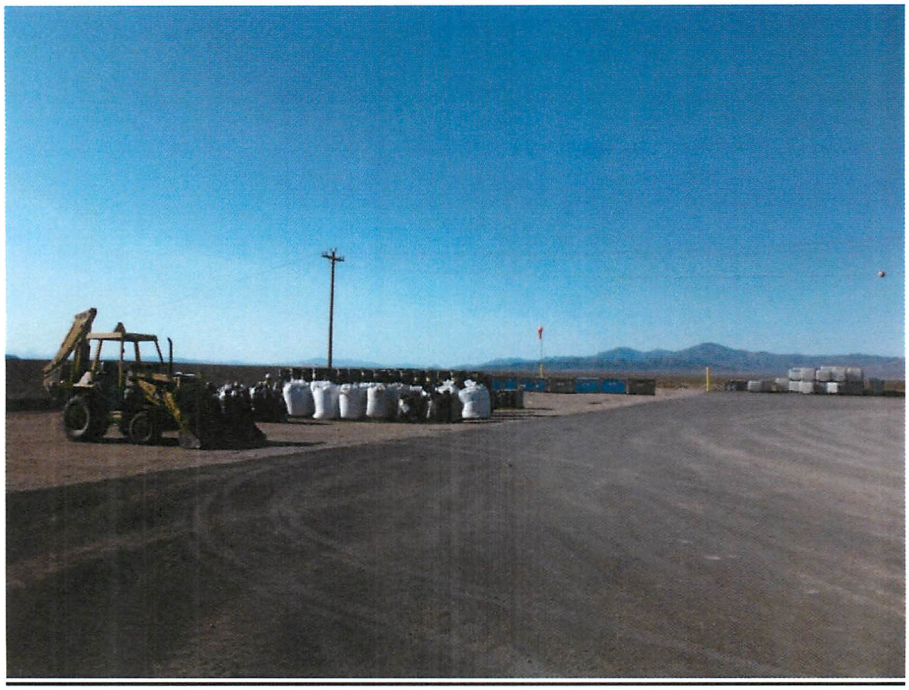

Photo 7 – CMU #6 – Dry Hazardous Waste Storage Area (D2)

Photo 8 – CMU #17 – Dry Hazardous Waste Storage Area (D3)

Facility Photographs

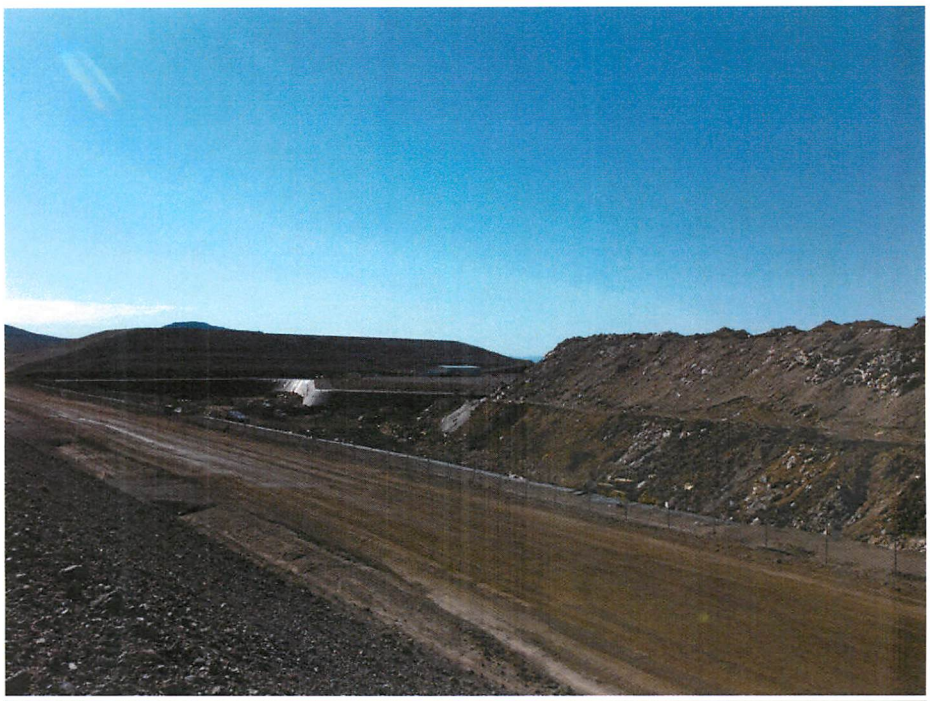

Photo 9 – Trench Cell 12

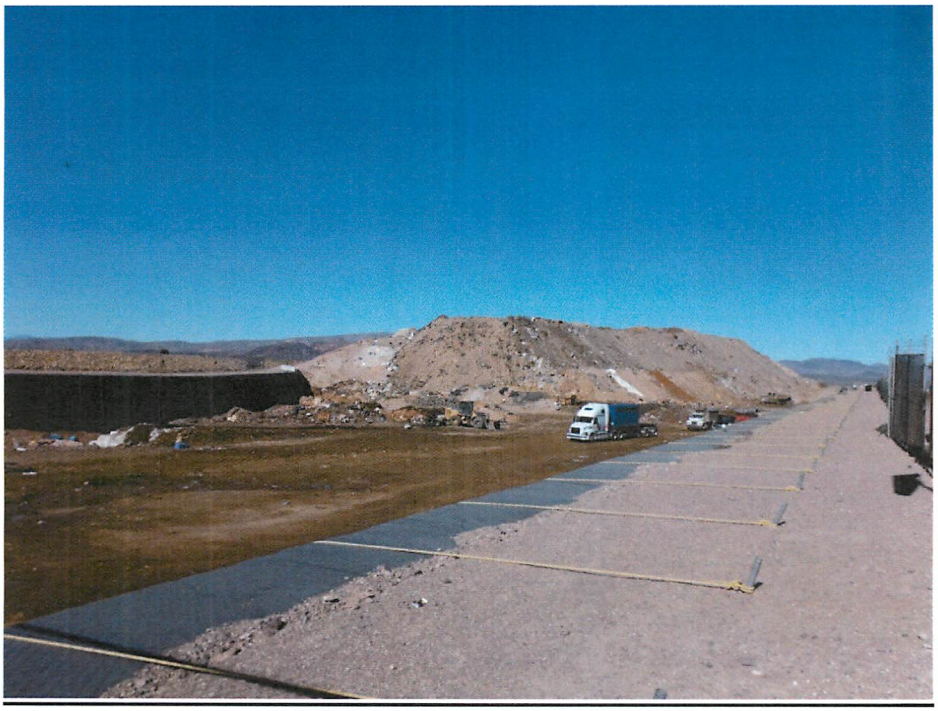

Photo 10 – Trench Cell 12

Facility Photographs

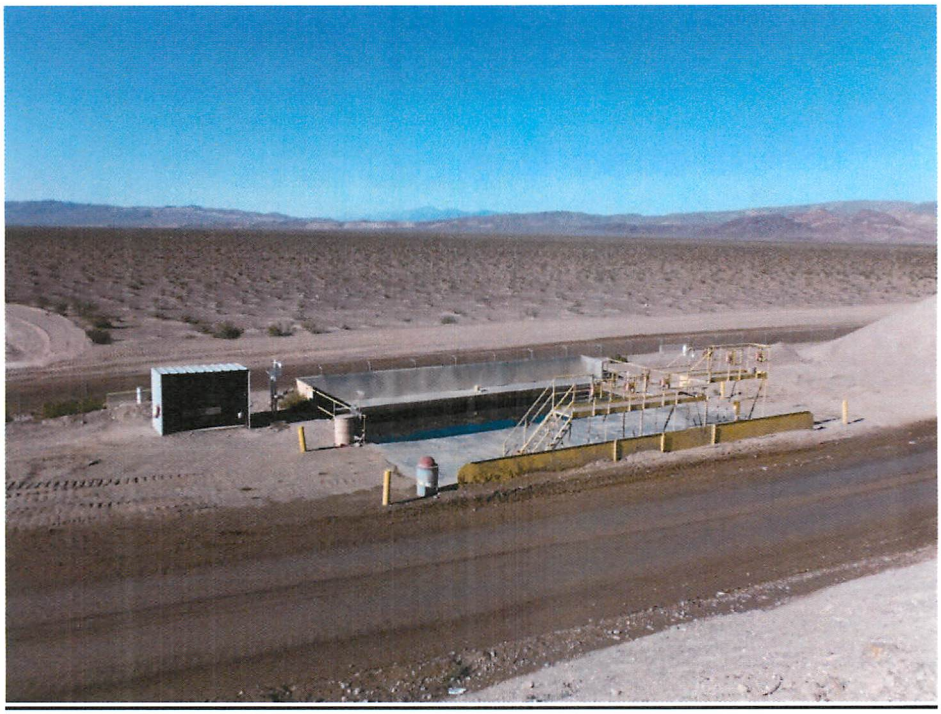

Photo 11 – T-11 Evaporation Pad

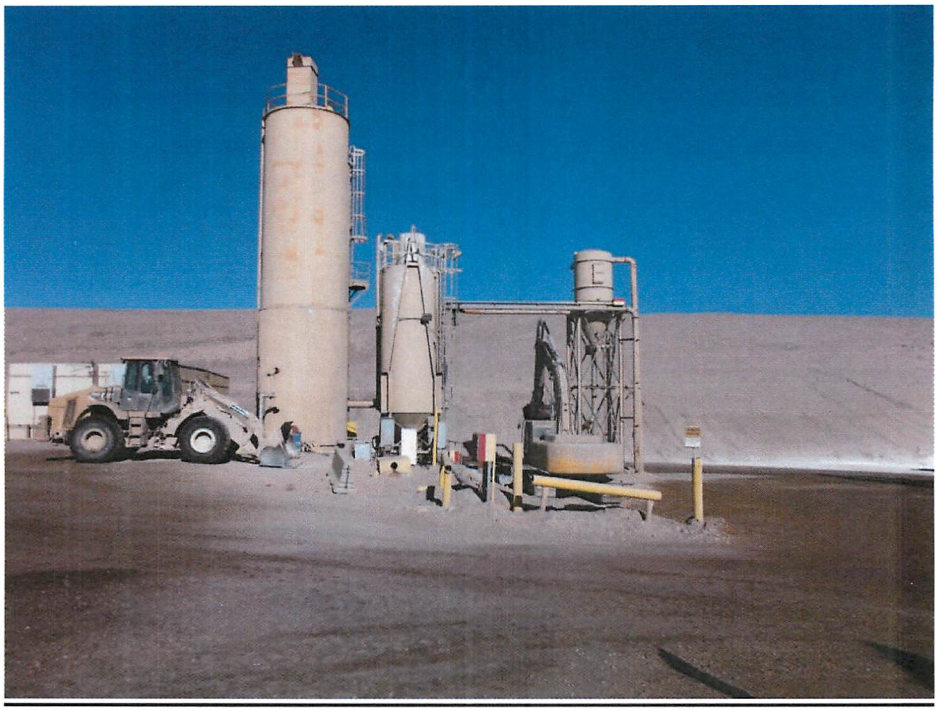

Photo 12 – Reagent Storage Silos

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EXPOSURE INFORMATION REPORT

US ECOLOGY NEVADA

March 2010

Revised June 2015

SECTION 2
EXPOSURE INFORMATION REPORT
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SECTION 2

EXPOSURE INFORMATION REPORT

This report complies with the requirements of 40 CFR §270.10(j), and discusses the potential for public exposure to hazardous waste or constituents through reasonably foreseeable potential releases from both normal operations and accidents at the facility or from transportation to and from the facility.

2.1.0 SITE SETTING

The USEN Facility is located in Nye County, Nevada, a rural area located approximately 125 miles northwest of Las Vegas and 11 miles south of Beatty, Nevada. Beatty is an unincorporated community with approximately 1,200 residents. The Facility is owned by the State of Nevada and is leased by USEN, which operates it. The entire property leased by USEN covers approximately 80 acres, which is surrounded by a placarded fence, which prohibits access.

Waste disposal operations began at the facility in the 1960's after the site was selected because of its isolated desert location, excellent geologic environment and well-protected groundwater resources.

Figure 2.0
Facility Location Map

All adjacent property within several miles of the Facility is federally-owned and administered by the Bureau of Land Management (BLM) as rangeland. BLM leases the sections bordering the Facility boundaries to the State of Nevada as a buffer zone (400 acres in extent; approximately 1,320 feet from the Facility fence line).

Neither the buffer zone nor the facilities are located on or adjacent to tribal lands. The nearest private residence is 11 miles to the north.

Facility access is provided by a sole entrance road which leads from U.S. Highway 95 to the east of the site. Employees and customers use this road exclusively. Employees park to the north of the facility in the buffer zone, on graveled surfaces. Interior haul roads provide access for facility operations. Vehicles which have operated in the active portions of the landfill are not allowed to leave the property until they pass through the wash station. Wash water is evaporated on site or used for dust suppression within the active landfill area.

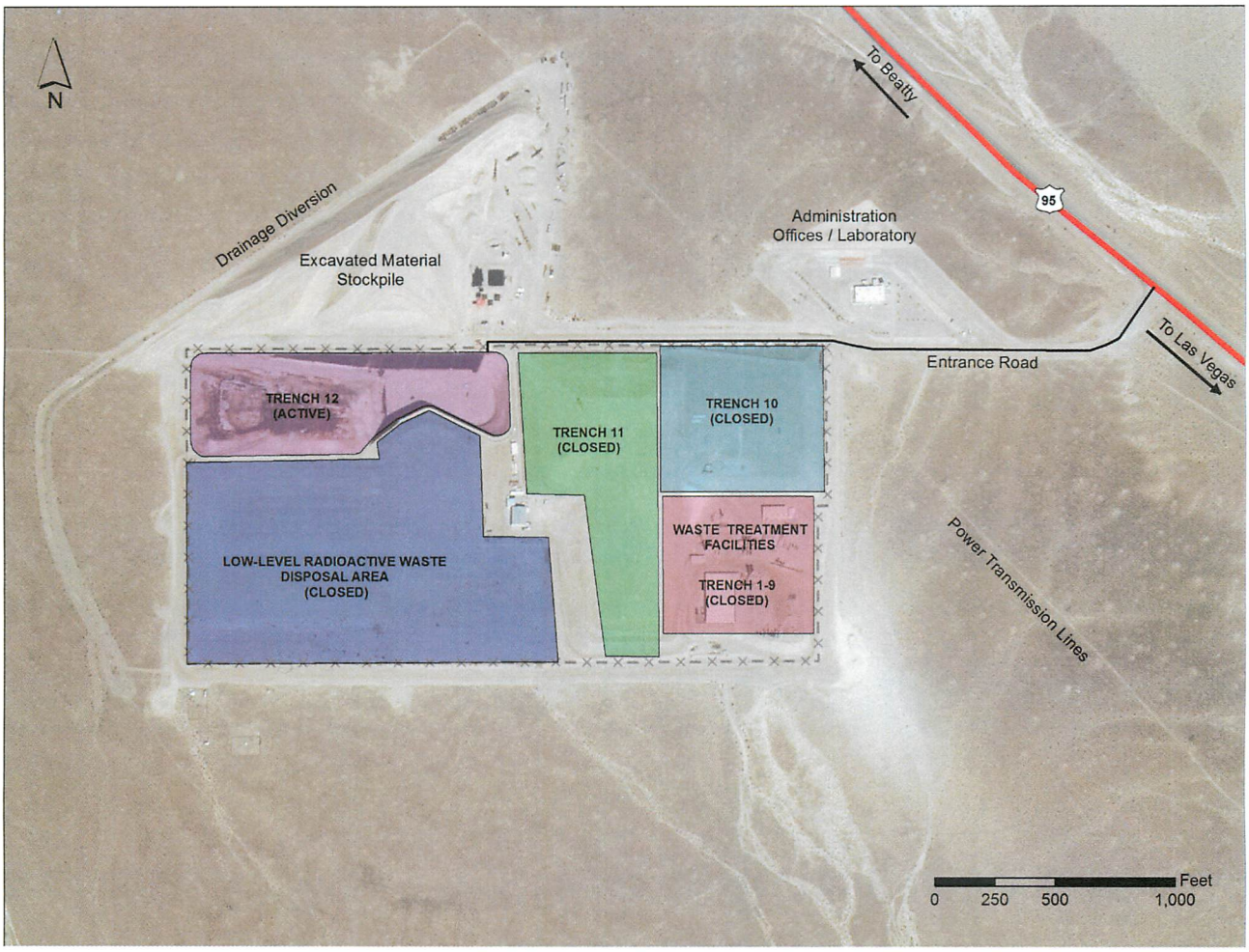

Figure 2.1
Facility Layout
Showing 80 Acre State of Nevada Property and Leased Buffer Zone

The Amargosa Desert is in the northern Mojave Desert separated from Death Valley by the Amargosa Range, and is one of the driest regions in the United States. Amargosa Desert average annual rainfall is approximately four inches. Annual precipitation ranged from 0.08 inches during 2002 to approximately 9 inches during 1983. About 70% of the precipitation is associated with frontal systems during October

through April. Snow, however, is rare. Summer rainfall occurs predominantly during localized, short-duration, convective storms. Monthly mean air temperatures range from 37.4°F during December to 91.4°F during July. Daytime high temperatures in the summer are commonly above 100°F. Evapotranspiration approaches 78 inches per year.

The potential for public exposure is minimized by the Facility's remote location. No one lives within 11 miles of the site and the nearest public water source is 11 miles away. Recreational use of the BLM lands surrounding the site is a rare event. There are no surface waters in the vicinity of the site and the desert environment is generally hostile to life. The dry desert environment facilitates secure disposal, while minimizing risks from waterborne movement of contaminants.

2.2.0 GROUNDWATER PATHWAY

The active landfill cells are provided with a double liner and leachate collection system to prevent migration of waste or waste constituents to the groundwater, as required by the Hazardous and Solid Waste Amendments of 1984. Landfill design is described in the Landfill Report.

The groundwater and geological conditions at the site are extensively discussed in the Groundwater Monitoring Plan. The US Ecology Nevada (USEN) hazardous waste management facility is located in a remote area of the Amargosa Desert, in western Nevada. The location of the facility combines characteristics that are optimal for waste disposal and that minimize any potential for public exposure resulting from groundwater contamination.

The facility is located in an area underlain by two discrete hydro geological units: an upper saturated zone consisting of approximately 150 feet of partially cemented to well-indurated clays, silts, and sand; and a confined gravel aquifer beneath the fine-grained deposits at a depth of 380 feet or more. The depth to the saturated zone ranges from 285 to 360 feet. The upper saturated zone is characterized by low transmissivity values, and therefore low ground water flow velocities (ranging from less than 0.1 to a maximum of about 3 ft/yr).

Due to the arid climate of the desert, the moisture-deficient nature of the soil, and the thickness of the unsaturated zone, no significant recharge of groundwater occurs, even during the infrequent, but intense precipitation events. Most rainfall at the facility infiltrates the ground surface, but because of the dry conditions of the soil, moisture will return to the atmosphere as evaporation or transpiration before any deep migration takes place. As discussed in the Groundwater Monitoring Plan, a study conducted at the site suggested that percolation of moisture at depths greater than two (2) meters have occurred only three (3) times in a period of 14 years.

The likelihood for groundwater contamination from the disposal cells is minimized by the final cover placed over the disposal cells upon closure. Cell capping reduces the potential for rainwater to reach the disposal zone and generate leachate that could migrate to groundwater.

In the unlikely event of any contaminant reaching the groundwater, the facility groundwater detection system will detect a release from the land disposal units (see the Groundwater Monitoring Plan for details). Because of the low groundwater velocities in the upper saturated zone, it is likely that detection and remediation can take place before the release impacts a large area. The potential for public exposure to contaminated groundwater is low.

2.3.0 SURFACE WATER PATHWAY

The USEN Facility is located on an alluvial fan within the Amargosa Desert, which is not in a 100-year flood plain. Rainfall is very sparse in this desert region and evaporation rates are high. The extremely low rainfall and high evaporation rate result in the total absence of any local surface water source. There are no continuous flowing surface water sources within a radius of at least eight (8) miles from the facility.

The facility is subject to concentrated storm-water flows resulting from sporadic rainfall events. Run-on from these intermittent storms is diverted from the facility by elevated earthen diversion structures and the Amargosa River channel. Landfill design provides for containment structures in the active cell and engineered covers in inactive cells to control the migration of contaminated run-off during rainfall events. The Landfill Report describes the run-on and run-off controls in more detail.

The facility does not dispose of free liquids in the cell, thus eliminating the potential for rapid spread of a liquid material off-site before clean-up activities can be initiated.

The potential for exposure to contaminated surface water is low.

2.4.0 AIR PATHWAY

The primary source of air emissions at the site is dust generated during disposal of fine particulate bulk waste loads, earth moving operations and vehicular traffic. Potential emissions may also result from the Container Management Building, and/or from the inadvertent commingling of incompatible waste. The Container Management Building is equipped with emission control equipment. The potential of human exposure resulting from air releases is minimized by the facility's remote location, which makes it very unlikely that concentrated emissions could ever reach a population source. Besides Beatty (11 miles away), the closest town is Lathrop Wells, located approximately 20 miles southeast of the facility. There are no residences located near the facility due to the desert conditions. Any air release that may leave the facility would be well dispersed before reaching a population concentration. Travelers on Highway 95 pass within one mile of the facility, however they would only be potentially exposed for a few seconds when passing the site.

The controlled operation of the USEN Facility minimizes air releases. Dust generation as a result of earth-moving operations and vehicular traffic is controlled by use of dust suppression. The potential for wind dispersal of particulates and odor is minimized through evaluation of potential waste steams to be accepted into the facility. Waste descriptions and samples are evaluated during the waste stream approval process to characterize the potential for particulate emissions, odor or dust generation. Waste streams, which pose a

potential for emissions, may be rejected, or managed on-site using special precaution such as water spray during off-loading or special packaging or handling. Also, daily cover practices minimize emission from disposed waste.

After unloading, all trucks are inspected and, if necessary, decontaminated at the facility wash pad before being allowed to exit the facility. This procedure reduces the potential for dispersion of waste materials over other portions of the facility and the surrounding highways.

The waste characterization and handling procedures also address the potential for inadvertent commingling of incompatible waste. Prior to acceptance, all waste streams are inspected in accordance with procedures outlined in the Waste Analysis Plan (WAP) and any waste which cannot meet the requirements outlined in 40 CFR §§264.312 and 264.313 will not be accepted at the facility. USEN's waste characterization system provides the information necessary to take precautions in handling these materials to prevent releases, fires or explosions.

Because of the facility's location, operation, and waste characterization and handling techniques, the potential for human exposure from air releases at the USEN Facility is low.

2.5.0 SUBSURFACE GAS PATHWAY

The facility's cell characteristics, the type of waste accepted for disposal, as well as the facility's cell location and open area operation, minimize the potential for significant quantities of subsurface gas to accumulate.

No municipal waste or large quantities of biodegradable materials have ever been disposed. In addition, landfill cells are located at sufficient distance from buildings and other structures that could possibly trap a significant amount of a subsurface gas release. Facility operations are performed in an open area, which provides adequate dilution and dispersion of any subsurface gas release.

A study conducted by Dames and Moore in 1978 has confirmed that the likelihood for generation of gas is minimized by the dry desert conditions. The study, *Trench Gas Study at the Beatty Low-Level Radioactive Waste Disposal Site*, concluded the following:

> *"The relatively small quantities of carbon dioxide and methane in the trench gas suggest that relatively limited organic decomposition is taking place. This limited decomposition is probably a result of the extremely small quantities of water which exist in the solid waste cell."*

A RCRA Facility Assessment concluded that organic gasses migrating from disposal cells have caused limited contamination of facility groundwater. As discussed above, the potential for human exposure to contaminated groundwater is low.

The overall potential for human exposure from subsurface gas release at the USEN Facility is low.

2.6.0 RELEASE TO THE SOIL

The potential for human exposure from soil releases at the USEN Facility is low. The facility design and operational procedures minimize the potential for soil contamination and, in the unlikely event of such contamination, control the factors that could promote its migration.

The most likely sources of soil contamination would be spillage while unloading waste and transporting it within the landfill. To minimize these sources, speed limits are imposed on all vehicles transporting waste within the facility boundaries, and USEN personnel ensure precautions are observed. To eliminate the potential for spillage while unloading waste, all waste shipments are unloaded within the landfill or over containment structures. In addition, employees are trained to detect and report spill events.

In the event of any hazardous material release, USEN is equipped to handle on-site response operations. Facility personnel are trained in response techniques for containment, monitoring, and ultimate clean up of a spill or release. Further information on these procedures is provided in the Contingency Plan.

Perimeter security prevents exposure of contaminated soil to humans or livestock. The principal component of this security is a chain-link fence topped with three (3) strains of barbed wire. The fence is also designed to prevent access from crawling animals. The fence perimeter is appropriately posted with signs, which warn intruders against unrestricted entry. Exposure outside the fence is minimized by the remote location of the facility.

Another source of soil release is the dispersion of fine particulate waste by the wind. As discussed in Section 3.0, waste characterization and handling procedures minimize the wind dispersal of these materials.

2.7.0 TRANSPORTATION

All transportation to and from the facility occurs on an access road leading from Highway 95. Any accidents or spills along this road will be immediately apparent and rapidly remediated. There is no public use of the access road.

The transportation methods used on public highways are designed to minimize releases primarily through containment. Most wastes shipped to the facility are solid or semi-solid materials, and are either containerized (e.g.; drums or roll-off boxes), bagged (e.g.; asbestos), or placed within a plastic liner and tarped. Smaller amounts of aqueous materials are brought to the facility and this reduces the potential for emergency situations involving liquids. In the unforeseen event of a release, USEN has the capabilities to address the release through implementation of the Contingency Plan. Off-site waste shipments are primarily containerized wastes.

The facility is equipped to handle response and clean-up operations for on-site transport releases. Facility personnel are trained in response procedures and techniques to contain, monitor and clean-up releases resulting from transport accidents or leaks. Assessment and remedial response to a release would be

conducted by trained and equipped personnel. For a breakdown of these procedures, personnel training and available equipment, refer to the Contingency Plan and the Training Plan.

The potential for human exposure from transportation-related releases on-site is low due to the facility's location, response capabilities and the absence of surface water pathways. Potential for off-site transportation releases is limited by the types and amounts of waste transported.

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GENERAL INFORMATION REPORT

US ECOLOGY - BEATTY, NEVADA

March 2010

Revised June 2015

GENERAL INFORMATION REPORT
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GENERAL INFORMATION REPORT

3.1.0 General Facility Description

US Ecology Nevada (USEN) operates a hazardous waste[1] management facility in Nye County, Nevada, approximately 11 miles south of Beatty, in the Amargosa Desert. The facility is owned by the State of Nevada and is leased by USEN, who operates it. The entire property leased by USEN covers approximately 80 acres, part of which was previously utilized for the disposal of low-level radioactive waste (LLRW). The closed LLRW portion of the property is separated from the Resource Conservation and Recovery Act (RCRA) disposal area by a buffer zone where no below-grade waste disposal activities take place. The surrounding land is federally owned and administered by the Bureau of Land Management (BLM) as rangeland. BLM leases the sections bordering the facility boundaries to the State of Nevada as a buffer zone (approximately 1,320 feet wide). The facility is not located on or adjacent to Indian Lands.

Wastes accepted at the facility include RCRA hazardous wastes identified in 40 CFR Part 261, polychlorinated biphenyl waste regulated under the Toxic Substances Control Act (TSCA), and other non-hazardous wastes. The facility is required to obtain a RCRA permit as specified in 40 CFR Part 270. The original RCRA Permit was issued in 1988, with a term of five years. The permit was subsequently renewed. The RCRA Part A lists the acceptable wastes and anticipated annual quantities. This list of waste codes may be revised as the U.S. Environmental Protection Agency (EPA) modifies the scope of listed/identified wastes in 40 CFR Part 261.

Wastes identified in the Part A include on-site generated waste managed at the facility. Facility wastes generated incidental to facility operations are managed following procedures in the Waste Analysis Plan similar to those employed in managing incoming waste. These include:

- Landfill leachate (F039) – Typically stored (in totes) and used as a dust suppressant within the same active landfill it was generated from, or stored on-site for subsequent transportation to an authorized off-site treatment, storage or disposal facility;
- Evaporation Pad liquids and solids; and Laboratory Waste: Including rinse waters treated (evaporated) in the Evaporation Pad and miscellaneous lab chemicals from the facility laboratories, which are collected and managed on-site or transported to an authorized off-site facility for management.
- Personal Protective Equipment – This will include disposable Tyvek coveralls, gloves, spent respirator cartridges, and any other personal protective equipment used.
- Universal wastes – Which may include light bulbs and used batteries

[1] Also referred to as RCRA waste, here-in-after referred to collectively as "waste" or "wastes."

A general description of the facility waste management capabilities is provided below. Additional details and design specifications for each hazardous waste management unit are provided in the corresponding engineering reports (Container Management – Section 9, Tank Systems- Section 10 and Landfills - Section 11). In addition, all regulated hazardous waste management units are summarized in Appendix A.

- One hazardous waste landfill unit (Trench 12), which meets or exceeds the minimum technology requirements of the Hazardous and Solid Waste Amendments of 1984 (HSWA) for double liner and leak detection systems. See the Landfill Report for additional details on this unit.
- Seven container management units (CMUs) described below[2]. Details about these units are provided in the Container Management Report. Such containers will be managed in accordance to 40 CFR §264 Subpart I, 40 CFR §262.30 – 32 and NAC 444.8671.

  - **CMU #1**. The unit is an internal (roofed) area with secondary containment, meeting RCRA (and TSCA) container management requirements for solid and / or liquid wastes. Waste with free liquids or with waste codes F020, F021, F023, or F027 may be stored in this area without additional containment. This unit is also called "The PCB Building" and it is located on the northeast side of the facility.
  - **CMU #6**. The Dry Hazardous Waste Storage Area #2 (DHWSA #2) is located on the east side of the facility, east of the CMS Building and is utilized as a general containerized waste storage area. The unit is an external area, meeting RCRA container management requirements for waste without free-standing liquids.
  - **CMU #7**. The Bin Storage Pad is located on the east side of the facility south of the stabilization processing area, north of the Container Management Building (CMU #16) and is utilized as a general containerized waste storage area. The unit is an external area with secondary containment, for waste with or without free-standing liquids. All waste (including waste codes F020, F021, F023, or F027) may be stored in this area.
  - **CMU #8**. A satellite accumulation storage area for laboratory waste operated under 40 CFR §262.34(C)(1).
  - **CMU #16** is called the Container Management Building (CMB). The CMB is the primary RCRA containerized processing area onsite. Containers are brought to this unit predominantly for subsequent management elsewhere on the facility. Typically, containerized waste is stored, consolidated into larger containers (e.g.; roll-offs) either within the unit, at the associated dock, or

---

2 In addition to these specific areas for the management of hazardous wastes, non-hazardous waste can be staged in other areas within the facility. Since these units are not regulated under RCRA, they are not designated in this application. In addition, although the major CMUs are listed here, there may be CMUs utilized during the life of the facility which do not require permitting (e.g.; staging areas used for periods of less than 72 hours, or container management units operated under the <90 day storage provisions of 40 CFR §262.34. NDEP prefers that non-hazardous waste is not stored in permitted hazardous waste management units.

at the other permitted CMUs for subsequent treatment (e.g.; stabilization). If appropriate, some treatment can occur at the CMU. The unit is an external area with secondary containment, for waste with or without free-standing liquids.

- **CMU #17** The Dry Hazardous Waste Storage Area #3 (DHWSA #3) is located on the northeast side of the facility, on top of the closed Trench 10 landfill, and is used as a general containerized waste storage area. The unit is an external area, meeting RCRA container management requirements for waste without free-standing liquids.
- **CMU #18** A satellite accumulation storage area for laboratory waste operated under 40 CFR §262.34(C)(1).

Table 1 – Summary of Container Management Units

CMU	Common Name			Secondary Containment Capacity [gal]	Storage Capacity		
	Common Name	Status	Permit Required[3]		Gallons	55-gallon Drums	yds^3
#1	PCB Building	Existing	Yes	26,928	59,400	1080	294
#6	Dry Hazardous Waste Storage Area #2	Existing	Yes	0	250,696	4,588	1,241
#7	Bin Storage Pad	Existing	Yes	20,287[3]	80,778	1,469	400
#8	Lab Waste Storage Area	Existing	No	0	425	7	2.1
#16	Container Management Building	Existing	Yes	61,630	246,520	4,482	1,220
#17	Dry Hazardous Waste Storage Area #3	Existing	Yes	0	694,516	12,627	3,438
#18	Satellite Lab Waste Storage Area	Future	No	0	425	7	2.1

The facility has fourteen tank management units, which are described below.

- **Stabilization Tanks** (T-1, T-2, & T-3, T-18, & T-19) capable of storing and treating wastes with variable physical and chemical consistencies in order to solidify and/or immobilize hazardous constituents in compliance with 40 CFR Part 268 Land Disposal Restriction requirements;
- **The PCB Storage Tank Farm** (T-4, T-5, T-6, T-7,) for storage and bulking of RCRA wastes (e.g.; high BTU containing materials) and PCB-containing liquids prior to on-site management or shipment to an off-site facility. Details on this unit are provided in the PCB Tank Farm Report; and
- **Evaporation Tank** (T-11) to manage liquid waste (including wash water generated from vehicle decontamination and the facility laboratory, leachate and other contaminated waters). Details on this unit are provided in the Tank Systems Report.

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3 Separate permits are not required for CMUs operated under the provisions of 40 CFR §262.34, temporary staging areas in support of facility operations, units located within permitted areas or units which are ancillary to or supportive of other facility operations (e.g.; CMUs #8 and #17).

3 There are 10 bays @ 271.2 ft^3 each for a total of 2,712 ft^3. There are 7.48 gallons / ft^3, for a total of 20,287 gallons of secondary containment capacity.

Table 2 – Summary of Tank Management Units				
Tank	Common Name			Capacity [gallons]
	Common Name	Status	Permit Required	
#1	Stabilization Tank (Pan 1)	Existing	Yes	6,400
#2	Stabilization Tank (Pan 2)	Existing	Yes	35,500
#3	Stabilization Tank (Pan 3)	Existing	Yes	35,500
#4	PCB Storage Tank	Existing	Yes	5,000
#5	PCB Storage Tank	Existing	Yes	7,500
#6	PCB Storage Tank	Existing	Yes	5,000
#7	PCB Storage Tank	Existing	Yes	7,500
#11	Evaporation Tank	Existing	Yes	10,000
#18	Stabilization Tank (Pan 4)	Existing	Yes	17,250
#19	Stabilization Tank (Pan 5)	Existing	Yes	17,250

3.2.0 Topographic Map Requirements

A topographic map of the area surrounding the facility is included in Appendix B. The map illustrates the topography of the area to 2,500 feet or more beyond the facility boundaries.

The requirements of 40 CFR §270.14(b)(19), as adopted by the Nevada Division of Environmental Management (NDEP), are addressed as follows:

- Scale and date – Although the map scale used is greater than one inch equals 200 feet, the map contains sufficient detail for engineering analysis. Map contour intervals are 5 feet.
- Intermittent stream shown - there are no perennial streams located within a mile of the facility.
- Surrounding land use – BLM rangeland, except for buffer zone leased by the State of Nevada.
- Wind rose
- Map orientation

The following site-specific requirements are addressed in the Site Access map included as Appendix D.

- Access control fences.
- On-site/off-site injection and withdrawal wells – There are no injection wells on or off site. On-site withdrawal and monitoring wells are illustrated on the site-specific map and the site access diagram.
- Buildings, treatment, storage and disposal units, and other structures
- Facility access road
- Fire control facilities

Appendix E includes a map that identifies drainage diversion ditches as constructed.

The location of the 100-year floodplain in relation to the facility is illustrated on the Flood Insurance Rate Map included in Appendix E.

3.3.0 Facility Location Information

3.3.1 Seismic Standard

The facility is not located in a recognized fault zone. The nearest major fault zones are Death Valley Fault zone (20 miles from the facility) and the Las Vegas Fault zone (100 miles from the facility). An analysis of geologic maps for the Bare Mountain and Big Dune quadrangles (USGS Maps I-1767 and I-1826) showed no evidence of Holocene faults within a one-mile radius of the facility.

3.3.2 Floodplain Standard

The Flood Insurance Rate Map (FIRM) for Community Panel No. 320019-4000-C (facility location) in Nye County, Nevada is included in Appendix E. The FIRM map demonstrates that the facility is located outside the identified floodplain areas.

3.3.3 Stationary Facilities Standard (NAC 444.8456)

The USEN Facility complies with the location criteria identified in NAC 444.8456. The nearest dwelling, school, church, community center or Public Park is located in the town of Beatty, ~ 11 miles from the facility. The area where the facility is located has not been identified as a key habitat for any wildlife or endangered species. Ash Meadows National Wildlife Refuge, ~ 30 miles southeast of the facility, is the nearest wildlife habitat. No surface water bodies, drinking water supply wells, or wetlands exist within one (1) mile of the facility.

As discussed in the Landfill Report and Groundwater Monitoring Plan, the groundwater table doesn't exhibit significant seasonal fluctuations. The depth to the top of saturation, as measured from the ground surface, ranges between 285' to the facility's north and to 360' at the southwest corner of the LLRW site. The facility is not located on the 100-year floodplain, or in an area identified by the Division of Historic Preservation as a historical or archaeological site.

3.3.4 Site Legal Description

The USEN facility is located in Nye County, Nevada, approximately 11 miles south of Beatty, in the Amargosa Desert (Latitude - 36° 46' 9", Longitude - 116° 41" 23"). A detailed legal description of the facility is included as appendix F.

3.4.0 Traffic Information

The only public road in the vicinity of the Beatty hazardous waste facility is Highway 95 (see Appendix G), which is a primary two (2) lane, hard-surfaced road bordered by BLM range fence (a deterrent to off-road vehicle traffic). The facility entrance (off the southwest side of Highway 95) is a 100-foot wide asphalt concrete apron transitioning into a two-lane road. The entrance road, which is well crowned with graded shoulders and ditches, passes through the range fence by way of a cattle guard. It enters the facility property at the north end of the buffer zone and administration area through a security gate. Gravelly material is generally employed to surface facility roads. No studies have been conducted to determine

the road bearing capacity, but it is expected to be in the range of 230-380 psi, which is the site soil bearing capacity, as determined from a geotechnical evaluation conducted during construction of the Bin Storage Area.

3.4.1 On-site Traffic Patterns

General access to the facility is through main site entrance, which remains open during normal business hours under the general surveillance of facility personnel. Access is also possible through other gates as described in the Security Plan. A vehicle transporting waste typically proceeds to the scale to weigh-in and deliver the waste shipment documentation to the Receiving Office. Bulk waste delivery vehicles then precede to a staging area, where they remain until the shipment and accompanying documentation are reviewed to confirm its acceptability. The vehicle is then sent to the waste management unit for processing or storage. Deliveries of containerized wastes are sent to the appropriate CMU for off-loading and waste verification.

3.4.2 Vehicle Types and Volume

Traffic to the facility typically includes tractor-trailer trucks, tankers for bulked liquids, and dump trucks used to transport bulk solids. Traffic volumes vary according to the volume of waste received. Operational records for the period between January 1, 2013, and December 31, 2013, indicate an average weekly traffic volume of 211shipments.

3.5.0 Preventive Procedures, Structures and Equipment

3.5.1 Hazard Prevention during Unloading Operations

Waste entering the facility may be unloaded from the transport vehicle into one of several areas:

- Containerized wastes will be unloaded at one or more of the container management units or directly into the disposal unit, and
- Bulk solid wastes will be unloaded directly into the disposal unit, or if treatment is required, shipments may be unloaded into any of the treatment units.

Containerized hazardous wastes will typically be removed from the transport vehicle using a forklift or front-end loader equipped with drum handling mechanisms. When unloading into the landfill, containers are typically placed into the bucket of a front-end loader prior to final placement. An alternative method to unload containerized waste is to place them directly in the cell using a forklift. A forklift is also typically employed to unload and transfer containers at storage areas, as necessary.

Operations personnel are trained to ensure appropriate care is exercised during unloading and transfer activities to minimize dropping, damaging or careless management of containers.

Unloading of bulk materials into the landfill takes place within the active disposal area to minimize the likelihood of waste spillage. The transport vehicle driver is directed by operating personnel to bring the

vehicle to a stable area or to the landfill dock where unloading takes place. Prior to leaving the active cell area, the truck tailgates and mud flaps are inspected, and any excess residue present is removed.

Bulk solid waste requiring treatment is unloaded by bringing the transport vehicle as close as practical to the treatment unit, and unloading directly into the unit. To prevent the generation of excessive dusting or odor during unloading of bulk materials, USEN evaluates candidate waste streams during the approval process to ensure that materials which could create these types of emissions are either not approved for disposal, or are managed on-site to minimize fugitive emission generation.

3.5.2 Run-off Prevention

Diversion dikes and site drainage are employed as control measures to prevent run-on into the disposal areas. There are two (2) run-on control ditches: a trapezoidal ditch designed to provide run-on control for the 25-year, 24-hour storm, and a smaller triangle ditch that diverts any run-on inside the main diversion ditch. A detailed description of these run-on control mechanisms is provided in the Landfill Report.

With the run-on control measures in place, the only water expected to come in contact with the waste management units is from falling precipitation. Run-off is contained within the disposal units since temporary and/or permanent dikes in the below-grade and above-grade sections of the landfills contain precipitation within the cells themselves.

Run-off from treatment and storage units is of minimal concern due to the sparse rainfall in the region and the dry, well-graded nature of the facility soils. Outdoor waste management units generally have waste stored in closed containers and/or are provided with adequate secondary containment to eliminate the possibility of contaminated run-off.

3.5.3 Prevention of Water Supply Contamination

Facility operating procedures and design constitute the best assurance that the facility does not represent a potential for contamination of water supplies. In addition, the lack of surface water bodies or groundwater supplies within 10 miles or more of the facility, further assures protection of water supplies.

The upgradient location of the facility withdrawal well and its construction features protect it from any potential contamination. The well is cased with an eight-inch steel casing from the surface to the first perforations at a depth of 300 feet, sealed at the surface with steel, and the annular space between the casing and the borehole is filled with grout. This water is used for waste treatment and dust control and is not used as drinking water

3.5.4 Prevention of Adverse Effects from Equipment Failure and Power Outages

Sufficient supplies of emergency/safety equipment ensure that replacements are available in the event of equipment failure. Safety equipment is subject to regular inspections to ensure that adequate supplies are maintained.

Adverse effects due to failure of any component of the facility's communication system are prevented by maintaining back-up units and systems. For example, multiple FM radios are available, but should all units fail, the Emergency Alert warning system will serve as a back-up.

Failure of heavy equipment would not impact the facility's ability to respond effectively to an emergency since multiple units are available and easily interchangeable during a response effort with similar effectiveness and margin of safety.

Due to the type of waste management activities conducted at the facility, no adverse effects are anticipated from a power outage. In the event of a power outage, a portable power generator is available on-site to minimize disruption of facility activities.

A power outage would not impact any emergency response effort since all pumps devoted to emergency use are gas or air operated. Portable, self-contained lighting units are maintained at the facility for use at night if extended operations are required, or in response to an emergency situation at night.

3.5.5 Prevention of Undue Personnel Exposure to Hazardous Waste

All operating personnel have been issued personal protective equipment (PPE), including respiratory protection as well as hard hats, safety glasses, and safety shoes. Additional PPE (e.g.; Tyvek suits, chemical splash goggles) is required when performing specific tasks, and is readily available at various locations throughout the facility (see the Contingency Plan).

Employees required to work in active areas of the facility where wastes are received, handled, stored or disposed, are provided with initial training within six months of employment. Continuous training is provided to ensure safe performance of the tasks associated with each position. The training program includes, among other things:

- Basic chemistry training to familiarize employees with waste properties and behaviors;
- USEN's chemical compatibility segregation system;
- Contingency Plan implementation;
- Proper use and maintenance of PPE, and
- Compliance with the permit's provisions.

3.5.6 Prevent Releases to Atmosphere

3.5.6.1 Containers

To prevent releases to the atmosphere all containers will be maintained in the closed position except when it is necessary to open the container to add, remove, inspect, or sample the material in the container. All bulk loads stored in roll-off bins will be covered utilizing a vinyl tarp or its equivalent except when it is necessary to remove the cover to add, remove, inspect or the sample the material in the roll-off bin. All containers and bulk roll-offs will be inspected on a daily basis to ensure their integrity.

3.5.6.2 Treatment Tanks

To prevent releases to the atmosphere from the batch treatment tanks only RCRA hazardous waste with Volatile Organic Compound (VOCs) concentrations of less than 500 ppm will be treated. To minimize fugitive dust emissions, upon arrival, waste will be visually inspected and its dusting potential is assessed. Should facility personnel find that a waste has a medium or high dusting potential, water sprays are used to control emissions. These operations are monitored and controlled during the course of the work to minimize fugitive process emissions from the waste

3.6.0 Waste Minimization Program

As part of the Hazardous and Solid Waste Amendments of 1984 (HSWA), Congress amended Section 3002 of RCRA to add a new subsection requiring that generators have a program in place to reduce the volume and toxicity of waste generated, to the degree determined by the generator to be economically practical. The generator must certify that the proposed method of treatment, storage, or disposal is the practical method currently available, which minimizes the present and future threat to human health and the environment.

Daily waste management activities at the facility generate hazardous wastes in excess of 1,000 kilograms per calendar month. USEN has developed a written program to achieve HSWA waste minimization goals for on-site generated waste, a copy of which is included in Appendix H.

Certification of compliance with the waste minimization requirements is maintained as part of the facility's operating record.

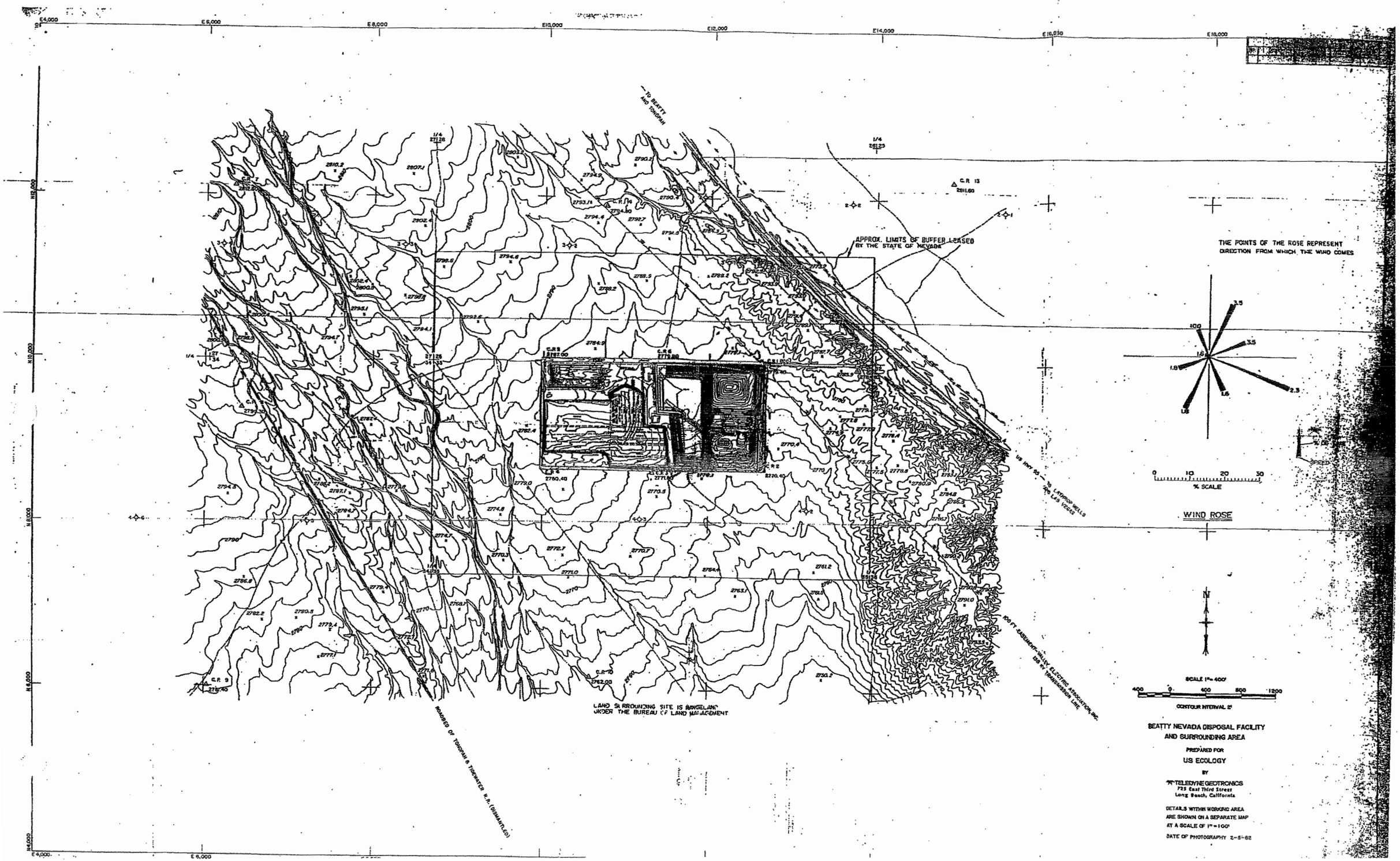
Appendix A

Summary of Waste Management Units

Waste Management Units				
Waste Management Unit Designation [WMU]	**WMU Name / Activity**	**Sub-Unit(s) or Associate Unit(s)**	**ID #**	**Status**
#1	Landfill Cell #12	Landfill Cell #12	None	Active
#2	Container Storage Building	PCB Building	CMU #1	Active
		PCB Storage Tank	T-4	Active
		PCB Storage Tank	T-5	Active
		PCB Storage Tank	T-6	Active
		PCB Storage Tank	T-7	Active
#3	Containerized Waste Consolidation / Aggregation Activities	Container Management Building (CMS Building)	CMU #16	Active
#4	Bulk Solids/Roll Off Storage	Dry Hazardous Waste Storage Area #2	CMU #6	Active
		Dry Hazardous Waste Storage Area #3	CMU #17	Active
		Stabilization Bin Storage Pad	CMU #7	Active
#5	Stabilization System	Stabilization Tank #1 (Pan 1)	T-1	Active
		Stabilization Tank #2 (Pan 2)	T-2	Active
		Stabilization Tank #3 (Pan 3)	T-3	Active
		Stabilization Tank #4 (Pan 4)	T-18	Active
		Stabilization Tank #5 (Pan 5)	T-19	Active
#6	Truck Decontamination Pad & Evaporation Tank	Truck Decontamination Pad & Evaporation Tank	T-11	Active
#7 (removed from service)	Waste Liquids Storage Tanks	Leachate Storage Tank	T-15	Removed
#8	Laboratory Waste Storage	Main Laboratory Waste Storage	CMU #8	Active
#9	Satellite Laboratory Waste Storage	Satellite Laboratory Waste Storage	CMU #18	Future

Appendix B

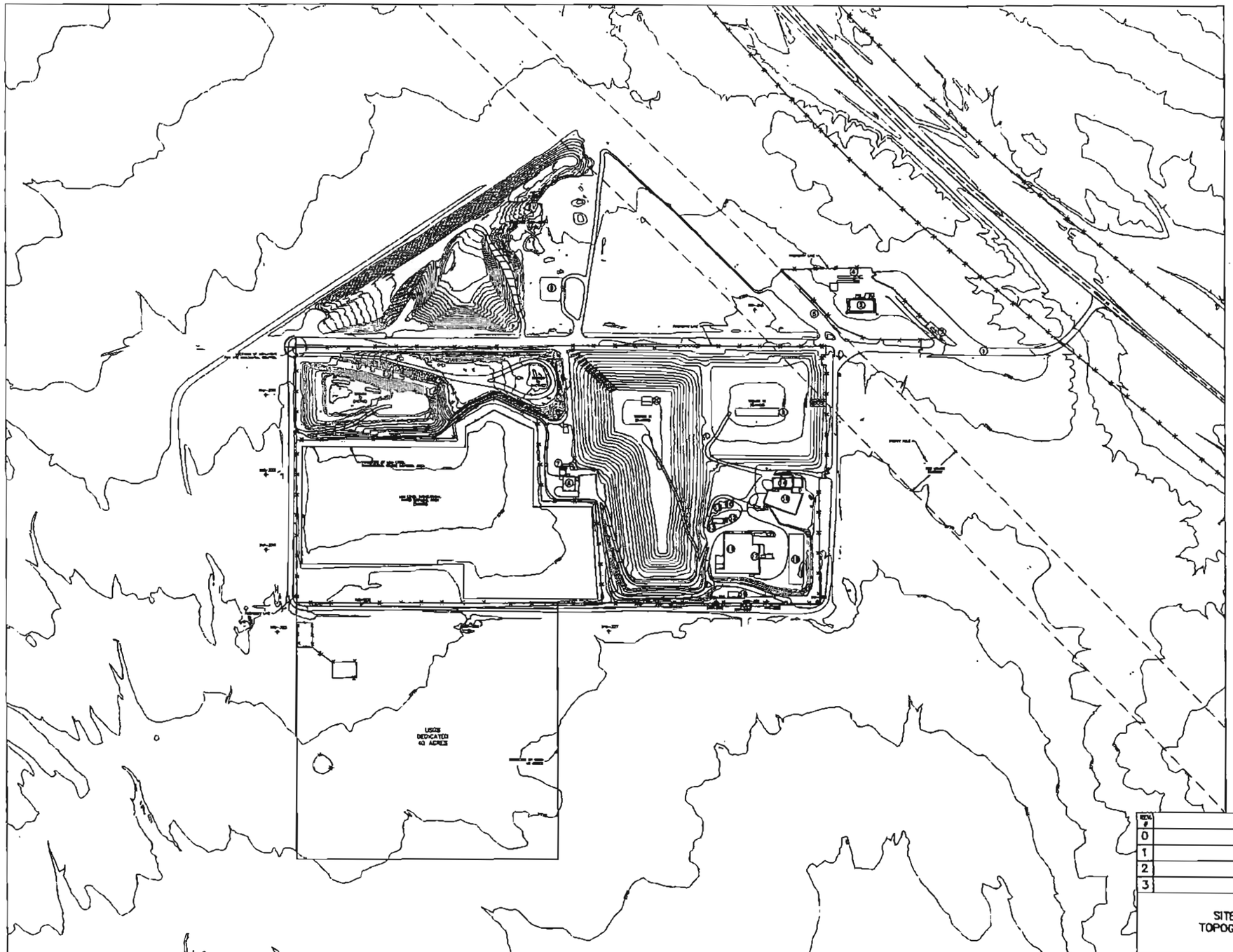
Area Topographic Map


TO BEATTY AND TONOPAH
APPROX. LIMITS OF BUFFER LEASED BY THE STATE OF NEVADA
THE POINTS OF THE ROSE REPRESENT DIRECTION FROM WHICH THE WIND COMES
WIND ROSE
% SCALE
US HWY 95 — TO LATHROP WELLS AND LAS VEGAS
100 FT. EASEMENT - VALLEY ELECTRIC ASSOCIATION, INC. 138 KV TRANSMISSION LINE
ROADBED OF TONOPAH & TIDEWATER R.R. (ABANDONED)
LAND SURROUNDING SITE IS RANGELAND UNDER THE BUREAU OF LAND MANAGEMENT
SCALE 1" = 400'
CONTOUR INTERVAL 2'
BEATTY NEVADA DISPOSAL FACILITY
AND SURROUNDING AREA
PREPARED FOR
US ECOLOGY
BY
TELEDYNE GEOTRONICS
725 East Third Street
Long Beach, California
DETAILS WITHIN WORKING AREA
ARE SHOWN ON A SEPARATE MAP
AT A SCALE OF 1" = 100'
DATE OF PHOTOGRAPHY 2-5-82

Appendix C

Site-Specific Topographic Map

-updated July 2015



1. MAIN SITE ENTRANCE
2. ADMINISTRATION OFFICE
3. SECURITY AND DRIVERS TRAILER
4. INBOUND AND OUTBOUND SCALES
5. PROFILING STATION
6. WATER STORAGE
7. FUEL STORAGE
8. MAINTENANCE SHOP
9. DRY HAZARDOUS WASTE STORAGE AREA 3
10. TREATMENT PANS 2 AND 3
11. TREATMENT PAN 1
12. REAGENT STORAGE SILOS
13. OPERATIONS OFFICE
14. PCB PROCESSING AREA
15. REAGENT SOLIDS STORAGE
16. CONTAINER MANAGEMENT AND STORAGE BUILDING
17. BATCH STABILIZATION UNITS
18. DRY HAZARDOUS WASTE STORAGE AREA 2
19. EVAPORATION PAD
20. WEATHER STATION AND TRENCH 11 LYSIMETER

MW-300 EXISTING MONITORING WELL LOCATION
APPROXIMATE RADIOLOGICAL WASTE DISPOSAL PERIMETER
EXISTING PROPERTY LINE
EXISTING FENCE
INTERNAL ROADWAYS
GATE

NOTES:
1. DATE OF AERIAL TOPOGRAPHY: 2014
2. HORIZONTAL CONTROL: SITE COORDINATE SYSTEM
3. MONUMENT COORDINATES: 10,000 N - 10,000 E
4. ELEVATION: FEET (NORTH AMERICAN VERTICAL DATUM 1988)

250 0 250 500
SCALE 1"=250'

REV. #	DESCRIPTION	DATE
0		
1		
2		
3		

US ecology

BEATTY NEVADA
HAZARDOUS WASTE
MANAGEMENT FACILITY

SITE SPECIFIC
TOPOGRAPHIC MAP

PROJECT NUMBER:

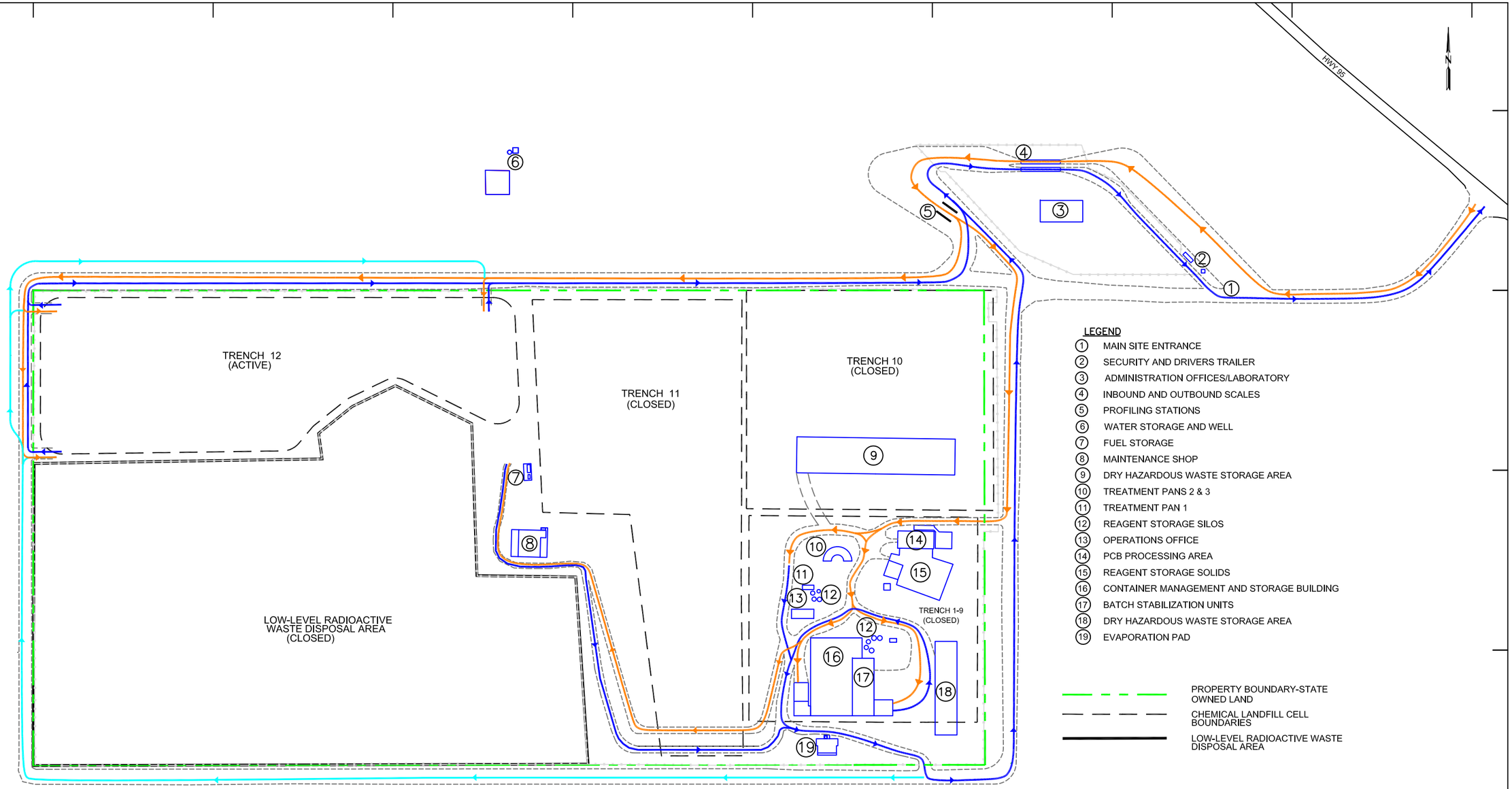
AquaAetter

DRAWING NO: FIGURE 002

Appendix D

Facility Access Diagram

-updated July 2015



LEGEND

1. MAIN SITE ENTRANCE
2. SECURITY AND DRIVERS TRAILER
3. ADMINISTRATION OFFICES/LABORATORY
4. INBOUND AND OUTBOUND SCALES
5. PROFILING STATIONS
6. WATER STORAGE AND WELL
7. FUEL STORAGE
8. MAINTENANCE SHOP
9. DRY HAZARDOUS WASTE STORAGE AREA
10. TREATMENT PANS 2 & 3
11. TREATMENT PAN 1
12. REAGENT STORAGE SILOS
13. OPERATIONS OFFICE
14. PCB PROCESSING AREA
15. REAGENT STORAGE SOLIDS
16. CONTAINER MANAGEMENT AND STORAGE BUILDING
17. BATCH STABILIZATION UNITS
18. DRY HAZARDOUS WASTE STORAGE AREA
19. EVAPORATION PAD

PROPERTY BOUNDARY-STATE OWNED LAND

CHEMICAL LANDFILL CELL BOUNDARIES

LOW-LEVEL RADIOACTIVE WASTE DISPOSAL AREA

SITE ROADS

INWARD ROUTES

OUTWARD ROUTES

HAUL TRUCKS ONLY

300 200 100 0 300

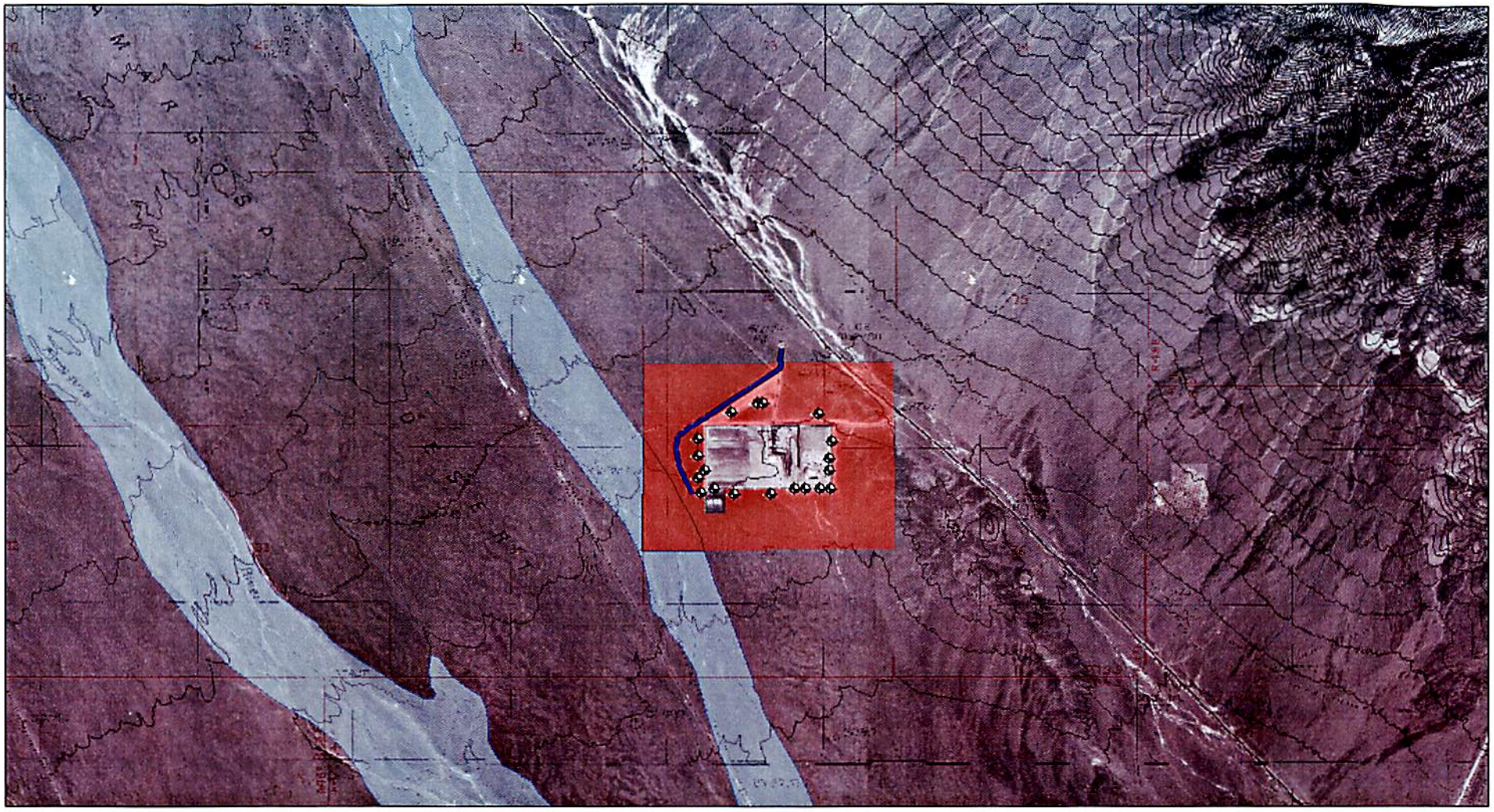
SCALE FEET

TRANSPORTATION PLAN
US Ecology Nevada, Inc.
HAZARDOUS WASTE MANAGEMENT FACILITY
BEATTY, NEVADA 89003

Appendix E

Flood Insurance Rate Map

A
B
C
D
E
F
G
H
J
ZONE X
ZONE A
Nellis Air Force Range and Nuclear Testing Site
ALL ZONE D
BUFFER BOUNDARY
FACILITY BOUNDARY
LEGEND
NOTES
APPROXIMATE SCALE IN FEET
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
NYE COUNTY, NEVADA
(UNINCORPORATED AREAS)
PANEL 4000 OF 4450
COMMUNITY-PANEL NUMBER
320018 4000 C
MAP REVISED:
SEPTEMBER 28, 1990
Federal Emergency Management Agency



AquAeTer
optimizing environmental resources
water. air. earth

Legend

FEMA Flood Zone
Buffer Zone
Existing Drainage
Detection Monitor Well

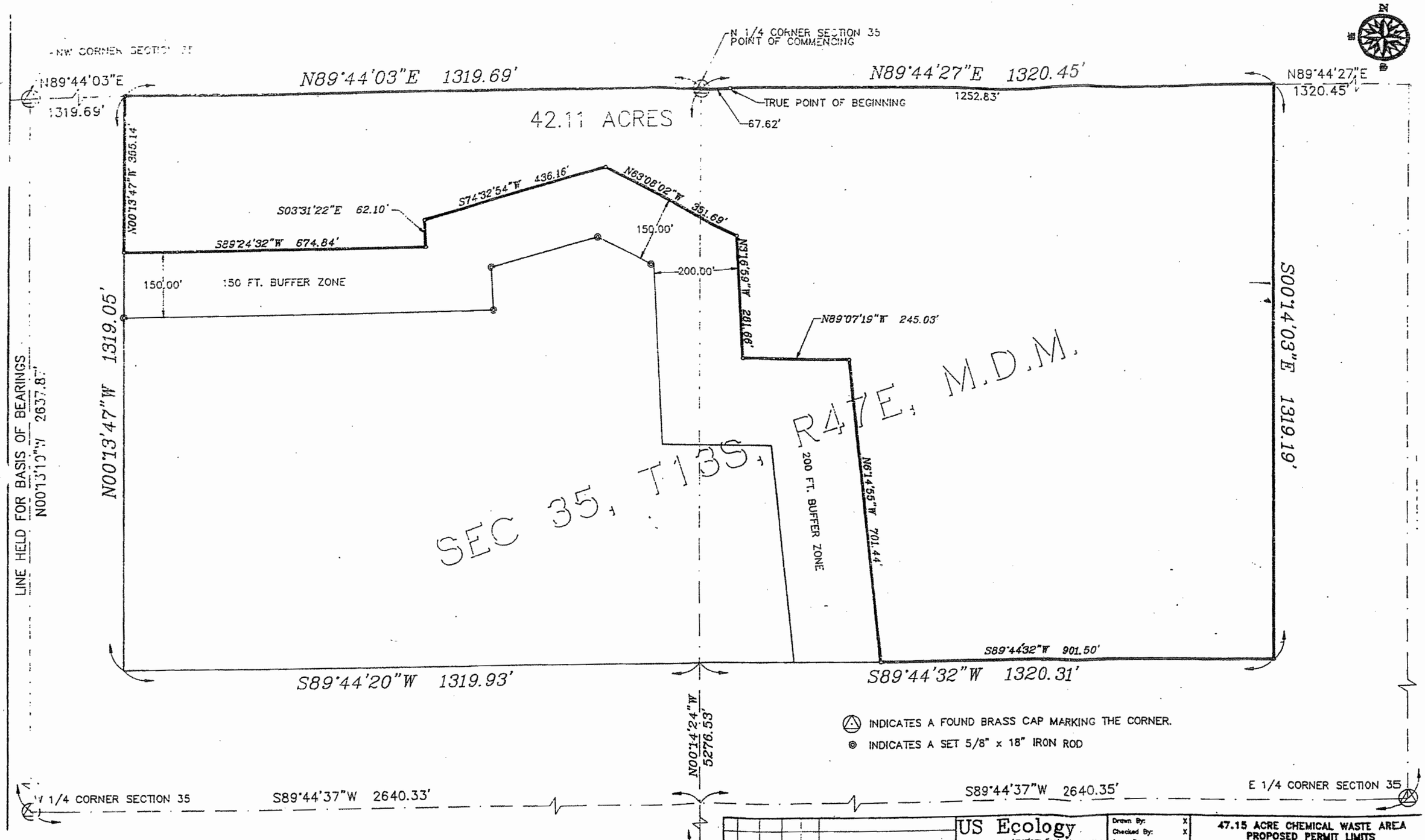
0 2,000 4,000 Feet
1 inch equals 2,000 feet

FIGURE 1
CURRENT SITE CONDITION
US Ecology Nevada, Inc.
Hazardous Waste Management Facility
Beatty, Nevada

DRAFT

Appendix F

Legal Description and Facility Boundaries



Thompson Surveying Company
Land Surveying/Mapping/GPS/GIS
DWG NO.: 94071083

Rev	Drawn	Check	Appr	Date	Description

REVISIONS

US Ecology
an American Ecology company
US Ecology Inc.
5333 WESTHEIMER
Suite 1000
Houston, Texas 77056

Reference Drawings

Drawn By: X
Checked By: X
Appr. By:
Date: 7/94
Scale: AS NOTED
Project No.: NV-148

47.15 ACRE CHEMICAL WASTE AREA
PROPOSED PERMIT LIMITS
HAZARDOUS WASTE MANAGEMENT FACILITY,
U.S. Ecology, Inc.
BEATTY, NEVADA

Drawing No. NV-148-FIG-013
Revision 0

Thompson Surveying Company

P.O. Box 801405
Houston, TX 77280

(713) 895-7348
Fax (713) 895-8528

Metes and Bounds Description of
42.11 Acre Site
in the North half of Section 35,
T 13 S, R 47 E, Mount Diablo Base Meridian
Nye County, Nevada

Being a 42.11 acre tract of land in the North half of Section 35, T 13 S, R 47 E, Mount Diablo Base Meridian, Nye County, Nevada being more particularly described as follows:

Commencing at the North quarter corner of said Section 35, being a 1" pipe with brass cap set by G.L.O. thence N 89 deg 44' 27" E, a distance of 67.62 feet to the TRUE POINT OF BEGINNING;

THENCE continuing N 89 deg 44' 27" E, a distance of 1252.83 feet to the NE corner of the NW 1/4, NE 1/4 of said Section 35, from which a point for the NE corner of said Section 35 bears N 89 deg 44' 27" E, a distance of 1320.45 feet;

THENCE S 00 deg 14' 03" E, a distance of 1319.19 feet to the SE corner of the NW 1/4, NE 1/4 of said Section 35;

THENCE along and with the south line of said NW 1/4, NE 1/4 a bearing of S 89 deg 44' 32" W, a distance of 901.50 feet to a point;

THENCE N 06 deg 14' 55" W, a distance of 701.44 feet to a point for a corner;

THENCE N 89 deg 07' 19" W, a distance of 245.03 feet to a point for a corner;

THENCE N 03 deg 16' 59" W, a distance of 281.66 feet to a point for a corner;

THENCE N 63 deg 08' 02" W, a distance of 351.69 feet to a point for a corner;

THENCE S 74 deg 32' 54" W, a distance of 436.16 feet to a point for a corner;

THENCE S 03 deg 31' 22" E, a distance of 62.10 feet to a point for a corner;

THENCE S 89 deg 24' 32" W, a distance of 674.84 feet to a point in the west line of the NE 1/4, NW 1/4 of said Section 35;

Metes and Bounds Description

THENCE with said west line of NE 1/4, NW 1/4 a bearing of N 00 deg 13' 47" W, a distance of 355.14 feet to a point for the NW corner of the NE 1/4, NW 1/4 from which a 2" iron pipe with brass cap set by G.L.O. for the northwest corner of said Section 35 bears S 89 deg 44' 03" W, a distance of 1319.69 feet;

THENCE N 89 deg 44' 03" E, a distance of 1319.69 feet to the North quarter corner of said Section 35;

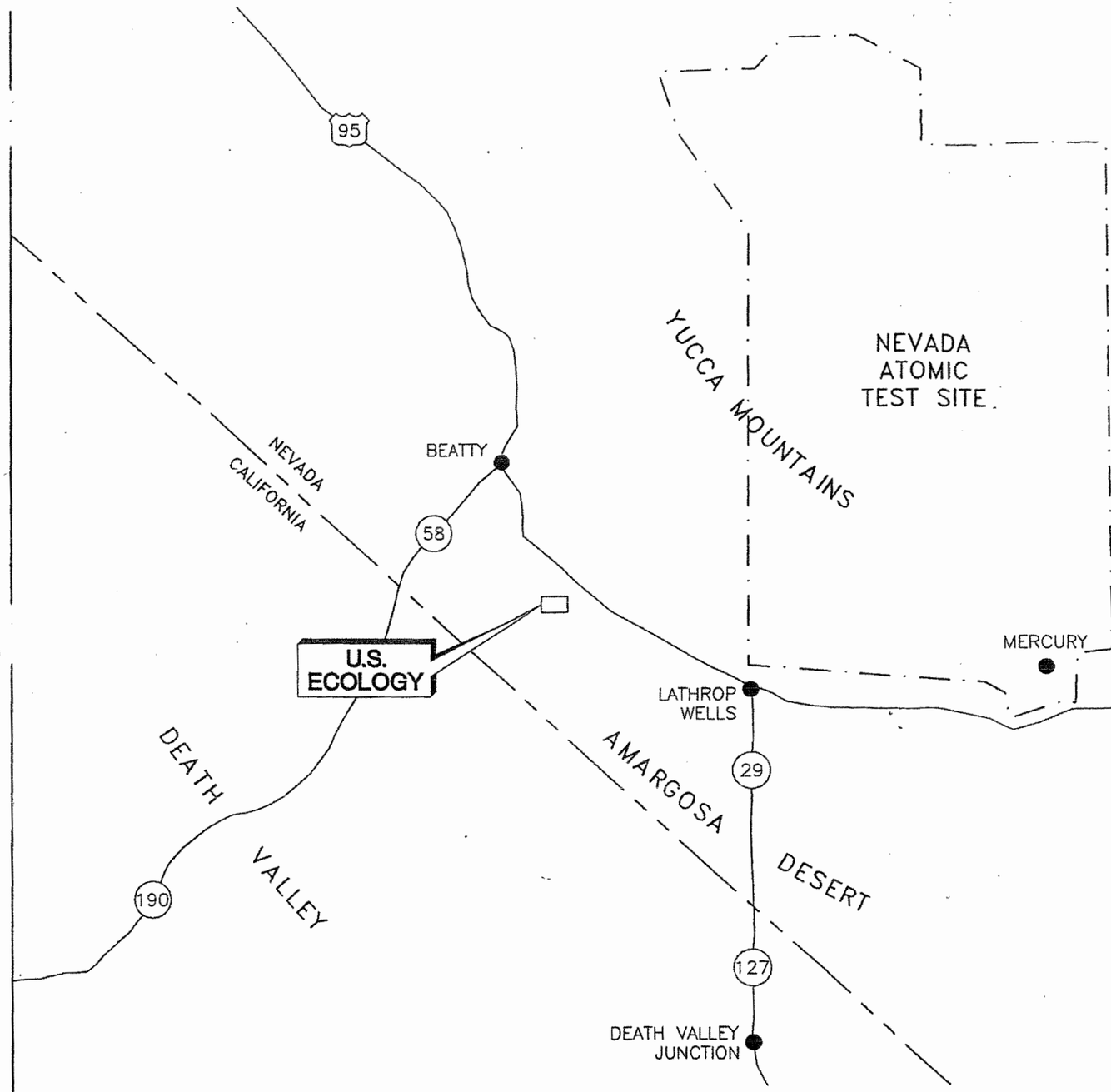
THENCE N 89 deg 44' 27" E, a distance of 67.62 feet to the POINT OF BEGINNING, delineating and encompassing 42.11 acres more or less.

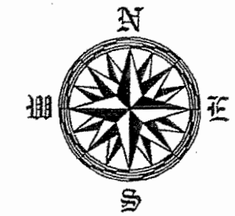
Compiled by:
Thompson Surveying Company
July 26, 1994
Job Number 940710

REGISTERED LAND SURVEYOR-STATE OF NEVADA
BRUCE R. PENNELL
No. 6353

Appendix G

Facility Access from Highway 95





20 10 0 20
SCALE MILES

Rev	Drawn	Check	Appr	PE Appr	Date	Description

REVISIONS

US Ecology
an American Ecology company
US Ecology Inc.
5333 WESTHEIMER
Suite 1000
Houston, Texas 77056

Reference Drawings

Drawn By	DKK
Checked By	EEP
Appr. By	
PE Appr. By	
Date	11-93
Scale	AS NOTED
Project No.	NV148

REGIONAL SITE LOCATION MAP
CELL 12
HAZARDOUS WASTE MANAGEMENT FACILITY
U.S. Ecology, Inc.
BEATTY, NEVADA

Drawing No. NV-148-FIG-001

Revision No. 0

Appendix H

Waste Minimization Program

WASTE MINIMIZATION PROGRAM

US Ecology - Beatty, Nevada

October 2009

Revised May 2014

WASTE MINIMIZATION PROGRAM

US Ecology - Beatty, Nevada

1.0 INTRODUCTION

US Ecology, Inc. operates a commercial hazardous waste management facility located near Beatty, Nevada. The facility disposes of containerized and bulk hazardous waste in a Resource Conservation and Recovery Act (RCRA) and Toxic Substances Control Act (TSCA) landfill which meets RCRA minimum technical requirements. Disposal is based on established compatibility requirements. Waste management capabilities include: PCB waste management (storage & drain & flush activities), bulk & container storage, bulk & container treatment, and solidification and / or stabilization of waste, thermal treatment, and landfill disposal.

2.0 PROGRAM PURPOSE

As part of the Hazardous and Solid Waste Amendment of 1984 (HSWA), Congress amended Section 3002 of RCRA to add a new subsection requiring that generators have a program in place to reduce the volume and toxicity of waste generated, to the degree determined by the generator to be economically practical. The generator must also certify that the proposed method of treatment, storage, or disposal is the practical method currently available, which minimizes the present and future threat to human health and the environment.

US Ecology, through its daily activities of industrial waste management generates hazardous wastes in excess of 1000 kilograms per calendar month. A program has been established to reduce the volume and toxicity of waste generated at the facility during waste management operations.

3.0 PROGRAM RESPONSIBILITY

The Environmental Manager is primarily responsible for the waste minimization program, including development and coordination of specific waste minimization efforts. The Environmental Manager in cooperation with the other facility managers is responsible for monitoring waste generation, ensuring maintenance of equipment and structure, which reduce waste generation, and establishing and implementing waste minimization practices. Site personnel may be assigned to these responsibilities as the Facility Manager determines necessary.

4.0 BASIS OF THE WASTE MINIMIZATION PROGRAM

US Ecology's waste minimization program is designed to incorporate employee training, operational procedures and facility design to minimize the generation of hazardous waste during waste management operations conducted at the facility. Because of the nature of its business, waste generation at the facility is not associated with product manufacture, and therefore the reduction in generated waste toxicity and volume through substitution of less toxic raw materials or process changes is not appropriate. Consequently, waste minimization concentrates on reduction of waste generation. Recycling of generated waste is considered whenever practical and feasible.

5.0 FACILITY WASTE STREAMS AND WASTE MINIMIZATION EFFORTS

5.1 Landfill Leachate

Leachate generation is primarily due to the amount of precipitation that occurs each year. Waste is deposited in the cell so as to promptly cover the cell floor, minimizing the percolation of rainfall and therefore, the generation of leachate.

Leachate minimization is also accomplished by facility berms and other water control measures, which provide run-on control to active areas. Closed cell's caps have been designed to inhibit or preclude rainfall infiltration; these systems are inspected on a routine basis and maintained as needed. No hazardous waste liquids are accepted for direct disposal with the exception of lab packs, which are packed with excess absorbents to preclude any migration from the overall packaging.

Generated leachate is either reutilized in the landfill for dust suppression or disposed of off-site at permitted facilities.

5.2 Miscellaneous Lab Waste

There are three (3) main sources for waste generated in the facility laboratory:

- Discarded lab supplies;
- Samples from incoming waste load; and
- Laboratory wastewater.

Through purchasing and tracking procedures, only the amounts of lab chemicals needed are ordered. Laboratory personnel will try, to the extent practical, to order, stock and use those items that have a "shelf life" prior to expiration.

Samples from incoming waste loads and samples used in stabilization treatability studies taken for on-site verification will be disposed of in the active cell once all analyses are finished, if permitted for land disposal. If the waste is not approved for treatment or shipped to the facility, the sample will be managed in accordance with the Waste Analysis Plan.

Wastewater is generated in the facility laboratory as a result of glassware cleansing. The generation of this waste stream is minimized through proper training of the facility personnel in the use of adequate cleansing methods while using only the amount of water reasonably necessary to accomplish the task. Refresher training is provided at least annually.

Lab wastewater is stored in 90 day accumulation tanks and pumped out when full. Lab wastewater will be added to a stabilization batch and back-end tested to ensure compliance with all applicable treatment standards prior to disposal.

5.3 Decontamination Pad Solids

The generation of decontamination pad solids is minimized by the use of shovels and brushes to remove visible waste from each delivery truck prior to exiting the active disposal cell. Traffic areas and access ramps are covered with clean backfill soil to avoid vehicle contact with waste as they exit the cell.

Customers and/or transporters are strongly encouraged to install a truck bed liner on all trucks bringing bulk waste shipments to the facility. ~~Additional fees are ass~~essed to the generator if the truck is not provided with a bed liner.

Decontamination pad solids are sampled and removed for on-site treatment (if required) and disposal in the active cell.

5.4 Decontamination Pad Wastewater

To minimize generation of this waste stream high-pressured water wash is used to decontaminate the trucks. High-pressure water is not only an effective cleaning method, but also generates less water. The water that is generated is permitted to evaporate in the Evaporation Pad and the remaining sludge is stabilized prior to placing it in the disposal cell. Any water remaining in the pad that does not evaporate will be sampled and either sent off-site for treatment and disposal or treated on-site, solidified and disposed in the active cell.. As stated earlier in Section 5.3, the use of washwater is further minimized by removing all visible residue in the cell and by implementing the truck liner mandate.

5.5 Contaminated Soil from Deminimis Spills

Training of site personnel in spill prevention and spill cleanup is conducted on a regular basis. Any minor spills, which may occur, will be contained as soon as possible to keep the spill and contaminated materials to a minimum. The waste will be disposed of in the active cell or sent off-site for proper treatment and disposal, depending on the spilled material.

5.6 Contaminated Personal Protective Equipment

Caution is taken to minimize the potential for exposure by personnel when handling waste materials. Personal protective equipment (PPE) is used to protect facility personnel. The volume of contaminated PPE generated is minimized by training facility personnel on proper use of PPE, reuse of protective clothing when practical and feasible, and operating procedures, which minimize personal contact with, waste materials. Contaminated clothing, which has exceeded its useful life, is disposed of in the on-site disposal cell.

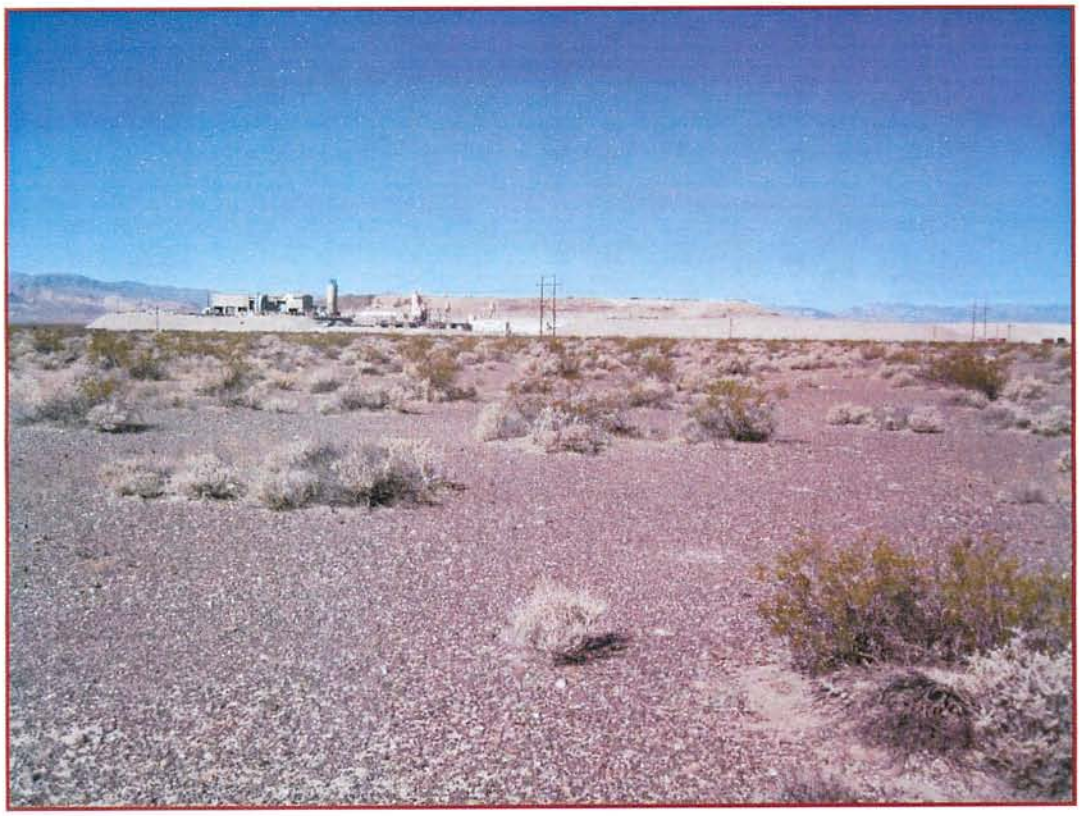
6.0 SUMMARY

US Ecology has historically implemented operational procedures and complied with permit provisions for waste minimization. The facility has been committed over the course of its operations, to maximize its efforts to control on-site generation of waste and has incorporated those features into its daily operating programs.

Appendix I

Desert Tortoise Survey Report

Desert Tortoise Survey Report
US Ecology Buffer Area
Nye County, Nevada



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September 28, 2009

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Appendix A – Data Sheets
Appendix B – Vegetation and Wildlife Observations
Appendix C – Photos

1.0 Introduction

On August 14 - 17, 2009, JBR Environmental Consultants, Inc (JBR) conducted a protocol (USFWS 2009) Pre-project Field Survey for Mohave desert tortoises (*Gopherus agassizii*) near Beatty, Nevada. The Action Area includes a 1,300-foot buffer around the existing US Ecology facility and is located in Township 13 South, Range 47 East, Sections 26 and 35 (Figure 1). Surveys were conducted by four JBR biologists with previous desert tortoise survey experience. Seth Topham and Greg Sharp have extensive tortoise experience and have worked on many projects as Authorized/Qualified Desert Tortoise Biologists. Laura Arneson and Dwayne Winslow each hold MS degrees in biology and have over 100 hours of tortoise survey experience.

2.0 Methods

The desert tortoise is listed as threatened under the Endangered Species Act and the study area is located in the Eastern Mojave recovery unit for the species. For this reason, JBR biologists conducted a protocol (USFWS 2009) desert tortoise survey within the Action Area.

The Action Area and belt transects were mapped in a GIS and uploaded to Trimble GPSs prior to the survey. Using the GPSs, JBR biologists walked parallel transects spaced 10 meters apart to achieve 100% coverage of the Action Area (Figure 2). During the survey, special attention was given to the identification of desert tortoises and their sign (e.g., burrows, scat, carcasses, etc.). Survey information was recorded on established data sheets (Appendix A). Air temperatures were measured through out the day at 5 centimeters from the soil surface in an area of full sun, but in the shade of the observer. Surveys were stopped when the air temperature exceeded 40 degrees Celsius. JBR also recorded all vegetation and other wildlife observed in the Action Area (Appendix B) and photos were taken to document the habitat (Appendix C).

3.0 Results

No desert tortoises or sign were found in the Action Area. The Action Area measures approximately 414 acres, and per the Protocol's Decision Tree, no transects were surveyed at 200-meter intervals around the project.

The entire Action Area had a hard, gravel, desert pavement layer with low shrub cover. Vegetation within the Action Area was a typical Mojave Desert creosote bush scrub community. The dominant vegetation consisted of creosote bush (*Larrea tridentata*), shadescale (*Atriplex confertifolia*), burrow bush (*Ambrosia dumosa*), and boxthorn (*Lycium* spp). A complete vegetation list and wildlife observations are found in Appendix B.

Many predator burrows were found in the Action Area (Figure 2). Some of these burrows had collapsed and formed a half moon shape similar to desert tortoise burrows. However, examination of these burrows showed that the half moon shape did not continue down into the ground; the burrow floors were rounded.

C:\Documents and Settings\STopham\My Documents\PROJECTS\Beaty tort\GIS\MXD\Beaty Tort Fig1 090109 B.A09232.00

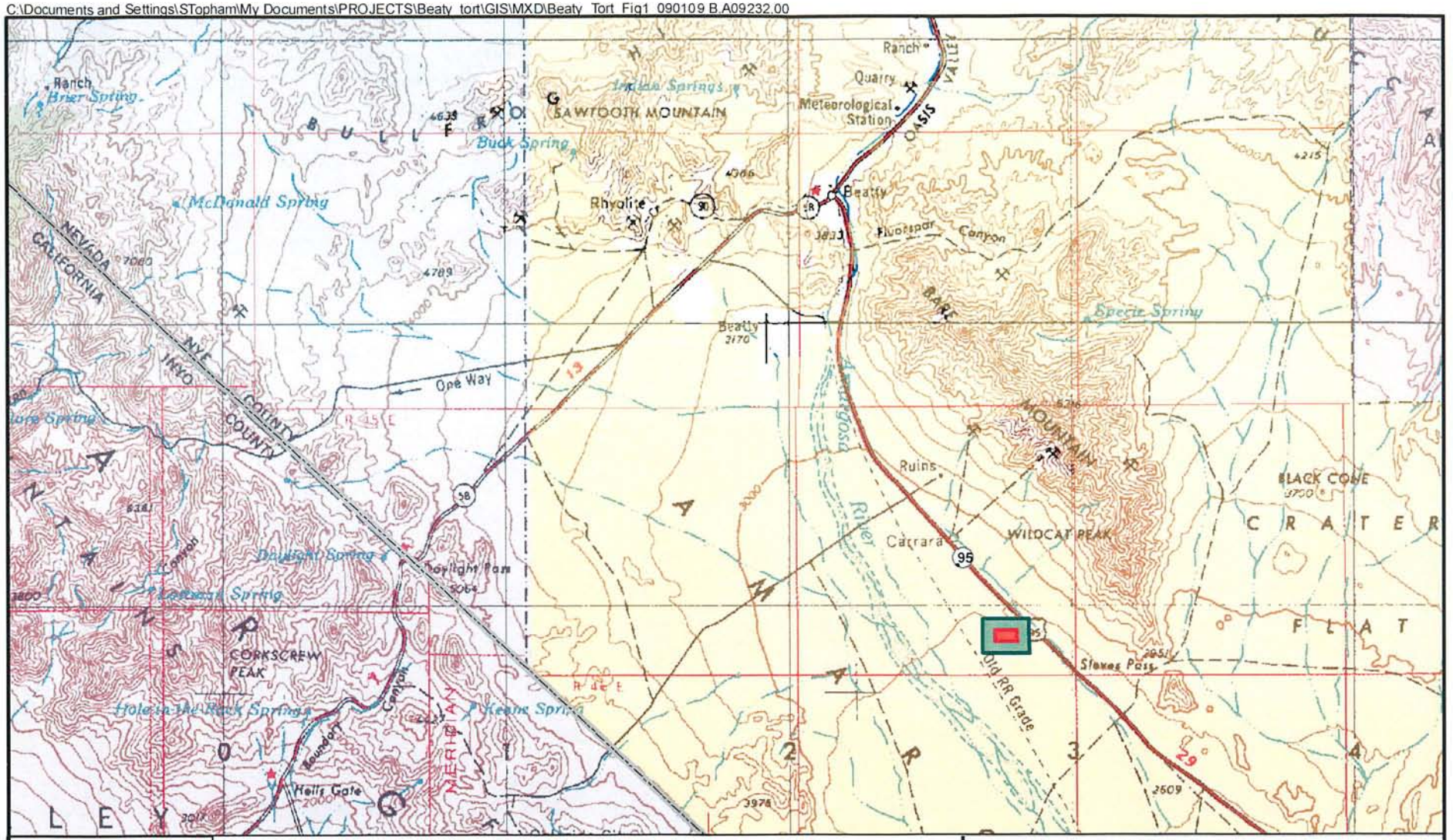


FIGURE. 1 Project Location

- Facility
- Survey Area
- Bureau of Land Management
- Department of Defense
- National Park Service
- Private

0 10,000 20,000 Feet

N W E S

US Ecology

PCBs Tortoise Survey

Disclaimer
This document is for references purposes only and should not be used as a legal document. JBR make no guarantees to the accuracy of the data contained herein or any loss resulting there from.

Data Source
Death Valley - 1:250,00 USGS
Land Ownership: State of Nevada, Survey Area - JBR Map Index
Facility Boundaries - US Ecology

jbr environmental consultants, inc.

DESIGN BY	DRAWN BY	SCALE	DATE DRAWN	DATE REVISED
S Topham	S Topham	1:12,000	09-21-09	09-21-09

C:\Documents and Settings\STopham\My Documents\PROJECTS\Beaty tort\GIS\MXD\Beaty Tort Fig2 090109 B.A09232.00

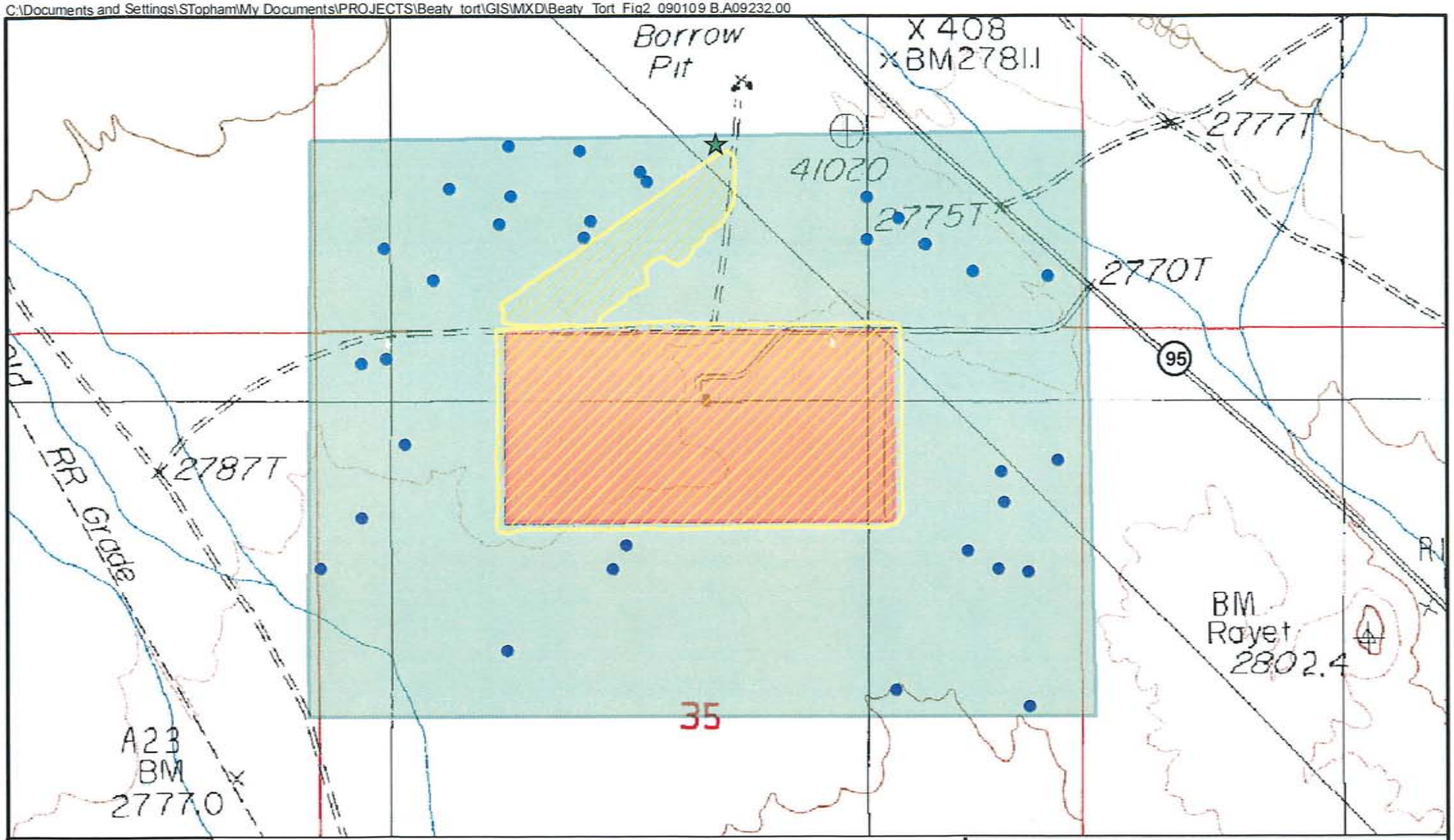


FIGURE. 2 Survey Results

- Facility
- Survey Area
- Facility Disturbance Areas
- Predator Burrow
- Sidewinder Rattlesnake

0 600 1,200 Feet

N W E S

US Ecology
PCBs Tortoise Survey

Disclaimer
This document is for references purposes only and should not be used as a legal document. JBR make no guarantees to the accuracy of the data contained herein or any loss resulting there from.

Data Source
Carrara Canyon - 1:24.00 USGS
State of Nevada, Survey Area - JBR Map Index
Facility Disturbance Polygon and Point Data - JBR Trimble GPS
Facility - US Ecology

jbr environmental consultants, inc.

DESIGN BY	DRAWN BY	SCALE	DATE DRAWN	DATE REVISED
S Topham	S Topham	1:12,000	09-01-09	09-21-09

4.0 References

US Fish and Wildlife Service (USFWS). 2009. Preparing for any action that may occur within the range of the Mojave desert tortoise (*Gopherus agassizii*). April 2009. US Fish and Wildlife Service.

APPENDIX A
DATA SHEETS

USFWS 2009 DESERT TORTOISE PRE-PROJECT SURVEY DATA SHEET

Date of survey: 9/14/09 (day, month, year) Survey biologist(s): G. Sharp, S. Topham, L. Arneson, D. Winslow

Site description: US Ecology Buffer Zone, 414 Acres, 11 miles south of Beatty NV. (project name and size, general location)

County: Nye Quad: Carrara Canyon Location: Part of S26 T13S,R47E and S35 T13S,R47E (UTM coordinates, lat-long, and/or TRS, map datum)

Transect #: 1 Transect length: 1.03 Mi Type of survey: 414 Acres; 100% Coverage (project area size to be surveyed, 100%- coverage/probabilistic sampling)

GPS Start-point: 526314.68mN 4005761.95mE 838.33m (easting, northing, elevation in meters) Start time: 8:00 am/pm

GPS End-point: 527301.7mE 4006940.42mN (easting, northing, elevation in meters) End time: 2:00 am/pm

Start Temp: 22.6 °C Weather: CLEAR, BREEZE 3-5 mph,

End Temp: 35.4 °C

Live Tortoises

Detection number	GPS location Easting	Northing	Time	Tortoise location (*in burrow*, all of tortoise beneath plane of burrow opening, or *not in burrow*)	Approx MCL >160 mm? (Yes, No or *Unknown*)	Existing tag # and color, if present
1						
2						
3						
4			NONE			
5						
6						
7						
8						

Tortoise Sign (burrows, scats, carcasses, etc)

Detection number	GPS location Easting	Northing	Type of sign (*burrows, scats, carcass, etc*)	Description and comments
1				
2				
3				
4			NONE	
5				
6				
7				
8				

USFWS 2009 DESERT TORTOISE PRE-PROJECT SURVEY DATA SHEET

Date of survey: 9/15/09 (day/month, year) Survey biologist(s): G. Sharp, S. Topham, L. Arneson, D. Winslow

Site description: US Ecology Buffer Zone, 414 Acres, 11 miles south of Beatty NV. (project name and size, general location)

County: Nye Quad: Carrara Canyon Location: Part of S26 T13S, R47E and S35 T13S, R47E (UTM coordinates, lat-long, and/or TRS, map datum)

Transect #: 2 Transect length: 1.03 Mi Type of survey: 414 Acres; 100% Coverage (project area size to be surveyed, 100% coverage/probabilistic sampling)

GPS Start-point: 527643.97mE 4009683.18mN 850.40 (easting, northing, elevation in meters) Start time: 7:30 am/pm

GPS End-point: 527467.9mE 4009622.23mN 847.80m(mm) (easting, northing, elevation in meters) End time: 2:27 am/pm

Start Temp: 17.3 °C Weather: CLEAR, CALM, NO CLOUDS.

End Temp: 30.8 °C

Live Tortoises

Detection number	GPS location Easting	Northing	Time	Tortoise location (in burrow: all of tortoise beneath plane of burrow opening, or not in burrow)	Approx MCL >160-mm? (Yes, No or Unknown)	Existing tag # and color, if present
1						
2						
3						
4			NONE			
5						
6						
7						
8						

Tortoise Sign (burrows, scats, carcasses, etc)

Detection number	GPS location Easting	Northing	Type of sign (burrows, scats, carcass, etc)	Description and comments
1				
2				
3				
4			NONE	
5				
6				
7				
8				

Date of survey: 9/15/09

Transect number: 2

USFWS 2009 DESERT TORTOISE PRE-PROJECT SURVEY DATA SHEET

Date of survey: 9/16/09 (day, month, year) Survey biologist(s): G. Sharp, S. Topham, L. Arneson, D. Winslow

Site description: US Ecology Buffer Zone, 414 Acres, 11 miles south of Beatty NV. (project name and size, general location)

County: Nye Quad: Carrara Canyon Location: Part of S26 T13S,R47E and S35 T13S,R47E (UTM coordinates, lat-long, and/or TRS, map datum)

Transect #: 3 Transect length: 1.03 Mi Type of survey: 414 Acres; 100% Coverage (project area size to be surveyed, 100% coverage/probabilistic sampling)

GPS Start-point: 527986.11 mE 4069926.94 mN 948.41 m (easting, northing, elevation in meters) Start time: 7:30 am/pm

GPS End-point: 527643.97 mE 4069683.18 mN 850.90 (easting, northing, elevation in meters) End time: 2:45 am/pm

Start Temp: 20.7 °C Weather: clear, calm, 3% cloud

End Temp: 40.7 °C

Live Tortoises

Detection number	GPS location Easting	Northing	Time	Tortoise location (in burrow: all of tortoise beneath plane of burrow opening, or not in burrow)	Approx MCL >160-mm? (Yes, No or Unknown)	Existing tag # and color, if present
1						
2						
3						
4			NONE			
5						
6						
7						
8						

Tortoise Sign (burrows, scats, carcasses, etc)

Detection number	GPS location Easting	Northing	Type of sign (burrows, scats, carcases, etc)	Description and comments
1				
2				
3				
4			NONE	
5				
6				
7				
8				

Date of survey: 09-16-09

Transect number: 5

USFWS 2009 DESERT TORTOISE PRE-PROJECT SURVEY DATA SHEET

Date of survey: 17/09/09 (day, month, year) Survey biologist(s): G. Sharp, S. Topham, L. Arneson, D. Winslow

Site description: US Ecology Buffer Zone, 414 Acres, 11 miles south of Beatty NV. (project name and size, general location)

County: Nye Quad: Carrara Canyon Location: Part of S26 T13S,R47E and S35 T13S,R47E (UTM coordinates, lat-long, and/or TRS, map datum)

Transect #: 4 Transect length: 1.03 Mi Type of survey: 414 Acres; 100% Coverage (project area size to be surveyed, 100% coverage/probabilistic sampling)

GPS Start-point: 527467.9 m E 4069622.73 m N 847.80 m (easting, northing, elevation in meters) Start time: 7:19 am/pm

GPS End-point: 528372.378 m E 4069757.44 m N 837.71 m (easting, northing, elevation in meters) End time: 10:45 am/pm

Start Temp. 19.1 °C Weather: CLEAR/CALM, NO CLOUDS

End Temp: 32.1 °C

Live Tortoises

Detection number	GPS location Easting	Northing	Time	Tortoise location (in burrow: all of tortoise beneath plane of burrow opening, or not in burrow)	Approx MCL >160-mm? (Yes, No or Unknown)	Existing tag # and color, if present
1						
2						
3						
4			NONE			
5						
6						
7						
8						

Tortoise Sign (burrows, scats, carcasses, etc)

Detection number	GPS location Easting	Northing	Type of sign (burrows, scats, carcass, etc)	Description and comments
1				
2				
3			NONE	
4				
5				
6				
7				
8				

Date of survey: 09/17/09

Transect number: 4

APPENDIX B
VEGETATION AND WILDLIFE OBSERVATIONS

Vegetation

burrow- bush	*Ambrosia dumosa*
alkali saltbush	*Atriplex polycarpa*
shadscale	*Atriplex confertifolia*
devils spine flower	*Chorizanthe Rigida*
Mormon tea	*Ephedra nevadensis*
desert trumpet	*Eriogonum Inflatum*
cheese bush	*Hymenoclea salsola*
creosote	*Larrea tridentata*
desert pepperweed	*Lepidium fremontii*
Anderson boxthorn	*Lycium andersonii*
pallid boxthorn	*Lycium pallidum*
beaver tail cactus	*Opuntia basilaris*
buckhorn cholla	*Opuntia acanthocarpa*
wire lettuce	*Stephanomeria pauciflora*

Reptile

tiger whiptail	*Aspidoscelis tigris*
zebra-tailed lizard	*Callisaurus draconoides*
sidewinder rattlesnake	*Crotalus cerastes*
desert iguana	*Dipsosaurus dorsalis*
desert horned lizard	*Phrynosoma platyrhinos*
ground snake	*Sonora semiannulata*
side-blotch lizard	*Uta stansburiana*

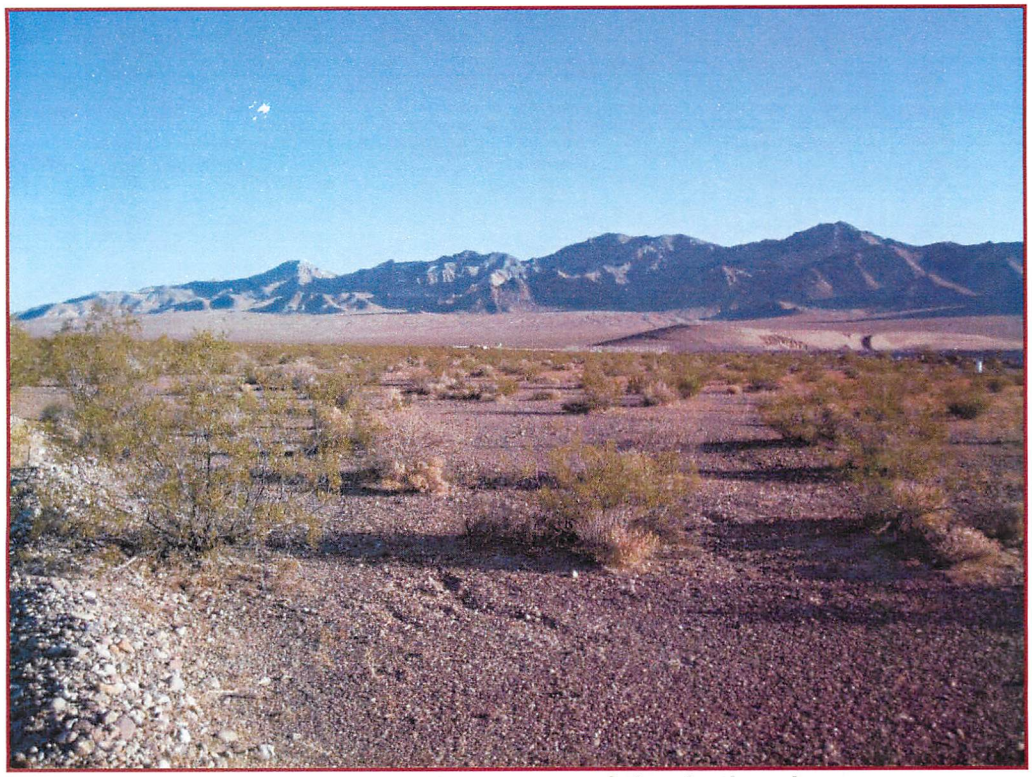
Bird

lesser nighthawk	*Chordeiles acutipennis*
common raven	*Corvus corax*
horned lark	*Eremophila alpestris*
yellow-headed blackbird	*Xanthocephalus xanthocephalus*
mourning dove	*Zenaida macroura*

Mammal

white-tailed antelope ground squirrel	*Ammospermophilus leucurus*
black-tailed jack rabbit	*Lepus californicus*

APPENDIX C
PHOTOS



Habitat in the southern part of the Action Area.

Habitat in the western part of the Action Area.

Habitat in the northern part of the Action Area.

Habitat in the eastern part of the Action Area.

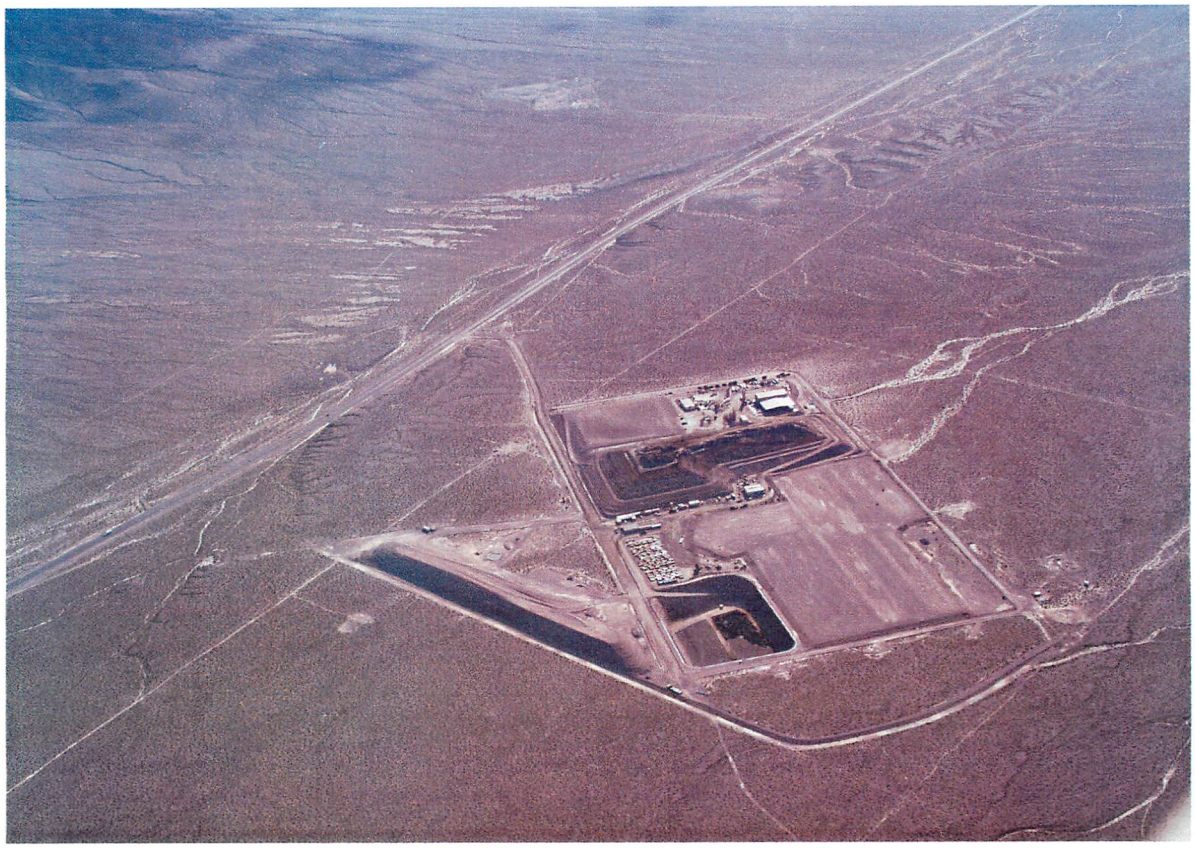
Appendix J

Environmental Impact Statement

TOXIC SUBSTANCES CONTROL ACT (TSCA) PERMIT RENEWAL APPLICATION

US Ecology Nevada

Beatty, NV



Environmental Impact Statement – January 2005
Ecological / Biological Assessments

March 3, 2009

4 ALTERNATIVE SITE #2: US ECOLOGY (BEATTY, NEVADA)

4.1 LAND USE

4.1.1 Description of Existing Environment

The USE Beatty facility is located in Nye County, Nevada, approximately 125 miles northwest of Las Vegas and 11 miles south of Beatty (**Figure 2-9**). The facility is owned by the State of Nevada and is leased by USE, which operates it. The entire property leased by USE covers approximately 80 acres, part of which was previously used for the disposal of LLRW. The closed LLRW portion of the property is separated from the RCRA disposal area by a buffer zone where no below-grade waste disposal activities take place. All adjacent property within several miles of the facility is federally-owned and administered by the Bureau of Land Management (BLM) as rangeland. BLM leases the sections bordering the facility boundaries to the State of Nevada as a buffer zone (400 acres in extent; approximately 1,320 feet from the facility fence line). Neither the buffer zone nor the facilities are located on or adjacent to tribal lands (Shaw 2004d, USE 2004b)

The USE disposal facility near Beatty, Nevada provides full RCRA and TSCA treatment and disposal services. The Beatty facility provides RCRA treatment and solidification services for industrial and government customers. The facility also provides chemical oxidation and thermal desorption for organic contaminated wastes and oil refinery catalysts. USE operates two onsite thermal desorption units at the Beatty facility. These patented thermal desorption units utilize a vacuum-enhanced, low temperature distillation process. This batch treatment process has been in operation since 1999, and has treated tens of thousands of tons of waste (USE 2004c).

The proposed WAO system and tank storage would be located in the southeastern portion of the facility property in an area currently used for containerized waste storage and reagent storage (**Figure 2-10**). The WAO unit would be constructed on top of closed landfill cells. These cells include approximately 20 feet of cover (Shaw 2004d).

4.1.2 Effects of the Proposed Action

The area required for the new storage facilities and the WAO system is approximately 15,000 ft^2. An additional 15,000 ft^2 is required for construction laydown. The areas proposed for this project are considered to be disturbed and no land use impacts are expected from construction or operation of the WAO system at this site. Use of the site for the storage and treatment of neutralent waste should have no impact on the use of any of the surrounding lands. After completion of the treatment of waste, the WAO system will either remain in place and be used for commercial treatment of wastes, or it will be dismantled and removed from the site. The installation of the WAO system is compatible with the existing uses on the facility property. All of the construction activity would be confined to the facility boundary, and operations would be confined to the WAO unit, solidification operation and active landfill Cell 11. Therefore no impacts to off-site land uses are anticipated (Shaw 2004d).

4.2 AESTHETICS AND VISUAL RESOURCES

4.2.1 Description of Existing Environment

The USE Beatty facility is situated in a remote desert environment in southwestern Nevada. The topography is flat and there are no sensitive receptors within view of the facility. There are surrounding public lands including nearby mountains from which one can view the facility, however, public vehicle access is limited to existing roads. The closest mountains overlooking the facility with existing roadways include patented inactive mining claims which are posted with no trespassing signs (USE 2004j). There are no known parks, recreation areas or landmarks from which the USE facility is visible.

4.2.2 Effects of the Proposed Action

The proposed action will take place in an existing industrial setting and will be sited entirely within the boundaries of the USE Beatty facility. The storage and treatment of waste will require the construction of six new storage tanks and the WAO system facilities. Although these facilities will be visible from off site areas, there are no sensitive receptors, and the new facilities will not differ from the existing character of the present site. Since the proposed action would take place in an existing industrial setting, there would be no noticeable effects on aesthetics and visual character of the area.

4.3 GEOLOGIC RESOURCES

4.3.1 Description of Existing Environment

The USE Beatty facility is located in the Amargosa Desert basin. This basin was formed by normal block faulting, which displaced the surrounding strata upward with respect to the crustal block underlying the valley. This widespread structural process formed the characteristic topography of the entire Basin and Range province. Erosion of the uplifted areas, during and after their displacement, has filled the basin with a variety of sedimentary deposits. These deposits have reached a depth of 1000 feet in the center of the basin near Lathrop Wells.

The sediments of the valley floor are unconsolidated to partly indurated, and Tertiary to Quaternary in age. Deposited as alluvial fans, debris flows, streambeds, dunes, and lake or marsh beds, they exhibit a very wide range of shapes and grain size distributions. The mineralogy of the sediments varies widely as well, reflecting the diversity of their source rocks.

Details on the nature of the unconsolidated strata beneath the facility have been determined from the various borings and well installations which have been made since 1961. Extensive hydrogeologic investigations have been conducted at the site to determine the soil properties and hydrologic characteristics.

Stratigraphic information derived from the site characterization and monitoring well installation programs for the RCRA disposal facility describe a sequence of deposits consistent with alluvial fan and playa depositional processes. Deposits from the ground surface to a depth of approximately 300 feet beneath the RCRA facility are alluvial in nature. The alluvial sediments are predominantly gravelly sands with poorly sorted gravel or sand deposits which occur in

discontinuous intervals. The gravelly sand extends deeper (approximately 350 feet below ground surface [bgs]) at the southwestern area of the LLRW facility.

Generally, the next 50 to 150 feet of deposits beneath the RCRA facility consist of silt, clay and indurated deposits. The fine-grained sediments are typical of playa deposits and may change composition relatively quickly with depth.

The silt-clay deposits were also observed in borings completed at the site. The upper surface of the silt-clay unit is relatively flat beneath the northern half of the RCRA facility and appears to deepen to the southwest beneath the LLRW facility. Surface soils in the area are shown on **Figure 4-1**.

Drilling investigations indicate that the upper saturated zone occurs near the contact of the silt-clay and indurated sediments with the overlying gravelly sands. The confined aquifer occurs in a sandy gravel formation underlying the silt-clay deposits.

This sandy gravel generally becomes coarser as it extends to depths exceeding 650 feet below ground level. The deeper gravels, cobbles, and boulders represent a higher energy, fluvial environment (USE 2004b).

The facility is not in a recognized fault zone, the nearest major fault zones being the Death Valley Fault Zone and the Las Vegas Fault Zone, 20 miles and 100 miles from the facility, respectively. An analysis of aerial photographs showed no faults or lineations that would indicate the presence of a fault within a 3,000-foot radius of the site.

Published data lists no record of any historic earthquake epicenter in the area around Beatty for the period (since 1800) that records have been kept. A review of geologic data gathered on site indicates the absence of any evidence of subsurface faulting to the total explored depth of 575 feet (USE 2004f).

4.3.2 Effects of the Proposed Action

The WAO Unit will be constructed on top of the previously closed landfill area which is currently used for storage. Excavation for the WAO Unit is not expected to be deeper than 5 feet (into the 20 feet of cover) and therefore, will not effect below grade geologic features. Activities associated with the WAO system proposed to occur on top of the capped landfill are permitted by NDEP (USE 2005). Following the solidification process, solids will be placed in the active Subtitle C Landfill, Cell 11 at the site. No impacts to geological features are expected from the proposed project. The additional withdrawal of groundwater will not impact geologic features. USE has existing permitted and leased ground water rights, which have been fully utilized in the past, and full utilization of these rights are not expected to create a new impact (USE2005).

4.4 AIR RESOURCES

4.4.1 Description of Existing Environment

The USE Beatty facility is located in Nye County, in the Nevada AQCR (AQCR Code 147). The State of Nevada currently has standards for seven air pollutants under the SAAQS. In addition to the criteria pollutants of SO_2, CO, O_3, NO_2, Pb and PM_{10}. Nevada also has a 1-hour

standard for hydrogen sulfide (i.e., 0.08 ppm). The criteria pollutant standards are identical to the NAAQS with the exception of a lower 1-hour O_3 standard for the Lake Tahoe Basin (i.e., 0.10 ppm) and a lower 8-hour CO standard at elevations equal to or greater than 5,000 feet above Mean Sea Level (i.e., 6.0 ppm). These lower standards are not applicable to the USE site. The closest Class 1 area to the USE site is the John Muir Wilderness Area located approximately 90 miles west of the site in California.

Nye County is listed as an "attainment/unclassifiable" area for CO and O_3 (1- and 8-hour), an "unclassifiable" area for PM_{10}, a "cannot be classified or better than national standards" area for NO_2, a "better than national" area for SO_2, and "not designated" for Pb per 40CFR81.329 for Nevada.

The nearest ambient air quality monitoring stations with at least five years of data for CO, NO_2, O_3, PM_{10}, and SO_2 are located in Clark County in greater Las Vegas. **Table 4-1** presents the highest recorded air quality levels that are representative of the USE facility area compared against the SAAQS for each pollutant (EPA 2004).

Two exceedances of the applicable NAAQS are noted in **Table 4-1**: 24-hour and annual average PM_{10} concentrations of 535 and 56 $\mu g/m^3$, respectively. Monitoring data since 1999 indicates that PM_{10} concentrations exhibit a downward trend in time, except for the concentrations observed in 2002 and 1999.

USE currently has a Class II Air Quality Operating Permit dated July 16, 2002 for the operation of stabilization and solidification units, thermal desorption units, and a PCB processing unit.

4.4.2 Effects of the Proposed Action

4.4.2.1 Site Preparation and Installation of the WAO System

During installation of the proposed WAO system at USE's Beatty facility temporary and localized increases in atmospheric concentrations of NO_x, CO, SO_2, VOC, and PM_{10} would result from exhaust emissions of workers' vehicles, heavy construction vehicles, and other machinery and tools. Construction vehicles and machinery would be equipped with pollution-control devices to minimize emissions, and the vehicles would be required to meet federal emissions standards. Thus, the vehicles used in conjunction with this project would conform to those standards. The resulting temporary and localized emissions are expected to be very small compared to regulatory thresholds typically used to determine whether further air quality impact analysis is necessary.

NDEP regulations NAC 445B.22037 Emissions of PM_{10}: Fugitive dust (NRS 445B.210), regulate the emission of fugitive dust and require dust control programs be implemented prior to construction activities. Fugitive dust could result from earthwork and movement of construction vehicles. No clearing of vegetation and minimal excavation is expected. Dust control is a requirement of USE's operating permits, held by the NDEP. Dust will be controlled by wetting all active surface areas (roadways, cell cover material, etc), ensuring dusty wastes are covered immediately, complying with daily cover requirements, and utilizing chemical dust suppression agents as appropriate as part of normal operations. USE has developed a facility specific dust control plan to ensure compliance with the dust control provisions of its permits.

Table 4-1
National Ambient Air Quality Standards (NAAQS) and Highest Regional Levels Representative of the US Ecology Facility

Pollutant	Averaging period	NAAQS			Highest Regional Air Quality Value	
		Standard Value	Notes	Standard Type	Concentration	Location (year)
CO	1-hour	35 ppm (40 mg/m^3)	1	Primary	3.3 ppm	N. Las Vegas (2000)
	8-hour	9 ppm (10 mg/m^3)	1	Primary	2.8 ppm	N. Las Vegas (1999)
NO_2	Annual	0.053 ppm (100 µg/m^3)	1	Primary & Secondary	0.008 ppm	N. Las Vegas (2002)
O_3	1-hour	0.12 ppm (235 µg/m^3)	2	Primary & Secondary	0.11 ppm	N. Las Vegas (2003)
Pb	Calendar quarter	1.5 µg/m^3	1	Primary & Secondary	NA	NA
PM_{10}	24-hour	150 µg/m^3	3	Primary & Secondary	535 µg/m^3	N. Las Vegas (2002)
	Annual	50 µg/m^3	1	Primary & Secondary	56 µg/m^3	N. Las Vegas (1999)
SO_2	3-hour	0.50 ppm (1300 µg/m^3)	1	Secondary	0.006 ppm	N. Las Vegas (2003)
	24-hour	0.14 ppm (365 µg/m^3)	1	Primary	0.002 ppm	N. Las Vegas (2003)
	Annual	0.03 ppm (80 µg/m^3)	1	Primary	0.001 ppm	N. Las Vegas (2003)
Hydrogen Sulfide	1-hour	112 µg/m^3 (0.08 ppm)		-	NA	NA

Notes: 1 - These standards, other than for O_3, PM_{10}, and those based on annual averages, must not be exceeded more than once per year.
2 - The 1-hour O_3 standard is attained when the expected number of days per calendar year with a maximum hourly average concentration above the standard is equal to or less than one.
3 - The PM_{10} 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above the standard, rounded to the nearest 10 µg/m^3, is equal to or less than one. The expected number of days per calendar year is generally based on an average of the number of times the standard has been exceeded per year for the last 3 years.
NA = Not available

4.4.2.2 Operation

The operation of the WAO system will result in minimal air pollutant emissions from a RTO, used to control the WAO off-gas emissions, and from a propane fired hot oil heater. There will also be minimal PM_{10} emissions from the operation of a small cooling tower. The expected annual air pollutant emissions from the operation of the WAO, along with the most recent available actual emissions from the USE site, are provided in **Table 4-2**. The WAO operational emissions estimate conservatively assumes full operation for one year (i.e., 8.760 hours per year).

With the addition of the new combustion sources and cooling tower at the USE facility, resulting in new air pollutant emissions, the existing Class II Air Quality Operating Permit will need to be modified and approved by the NDEP under Nevada Administrative Code (Part 445B), Chapter 287, "Operating Permits and Permits to Construct: General Requirements; Exception; Restrictions on Transfer".

Table 4-2
Comparison of Expected WAO Air Pollutant Emissions with Existing US Ecology Emissions (tons per year)

Pollutant	WAO Sources			Total	Existing Actual Emissions
	Cooling Tower	Hot Oil Heater	Thermal Oxidizer		
CO	N/A	1.8	0.08	1.9	5.3
NO_x	N/A	5.3	0.06	5.3	0.6
SO_2	N/A	0.05	0.004	0.05	1.8
PM_{10}	4.1	0.3	0.03	4.4	2.7
VOC	N/A	0.2	0.02	0.2	0.8

Air emissions from the new WAO equipment (RTO and hot oil heater) and cooling tower would not constitute a "major modification" under the applicable Prevention of Significant Deterioration (PSD) regulations implemented by the NDEP. Each source would comply with the pertinent EPA and NDEP standards applicable to small emissions sources. The NDEP does not typically require ambient air impact analysis (modeling) for small sources because of their typically insignificant impacts. Thus the new emission sources will contribute minimally to local air pollution but without significant impact.

4.5 NOISE

4.5.1 Description of Existing Environment

The proposed facility is located in a remote area approximately 11 miles from the nearest occupied or inhabited area. No ambient noise measurements are available for the site. Area sound levels were estimated based on the industrial activity currently occurring at this facility. The onsite sound levels were estimated to range from 60 to 70 dBA during the daytime and from 50 to 60 dBA during the nighttime. The types of noise generated at the USE facility generally include earth moving equipment operating in various work areas; trucks accessing, traversing and exiting the site, and other mechanical equipment sounds related to the operation. The facility currently conducts operations 24 hours per day Monday through Friday. It is anticipated that construction and operation of the WAO unit may require 24 hour per day operations 7 days per week (USE 2004i).

There are no noise sensitive receptors located near the USE Beatty facility. Noise sensitive receptors typically include; residences, schools, hospitals, parks, and cemeteries. The closest noise sensitive receptor is a residence in Beatty, Nevada, approximately 11 miles away.

The State of Nevada does not have any noise regulations applicable for stationary noise sources. There are also no county or local noise regulations. The EPA has published noise level guidelines that have been used when there are no applicable state or local noise regulations. However, these guidelines apply only to residential areas, and since the nearest residence is 11 miles away, these guidelines do not apply.

4.5.2 Effects of the Proposed Action

4.5.2.1 Site Preparation and Installation of the WAO System

The construction equipment anticipated to be used on this project includes backhoes for excavation work, and fork lifts and cranes for unloading the equipment from trucks and for installation of the WAO and BOP equipment. The equipment will operate intermittently and under varying loads throughout the day. Of the equipment to be used at the WAO site, the backhoe has the loudest noise emission, estimated at 80 dBA (measured at 50 feet away).

The closest sensitive receptor to the site is 11 miles to the north; therefore construction noise is not anticipated to impact the general public.

4.5.2.2 Operation

The WAO system and BOP will be situated within the boundaries of the existing USE facility. The WAO system and BOP will be located on a small lot, approximately 100 by 150 feet, about 300 feet from the southeast corner of the USE fenceline near the proposed new tanks. The nearest USE site property line is about 250 feet east of the nearest WAO/BOP system boundary.

The WAO system and BOP equipment noise sources are discussed in more detail in Section 2. Based on the equipment list and specifications, the process air compressor package was identified as the loudest piece of equipment. Other noise sources considered were the high pressure pumps, and step-down transformer. The predicted sound level at the nearest property line (east) is 58 dBA.

USE will support this facility with the addition of a new mechanical draft cooling tower, small transfer pumps, and storage tanks located near the WAO and BOP facility. The cooling tower is the loudest of these new noise sources and at this time its specific location has not been determined. The predicted noise level for a representative mechanical draft cooling tower is 53 dBA at a 400-foot distance from the rim or basin edge.

Currently, USE operates an active landfill with mobile diesel-powered equipment operating at various locations around the property. These noise sources are relatively large when compared to the smaller electric-powered equipment used for the operation of the WAO and BOP.

The noise from the WAO and BOP operation will only be noticeable near the facility. Beyond the USE property lines, sound levels including the operating WAO and BOP is expected to be about the same as the existing site noise levels. Therefore, the expected sound level increase offsite is expected to be minimal. Since the closest sensitive receptor to the site is 11 miles to the north, operational noise is not anticipated to impact the general public.

4.6 WATER RESOURCES

4.6.1 Water Use

4.6.1.1 Description of Existing Environment

Water is supplied to the site from a well located 556 feet bgs on the facility property. USE has a Permit to Appropriate Public Waters from the State of Nevada, which expires December 1, 2008. This permit allows withdrawals up to 4.3 million gal/year. USE also has Leased Water Rights to Appropriate Public Waters from the State of Nevada in the amount of 6.5 million gal/year. This permit expires December 31, 2007. These two permits constitute an available water source of 10.8 million gal/year. Current consumption at the facility is approximately 3 million gal/year (USE 2004g, 2004i)

4.6.1.2 Effects of the Proposed Action

The maximum total water required for service and cooling of the WAO system at USE has been estimated to be 11.2 million gallons. Approximately 6.4 million gallons is required for WAO process water and 4.8 million gallons is required for the cooling system during the entire campaign. USE currently has a surplus of 7 million gal/year from their existing permitted well and water rights permits, but will need to obtain the additional 4.2 million gallons from other sources. USE has obtained a commitment from a private local source for additional water needed to operate the WAO unit. It is estimated that approximately 15,185 gallons per day (gpd) would be required to meet the additional demand. This water would be delivered to the site in approximately three tanker truck loads per day (USE 2004f, 2004g).

This water is a small portion of a very large water right held by a local mining company. USE's use of this amount of water will not deprive any other entity of such water right (USE 2005).

4.6.2 Groundwater

4.6.2.1 Description of Existing Environment

The surficial drainage area of the Amargosa Desert covers about 2600 square miles and is part of two regional groundwater systems. These two groundwater systems converge in the Amargosa Desert and probably continue to the south into Death Valley. Groundwater flow directions in the Amargosa Desert are generally to the southeast and southwest. Groundwater flow is controlled by alluvium, volcanic rock, and carbonate rocks. Thick volcanic sequences associated with calderas of the Nevada Test Site and areas to the west become less significant to the south, and thick carbonate rock sequences are assumed to be present beneath the Amargosa Desert (USE 2004b). Groundwater at the facility is approximately 285 feet deep. The closest public drinking water supply well is located in Beatty, approximately 11 miles to the north of the site. Aside from the well which supplies water to the site, the nearest private water well is located approximately 10.5 miles north of the facility at the Vanderbilt Mine.

A network of monitoring wells has been installed to monitor groundwater conditions at/near the site. A groundwater-monitoring plan has been developed to describe in detail the sampling, maintenance, and analytical methodologies and procedures necessary to assure consistent

groundwater quality data. The groundwater monitoring plan has been prepared in compliance with the requirements of 40CFR264, Subpart F and 270.14(c)(6)(iv), and in accordance with procedures described in the 1992 RCRA Groundwater Monitoring Technical Enforcement Guidance (TEGD) published by EPA Office of Solid Waste.

Data from the groundwater monitoring wells indicates that groundwater is contaminated in the immediate vicinity of the pre-RCRA units at the site. A RCRA Facility Investigation and Corrective Measures Study has been completed and accepted by NDEP. Soil vapor extraction wells are being installed to remove the volatile contaminants, which are the identified cause of the groundwater contamination (AEC 2004).

4.6.2.2 Effects of the Proposed Action

As described above, the total water requirements over the life of the proposed action (about 9 months of operations) amount to 11.2 million gallons. This volume exceeds the permitted capacity of the existing well on site, and other sources of water are required to meet the demand. As described in Section 4.6.1.2, USE will purchase and truck three tanker truck loads of water per day from an identified committed source. The increased use of groundwater will be temporary, extending over an approximately nine month period. USE has indicated that the additional identified source of water has confirmed that it has sufficient permitted and available capacity to meet the approximate 15,185 gpd additional requirement and is permitted for industrial applications for the water (USE 2004g, 2004i). Further, US Ecology's existing permitted and leased water sources, and obligated additional water source are groundwater sources, drawn from deep aquifers that are not affected by seasonal, short-duration (5-10 year) droughts. The facility has never experienced restricted water use due to drought conditions and has no expectation that facility water use shall become subject to restriction due to drought conditions during the proposed term of this project (USE 2005). Therefore, the impact to groundwater resources is not considered to be significant.

The RCRA Corrective Action Program is directed at remediating subsurface soil vapor contamination related to pre-RCRA waste management practices that occurred at the USE facility. The contamination is not hydraulically connected to the water supply well utilized at the the facility, therefore no impact to the RCRA Corrective Action is anticipated.

4.6.3 Surface Water

4.6.3.1 Description of Existing Environment

The USE Beatty facility is located in the Amargosa Desert. Average annual rainfall is approximately four inches. The Amargosa River Channel is the closest surface water body, however it is predominantly dry, except after periods of heavy rainfall. The Amargosa River Channel has a drainage area of 15,540 km^2 and ranges in elevation from <2,400 m in its Pahute Mesa headwaters, to -86 m at its modern terminus in Badwater Basin, Death Valley (Desert Research Institute 2004). **Figure 4-2** presents surface water resources in the vicinity of the project site. The resources shown on the figure, including the Amargosa River, are dry river beds and washes, which flow only during heavy rain events.

4.6.3.2 Effects of the Proposed Action

The proposed action will generate no liquid effluents that will be discharged to off-site sources. Furthermore, due to the great distance to the nearest surface water body (approximately 27 miles), there will be no impacts to surface water resources as a result of the project.

4.6.4 Wastewater Treatment

4.6.4.1 Description of Existing Environment

There is currently no wastewater treatment facility at the USE Beatty facility. Portable toilets are utilized in operational areas of the facility. These units are serviced by a licensed sanitary waste disposal company. Sanitary waste generated in the administrative area is disposed through existing permitted septic systems. Wastewater generated from the laboratory is discharged to the facility's permitted wash pad/evaporation pad. Waste water from laundry is utilized as dust suppression within the active disposal cell (USE 2004j). Diversion dikes and site drainage are employed as control measures to prevent run-on into the disposal areas. There are two (2) run-on control ditches: a trapezoidal ditch designed to provide run-on control for the 25-year, 24-hour storm, and a smaller triangle ditch that diverts any run-on inside the main diversion ditch (AEC 2004)

With the run-on control measures in place, the only water expected to come in contact with the waste management units is from falling precipitation. Run-off is contained within the disposal units since temporary and / or permanent dikes in the below-ground and above-grade sections of the landfills contain precipitation within the cells themselves (AEC 2004).

Run-off from treatment and storage units is of minimal concern due to the sparse rainfall in the region and the dry, well-graded nature of the facility soils. Storm water that comes in contact with active waste management areas at the facility is managed through utilization as process water for waste stabilization activities or if non-hazardous, as dust suppression in the active disposal cell (USE 2004j). Outdoor waste management units generally have waste stored in closed containers or are provided with adequate secondary containment to eliminate the possibility of contaminated run-off (AEC 2004).

4.6.4.2 Effects of the Proposed Action

USE proposes to solidify all treated water and dispose of the solidified mixture in their onsite RCRA Subtitle C landfill disposal Cell 11. There will be no release of any treated wastewater offsite, nor will there be any offsite transportation of wastewater (USE 2004c). In addition, WAO construction and operation will create minimal additional wastewater. The 8 additional employees and visitors will add minor additional use of USE's system. USE currently has 33 full-time employees utilizing this system, and has had as many as 40 facility employees in the past. Past experience with additional full-time employees, and experience hosting large school tours (up to 75 people), and regular customer audits verify that USE's wastewater disposal capacity is adequate for this project (USE 2005). No impact to this system is anticipated.

4.7 BIOLOGICAL RESOURCES

4.7.1 Terrestrial Resources

4.7.1.1 Description of Existing Environment

The USE Beatty facility, located in the Amargosa Desert, covers a total of approximately 80 acres with a 400-acre buffer zone surrounding the site. The site is approximately 12.5 miles east of Death Valley National Park. The Amargosa Desert is in the northern Mojave Desert separated from Death Valley by the Amargosa Range, and is one of the driest regions in the United States. Annual precipitation averages approximately four inches per year at the site and has ranged from 0.08 inches during 2002 to approximately 9 inches during 1983. About 70% of the precipitation is associated with frontal systems during October through April. Snow, however, is rare. Summer rainfall occurs predominantly during localized, short-duration, convective storms. Monthly mean air temperatures range from 37.4°F during December to 91.4°F during July. The site is approximately 2,770 feet above sea level (USGS 2004).

Vegetation in the area surrounding the site is sparse, in part due to the arid climate, but also due in part to the physiology of the dominant shrub species. Creosote-bush, white bur-sage, hop-sage and big sagebrush were the dominant shrub species observed on the site. Creosote bush and white bur-sage are known to secrete substances into the soil that keep the roots of adjacent creosote bushes and white bur-sages from elongating (MacKay 2003). The result is an evenly-spaced shrub community with open areas of desert floor. **Table 4-3**, below, includes a list of the plant species observed on the site during a site assessment conducted on November 18 and 19, 2004.

Table 4-3
Vegetation Observed on the Site

Scientific Name	Common Name	Habit
Amaranthus fimbriatus (Torrey) Benth.	Fringed Amaranth	Herb
Ambrosia dumosa (A. Gray) Payne	White Bur-sage	Shrub
Artemisia tridentate Nutt.	Big Sagebrush	Shrub
Atriplex confertifolia (Torrey & Fremont) S. Watson	Shadscale	Shrub
Chorizanthe rigida (Torrey) Torrey & A. Gray	Spiny-herb	Herb
Cryptantha (Lehm.) sp.	Forget-me-not	Herb
Ephedra nevadensis S. Watson	Mormon Tea	Shrub
Eriogonum inflatum Torrey & Fremont var. *inflatum*	Desert Trumpet	Herb
Grayia spinosa (Hook) Moq.	Hop-sage	Shrub
Hymenoclea salsola A. Gray	Cheesebush	Shrub
Larrea tridentata D.C. (Cov.)	Creosote Bush	Shrub
Plantago ovata Forsskal	Desert Plantain	Herb
Salsola tragus L.	Russian Thistle	Herb

Soils and sediments are typically coarse textured and highly stratified. Sediments in the area are largely unconsolidated fluvial and alluvial fan deposits that are at least 550 feet thick. The water table in the area ranges from about 280 to 380 feet below land surface (USGS 2004).

Due to the time of the year, few wildlife species were observed during the November 18 and 19, 2004 site inspection. A total of 11 transects were established throughout the site in order to

conduct a comprehensive survey of the plant and animal species. A total of eight species were confirmed, but many others would be expected to utilize the buffer area around the facility. The observed wildlife species in the vicinity of the USE site were typical of high desert communities. Wildlife observed were mammals, birds and reptiles. Due to the lack of suitable breeding habitat, it is highly unlikely that amphibians are present at the USE site. However, about 10 miles north of the site there is a roadside wetland dominated by bulrush (Scirpus sp.), which is near a cottonwood (*Populus fremontii* S. Watson) dominated riparian forest that may offer suitable amphibian habitat. **Table 4-4**, below, includes a list of the animal species observed on the site during the November 2004 site inspection. In some cases, the species was not seen, but evidence of the species was observed such as tracks, burrows, etc.

Table 4-4
Wildlife Observed or Evidenced on the Site

Scientific Name	Common Name	Evidence/Location
Amphispiza belli	Sage Sparrow	Sighted in buffer area to north
Carduelis psaltria	Lesser Goldfinch	Sighted in buffer area to north
Columba livia	Rock Dove (Pigeon)	Sighted within existing facility
Corvus brachyrhynchos	American Crow	Throughout existing facility and buffer area
Gopherus agassizzii	Desert Tortoise	Burrows distributed throughout buffer area
Lepus californicus	Blacktail Jackrabbit	Sighted in buffer area to north
Passer domesticus	House Sparrow	Sighted within existing facility
Sceloporus magister	Desert Spiny Lizard	Throughout buffer area

The desert tortoise is a species listed as a threatened species at the federal level, as well as protected under N.R.S. 501 at the state level. The desert tortoise is one of four large terrestrial turtles in the United States, and the only one that inhabits the southwest. It is restricted to the desert communities of California, Nevada and Arizona, primarily below 4,000 feet in elevation. Desert tortoises are present in the vicinity of Beatty, Nevada in low densities. Concern for the losses of tortoises and their habitat has prompted their protection by both federal and state governments. It is illegal to collect, kill, harass or sell a desert tortoise. The closest tortoise burrows to the site were observed at approximately 75 feet from the facility's western fenceline and 100 feet north of the parking area. Since animals would be hibernating at the time of the site inspection, there was no way to determine if the burrows were inhabited.

Additional common species that are within the geographic range of the site include those listed in **Table 4-5**. Due to the relatively small size of the site, it is likely that a small percentage of the animals listed in **Table 4-5** would actually be present, and many other species could likely migrate through the area.

Table 4-5
Possible Additional Wildlife on the Site

Scientific Name	Common Name	Scientific Name	Common Name
Ammospermophilus leucurus	White-tailed Antelope Squirrel	*Masticophis taeniatus*	Striped Whipsnake
Buteo jamaicensis	Red-tailed Hawk	*Neotoma lepida*	Desert Woodrat
Callisaurus draconoides	Zebra-tailed Lizard	*Onychomys torridus*	Southern Grasshopper Mouse

Scientific Name	Common Name	Scientific Name	Common Name
Campylorhynchus brunneicapillus	Cactus Wren	*Perognathus longimembris*	Little Pocket Mouse
Canis latrans	Coyote	*Perognathus parvus*	Great Basin Pocket Mouse
Cathartes aura	Turkey Vulture	*Peromyscus emericus*	Cactus Mouse
Chionactis occipitalis	Western Shovel-nosed Snake	*Phrynosoma platyrhinos*	Desert Horned Lizard
Citellus tereticaudatus	Round-tail Ground Squirrel	*Phyllorhynchus decurtatus*	Spotted Leaf-nosed Snake
Cnemidophorus tigris	Western Whiptail	*Rhinocheilus lecontei*	Long-nosed Snake
Crotalus scutulatus	Mojave Rattlesnake	*Salvadora hexalepis*	Western Patch-nosed Snake
Crotaphytus insularis	Desert Collared Lizard	*Sceloporus graciosus*	Sagebrush Lizard
Dipodomys deserti	Desert Kangaroo Rat	*Sonora semiannulata*	Ground Snake
Dipsosaurus dorsalis	Desert Iguana	*Tantilla planiceps*	Western Black-headed Snake
Gambelia wislizenii	Leopard Lizard	*Uta stansburiana*	Side-blotched Lizard
Geococcyx californianus	Greater Roadrunner	*Vulpes macrotis*	Kit Fox
Hypsiglena torquata	Night Snake	*Reithrodontomys megalotis*	Western Harvest Mouse
Lampropeltis getulus	Common Kingsnake	*Xantusia vigilis*	Desert Night Lizard

4.7.1.2 Effects of the Proposed Action

Activities associated with construction and operation of the WAO system would be confined to the existing, fenced facility. The proposed WAO system would be located in the previously disturbed, southeastern part of the facility. It appears that little, if any clearing and grading would be required to accommodate the WAO system at this location, and no vegetation would be affected. Staging areas for construction vehicles would be located within the existing facility. Because the surrounding area is heavily disturbed, industrial in character, and little utilized by terrestrial species, these activities would not be expected to impact wildlife. The construction of the WAO system would not disturb any existing habitat.

To protect tortoises which may be in the vicinity of the USE's Beatty, Nevada site, the company has instituted a Desert Tortoise training program for all employees at the site. This training includes an awareness program and procedures to follow in the event an animal is discovered. Failure to comply with the procedures is grounds for immediate suspension and related personnel actions. USE has no record of any observations of Desert tortoise on site (USE 2004d).

4.7.2 Aquatic Resources

4.7.2.1 Description of Existing Environment

Due to the desert climate and lack of surface water bodies, there are no permanent aquatic resources in the vicinity of the facility. The southwestern part of the buffer area has several intermittent washes and small intermittent riparian corridors which direct water offsite to the south. An existing man-made drainage diversion structure directs water runoff from US 95 westward through the northern part of the buffer area, and then southward to the intermittent washes in the southwest part of the buffer area. Another intermittent wash was noted within the

buffer area east of US 95. This feature directs runoff offsite to the south. All of the drainage for the site is eventually directed southward to the headwaters of the Amargosa River.

4.7.2.2 Effects of the Proposed Action

There are no aquatic ecological resources or habitats in the area of the proposed project. The WAO site is located within a highly disturbed, open industrial area. No impacts to aquatic ecological resources are anticipated as a result of this project.

4.7.3 Wetlands

4.7.3.1 Description of Existing Environment

There are no wetland resources located on or near the site. The closest wetland resource is located approximately 10 miles north, just south of the town of Beatty, where a roadside wetland dominated by bulrush (Scirpus sp.) was observed. This wetland was in turn near a cottonwood (*Populus fremontii* S. Watson) dominated riparian forest along the headwaters of the Amargosa River.

4.7.3.2 Effects of the Proposed Action

There are no wetlands on or near the proposed WAO site or the USE Beatty facility. Therefore, the project would not result in any impact to wetland resources.

4.7.4 Threatened & Endangered Species

4.7.4.1 Description of Existing Environment

The presence of endangered or threatened species whose geographic range includes the proposed project area was investigated. The U.S. Fish and Wildlife Service Field Office, BLM and Nevada Natural Heritage Commission were contacted to ascertain the current status of any state or federal listed endangered and threatened species of flora and fauna in the general vicinity of the proposed WAO system.

A November 23, 2004 letter from the Nevada Natural Heritage Program indicated that there were no mapped species within two miles of the site. Natural Heritage also indicated that their data was incomplete for this area and recommended a survey, which was conducted by Shaw and is summarized above. Responses from U.S. Fish and Wildlife Service and BLM are pending.

The November 23 letter did indicate that habitat for the Endemic Ant, determined to be "critically imperiled" by the Nevada Natural Heritage Program; the Desert Tortoise, a federally threatened species; and the Mountain Plover, a federally proposed threatened species, likely exist in the area.

4.7.4.2 Effects of the Proposed Action

It is unlikely that any threatened or endangered species are present within the fenced portion of the facility, including the proposed location of the WAO System. No appropriate habitat is

present in areas where the proposed activities would occur, and the surrounding area has been previously disturbed.

As described above, USE has instituted a Desert Tortoise training program for all employees at the site. This training includes an awareness program and procedures to follow in the event an animal is discovered. Failure to comply with the procedures is grounds for immediate suspension and related personnel actions (USE 2004d).

4.8 CULTURAL, ARCAEOLOGICAL, & HISTORIC RESOURCES

4.8.1 Description of Existing Environment

The Nevada Historical Commission was contacted to ascertain the presence of any cultural, archeological, and historic resources in the proposed project area. In a December 8, 2004 letter to USE, the Department of Cultural Affairs indicated that no archaeological or historical properties are likely to be found in the project area. The site is extensively disturbed and there are no known properties on or near the site.

4.8.2 Effects of the Proposed Action

Because WAO installation and operations would involve a previously disturbed area where no cultural, archaeological, or historic resources have been identified, no impacts are expected. The Department of Cultural Affairs indicated that given the limited archaeological sensitivity of the project area, an archaeological inventory of the project site would not be recommended. If any cultural materials are encountered during WAO installation or operations, activities will cease immediately, and the Nevada Historical Commission will be contacted.

4.9 SOCIOECONOMIC RESOURCES: POPULATION, COMMUNITY RESOURCES, EMPLOYMENT, ECONOMIC, TRAFFIC

4.9.1 Description of Existing Environment

Beatty and Pahrump Nevada are the closest towns to the USE facility and are 11 and 70 miles away, respectively. The 2000 population of Beatty and Pahrump was 1,154 and 24,631, respectively. **Table 4-6** compares the population of the United States, the State of Nevada, Nye County, Beatty, NV and Pahrump, NV.

The total population in the labor force in Beatty in 2000 was estimated to be about 492 people, with USE employment being about 39. Unemployment in Beatty was estimated to be 3.5% in 2000 which was below the State unemployment rate of 4.0%. The sector providing the highest percentage of employment in Beatty is arts, entertainment, recreation, accommodation and food services at 33%. Educational, health, and social services is second at 15.3%; agricultural, forestry, fishing, hunting and mining is third at 13.1% and Professional, scientific, management, administrative and waste management services is fourth at 10.1% (U.S. Census Bureau 2000).

Housing units in Beatty in 2000 totaled 740 units, with 205 or 27.7% being vacant. This is significantly above the state of Nevada's vacant housing percentage of 9.%. The closest residential area to the facility is 11 miles away in the town of Beatty.

Beatty supports a High School (grades 9-12) with approximately 135 students and an elementary School (Grades PK through 8) with 145 students. The Beatty High School is closest to the facility and is 11 miles away. There is a medical clinic in the town of Beatty, but the closest full service hospital is Southern Inyo Hospital located approximately 94 miles away in Lone Pine, CA and the Nye Regional Medical Center in Tonopah, NV, located approximately 97 miles away (city-data.com 2004).

Traffic through the main gate of the USE facility averages approximately 39 worker vehicles per day and an average of 27 truck deliveries per day. Route 95, which passes by the site, is a two lane, paved highway (USE 2004e).

4.9.2 Effects of the Proposed Action

Installation and operation of the WAO system at USE Beatty facility would have, at most, a minor impact on the socioeconomic resources of the local area. Prior to commissioning of the WAO system, USE will hire and train 8 new full-time employees for the operation of the system. Although this is a small number of new employees, it represents approximately 1.6% of the workforce in Beatty, NV. Construction work force involves approximately 10 to 25 workers. Workers will be drawn from the local work force and therefore will not impact housing, schools, and other public services. Impacts of worker vehicles on traffic in and around the facility also would be negligible.

The vehicle trip generation for the WAO project has been estimated for the "construction and startup phase" and for the "operations" phase. During the 6+ month construction period there will be 24 laborers and foremen on-site, with additional traffic entering the site to deliver materials (steel, concrete, equipment on skids, etc.). The total daily trips during the construction phase will be approximately 106 vehicles per day (53 in, 53 out). The peak hour trips are estimated to be 31 morning inbound and 5 morning outbound. This is a temporary traffic condition lasting about 6 months.

During the operations phase, the total daily trips are estimated to be 34 vehicles per day (17 in, 17 out). The peak hour trips are estimated to be 6 morning inbound and 4 morning outbound. This is a minimal traffic impact to the adjacent roadways during both peak periods. USE may also have an additional 3 inbound and 3 outbound truck trips daily to deliver water to the site.

Since local labor will be utilized, there will be no impact on housing, schools, and other public services. Impacts of worker vehicles and truck trips on traffic in and around the USE facility would be negligible both during construction and operation.

4.10 MINORITY & LOW INCOME POPULATIONS (ENVIRONMENTAL JUSTICE)

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was issued on February 11, 1994 (59FR7629). The goal of the Executive Order is to ensure that all federal agencies identify and address, as appropriate, any disproportionately high and adverse impacts of their programs and activities on minority or low-income groups.

4.10.1 Description of Existing Environment

The following information represented in **Tables 4-6** and **4-7** were created using data from the U.S. Bureau of the Census for the year 2000. **Table 4-6** compares the poverty status of the United States, the State of Nevada, Nye County, Beatty, NV and Pahrump, NV while **Table 4-7** compares the racial and ethnic composition of the same areas. Beatty has a higher percentage of individuals and families living in poverty when compared to the State of Nevada and Nye County and neighboring Pahrump, NV. Median income is higher in Beatty than Nye County and Pahrump and is nearly equal the national median income figure.

As shown in **Table 4-7**, the ethnic make up of both Beatty and Pahrump is almost 91% white, which is higher than the State of Nevada at 75.2% and slightly higher than Nye County at 89.6%.

Table 4-6
Poverty Status

Location	Population Data[1]			
	Total Population	Persons Below Poverty Level, 2000	Families Below the Poverty Level	Estimated Median Household Income, 2000
United States	281,421,906	33,899,812 (12.4%)	6,620,945 (9.2%)	$41,994
State of Nevada	1,998,257	205,685 (10.5%)	37,877 (7.5%)	$44,581
Nye County	32,485	3,454 (12.4%)	663 (7.3%)	$36,024
Beatty, NV	1,154	144 (13.4%)	28 (10.4%)	$41,250
Pahrump, NV	24,631	2,641 (10.7%)	524 (7.3%)	$34,860

[1] U.S. Census Bureau 2000 Census

Table 4-7
Ethnic & Racial Composition

Location	Ethnic & Racial Composition[1]								
	Total Population	White	Black or African American	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Other Race	Two or More Races	Hispanic or Latino Origin
United States	281,421,906	75.1%	12.3%	0.9%	3.6%	0.1%	5.5%	2.4%	12.5%
State of Nevada	1,998,257	75.2%	6.8%	1.3%	4.5%	0.4%	8%	3.8%	19.7%
Nye County	32,485	89.6%	1.2%	2%	0.8%	0.3%	3%	3.1%	8.4%
Beatty, NV	1,154	90.9%	0.1%	1.5%	1.2	0%	3.1%	3.2%	8.9%
Pahrump, NV	24,631	91%	1.3%	1.3%	0.9%	0.4%	2.3%	2.9%	7.6%

1 U.S. Census Bureau 2000

4.10.2 Effects of the Proposed Action

As discussed in previous sections, the proposed action should have no adverse effects to land use, air quality, water resources and water quality, and visual resources. No significant impacts to human health and safety are anticipated from installation and operation of the WAO system. Under normal operations, the risk of any health impacts to workers and public from releases of hazardous materials would be very low. All construction activities associated with the proposed

project will be conducted within the vicinity of the WAO system and within the boundaries of the facility. Population groups outside of the facility will not be affected by project activities. The project will generate approximately eight new temporary jobs for the duration of operation of the WAO system and a small number of temporary jobs for the local labor force during construction.

Final treatment and ultimate disposal of WAO wastes are unlikely to result in impacts to low-income and minority populations in the vicinity of the facility. Disposal of the liquid wastes would be fully permitted under RCRA and other applicable federal, state, and local statutes. The amounts of wastes generated would be small in comparison to the available capacity of this facility. Thus, no disproportionate and adverse impacts to minority or low-income populations from installing and operating the WAO system at USE would be expected.

4.11 WASTE MANAGEMENT

The WAO system will produce liquid waste during operations. All wastes would be managed, transported, treated and disposed of in compliance with federal, state, and local regulations. This section examines the effects of the proposed action on waste management systems on and off the USE site that would be affected by the proposed action.

4.11.1 Description of Existing Environment

USE's disposal facility provides full RCRA and TSCA treatment and disposal services. The Beatty facility was the first hazardous waste site in the nation to receive authorization to receive TSCA regulated materials, and remains a major national outlet for TSCA regulated transformers and capacitors. The Beatty facility provides full RCRA treatment and solidification services and disposal via a Subtitle C landfill for industrial and government customers. Operations at the Beatty facility include the following technologies and processes (AEC 2004).

4.11.1.1 Landfill Disposal

The active landfill at the USE facility is Cell 11, which has an approximate ground surface footprint of 11.3 acres. Cell 11 employs a liner and leachate collection systems equivalent to the Hazardous and Solid Waste Amendments (HSWA) of 1984 as Minimum Technological Requirements (MTR) to prevent the migration of hazardous wastes from land disposal units to groundwater and the surrounding environment. The Cell 11 double liner system incorporates a primary and a secondary leachate collection (i.e., leak detection/collection) and removal system (LCRS). The primary LCRS is located above the primary liner, and is designed to collect and allow removal of liquids within the cell. The secondary system is located between the two (2) liners, and its main function is to provide detection and removal of any leakage through the top liner (AEC 2004).

4.11.1.2 Low Temperature Thermal Desorption

The Low Temperature Thermal Desorption (LTTD) System is used for the treatment of waste containing hazardous organic chemicals, petroleum products, volatile and semi-volatile compounds, chlorinated solvents, pesticides and other RCRA hazardous wastes. The LTTD technology is a vacuum enhanced, low temperature distillation system; patented by Industrial

Recovery Services International, Inc. Treatment in LTTD units is intended to achieve Best Demonstrated Available Technology (BDAT) concentration levels for constituents subject to 40CFR268 LDRs (AEC 2004).

4.11.1.3 Stabilization/Chemical Oxidation

USE operates three (3) outdoor stabilization tanks to treat hazardous wastes requiring immobilization of hazardous constituents to comply with applicable 40CFR268 LDR constituent concentrations or treatment methods. The units are also used for other purposes, including (but not limited to): solidification of wastes containing free liquids, transferring wastes between containers, and to sort and treat hazardous debris. Also, USE is permitted to treat organic wastes by chemical oxidation at the waste stabilization units (AEC 2004).

4.11.1.4 PCB Processing

USE operates an enclosed building for the processing of PCB articles. Processing includes draining and/or flushing articles as required prior to disposal. PCB liquids are transported offsite for incineration (AEC 2004).

4.11.1.5 Small Quantity Consolidation

Containerized waste is aggregated and the contents placed into bulk containers for subsequent treatment or disposal allowing for the efficient use of the stabilization process for similar waste types. Once aggregated, the contents of the roll-off may be homogenized, and a sample is taken of the aggregated material for characterization and/or recipe development (AEC 2004).

4.11.2 Effects of the Proposed Action

4.11.2.1 Liquid Wastes

USE proposes to solidify all treated water and dispose of the solid material in their onsite RCRA Subtitle C landfill disposal Cell 11. There will be no release of any treated wastewater offsite, nor will there be any offsite transportation of wastewater. USE will utilize one of the six new 50,000 gallon storage tanks for interim management of the treated water prior to solidification and disposal. From the interim storage tank, piping will feed directly to the existing RCRA Subpart J stabilization tanks where the reagents will be added to solidify the treated waters to pass the EPA's Method 9095A "Paint Filter Liquids Test."

Following successful solidification, the solidified material will be placed into the RCRA Subtitle C disposal Cell 11, disposal coordinates will be recorded, and certificates of disposal produced (USE 2004c). A diagram showing USE's RCRA Subtitle C disposal cell is provided in **Figure 2-12**.

Operation of the WAO system would generate the following primary liquid waste streams over a 9-month period: approximately 6,400,000 gallons of effluent from the treatment of the DF neutralent, and approximately 1,300,000 gallons of effluent from the treatment of the QL neutralent (see Section 2.1.3). Ultimate disposal of the WAO effluent will be via USE's solidification/stabilization process and then landfilled. The remaining capacity of the existing landfill is 530,000 cubic yards. It is expected that 40,000 cubic yards of solidified waste will be

landfilled into Cell 11 as a result of this project. This accounts for approximately 7.5% of the remaining landfill capacity. USE has permits in place to open another cell (Cell 12) at the facility. Although plans to open this cell have not been finalized, it is expected that it will be opened within the next five years. Storm water collected from the WAO site will be directed into the facility's existing site runoff system. Due to the low precipitation in this area, storm water is not expected to be an issue. The proposed action would generate no other liquid effluents.

4.12 HUMAN HEALTH & SAFETY

4.12.1 Worker Health & Safety

4.12.1.1 Description of Existing Environment

USE has an approved Health and Safety Plan (HASP) which addresses potential hazards associated with activities to be performed at the facility. Site operations include the transport, storage, treatment, and disposal of hazardous waste. The EPA has established regulations governing these types of activities. These regulations are found in 40CFR264 and overseen by the EPA, under the RCRA. NDEP has received EPA authorization for the implementation of the RCRA program and has promulgated regulations governing these types of activities. The facility's HASP establishes the general chemical safety criteria and safety standards as required by 29CFR1910.120 for TSDF and RCRA and state regulations, to ensure that all facility operations involving hazardous wastes are conducted in a consistent and safe manner.

The HASP stipulates that all work be performed in accordance with the regulations and guidelines outlined in:

- OSHA 29CFR1910 "Safety and Health Regulations for General Industry"
- OSHA 29CFR1926 "Safety and Health Regulations for Construction"
- OSHA 29CFR1926.65 "Hazardous Waste Operations and Emergency Response"
- 40CFR264

A Facility Inspection Plan has been developed by USE to comply with the regulatory requirements of 40CFR264.15, as adopted by the NDEP. The plan describes the inspection procedures employed at the facility to identify operator errors and structure/equipment malfunctions or deterioration that may pose a threat to human health and the environment, if not corrected in a timely manner. The inspection plan will be implemented by individuals trained, per the RCRA Part B Application, in hazardous waste management, inspection/remedial action procedures, and adherence to proper documentation and record keeping requirements. The Facility Manager is responsible for the delegation and review of the facility inspections. USE's inspection program provides for the overall inspection of the facility operations according to these schedules: daily, weekly, monthly, bimonthly, quarterly, and annually.

In the event that an emergency condition occurs at the facility which has the potential to threaten human health or the environment, the HASP includes a contingency plan which would be implemented and maintained until the condition has been stabilized (USE 2004a).

4.12.1.2 Effects of the Proposed Action

The construction and operation of the WAO system may present some possible hazards to the workers at the site. Possible impacts from these hazards are discussed below.

Construction Impacts

Section 2.2.1 describes the proposed WAO system site. The construction hazards to the workers would not be unique and would be characteristic of those for any similar project.

Operational Impacts

The WAO feed streams and effluent are characterized in Section 2.1.1. Normal operation of the WAO system should have no health and safety impact on people outside the facility. USE has an approved HASP which addresses a wide variety of potential hazards at the facility. Training and inspection programs verify implementation of USE's health and safety initiatives.

During the solidification of WAO wastes, the potential exists for health and safety issues when adding quicklime. Significant amounts of heat may be released if quicklime is added to water (heat of hydration) and from the reactions with any acids, if present. USE has significant experience with adding quicklime to liquids and will implement procedures including slowly added quicklime and mixing well to control the rate of heat released.

4.12.2 Accident Analysis

Shaw has evaluated the potential impacts of a "worst-case" accidental release of binary neutralent and/or WAO process liquid/effluent. That scenario was determined to be loss of contents of a 140,000 gallon DF neutralent storage tank into its containment area (WAO process liquid/effluent is both significantly diluted and quickly broken down into dissolved inorganic salts). A modeling analysis was conducted to determine potential impacts based on a generic WAO/storage installation design. The analysis found that the worst-case condition resulted in a HF vapor plume at or above the IDLH value extending 35 m downwind of the (generic) containment area.

Based on site-specific conditions at the USE facility, no potentially significant off-site effects would occur from this type of release at the USE Beatty facility. The total surface area of USE's proposed new containment structure is approximately 209 m^2. The surface area for each tank will be approximately 19 m^2. Since there would be two tanks in each containment area, the total surface area exposed to the atmosphere in the event of a release is approximately 171 m^2 which is less than the 245 m^2 used in the generic analysis of the DF neutralent release (USE 2004k). It is at least 60 m from the proposed tank storage location to the facility's fenced boundary. The analysis indicated that IDLH levels would not be exceeded beyond 35 m of the release. Therefore, based on the analysis, no IDLH levels of HF would be encountered beyond the facility's boundary. In addition, the State of Nevada controlled buffer zone surrounding the facility extends an additional 400 m beyond the facility's boundary. The nearest likely potential public receptor would be on U.S. Highway 95 which is approximately 610 m from the fenced boundary of the facility and is occupied by transient traffic only. The nearest permanent residence is located at least 17 kilometers from the facility.

USE has an existing approved contingency plan that addresses responses to sudden or non-sudden releases or spills of hazardous materials. The contingency plan is routinely evaluated through on-site drills and exercises. This plan requires that the following actions be implemented in the event of such a release.

1. All facility personnel will be notified and communication established in accordance with the plan.
2. All facility operations will cease and personnel will proceed to designated muster areas.
3. The Emergency Coordinator, or designee, will assess the incident by considering:
   - The extent of the incident
   - The location of the incident
   - The nature and quantities of the materials involved
   - Wind direction and speed
   - The potential for short and long-term effects, with regards to human health and the environment
   - The potential for fire and/or explosion
   - The need for additional outside assistance and/or evacuation
4. The Emergency Coordinator will direct all on-scene response efforts and ensure that the incident does not escalate to include other facility processing areas.
5. When the emergency has been brought under control and the threat to human life or the environment has been minimized, the Emergency Coordinator will immediately initiate remedial actions in order to restore the facility to operational readiness. All response and remedial activities will be conducted in accordance with facility health and safety requirements to ensure personnel exposure to hazardous materials is minimized.

USE also intends to install sensors and alarms as part of the proposed tank system to ensure that any releases will be immediately identified in order to minimize any potential impact. USE also expects to evaluate specific aspects of toxicology, employee training, equipment design, construction, operations, and remedial actions as detailed project planning proceeds. Based on the analysis provided and the remote location of the facility, no off-site impacts are expected to occur in the unlikely event of a significant release (USE 2004h).

4.13 CUMULATIVE IMPACTS

Cumulative impacts are those "which result from the incremental impacts of the action when added to other past, present, and reasonably foreseeable actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40CFR1508.7). As discussed in this EA, the proposed action to install and operate the WAO Unit and landfill solidified WAO effluent in the RCRA Subtitle C Cell 11 Landfill at the USE Beatty facility is unlikely to result in significant project-specific impacts. Further, the existing USE facility conducts hazardous waste treatment, storage and disposal operations within the limits of its existing permits, without significant environmental impacts. Potential cumulative impacts from the WAO project would be expected to be similarly limited by the constraints of the new and amended permits required for the project. This section discusses the incremental

impacts of the proposed project in the context of on-going and planned projects at USE and evaluates its incremental impacts when added to the impacts of these other projects.

4.13.1 Opening of Cell 12 Subtitle C Landfill

Ongoing and planned projects at the facility include normal operations at the site, the opening of the new Cell 12 Subtitle C Landfill and the construction of a 17,500 ft^2 RCRA containment building. Although the opening of Cell 12 is permitted, there are no plans to begin operations at this cell at this time. Construction of the containment building is planned for 2005. As discussed in previous sections of this EA, no significant impacts are expected from the proposed construction and operation of the WAO system. This coupled with the fact that there are no other known major projects ongoing for the duration of the proposed project, indicates there will be no cumulative impacts.

4.13.2 Potential Future Use of the WAO System

At the conclusion of the binary neutralent treatment and disposal campaigns, USE may elect to negotiate an agreement with NSCMP and Shaw to retain the WAO system for future use. This use could potentially include either waste processing of other NSCMP or CMA wastes generated from the destruction of RCWM at off-site locations nationwide, or commercial waste processing.

Application of the WAO system to processing of other waste streams would have to be evaluated on a case-by-case basis to determine the necessary reagent feed and moderation water ratios, and to evaluate MOC compatibility. Waste streams determined to be treatable with the WAO system would be expected to result in air emissions that would not present additional environmental impacts because of the WAO system's integral emission control system (RTO). Similarly, WAO effluent resulting from treatment of additional NSMCP or commercial wastes would consist of primarily non-hazardous inorganic wastes that would be readily disposed of in the existing stabilization/solidification and landfill operation. Any hazardous constituents present in the initial waste feed that would pass through the WAO system such as RCRA regulated (TCLP) metals can still be disposed of in the existing on-site stabilization/solidification and landfill operation.

The WAO system throughput, if retained, would be limited by the system flow design parameters and the necessary reagent feed and moderation water ratios; in other words, organics loading to the WAO system in the future waste feed could not significantly exceed that of the binary neutralent feed (i.e., actual waste feed rate would depend on the organics concentration in the waste). Actual quantities or rates of other NSMCP or commercial waste could not be predicted at this time, but would have to operate within those parameters.

Potential impacts to other environmental resources from on-going WAO operations would not be expected to differ significantly from those associated with the binary neutralent campaign, which are insignificant. At worst, treatment of more dilute waste feeds might mean additional tank truck traffic deliveries, but treatment of more concentrated waste (requiring more reagent and moderation water feed) might mean slightly lower traffic. Additional RCRA permit modifications might be required for USE to process other NSCMP or commercial wastes in the WAO system.

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STATE OF NEVADA
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US ECOLOGY
DEC 14 2004
P.O. BOX 578
BEATTY, NV 89003

December 8, 2004

Robert Marchand
General Manager
US Ecology
P.O. Box 578
Beatty NV 89003

RE: Proposed Installation and Operation of Wet Air Oxidation Unit to Treat Hazardous Waste at the US Ecology, Beatty, Amargosa Desert, Nye County.

Dear Mr. Marchand:

The Nevada State Historic Preservation Office (SHPO) reviewed the proposed undertaking. In order to determine the archaeological sensitivity of the proposed project area, the SHPO consulted the online statewide archaeological inventory. According to their records, only a small portion of the proposed project area has been inventoried for cultural resources. No cultural resources were found as a result of this effort. Given the limited archaeological sensitivity of the project area and the previous disturbance in the project area the SHPO does not recommend an archaeological inventory of the project area.

As no historic properties are likely to be found within the area of potential effects (APE) for the subject undertaking, the SHPO would concur with a U.S. Army determination that historic properties will not be affected by the proposed undertaking. According to the National Historic Preservation Act of 1966, as amended, federal agencies are required to make determinations of eligibility and effect. In this case, if the U.S. Army were to request our concurrence with a determination of 'No Historic Properties Affected' our office would be happy to expedite the request.

If you have any questions concerning this correspondence, please contact me by phone at (775) 684-3443 or by E-mail at rlpalmer@clan.lib.nv.us.

Sincerely,

Rebecca Palmer

Rebecca Lynn Palmer
Historic Preservation Specialist

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Nevada Fish and Wildlife Office
1340 Financial Boulevard, Suite 234
Reno, Nevada 89502
(775) 861-6300 ~ Fax: (775) 861-6301

TAKE PRIDE IN AMERICA
FEB 3 2005
P.O. BOX 578
BEATTY, NV 89003

January 31, 2005
File No. 1-5-05-SP-424

Mr. Robert Marchand, General Manager
US Ecology
Post Office Box 578
Beatty, Nevada 89003

Dear Mr. Marchand:

Subject: Species List for the Installation and Operation of a Wet Air Oxidation Unit at the US Ecology Facility, Beatty, Nye County, Nevada

This is in response to your letter received on November 12, 2004, regarding the proposed installation and operation of a Wet Air Oxidation (WAO) system for the treatment of liquid hazardous waste at US Ecology, Nye County, Nevada. The liquid waste would be transported by truck from a U.S. Army facility in Arkansas, processed using the WAO system, then solidified and landfilled in an onsite lined disposal cell. The WAO system would be installed in a previously disturbed area within the existing US Ecology fenced complex (Section 35, T 13 S, R 47 E). The site occurs within the range of the desert tortoise, a species listed as threatened under the Endangered Species Act of 1973, as amended. Additionally, suitable habitat for the species occurs immediately outside of the project site. Unless a barrier exists around the site that would restrict tortoise movement from adjacent areas, desert tortoises could appear in the project area. A suitable desert tortoise barrier should consist of 1-inch horizontal by 2-inch vertical or smaller mesh wire fencing material, buried 6-12 inches below ground and extend at least 18 inches above ground. The fence should be inspected on a regular basis to insure that zero ground clearance is maintained around the entire perimeter of the project area. This response fulfills the requirement of the Fish and Wildlife Service to provide a list of species pursuant to section 7(c) of the Endangered Species Act of 1973, as amended, for projects that are authorized, funded, or carried out by a Federal agency.

Per our phone conversation on December 17, 2004, and your subsequent facsimile, you have already contacted the State of Nevada's Natural Heritage Program regarding sensitive species in the project area.

Finally, based on the Service's conservation responsibilities and management authority for migratory birds under the Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 U.S.C. 703 et seq.), our review of the proposed project included consideration of potential impacts to migratory birds. Under the Act, active nests (nests with eggs or young) of migratory birds may not be harmed, nor may migratory birds be killed. The Federal list of migratory birds (50 CFR 10, April 15, 1985) includes nearly every bird species found in the State of Nevada. Since the installation and operation of the WAO system does not involve open bodies of water that would attract migratory birds to the area, we do not anticipate adverse impacts to occur.

Please reference File No. 1-5-05-SP-424 in future correspondence concerning this species list. If you have any questions regarding this correspondence or require additional information, please contact Erik Orsak in our Southern Nevada Field Office at (702) 515-5230.

Sincerely,

Cynthia T. Martinez

for Robert D. Williams
Field Supervisor

Nevada Natural Heritage Program

Department of Conservation and Natural Resources
1550 East College Parkway, Suite 137 * Carson City, Nevada 89706-7921
voice: (775) 687-4245 fax: (775) 687-1288 web: www.heritage.nv.gov

US ECOLOGY
NOV 29
P.O. BOX 578
BEATTY, NV 89003

23 November 2004

Robert Marchand
US Ecology, Inc.
P.O. Box 578
Beatty, NV 89003

RE: Data request received 16 November 2004

Dear Mr. Marchand:

We are pleased to provide the information you requested on endangered, threatened, candidate, and/or sensitive plant and animal taxa recorded within or near the US Ecology Hazardous Waste Management Facility project area. We searched our database and maps for the following: a two mile radius around,

Township 13S Range 47E Section 35

There are no sensitive taxa recorded within the given area. However, habitat may be available for: the endemic ant, *Neivamyrmex nyensis*, a Taxon determined to be Critically Imperiled by the Nevada Natural Heritage Program; the desert tortoise (Mojave Desert pop.), *Gopherus agassizii*, a Federally Threatened Species; and the Mountain Plover, *Charadrius montanus*, a Federally Proposed Threatened Species as well as a Nevada Bureau of Land Management Special Status Species. We do not have complete data on various raptors that may also occur in the area; for more information contact Ralph Phenix, Nevada Division of Wildlife at (775) 688-1565. Note that all cacti, yuccas, and Christmas trees are protected by Nevada state law (NRS 527.060-.120), including taxa not tracked by this office.

Please note that our data are dependent on the research and observations of many individuals and organizations, and in most cases are not the result of comprehensive or site-specific field surveys. Natural Heritage reports should never be regarded as final statements on the taxa or areas being considered, nor should they be substituted for onsite surveys required for environmental assessments.

Thank you for checking with our program. Please contact us for additional information or further assistance.

Sincerely,

Eric S. Miskow
Biologist/Data Manager

Updated Site Plan initiated by
Class1 RCRA Permit Mod Rev10

SECURITY PLAN

US ECOLOGY NEVADA

March 2010

Revised June 2015

SECTION 4

SECURITY PLAN

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Figure 4-1 Transportation Plan

SECURITY PLAN

This section describes the procedures employed at US Ecology Nevada (USEN) to comply with the security requirements of 40 CFR §264.14, as adopted by the Nevada Division of Environmental Protection (NDEP). The Facility Manager, or designee, is responsible for facility security.

4.1.0 Facility Surveillance

After-hours security is provided by security guards and by locking the facility entrance gate(s). Security guards and employees who may be working after hours are supplied with an outside phone and a radio to contact the emergency coordinator or Sheriff, as necessary. Normal business hours are 5:30 AM to 5:30 PM. Any deviations from established security measures are brought to the attention of the Facility Manager for corrective action.

4.2.0 Barrier and Means to Control Entry

Unauthorized access to the facility is minimized by means of a six-foot-tall chain link fence surrounding the facility. The integrity of the perimeter fence is evaluated during the weekly inspection, and any problems noted are corrected.

Controlled access to the facility is through Gate 1, which is located east of the office compound (See Figure 1 – Gate 1 is referred to as the Main Site Entrance), and through a second gate leading to the truck scales, located northeast of the administration complex. Gate 1 serves as the main entrance for facility personnel and visitors. Access for waste transporters is through the gate leading to the scale. Both gates generally remain open during normal working hours, and are under supervision by facility personnel. All gates are closed and locked at the end of each operational day, and remain closed during non-operational hours.

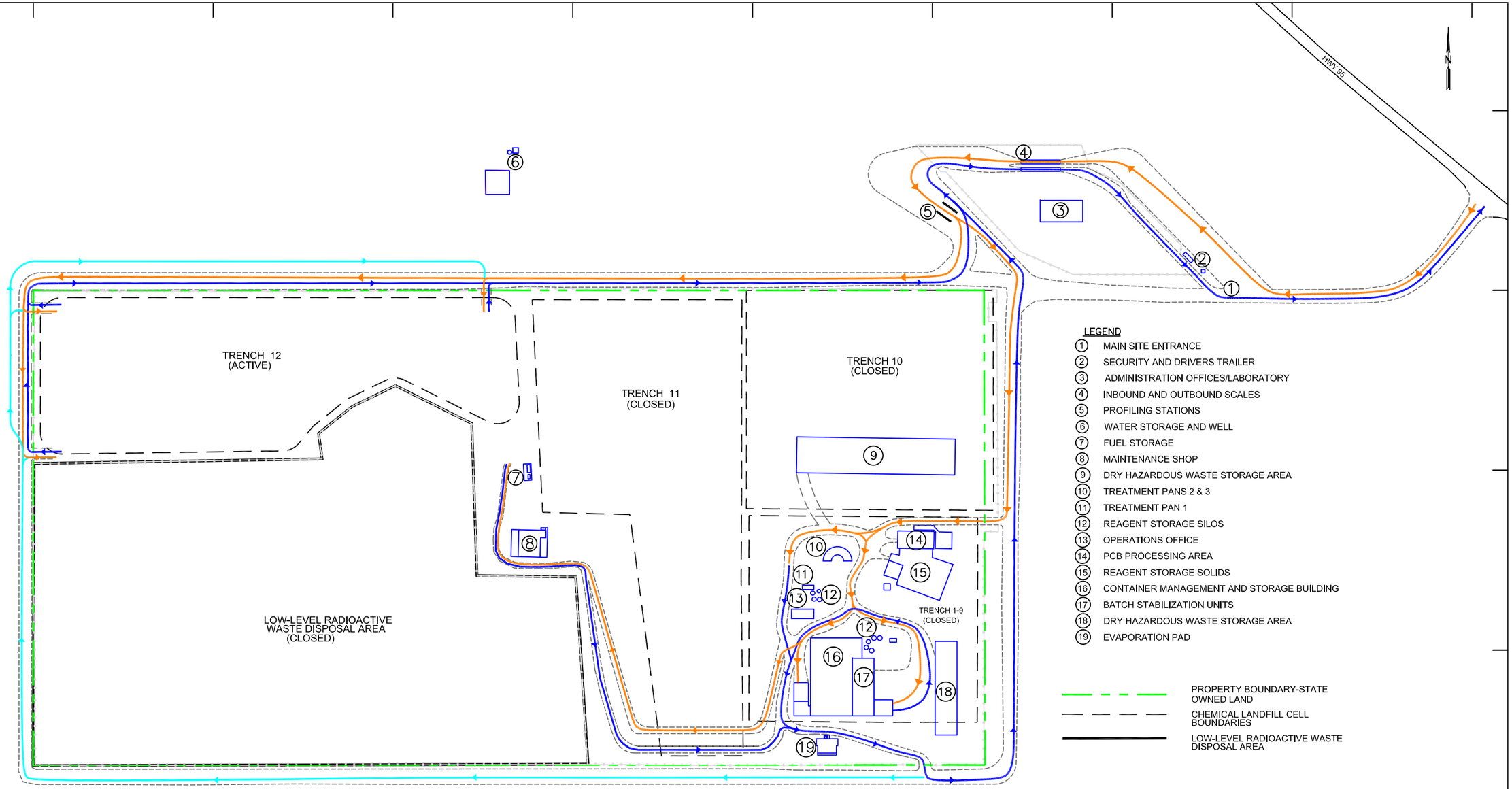
Incoming traffic approaches the facility west-bound on the main access road and is instructed by signs to turn right either to the truck scale (for waste deliveries) or through the main entrance gate and right to the visitor parking area. Once a non-waste vehicle is parked, drivers and passengers, if any, then proceed to the facility main office to register. Waste transporter and bulk load drivers are required to register in the Receiving Office.

Other gates leading to processing and disposal areas will remain open during operational hours, but will be closed and locked at the end of each business day.

Facility access roads are illustrated in Figure 1.

4.3.0 Warning Signs

Warning signs are posted at each entrance to the active portion of the facility and on the perimeter fencing at approximately 50 foot intervals such that they may be visible from any approach to the active portion of the facility. Warning signs bear the legend "Danger - Unauthorized Personnel Keep Out," and are of sufficient size to be legible from a distance of 25 feet.



LEGEND

1. MAIN SITE ENTRANCE
2. SECURITY AND DRIVERS TRAILER
3. ADMINISTRATION OFFICES/LABORATORY
4. INBOUND AND OUTBOUND SCALES
5. PROFILING STATIONS
6. WATER STORAGE AND WELL
7. FUEL STORAGE
8. MAINTENANCE SHOP
9. DRY HAZARDOUS WASTE STORAGE AREA
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11. TREATMENT PAN 1
12. REAGENT STORAGE SILOS
13. OPERATIONS OFFICE
14. PCB PROCESSING AREA
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16. CONTAINER MANAGEMENT AND STORAGE BUILDING
17. BATCH STABILIZATION UNITS
18. DRY HAZARDOUS WASTE STORAGE AREA
19. EVAPORATION PAD

PROPERTY BOUNDARY-STATE OWNED LAND

CHEMICAL LANDFILL CELL BOUNDARIES

LOW-LEVEL RADIOACTIVE WASTE DISPOSAL AREA

SITE ROADS

INWARD ROUTES

OUTWARD ROUTES

HAUL TRUCKS ONLY

300 200 100 0 300

SCALE FEET

TRANSPORTATION PLAN

US Ecology Nevada, Inc.

HAZARDOUS WASTE MANAGEMENT FACILITY

BEATTY, NEVADA 89003

RECEIVED
JUL 1 5 2015
NDEP BWM

FACILITY INSPECTION PLAN

US ECOLOGY NEVADA

March 2010

Revised June 2015

SECTION 5
FACILITY INSPECTION PLAN
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APPENDICES

Appendix 5 A Inspection Reports

INSPECTION PLAN

This Inspection Plan outlines the schedule for inspection of monitoring equipment, safety and emergency equipment, security devices, and operating and structural equipment that prevent, detect, or respond to environmental or human health hazards in accordance with 40 CFR §§270.14(b)(5), and 264.15, and 264.33. The chapter also addresses specific inspection areas in detail and contains examples of the inspection forms used at the facility. Table 1 outlines inspection frequencies for each area of the facility.

5.1.0 General Inspection Requirements

The following paragraphs identify facility equipment and operating areas, identify potential problems, and outline measures to prevent the occurrence of these problems. A copy of the completed inspection forms and the inspection schedule are kept at the facility at least three (3) years from the date of inspection.

The format of the inspection forms may be modified from time to time to address ongoing inspection assignments. Changes to the inspection format do not require NDEP notification or a permit modification since the content of the inspection forms/procedures or the minimum inspection frequency will not be altered. Content of inspection forms may be changed through a Class 1 permit modification. Additionally, non-RCRA required inspections might be added and removed from time to time for convenience.

5.1.1 Types of Problems

Regular inspections are conducted to identify equipment malfunctions, structural deterioration, operator errors, uncontrolled run-off, leachate generation, or other discharges that could cause or lead to the release of hazardous waste constituents or that would threaten human health or the environment. Inspections are intended to detect potential problems in time to correct them before they result in a release of hazardous waste constituents and/or cause harm to human health or the environment.

Appendix A presents the schedule of routine inspections for the various components/units critical to the proper operation of the facility. Specific inspection items and potential problems associated with each inspection area are referenced in the following paragraphs as well as on each individual inspection form.

5.1.2 Frequency of Inspections

The facility's inspection schedule was developed based on applicable regulatory requirements, estimated rate of potential equipment deterioration, and the probability of an environmental or human health incident if any equipment deterioration, malfunction or operator error were to go undetected between inspections. Table 1 identifies the inspection frequency for each of the various facility components/units. The frequency of the scheduled inspections is based on a probability of an occurrence of an incident or malfunctions and is designed to minimize the need to implement the facility's Contingency Plan. In addition to the daily inspections all permitted units are inspected weekly by facility management or their designee and documented on a weekly inspection form. Daily and weekly inspectionforms are included in Appendix A.

All facility units in which waste is actively being handled are under surveillance for spills, malfunctions, and operator error during active operations. The activities discussed in the following paragraphs are more formal, documented procedures to support and verify these operational inspections.

In all active waste handling areas, a daily inspection is performed when the area is in use (i.e.; each operating day). Other areas are subject to weekly or monthly inspections.

For specified areas, identified in Table 1, inspections are also performed after storm events of 0.25" of precipitation in 24 hours.

In accordance with 40 CFR §264.15, any deterioration or malfunction of equipment or structures that could cause or lead to the release of hazardous waste constituents or threaten the environment or human health will be corrected utilizing interim and final corrective measures. Where a hazard is imminent or has already occurred, action is taken expeditiously. Response actions for contingency procedures are provided in detail in the Contingency Plan.

5.2.0 Unit Specific Inspection Requirements

5.2.1 Container Management Unit Inspections [40 CFR §264.174]

At least weekly, areas where containers are stored are inspected for leaking containers and for deterioration of containers and the containment system caused by corrosion or other factors. If any of these conditions exist, corrective activities are instituted to clean up and limit the spread of material, and/or restore the integrity of the container or containment system. The CMUs and their associated containment systems are also visually inspected for the presence of cracks and gaps that could result in loss of containment effectiveness, where appropriate. Should structural problems occur that would allow leakage out of the unit or between compatibility segregation areas, or that may develop into a major failure, repair activity will be initiated. CMU #1 and #7 are inspected for proper drainage controls. During scheduled inspections, the CMUs and their associated waste staging loading and unloading areas are visually inspected to determine that adequate aisle space is maintained. Individual containers are also randomly inspected to ensure proper segregation is being maintained. Individual containers in the CMUs, subject to Subpart CC requirements, are inspected for Level 1 compliance.

The CMUs (including containment systems) are inspected for the presence of liquids/solids. Spilled solids are removed in accordance with the requirements of the Contingency Plan, if necessary, and the residues managed in accordance with the Waste Analysis Plan. Liquids discovered in the collection trenches on the truck unloading areas are removed within 48 hours of discovery or within 48 hours of cessation of the rain event. If necessary, absorbent materials are utilized to absorb standing liquid for proper disposal.

5.2.2 Tank System Inspections [40 CFR §264.195]

The following items must be inspected at least once each operating day:

(1) Any aboveground portions of the tank system to detect corrosion or releases of waste;

(2) The construction materials and the area immediately surrounding the externally accessible portion of the tank system, including the secondary containment system (e.g.; dikes) to detect erosion or signs of releases of hazardous waste (e.g.; wet spots, dead vegetation).

In addition, cathodic protection systems, if present, must be inspected according to the following schedule to ensure they are functioning properly:

(1) the proper operation of the cathodic protection system must be confirmed within six (6) months after initial installation and annually thereafter; and

(2) all sources of impressed current must be inspected and/or tested, as appropriate, at least bimonthly (i.e.; every other month).

Tank systems must also be inspected for the presence of any release of hazardous waste or accumulated liquid in the secondary containment system within 24 hours, or at the earliest practicable time. Spilled or leaked waste and accumulated precipitation must be removed from the secondary containment system within 24 hours, or in as timely a manner as is possible to prevent harm to human health and the environment. Additionally, aboveground piping (exclusive of flanges, joints, valves, and other connections); welded flanges, welded joints, and welded connections; seal-less or magnetic coupling pumps and seal-less valves; and pressurized aboveground piping systems which do not have secondary containment must be visually inspected daily when in operation.

5.2.2.1 Tank System External Corrosion and Releases

All permitted hazardous waste tanks, piping, valves, and connections are visually inspected for signs of leakage, corrosion, or structural deterioration.

5.2.2.2 Tank System Construction Materials and Surrounding Area

The area immediately surrounding the externally accessible portion of the tanks, including the secondary containment, is visually inspected to detect any erosion or releases.

5.2.2.3 Tank System Overfill Control Equipment

With the exception of the PCB Storage Tanks (T4-T7) all tanks rely on visual inspections to make certain the tanks are not overfilled. All 5 stabilization tanks rely on the equipment operators to monitor the tanks through out the day to ensure the tanks do not overfill. In these tanks waste is treated in batches as to minimize the risk of overflow. The evaporation tank (T-11) is visually inspected daily to prevent overflow. If the tanks are near capacity no additional liquids will be added. The PCB storage tanks are equipped with high level alarms to indicate when the tanks are nearing capacity. The alarms are tested daily using the control panel located inside the office

of the PCB building. When testing the alarms if the red indicator light comes on the alarm is working correctly.

5.2.2.4 Tank System Monitoring and Leak Detection Equipment

All tanks and piping are aboveground and are visually inspected each operating day for spills, leaks and accumulated precipitation.

5.2.2.5 Tank System Cathodic Protection

Cathodic protection systems are installed on Stabilization Tanks #1, #2, and #3 and are visually inspected for excessive deterioration bimonthly. USEN welds sacrificial cathodes to the outside of the stabilizations tanks (T1-T3) to prevent steel deterioration. A sacrificial anode is used in cathodic protection where it is intended to be dissolved to protect other metallic components. The more active metal is more easily oxidized than the protected metal and corrodes first. The anode must oxidize nearly completely before the less active metal will corrode, thus acting as a barrier against corrosion for the protected metal. On a bimonthly basis the inspector visually inspects the anodes for deterioration. Once the anode deteriorates to approximately 50% of its original size it is replaced.

5.2.2.6 Additional Tank System Inspection

The structural condition of the tanks and their associated piping are visually inspected monthly.

5.2.3 Surface Impoundment Inspection [40 CFR §264.226]

Not Applicable. The facility does not have any hazardous waste surface impoundments.

5.2.4 Waste Pile Inspection [40 CFR §264.254]

Not Applicable. The facility does not have any hazardous waste piles.

5.2.5 Land Treatment Inspection [40 CFR §264.278]

Not Applicable. The facility does not have any hazardous waste land treatment units.

5.2.6 Landfill Inspection [40 CFR §264.303]

While landfills are in operation, they must be inspected weekly and after storms to detect evidence of any of the following:

(1) deterioration, malfunctions, or improper operation of run-on and run-off control systems;

(2) proper functioning of wind dispersal control systems, where present; and

(3) the presence of leachate in and proper functioning of leachate collection and removal systems, where present

Where leak detection systems are present, the amount of liquids removed from each leak detection system sump must be recorded during the active life and closure period. After the final cover is installed, the amount of liquids removed must be recorded at least monthly. If the liquid level stays below the pump

operating level[1] for two (2) consecutive months, the amount of liquids must be recorded at least quarterly. If the liquid level stays below the pump operating level for two (2) consecutive quarters, the amount of liquids must be recorded at least semi-annually. If at any time during the post-closure care period the pump operating level is exceeded on a quarterly or semi-annual recording schedule, recording must return to monthly recording until the liquid level again stays below the pump operating level for two (2) consecutive months.

5.2.6.1 Run-On and Run-Off Control System

During landfill inspections, the landfill run-on/run-off control systems are inspected for evidence of deterioration, malfunction, or improper operation. Particular attention is given to the integrity of containment dikes (where present) and to any blockage of the drainage channels, swales, culverts, and other drainage structures.

5.2.6.2 Wind Dispersal Control System

Wind dispersal/dust control measures at the facility are inspected for adequacy and effectiveness. This activity includes both a visual inspection and determination of whether the condition of any exposed hazardous waste is a wind dispersal issue.

5.2.6.3 Leachate Collection and Removal System

Leachate collection and removal systems (LCRS) and secondary leak detection, collection, and removal systems (LDCRS) of Landfill Cells are inspected for the presence of liquids. In the event the quantity of liquid detected in the LDCRS exceeds the Allowable Leakage Rate, then the procedures defined in the Response Action Plan (RAP) will be implemented. The RAP for Trench 11 and Trench 12 can be found in Appendix 11-B and 11-C respectively.

5.2.7 Incinerator Inspection [40 CFR §264.347]

Not Applicable. The facility does not have any hazardous waste incinerators.

5.2.8 Security, Safety & Emergency Response Equipment

Security fences and gates and safety and emergency response equipment listed in the Contingency Plan are inspected monthly to ensure the equipment is operable and available, as appropriate.

5.2.9 Monitoring Well Inspections

Wells are inspected to verify they are locked, undamaged, and free from apparent tampering on a quarterly basis.

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1 "Pump operating level" is a liquid level based on pump activation level, sump dimensions, and level that avoids backup into the drainage layer and minimizes head in the sump.

Table 1

FACILITY INSPECTION SCHEDULE

-updated 7-15-2015

US Ecology Nevada
TABLE 1 – INSPECTION SCHEDULE

Unit	Location/Description	Frequency	Requirement	Form
CMU #1	PCB/RCRA Building	Daily		PCB Building
CMU #6	Dry Hazardous Waste Storage Area #2 (DHWSA #2)	N/A		DHWSA #2
CMU #7	Bin Storage Area (Secondary containment)	Daily		Truck Parking Area
CMU #18	Lab Waste Storage Areas	Weekly		Weekly Laboratory Housekeeping
CMU #16	Container Management and Stabilization Building	Daily		Container Management and Stabilization Building
CMU #17	Dry Hazardous Waste Storage Area #3 (DHWSA #3)	Daily		DHWSA #3
Tank #1	Stabilization Tank (Pan 1)	Daily		Batch Stabilization Tank
Tank #2	Stabilization Tank (Pan 2)	Daily		Batch Stabilization Tank
Tank #3	Stabilization Tank (Pan 3)	Daily		Batch Stabilization Tank
Tank #4	PCB Storage	Daily		PCB Building
Tank #5	PCB Storage	Daily		PCB Building
Tank #6	PCB Storage	Daily		PCB Building
Tank #7	PCB Storage	Daily		PCB Building
Tank T-11	Evaporation Tank	Daily		Daily Facility
Tank #18	Stabilization Tank (Pan 4)	Daily	RCRA Permit Condition 5.4	Batch Stabilization Tank
Tank #19	Stabilization Tank (Pan 5)	Daily	RCRA Permit Condition 5.4	Batch Stabilization Tank
NA	Landfill	Daily		Daily Active Disposal Cell 12 and Unburied Waste Inspection Report
NA	Closed Cells	Weekly		Weekly Inspection
NA	Two-way Radios and Emergency Alert System	Weekly		Weekly Inspection
NA	Portable Water Tank	Weekly		Weekly Inspection
NA	Truck Parking Area	Daily		Truck Parking Pad Area
NA	Safety Shed	Weekly		Weekly Inspection
NA	Security Fence and Warning Signs	Weekly		Weekly Inspection
NA	Dry Hazardous Waste Storage Areas	Weekly		Weekly Inspection
NA	Various Safety Shower /Eyewash equipment	Weekly		Weekly Inspection
NA	First-Aid Kits	Monthly		Monthly Safety & Equipment Inspection

NA	Full Face Respirator	Monthly		Monthly Full Face Respirator Inspection
NA	Emergency Respiratory Equipment	Monthly		Emergency Respiratory Equipment
NA	Spill Control Equipment	Monthly		Monthly Spill Control Equipment Inspection
NA	General Safety and Tool/Equipment	Monthly		Monthly Safety & Equipment Inspection
NA	Fire Extinguishers	Monthly		Monthly Fire Extinguisher Inspection
NA	Cathodic Protection System	Bi-monthly	RCRA Permit Condition 5.5.4	Stabilization Impressed Current Inspection & Test on Cathodic Protection System
NA	SWPPP Inspection (Storm Water Pollution Prevention Plan)	Quarterly		SWPPP Quarterly Inspection
NA	Annual Pollution Plan Inspection	Annual		Beatty Annual Pollution Plan Inspection Report

APPENDIX A

FACILITY INSPECTION REPORTS

BEATTY

DAILY FACILITY HOUSEKEEPING, EVAPORATION PAD (Tank T-11) and AIR EMISSION INSPECTION REPORT

DATE (m/d/y): _____ TIME: _____

INSPECTOR (Full Name): _____ (full name and full date of inspection)

Air Emission Monitoring / SVE Operation	No	Yes
If bag house is running – can visual emissions be detected?**		
Visually verify that the bag house feed screw is turning		
Visually verify that the rotary air lock is working		
Check belts/hoses for Cyclonaire		
Condition of facility roadways – can fugitive dust be seen?		
Are the flow meters working properly on SVE system?		
Are visual emissions detected from the outdoor treatment pans?		
FACILITY HOUSEKEEPING	Satisfactory	Unsatisfactory
Overall facility appearance		
Trash on site or other signs of un-orderly facility maintenance		
Miscellaneous tools are stored in an orderly fashion		
EVAPORATION PAD		
Cracks or signs of deterioration (inspect if unit is empty)		
Presence of spills on pad		
General housekeeping in the area		
Inspect secondary containment for presence of liquids (if present, depth = _____ inches)		
Ensure that a minimum of six-inch freeload is maintained		
Maintenance Area		
Check integrity of gasoline, diesel and used oil tanks. Verify tanks and hoses connected to tanks are not leaking.		
AFTER STORMS INSPECTIONS (complete only after storm event of 0.25" or greater (Facility Inspection Plan Section 5.1.2)		
Amount of Rainfall recorded: _____ inches		
Ensure proper functioning of leachate collection and removal systems		
Inspect landfill run-off control ditches to ensure they are not obstructed by the presence of sediment or debris		
Inspect landfill above grade dikes for signs of instability or erosion		
Inspect the daily cover applied for wind dispersal control for erosion and areas with exposed waste		

Any items which have been determined to be "Unsatisfactory" shall be noted below. Corrective Action will be tracked on this form or the "Inspection Deficiency Corrective Action Report form".

*Remarks/Corrective Action:

_____

*If corrective action is performed, include type of action taken, date complete, and individual performing corrective action.

** If visual emissions are detected contact Compliance Manager for Opacity reading.

BEATTY

CMU #7 DAILY INSPECTION

Truck Parking Pad Area

DATE (m/d/y): _____ TIME: _____

INSPECTOR (Full Name): _____

Please include inspectors' full name and full date of inspection.

A Daily Facility Inspection Report shall be completed and shall include any deficiencies noted and corrective action taken. The following items shall be addressed in the inspection and subsequent report. Please check satisfactory or unsatisfactory for each item inspected and submit completed form to the Compliance department.

TRUCK PARKING AREA	Satisfactory	Unsatisfactory
Inspect for signs of damage, leakage or fugitive odors from trailers/containers		
Inspect for liquids in TPP Area		
Inspect loading / unloading areas for presence of spillage		
Stored containers are closed		
Containers properly labeled		
Adequate aisle space maintained		
TPP total volume of waste stored does not exceed 20 roll-offs or a cumulative volume of 400 cu yd		
Containers are stored within indicated boundaries		
If >500 VOC - are containers managed per Subpart CC requirements: Meet Level 1 Standards (**)		
Drainage controls in place (Slide gates in place), pad is in good working condition, etc.		
Unloading dock structurally sound		
Signs of spillage/litter at unloading dock		

Any items which have been determined to be "Unsatisfactory" shall be noted below. Corrective Action will be tracked on this form or the "Inspection Deficiency and Corrective Action Report".

*Remarks/Corrective Action:

_____

_____

*If corrective action is performed, include type of action taken, date completed, and individual performing corrective action.

** 40 CFR Part 264.1086 (c)
- (1) i DOT approved container.
  - ii Adequate cover with no holes, gaps, or open spaces
  - iii Hazardous waste is not exposed to the atmosphere
- (2) Adequate closure device
- (3) Maintained in closed position

BEATTY

TANKS T-1, T-2, T-3, T-18 & T-19 DAILY INSPECTION

Treatment Pans 1 – 5

DATE (m/d/y): _____ TIME: _____

INSPECTOR (Full Name): _____

Please include inspectors' full name and full date of inspection.

A Daily Facility Inspection Report shall be completed and shall include any deficiencies noted and corrective action taken. The following items shall be addressed in the inspection and subsequent report. Please check satisfactory or unsatisfactory for each item inspected and submit completed form to the Compliance department.

BATCH STABILIZATION TANK	Satisfactory	Unsatisfactory
Inspect treatment pans for excessive damage that might cause unit failure		
Inspect unit's secondary containment for the presence of liquids		
Inspect surrounding area for presence of spillage/odor		
Ensure good general housekeeping is maintained		

Any items which have been determined to be "Unsatisfactory" shall be noted below. Corrective Action will be tracked on this form or the" Inspection Deficiency Corrective Action Report".

*Remarks/Corrective Action:

_____

_____

*If corrective action is performed, include type of action taken, date completed, and individual performing corrective action.

BEATTY

CMU #6 DAILY INSPECTION

Dry Hazardous Waste Storage Area #2

DATE (m/d/y): _____ TIME: _____

INSPECTOR (Full Name): _____

Please include inspectors' full name and full date of inspection.

A Daily Facility Inspection Report shall be completed and shall include any deficiencies noted and corrective action taken. The following items shall be addressed in the inspection and subsequent report. Please check satisfactory or unsatisfactory for each item inspected. And submit completed form to the Compliance department.

DRY HAZARDOUS WASTE STORAGE AREA II	Satisfactory	Unsatisfactory
Inspect for liquids and / or standing water in DHWSA II		
Inspect loading / unloading areas for presence of spillage		
Adequate aisle space maintained and area properly marked and roped		
Stored containers are DOT approved, closed and / or tarped		
Wastes excluded by Permit condition 3.4.4 (Liquids, PCBs, F020, F021, F022, F026) are not present		
Containers properly labeled		
If >500 VOC – are containers managed per Subpart CC requirements: Meet Level 1 Standards (**)		
Total Volume of Waste stored does not exceed 840 cu yd (approximately 42 20-yd roll-offs)		
Inspect empty roll-off bins / containers to verify that they do not contain any residue waste and meet the definition of "RCRA empty" (40 CFR 261.7) and labels are removed.		

Any items which have been determined to be "Unsatisfactory" shall be noted below. Corrective Action will be tracked on this form or the "Inspection Deficiency Corrective Action Report form".

*Remarks/Corrective Action:

_____

_____

*If corrective action is performed, include type of action taken, date completed, and individual performing corrective action.

** 40 CFR Part 264.1086 (c)
- (1) i DOT approved container.
  - ii Adequate cover with no holes, gaps, or open spaces
  - iii Hazardous waste is not exposed to the atmosphere
- (2) Adequate closure device
- (3) Maintained in closed position

CMU #17 DAILY INSPECTION

Dry Hazardous Waste Storage Area #3

DATE (m/d/y): _____ TIME: _____

INSPECTOR (Full Name): _____

Please include inspectors' full name and full date of inspection.

A Daily Facility Inspection Report shall be completed and shall include any deficiencies noted and corrective action taken. The following items shall be addressed in the inspection and subsequent report. Please check satisfactory or unsatisfactory for each item inspected and submit completed form to the Compliance department.

DRY HAZARDOUS WASTE STORAGE AREA 3	Satisfactory	Unsatisfactory
Inspect for liquids and / or Standing Water in DHWSA 3. If recent rain event check tarps for standing liquids.		
Inspect all areas for presence of spillage / waste on the ground		
Adequate aisle space maintained (3 feet)		
Stored containers are DOT approved, closed and / or tarped		
Wastes excluded by Permit condition 3.4.4 (Liquids, PCBs, F020, F021, F022, F026) are not present		
Containers properly labeled		
If >500 VOC – are containers managed per Subpart CC requirements: Meet Level 1 Standards (**)		
Total volume of waste stored does not exceed 3,438 cu yd (Approx. 172 20-yd roll-offs)		
Inspect empty roll-off bins / containers to verify that they do not contain any residue waste and meet the definition of "RCRA empty" (40 CFR 261.7).		

Any items which have been determined to be "Unsatisfactory" shall be noted below. Corrective Action will be tracked on this form or the "Inspection Deficiency Corrective Action Report".

*Remarks/Corrective Action:

_____

_____

_____

_____

*If corrective action is performed, include type of action taken, date completed, and individual performing corrective action.

** 40 CFR Part 264.1086 I
- (1) i DOT approved container.
  - Ii Adequate cover with no holes, gaps, or open spaces
  - iii Hazardous waste is not exposed to the atmosphere
- (2) Adequate closure device
- (3) Maintained in closed position

BEATTY

CMU #1, Tanks T-4, T-5, T-6 and T-7 Daily Inspection

PCB Building

DATE (m/d/y): _____ TIME: _____

INSPECTOR (Full Name): _____

Please include inspectors' full name and full date of inspection.

INSPECTED ITEMS	SATISFACTORY	
PCB PROCESSING AND STORAGE	YES	NO
PCB PROCESSING AND STORAGE: Audible Alarms (insure working order)		
Storage Tanks (corrosion, erosion or leaks)		
Valves, lines, and fittings (corrosion, erosion or leaks)		
PCB Tank Farm Secondary Containment Sumps for presence of liquids		
PCB processing: Storage Area (signs of spills, leaks, deteriorated/damaged containers)		
PCB Items, articles, and containers in storage are properly labeled and identified.		
PCB containers in storage are within nine months of their accumulation start date		
Inspect collection sumps in tank farm and truck loading areas for presence of liquids		
RCRA STORAGE : RCRA container storage (signs of leaks, spills, damaged/deteriorated containers, open containers in storage)		
RCRA waste in storage is compatible with stored PCB waste		
RCRA containers in storage are properly labeled, marked, and identified		
RCRA containers in storage are within seven months of their accumulation start date		
GENERAL : General Housekeeping (trash, debris, etc.)		
Concrete flooring and containment for expansion cracks, corrosion and other signs of deterioration		
Safety equipment present in proper working condition and properly stored. Chains on walkways on PCB storage tanks in 'closed' position.		
RCRA/PCB containers palletized and stored with a minimum three foot aisle space		
If >500 VOC – are containers managed per Subpart CC requirements: Meet Level 1 Standards (**)		
AFTER STORMS INSPECTIONS (complete only after storm event of 0.25" or greater (Facility Inspection Plan Section 5.1.2)		
Inspect tank containment for standing liquid or erosion		
FLOOR CONDITION (40 CFR Part 761)		
The epoxy coating is in tact and in good condition		
The colored undercoat is not exposed		
There is no evidence of spills and/or contamination		
The floor/building is maintained in a clean and orderly manner		

*Any items which have determined to be "Unsatisfactory" shall be noted below. Corrective Action will be tracked on this form or the "Inspection Deficiency Corrective Action Report".
*Remarks/Corrective Action:

_____

_____

*If corrective action is taken: include action taken, date completed and name of individual taking the action.

** 40 CFR Part 264.1086 (c)
- (1) i DOT approved container.
  - ii Adequate cover with no holes, gaps, or open spaces
  - iii Hazardous waste is not exposed to the atmosphere
- (2) Adequate closure device
- (3) Maintained in closed position

BEATTY

CMU #16 Daily Inspection

Container Management and Stabilization Building

DATE (m/d/y): _____ TIME: _____

INSPECTOR (Full Name): _____

Please include inspectors' full name and full date of inspection.

INSPECTED ITEMS

BUILDING/AUXILARY EQUIPMENT	SAT	UNSAT
Reagent Storage System (corrosion, erosion or leaks)		
Valves, lines, and fittings (corrosion, erosion or leaks)		

CONTAINER STORAGE AREA		
Signs of leaks and spills		
All containers in storage are properly labeled, marked, and identified		
All containers stored with a minimum three foot isle space		
All containers are closed and in good condition		

Unloading Docks		
Signs of spillage/litter at ramp/dock		
Ensure safety chains are secure		
Cleanliness around dock (stains, spills, trash, debris, etc.)		
Unloading dock structurally sound		
Other:		

GENERAL		
General Housekeeping (trash, debris, etc.)		
Concrete flooring and containment-expansion cracks, corrosion or other signs of deterioration		
All required safety equipment present in proper working condition and properly stored. Emergency shower/eyewash functional		
Control room is clean & well maintained		

*Any items which have determined to be "Unsatisfactory" shall be noted below. Corrective Action will be tracked on this form or the "Inspection Deficiency Corrective Action Report".

*Remarks/Corrective Action:

_____

_____

_____

_____

*If corrective action is taken: include action taken, date completed and name of individual taking the action.

BEATTY

DAILY ACTIVE DISPOSAL CELL 12 and UNBURIED WASTE INSPECTION REPORT

DATE (m/d/y):_____ TIME: _____

INSPECTOR (Full Name): _____

Please include inspectors' full name and full date of inspection.

A Daily Facility Inspection Report shall be completed and shall include any deficiencies noted and corrective action taken. The following items shall be addressed in the inspection and subsequent report. Please check satisfactory or unsatisfactory for each item inspected and submit completed form to the Compliance department.

ACTIVE DISPOSAL CELL 12: Inspect active disposal trench for the following:	Satisfactory	Unsatisfactory
Daily cover for erosion, wind dispersal		
Standing water present		
All drums and bulk materials covered properly		
Dust emissions		
Safety and fire control equipment readily available		
Equipment utilized during unloading is stored inside the disposal area during non-working hours		
**Signs of spillage/litter at unloading dock (when in service)		
Signs of tears/damage to synthetic liners		
Compatibility cells (A & B) are clearly marked		
UNBURIED WASTE:		
Signs of materials leakage		
INTERIM PROCESS LOADS:		
Are interim loads properly stored on plastic liner		
All interim loads are properly labeled		
All interim loads are stored for less than 10 business days		
AFTER STORM EVENT INSPECTION: (complete only after storm event of 0.25" or greater (Facility Inspection Plan Section 5.1.2)		
Inspect landfill above grade dikes for signs of instability or erosion		
Inspect the daily cover applied for wind dispersal control for erosion and areas with exposed waste		

Any items which have been determined to be "Unsatisfactory" shall be noted below. Corrective Action will be tracked on this form or the "Inspection Deficiency and Corrective Action Report".

*Remarks/Corrective Action:

_____

_____

_____

*If corrective action is performed, include type of action taken, date completed, and individual performing corrective action.

Revised 8/13/14 RH

BEATTY
WEEKLY FACILITY INSPECTION REPORT

DATE: _____ TIME: _____

EMPLOYEE PERFORMING INSPECTION: _____

A Weekly Facility Inspection Report shall be completed and shall include any deficiencies noted and corrective action taken. The following items shall be addressed in the inspection. Please check satisfactory or unsatisfactory for each item inspected.

EMERGENCY RESPONSE EQUIPMENT	*Sat.*	*Unsat.*	**SECURITY FENCE AND WARNING SIGNS**	*Sat.*	*Unsat.*
Ensure emergency response radios are operational and readily available.			Inspect fence and barriers surrounding the facility for damage/vandalism.		
Test Emergency Alert System.			Inspect the outside perimeter for indication of unauthorized entry.		
MAIN LAB WASTE ACCUMULATION CONTAINERS	*Sat.*	*Unsat.*	**SATELLITE LAB WASTE ACCUMULATION CONTAINERS**	*Sat.*	*Unsat.*
Inspect all piping for evidence of damage or leakage.			Inspect all piping for evidence of damage or leakage.		
Inspect accumulation container for signs of leakage / check accumulation start date.			Inspect accumulation container for signs of leakage / check accumulation start date.		
Inspect containment structure for presence of spills, standing liquid and signs of cracks or other damage.			Inspect containment structure for presence of spills, standing liquid and signs of cracks or other damage.		
Inspect satellite accumulation containers for spills, standing liquid, signs of cracks or other damage, proper labeling and proper storage of drums.			Inspect satellite accumulation containers for spills, standing liquid, signs of cracks or other damage, proper labeling and proper storage of drums.		
Perform a lab eyewash test.			Perform a lab eyewash test.		
LANDFILL- CELL 11	*Sat.*	*Unsat.*	**LANDFILL- CELL 12**	*Sat.*	*Unsat.*
Inspect leak detection/collection system for presence of leachate. (Monthly)			Inspect run-on control ditches for signs of erosion or sand, silt, or other deposits which might impede storm water flow.		
Inspect for signs of erosion, cracks, and integrity.			Inspect run-off control mechanisms to ensure proper performance, ie: Inspect above-grade dikes for signs of instability erosion, or other problems and ensure waste placement elevations are maintained at a minimum of one foot below crest elevation.		
SAFETY SHED/TRENCH 12			Inspect leak detection/collection system for presence of Leachate.		
Ensure that safety and fire control equipment is readily available			Inspect wind dispersal control systems for proper functioning.		
DHWSA 2	Sat	Unsat	**DHWSA 3**	*Sat.*	*Unsat.*
Inspect for signs of damage, leakage or fugitive odors from roll-offs.			Inspect for signs of damage, leakage or fugitive odors from roll-offs.		
Inspect all containers for proper labels and identification.			Inspect all containers for proper labels and identification.		
Inspect for signs of spillage on pad.			Inspect for signs of spillage on pad.		

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PCB BUILDING	Sat.	Unsat.	PCB TANK FARM/TRUCK PAD	Sat.	Unsat.
Inspect containers for leakage, severe rusting or structural defects.			Inspect containment for cracks, erosion, and other signs of deterioration.		
Ensure proper container labeling and identification.			Ensure epoxy coating is intact and in good condition.		
Inspect flooring for cracks, erosion, and other signs of deterioration.			Inspect storage tanks for corrosion, erosion or leaks.		
Ensure epoxy coating is intact and in good condition.			Inspect for liquids in secondary containment and sumps.		
TRUCK PARKING PAD	Sat.	Unsat.	**CONTAINER MANAGEMENT BUILDING**	Sat.	Unsat.
Inspect for signs of damaged or leaking drums.			Inspect for liquids in secondary containment.		
Inspect all containers for proper labeling.			Inspect containment structure for cracks, damage or structural defects that could cause failure.		
Remove any accumulated liquid.			Ensure stored containers are closed.		
Inspect for sign of spillage on pad.			Ensure proper container labeling and adequate aisle space.		
MAINTENANCE AREA	Sat	Unsat.	Inspect containers for leakage, severe rusting or structural defects.		
Inspect Empty roll-off bins (waiting for repairs) for residual waste.					
CLOSED CELLS	*Sat.*	*Unsat.*	**PORTABLE WATER TANK**	Sat.	Unsat.
Inspect for signs of erosion, cracks, and integrity.			Ensure the water truck if full and available for fire control.		

Any item which had been determined as "Unsatisfactory" shall be noted in remarks with an explanation and "Corrective Action" to be taken.

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WEEKLY LABORATORY HOUSE KEEPING AND INSPECTION REPORT

DATE: _____ TIME: _____

INSPECTOR (Full Name): _____

A weekly laboratory housekeeping and inspection report shall be completed as per Chemical Hygiene Plan. Please check satisfactory or unsatisfactory for each item inspected.

MAIN LABORATORY HOUSEKEEPING	*Satisfactory*	*Unsatisfactory*
All satellite accumulation drums at the main lab have proper labels		
All 90 day storage at the main lab have proper labels including USEN label and accumulation start date is within last 90 days		
Inspect drains under sinks for evidence of damage or leakage		
SATELLITE LABORATORY HOUSEKEEPING	*Satisfactory*	*Unsatisfactory*
All satellite accumulation drums at the satellite lab have proper labels		
All 90 day storage at the satellite lab have proper labels including USEN label and accumulation start date is within last 90 days		
Inspect drains under sinks for evidence of damage or leakage		

Any item which has been determined to be unsatisfactory shall be noted below. Corrective action will be tracked on this form or on the Inspection deficiency and corrective action report.

Remarks/ Corrective Action:
(Type of corrective action, Date completed, Individual performing corrective action)

_____

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MONTHLY LABORATORY HOUSE KEEPING AND INSPECTION REPORT

DATE: _____ TIME: _____

INSPECTOR (Full Name):_____

A monthly laboratory housekeeping and inspection report shall be completed as per Chemical Hygiene Plan. Please check satisfactory or unsatisfactory for each item inspected.

MAIN LABORATORY HOUSEKEEPING	*Satisfactory*	*Unsatisfactory*
All chemical containers have proper labels		
All chemical supplies have receipt date and initial		
All chemicals are stored in designated area		
All chemicals stored near work area at or below eye level		
All chemicals stored have sealed lid		
Minimum convenient amount of chemical stored in work area		
Laboratory work areas clean and uncluttered		
SATELLITE LABORATORY HOUSEKEEPING	*Satisfactory*	*Unsatisfactory*
All chemical containers have proper labels		
All chemical supplies have receipt date and initial		
All chemicals are stored in designated area		
All chemicals stored near work area at or below eye levels		
All chemicals stored have sealed lid		
Minimum convenient amount of chemical stored in work area		
Laboratory work areas clean and uncluttered		

Any item which has been determined to be unsatisfactory shall be noted below. Corrective action will be tracked on this form or on the Inspection deficiency and corrective action report.

Remarks/ Corrective Action:
(Type of corrective action, Date completed, Individual performing corrective action)

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PERSONNEL TRAINING PROGRAM

US ECOLOGY NEVADA

March 2010

SECTION 6
PERSONNEL TRAINING PROGRAM
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PERSONNEL TRAINING PROGRAM

6.1.0 Overview of RCRA Training Program

The RCRA training program provides facility personnel with the knowledge necessary to understand the processes and materials with which they are working. Training improves safety, reduces health hazards, prevents emergencies and prepares employee to respond to any situation. In addition, the program provides the knowledge for using, inspecting, repairing, and replacing facility emergency equipment.

Initial training of employees is completed within six (6) months of their start-work date. Each employee participates in an annual review of his or her initial training. Continuous instruction in safety is provided through safety meetings and drills. The goal is to have personnel trained to perform their specific job functions in a compliant manner and to maintain the facility in a state of preparedness.

6.1.1 RCRA Personnel Training Requirements

Facility personnel must successfully complete a program of classroom instruction or on-the-job training that teaches them to perform their duties in a way that ensures the facility's compliance with the Permit and regulations. Facility personnel must successfully complete the program within six (6) months of the date of their employment or reassignment, whichever is later. The program is designed to ensure that facility personnel are able to respond effectively to emergencies. Employees must successfully complete a program of classroom instruction <u>or</u> on-the-job training, and must be trained to perform their duties in a way that ensures the facility's compliance with this requirement.

6.1.2 "Facility Personnel" Defined

The regulations regarding facility personnel training require that employees responsible for managing hazardous waste be trained to the degree necessary that they can manage hazardous waste in compliance with the facility's permit and referenced regulations. For the purpose of this training program, the term "facility personnel" applies to those employees who work on-site for the purpose of managing (e.g., waste sampling, storing, treating, disposing) hazardous waste. There are also personnel on-site whose job functions do not involve the "management of hazardous waste" but may affect facility compliance. These persons/job descriptions include secretaries, load controllers, data entry clerks, receptionists, accountants, customer relation specialists, equipment mechanics, etc. At a minimum, these personnel will receive training in those areas of their jobs which may affect compliance. Not covered by this training program are persons from other divisions of US Ecology, consulting engineers, etc., who do not manage hazardous waste as described above (e.g., geologists, environmental samplers, construction personnel, auditors). Personnel from off-site who are involved in the management of hazardous waste will either be trained in accordance with this plan or the contractor or the employee must certify to the facility that all employees have been properly trained. This certification will be kept on-site in lieu of training records.

6.1.3 Training Records

Training records are maintained for each facility employee meeting the definition of facility personnel. Each record includes the job title of the employee, a description detailing the requisite skill, education, other qualifications, and duties related to that job title, and the amount of both introductory and continuing training that will be given to that employee. Also included in the file are records that document the training has been completed or job experience is satisfactory.

When personnel miss a refresher course (e.g., due to illness, vacation), they may review that topic with their supervisor, the training coordinator, or other qualified individuals or review the film of the training session. Such reviews are documented in the individual personnel training files.

Training records on current personnel will be kept until closure of the facility. Training records on former employees will be kept for at least three (3) years from the date the employee last worked at the facility except that, personnel training records may accompany personnel transferred within the company.

6.1.4 Off-Site Training

Training is available apart from the facility which can serve to fulfill the training required herein. In some areas, technical training, field experience, college credits or degrees can serve to exempt a person from further training in certain areas. For example, the General Manager and Lab Manager will normally have degrees or experience in engineering, chemistry, or other science-related fields. These personnel would not be well served by having to attend a course in "Chemical Terminology, Toxicology, and Handling." In fact, these personnel may serve as the on-site technical expert in that area. In those cases where a person has expertise in an area, formal education or job experience may be documented and serve as total fulfillment of that particular training need.

In some years, a person may attend an off-site seminar or training course which contains equivalent information contained in one or more of the on-site training sessions. This training may be documented by the trainee (self-certification) and serve as total fulfillment of that particular training need.

Management training often takes place in non-discrete sessions such as corporate staff meetings, compliance meetings, permit application work groups, permit negotiations, or other informal sessions and even self-directed learning sessions. These sessions often are of better quality for managers and can be documented by the trainee (self-certification) and serve as total fulfillment of that particular training need.

In summary, non-US Ecology sponsored training may be completed and documented to fulfill the training requirements contained in this plan. The training, if it is to be used as fulfillment of the requirements contained herein, must be documented appropriately.

6.2.0 US Ecology Sponsored Training

The RCRA training program is centered on the adequate training of facility personnel. USEN's employees are to be trained with safety and environmental protection as the primary concern. Training can be obtained from many sources, and frequent off-site training is encouraged to allow the free exchange of new ideas. However, to ensure that a basic core-training program is available to our employees, USEN sponsors and administers a comprehensive RCRA Training Program. The following descriptions are typical of the basic concepts administered through the USEN RCRA Training Program. These concepts may be taught as an entire training module, as part of a single module, or as part of several modules.

6.2.1 Company Orientation

All personnel, upon initial employment, are introduced to the company philosophy and method of operation as well as specific rules and regulations.

6.2.2 Chemical Terminology, Toxicology, and Handling

This training provides a basic understanding of relevant terminology and inherent properties of the waste groups managed on-site. Precautions to be taken in handling hazardous wastes and the reasoning for such measures are emphasized. Specific consideration is given to the procedures and practices governing the mixing of materials and prohibiting mixing of incompatible materials which may result in undesired events. As an example, container management personnel will receive training emphasizing storage of ignitable, reactive, and incompatible materials.

Instructions are typically provided by the Laboratory Manager, Environmental Manager, Health and Safety Supervisor, Training Coordinator, or other technical representatives. Discussions of toxicology and inherent hazards are tailored to meet the types of materials treated, stored, or disposed of on-site.

6.2.3 Operating Practices Summary

All operators (e.g., landfill operators, stabilization operators, container management operators) will be required to be familiar with the operating practices for their respective units. Each operator will be instructed in the permit modules applicable to their unit, and discussions will be held to answer questions. Procedures and actions will be discussed, and actual drills may be performed in the field. Other personnel will be trained, as needed, through orientation or review of other relevant plans.

6.2.4 Contingency Plan

All personnel are required to understand the Contingency Plan to the degree that it affects them and be prepared to put it into action at all times. The Contingency Plan covers response to spills, fires, releases, and other emergency situations. The plan also discusses notification, evacuation, and clean-up procedures. This area of training includes instruction in the procedures for using, inspecting, repairing, and replacing facility emergency and monitoring equipment; the key parameters for automatic waste feed cut-off systems; emergency communications and alarm systems and signals; response to ground-water contamination incidents; and procedures to be followed in the event of a shutdown of operations, as applicable.

Procedures and actions are discussed and actual drills may be performed in the field. These periodic drills are held to simulate fires, explosions, or releases of hazardous wastes. Reviews are conducted at least annually and when changes in facility operation or personnel affect the coordinated effort needed for an emergency response.

6.2.5 Respiratory Equipment

For protection in atmospheres known or suspected to contain hazardous substances, designated personnel are instructed in the care and use of respiratory protection equipment. The training instructor is either a factory representative or an individual qualified due to their job skill (e.g., Health and Safety Supervisor, Training Coordinator, Fire Fighter, Paramedic). Training stresses proper use and fit and procedures for inspection and maintenance. The types of respiratory protection necessary are unique to each activity, depending on the inherent hazards of the materials handled, and the environment/area in which the material is located. For this reason, respiratory protection procedures are reviewed periodically and assessed for additional risk of respiratory insult because of changes in an operation.

Literature available for the respiratory protection equipment is read by and/or reviewed with employees. All repairs and inspections of equipment are performed by trained personnel when and where required. Reviews are held at least annually.

6.2.6 Unit and Equipment Operations

All personnel involved in the operation of hazardous waste management units or process equipment are required to be cognizant of proper operating procedures, emergency procedures, and maintenance particular to the unit or machinery he or she operates. Initial training covers operation of new or unfamiliar units, processes, or pieces of equipment. However, experienced personnel are also required to review the training topics (e.g., Safety Meetings).

6.3.0 Implementation of Training Program

Upon employment, assignment to the facility, or assignment to a new job at the facility, a training file is created or reviewed for the employee. The training record includes a job description, a summary of

all training, and a summary of required training. Training may begin before the employee works in a hazardous waste management unit but must be completed within six (6) months of their start-work date. Employees do not work in an unsupervised position until the required training is completed. Each employee will participate in a review of his or her initial training at least annually (once per calendar year). Also included in the training file are records that document that the required training has been completed.

6.3.1 Qualification of Trainers

US Ecology shall ensure that a person trained (as described in 29 CFR §1910.120(p)(7)(iii)) in hazardous waste management procedures of 29 CFR §1910.120(p) shall direct the training program, and shall teach facility personnel hazardous waste management procedures relevant to their employment position. The required qualifications for the individuals responsible for training implementation include knowledge of state, federal, and local regulations pertinent to hazardous waste management and disposal. Training will be provided by the management staff under the guidance of the Facility General Manager.

6.4.0 Training Topics

Initial 24 HAZWOPR Training will include:

- Respiratory Protection
- Facility Safety Requirements
- Personal Protection Equipment (PPE) Requirements
- PPE Use and Limitations
- Hearing Protection
- Exposure Control
- Decontamination Procedures
- Hazard Communication
- Medical Surveillance
- Emergency Communications
- Contingency Plan
- Location and Use of all Emergency Equipment
- Fire Control Equipment
- Overview of the Resource Conservation and Recovery Act (RCRA)
- Overview of the Toxic Substance Control Act (TSCA)
- General Overview of Department of Transportation (DOT) Regulations

Additional Training will include:

- 8 hour forklift training

- Storm water Pollution Prevention (SWPP) Plan
- Spill Prevention, Control and Counter Measure (SPCC) Plan
- Heat Stress
- Blood Borne Pathogens
- Fall Restraints
- Biological Hazards
- Chemical Hazards
- Hazard Recognition
- Site Specific Standard Operating Procedures (SOPs)
- Any additional topics that management determines to be relevant.

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RCRA CONTINGENCY PLAN

US Ecology Nevada

October 2009

Revised December 2015

SECTION 7

RCRA CONTINGENCY PLAN

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1. The EC will notify all facility personnel by activating the Emergency Alert System either at the main panel at the Administration building, outside the front door of the PCB building, or outside the CMS control room. This is the primary emergency notification system.
2. When the emergency alarm is activated:
   A. All key personnel in possession of FM radios will immediately establish voice communication with the EC.
   B. The EC will determine which facility operations might likely be impacted by emergency response activities and will instruct those operations to cease or otherwise alter their operations, as appropriate.
   C. If directed by the EC, all personnel will proceed to their designated emergency muster areas.
   D. If and as directed by the EC, incoming vehicular traffic will be halted or reduced, with the exception of emergency assistance traffic, if required.
3. Injured personnel will be immediately removed to a safe location, and qualified personnel will administer appropriate first aid. **Note**: Employees requiring medical treatment will be transported to the appropriate medical facility by any means necessary, as determined by the extent of their injuries.
4. All movement to the emergency muster area will be via an up-wind route. An up-wind route may be established by watching any visual emissions or wind socks. If movement via an up-wind route is not possible, the affected personnel will notify the EC of the situation.
5. The EC will account for all personnel, visitors and contractors.
6. The EC will begin assessment of the incident through observations for the following criteria:
   - The nature and extent of the incident (fire and/or explosion, and magnitude);
   - The location of the incident;
   - The nature and quantities of materials involved (review of waste profiles, manifests, disposal records, computer records, cell coordinates);
   - The potential for escalation through subsequent explosions or the spread of fire to other hazardous materials;
   - The intensity of the fire or explosion;
   - The extent of released material to the air and immediate surrounding area;
   - Wind direction and relative speed;
   - The potential for short and long-term effects, with regards to human health and the environment;
   - The need for additional outside assistance and/or evacuation. (NOTE: No firefighting will be attempted if there is significant risk of injury to facility

personnel. Normally, only outbreak stage fires, which can be rapidly contained and controlled, will be handled);

- The proper extinguishing medium for the fire will be established by the EC (e.g., foam, dry chemical, water, soil, etc.);
- If the EC, determines that 1) the fire and/or explosion threatens human health and the environment outside the facility boundaries; 2) additional outside assistance is necessary to bring the incident under control; or 3) evacuation of local the area is necessary; the EC will immediately establish communication with local emergency response agencies, as appropriate, in accordance with Section 7.0 of this plan. Emergency telephone numbers can be found in the EC Phone Number List (Appendix A).

7. If the EC determines that the potential for an impending explosion is high, the EC will notify local emergency response agencies for assistance.

8. The EC will direct all on-scene USEN response efforts and, as appropriate and necessary, coordinate activities involving outside agencies. The EC will direct the following response efforts, as appropriate and necessary:

- Ensure all personnel not required for response efforts are evacuated to a safe area (i.e., non-essential personnel, visitors, contractors.);
- Establish necessary lines of communication;
- Provide all necessary PPE;
- Continually monitor the affected areas through observation for sign of escalation, release, or impending explosions due to gas or vapor build-up;
- Monitor piping systems and tanks if those areas are involved or threatened;
- Ensure all feed lines to the PCB storage tanks and propane tank are closed, if necessary and possible;
- Limit or restrict the use of motor vehicles in the affected area to avoid ignition or re-ignition of flammable vapors and/or gases;
- If practical, remove or isolate any waste containers or shipments that could become involved if the situation escalates or if the waste containers or shipments would be detrimental to the present situation;
- Collect and/or contain, to the extent practical, any released waste; and / or
- Construct soil dikes and/or barrier walls to serve as firebreaks and as temporary segregation measures, to prevent the spread of fire to other waste containing areas, and to control run-off discharge from the facility. These structures will be constructed utilizing heavy equipment as long as the operation of such equipment will not increase the potential for ignition or re-ignition of any flammable vapors.

9. Upon recovery from the emergency, the EC will ensure that all contaminated emergency equipment will be decontaminated. Decontamination procedures will typically be conducted on the Decon Pad to ensure that cleaning residues are contained and collected for appropriate management.
10. When the incident has been brought under full control, and no longer presents a threat to human health or the environment, the EC will initiate appropriate remedial clean-up operations.

7.3.2 Sudden or Non-Sudden Releases or Spills of Hazardous Materials

For purposes of this section, a "release or spill" is defined as 55 gallons or more of material (liquid or solid) outside of its container or tank not on sacrificial soils or contained within other containment structures. For materials on sacrificial soils or inside a containment structure, a spill or release will be considered to have occurred if the material poses a threat to other materials within the same containment unit.

In the event that a Reportable Quantity release or spill occurs at the facility, the EC will take the following actions:

1. Determine internal notification requirements and ensure such notifications are made;
2. Determine which facility operations might be impacted by emergency response activities and instruct those operations to cease or alter their operations, as necessary.
3. Assess the incident through observation, for the following criteria:
    - The nature and extent of the incident;
    - The location of the incident;
    - The nature and quantities of the materials involved (review of waste profiles, manifest, computer records, disposal records, truck placards, etc.);
    - Wind direction and relative speed;
    - The potential for short and long-term effects, with regards to human health and the environment;
    - The potential for fire and/or explosion; and
    - The need for additional outside assistance and/or evacuation.
4. If the EC determines that 1) the incident threatens human health and the environment outside the facility boundaries; 2) additional outside assistance is necessary to bring the incident under control; or 3) evacuation of the local area is necessary; the EC will establish communications with local emergency response agencies, as appropriate. The EC will also contact NDEP and the NRC, as necessary, in accordance with Section 7.7.0 of this plan. Emergency telephone numbers can be found in the EC Phone Number List (Appendix A).

5. The EC will direct all on-scene USEN response efforts and, as appropriate, coordinate activities involving outside agencies. The EC will direct the following response efforts, as appropriate and necessary:
   - If the incident involves the PCB processing area, all feed lines to the storage tanks will be closed;
   - If the surrounding materials could be reactive with the released waste, the EC will ensure they are removed to a safe location; and
   - If the incident involves leaking containers, the EC will ensure that the containers are appropriately managed.
6. Upon recovery from the emergency, the EC will ensure that all contaminated emergency equipment will be collected for decontamination. Decontamination procedures will typically be conducted on the Decon Pad to ensure that cleaning solutions are contained and collected for disposal.
7. When the incident has been brought under full control, and no longer presents a threat to human health or the environment, the EC will initiate appropriate remedial clean-up operations.

7.3.3 Remedial Clean-Up Operations

When the emergency has been brought under control and the threat to human life or the environment has been minimized, the EC will immediately initiate the following remedial actions, as appropriate, in order to restore the facility to operational readiness:

1. The entire area involved in the incident will be cordoned off and only those operations directly related to the remedial clean-up will be allowed in that area. No waste disposal, storage or treatment will be conducted in the cordoned-off area until clean-up operations are completed and permission to resume normal facility operations in the area is granted by the EC.
2. The EC will continue to monitor the area during remedial operations. Monitoring will be through observation and direct reading instruments, such as a portable six-gas monitor (PID), if necessary. Monitoring will be conducted for the presence of gas or vapor build-up, which could cause fire and/or explosion, if necessary.
3. The EC will ensure that all remedial operational personnel are properly equipped with necessary PPE.
4. All recovered waste, contaminated soil or other solid material resulting from the incident will be appropriately stored, treated, and / or disposed.
5. The EC will ensure that no waste that may be incompatible with the released or recovered material is treated, stored or disposed of in the affected area, until remedial clean-up procedures are completed.

6. When all spilled, released or fire-fighting liquids have been removed, the EC will have the area soil sampled and analyzed to ensure that the foreign material has been removed and no further contamination exists, as appropriate. The sampling will be as follows:
   - A minimum of two samples will be taken. This number will vary with the size and extent of the spill.
   - A sample will be taken from outside the periphery of the spill (background) and from the center of the spill (confirmation of clean-up).
   - Depth of samples will be determined by the EC based on visual observation.
   - Specific analysis will depend on materials involved.
7. Clean-up of any spill involving regulated PCBs will be conducted following the U.S. Environmental Protection Agency's (EPA's) Spill Clean-Up Policy.
8. All necessary reports will be submitted to the applicable agencies, informing them of the incident and all response measures taken to re-establish normal facility operations.
9. When remedial clean-up measures have been completed, the EC will ensure that the emergency equipment listed in the contingency plan is decontaminated, cleaned and fit for its intended use, before resuming normal operations. Other decontamination operations include:
   A. Disposable PPE will be appropriately managed.
   B. Respiratory protection equipment will be inspected and decontaminated, if necessary. Any required maintenance will be performed before reuse.
   C. Heavy equipment (e.g., dozers, front-end loaders, forklifts, etc.) will be transported to the Decon Pad for decontamination, if necessary.
   D. Incidental equipment, such as fire extinguishers, shovels, pumps, and reusable PPE, will be removed to the Decon Pad and thoroughly decontaminated, if necessary.
10. Liquids and other materials resulting from decontamination operations will be appropriately managed in accordance with the WAP.
11. Fire extinguishers will be inspected in accordance with the Facility Inspection Plan before being placed back in service.

7.3.4 Earthquakes

The USEN facility is located ~10 miles west of the Furnace Creek Fault Zone, and ~100 miles south of the Las Vegas Shear Zone. The following contingency response measures will be conducted in the event of significant seismic activity to the extent required by the EC:

1. Communication between key facility personnel and the EC will be immediately established;

2. Facility personnel will exit buildings, to an open area, if the building's structural integrity appears to be failing;
3. Facility personnel in operational areas will immediately halt or alter operations;
4. Heavy equipment operators will shut down equipment and egress to a safe open area;
5. Personnel located in the landfill will move away from the trench walls to the center open area and remain until the earthquake and associated initial after-shocks have dissipated;
6. Immediately following the earthquake and initial after-shocks, all personnel will proceed directly to the designated muster area;
7. The EC will account for all facility personnel;
8. Qualified personnel will administer first aid to injured personnel. Injured personnel will be transported for medical treatment, if necessary;
9. The EC will designate inspection teams and begin necessary measures to appraise facility damage;
10. Inspection of the facility will be conducted in an organized manner and will include the following areas:
    - The active landfill will be inspected for wall failure, cracks, exposed waste, severe depression in the floor and visible gas vapor emission.
    - Inactive cells will be inspected for cap integrity and fugitive visible emissions.
    - All access roads will be inspected for cracks and severe depressions.
    - Facility perimeter fencing will be inspected for integrity.
    - All electrical and utility systems will be inspected for operational effectiveness.
    - All facility equipment will be inspected for operational integrity.
    - All monitoring wells and sumps will be inspected for integrity.
    - The PCB processing area will be inspected for structural integrity of the building, flooring, valves, pipes, tanks, and containment controls. Signs of cracks, leaks or malfunction will be reported to the EC.
    - The propane tank and ancillary equipment will be inspected for leaks, cracks or malfunction.
11. The EC will ensure that all inspection personnel are properly equipped with PPE.
12. In the event that a fire and/or explosion result from the earthquake, subsequent contingency response will be in accordance with Section 3.1 of this plan.
13. In the event that a release of hazardous material occurs, subsequent contingency response will be in accordance with Section 3.2 of this plan.
14. The EC will then initiate any remedial actions necessary to bring the facility up to operational readiness.
15. All necessary reports will be submitted in accordance with Section 7.0 of this plan.

7.4.0 Evacuation Plan

All emergencies require prompt and deliberate action. The EC will be responsible for determining if a facility evacuation is required. In the event that this determination is made, the following actions will be taken:

1. The emergency horns will be activated twice. This is the primary signal for immediate facility evacuation. In addition, radio communications will be established and the verbal order for evacuation will be given.
2. All facility personnel will immediately don proper PPE, if required, and proceed to the primary evacuation route (Appendix B).
3. All evacuations will be coordinated by the EC in such a manner as to minimize potential exposure (i.e., up-wind egress).
4. All facility visitors and contractors will exit the facility immediately, under the direction of the EC.
5. In the event that evacuation by the primary designated route is not possible (due to blockage by releases or fire), the EC will authorize the sacrifice of facility fencing by use of heavy equipment or motor vehicles to create alternate routes. All personnel evacuating the facility in this manner will immediately proceed to the evacuation muster area when clear of danger or to an alternate muster area designated by the EC.
6. When the evacuation is complete, the EC will immediately account for all facility personnel, visitors and contractors.
7. No attempt will be made to find personnel unaccounted for, if it involves the endangering of lives of others by re-entry into the facility.
8. Re-entry into the facility will only be made after the EC gives clearance.

7.5.0 Equipment Requirements

The facility will maintain sufficient safety and emergency equipment for immediate response to most emergency situations. All facility communications and alarm systems, fire extinguishers, spill control equipment and decontamination equipment will be inspected and maintained in accordance with the Facility Inspection Plan.

7.5.1 Emergency Response Equipment

For a more comprehensive list of emergency equipment, see Appendix D.

7.5.2 Safety Equipment

The facility will maintain sufficient safety equipment to provide for immediate response to emergency situations.

7.5.2.1 Respiratory Protection

Air purifying half- or full-face respirators with appropriate cartridges will be available and stocked in the Health and Safety Storage room located in the Administration Building. A specific list of available equipment and locations include:

- Air purifying respirators (issued to each operational employee);
- Self-contained breathing apparatus (SCBAs) (located in the safety van, Stabilization Building, CMS Building and PCB Building);
- Spare bottles for SCBAs (located in the Emergency Response Trailer); and
- Cartridges for air purifying respirators (located in the Health and Safety Storage room located in the Administration Building, Stabilization Building, and the Emergency Response Trailer).

7.5.2.2 Personal Protective Equipment

Available PPE, in addition to the PPE issued to operational employees, includes:

- Tyvek™ outer garments (located in the stabilization building, trench shed, PCB Building, CMS Building, Maintenance Building, Emergency Response Trailer, and Health and Safety Storage room);
- Chemical-resistant suits (located in the Health and Safety Storage room, PCB Building and Stabilization Building);
- Chemical-resistant gloves (located in the Trench Shed, Stabilization Building, H&S Van, PCB Building, Site Laboratory, CMS Building, Maintenance Building, and Health and Safety Storage room);
- Face shields (located in the PCB Building and Health and Safety Storage room); and
- Chemical resistant over-boots for safety shoes (located in the PCB Building and Health and Safety Storage room).

7.5.2.3 Fire Extinguishers

Portable fire extinguishers, rated for class "ABC" fires, are available at multiple locations on-site. Specific lists of units (and respective locations) include:

- ABC units on all heavy equipment;
- ABC units stored on the loading dock and H&S Van;
- D unit stored in Trench Shed;
- 2 – Compressed foam units mounted in the bed of 2, 4-wheel utility vehicles
- 250-pound Ansul at the Stabilization Building;
- 3 - 250-pound Ansul at the CMS Building

7.5.2.4 Heavy Equipment and Vehicles

The facility routinely utilizes multiple pieces of heavy equipment and vehicles (such as trucks) to support on-site operations and this equipment is available for emergency response efforts. Typical equipment used on-site includes track-hoes, bulldozers, water trucks, forklifts, etc. Although this equipment is available on-site, it is not for "emergency response" purposes, per se, and is routinely exchanged for other similar equipment when its economic life is complete. Therefore, although this equipment is on-site, it is not listed here.

7.5.2.5 Spill Control and Response Equipment

A specific list of spill control and response equipment, in addition to on-site heavy equipment, includes:

- Recovery drums (inside the PCB Building and outside the CMS Building);
- Absorbent material for containment and solidification (inside the PCB Building);
- Spill control pads (PCB Building and facility laboratory); and
- Shovels (PCB Building, Maintenance Building, and wash pad).

7.5.2.6 Decontamination Equipment

Decontamination of contaminated equipment will typically take place at the Decon Pad, and all decontamination run-off will be collected in the wash pad holding tank. Additional equipment typically available for decontamination includes:

- High pressure and steam cleaning units (kept at the Decon Pad);
- Decon water soluble cleaning solution (PCB Building);
- Sponges and mops (PCB Building), and
- Portable and fixed emergency deluge showers and eye wash stations (fixed units located at the Waste CMS Building, PCB Building, Stabilization Area, Decon Pad and Lab).

7.5.2.7 First Aid Supplies

Typically available first aid supplies include:

- A complete emergency trauma kit (located in the H&S Van and Receiving Office);
- Basic first aid kits (located in CMS Building, PCB Building, and Stabilization Office);
- One stretcher (located in the H&S Van); and
- One burn pack (located in the H&S Van).

7.5.2.8 Water For Fire Control

The facility maintains a 20,000 gallon water storage tank located adjacent to the PCB building and a water storage pond located east of the main access gate.

Other fire fighting capabilities includes two mechanical foam spraying units. One is located in Trench 12 mounted in the bed of a 4-wheel utility vehicle, and the other is located outside of the Receiving Office in the bed of the other 4-wheel utility vehicle.

7.5.2.9 Internal Communication Systems

Internal communications consist of three (3) independent systems. The primary system is an emergency warning siren. The system consists of three (3) high-intensity warning horns, one (1) located at the PCB Building, one (1) at the CMS/Stabilization Building, and one (1) at the office compound area. The second system consists of radio units. This system consists of a minimum of eight (8) hand-held units located throughout the facility. All radios are interfaced for monitoring and communication purposes. The EC will monitor at least one unit at all times during normal facility operations. The third system consists of a telephone system.

7.5.2.10 External Communication Systems

External communications for summoning outside emergency assistance will be accomplished by telephone. There will be a minimum of six (6) telephones readily available for this purpose. One (1) will be located in the laboratory facility, one (1) in the Facility Manager's office, one (1) in the break area, and three (3) in the Administrative office.

7.6.0 Plan Distribution/Coordination Agreements

The following facilities and agencies are in possession of copies of the Emergency Coordinator Phone Number List (Appendix A.) These agencies were invited to participate in an orientation intended to familiarize response personnel with the facility layout, properties of the wastes handled at the facility and associated hazards. Each agency was asked to review and comment on the plan and establish specific actions that they will take in response to an emergency.

1. Beatty Volunteer Fire/Rescue;
2. Beatty Ambulance Service;
3. Beatty Medical Clinic;
4. Beatty Substation Nye County Sheriff; and
5. Mercy Air Ambulance Service.

A copy of the coordination agreement letter provided to each agency is included as Appendix C.

7.7.0 Reports

As soon as possible after implementation of the Contingency Plan, the Emergency Coordinator, or designee, will record the time, date, and details of the incident. USEN will orally report to the Nevada Division of Environmental Protection (NDEP) any incident requiring implementation of the Contingency Plan. The NDEP and the National Response Center will be notified of any incident involving a release to the environment of hazardous waste, pollutant or contaminant in a quantity equal to, or greater than the reportable quantity specified by 40 CFR Part 302.

The oral reports described above will be provided as soon as possible after becoming aware of the release, but no later than 24 hours following the incident. However, the EC must notify the NDEP that the facility is in compliance with the following items before operations are resumed in the affected area(s) of the facility:

1. No waste that may be incompatible with the released material is treated, stored, or disposed of until cleanup procedures are completed; and
2. All emergency equipment listed in the Contingency Plan is cleaned and fit for its intended use before operations are resumed. In this case, the EC may substitute equivalent emergency equipment in the affected area while repairing, replacing, or recharging used emergency response equipment.

A written report providing details on any incident requiring implementation of the Contingency Plan will be submitted to the NDEP Administrator within 15 days. The following information will included in the written notification to the Administrator:

1. Name, address and telephone number of the owner/operator of the facility;
2. Name, address and telephone number of facility;
3. Date, time, and type of incident (e.g.; fire, explosion);
4. Name and quantity of material(s) involved;
5. The extent of injuries, if any;
6. An assessment of actual or potential hazards to human health or the environment, where this is applicable; and
7. Estimated quantity and disposition of recovered material that resulted from the incident.

7.8.0 Plan Modification

The Emergency Coordinator, or designee, may find it necessary to adapt the Contingency Plan to a specific emergency situation in order to adequately protect human health or the environment. In addition, the Contingency Plan will be reviewed and amended, if necessary, whenever:

1. The facility permit is revised;
2. The plan fails in an emergency;

3. The facility changes – in its design, construction, operation, maintenance, or other circumstances – in a way that materially increases the potential for fires, explosions, or releases of hazardous waste or hazardous waste constituents, or changes the response necessary in an emergency;
4. The list of emergency coordinators changes; or
5. The list of emergency equipment changes.

Copies of the modified plan will be distributed as described in Section 6.0.

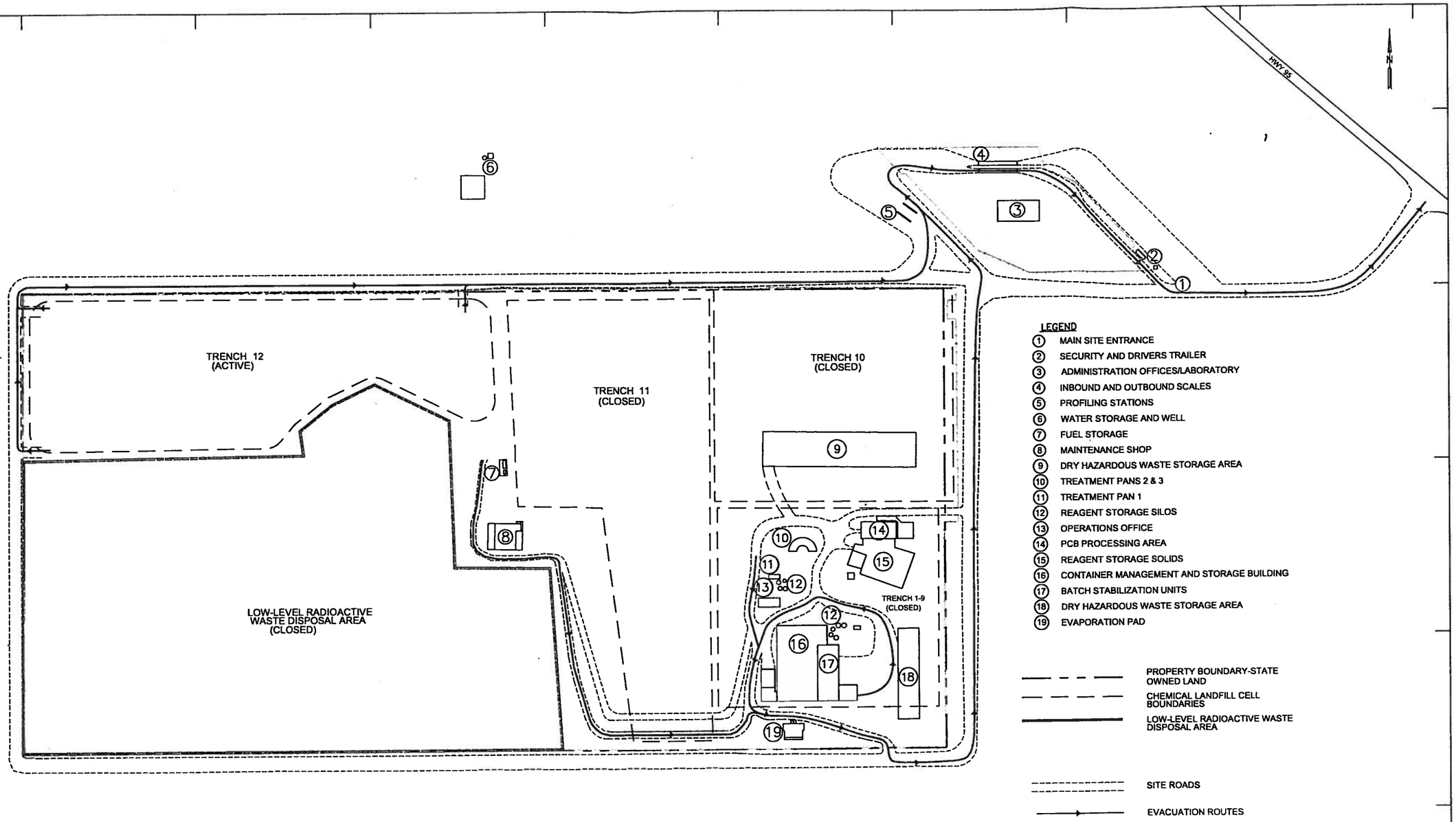
Appendix A

List of Emergency Coordinators

LIST OF EMERGENCY COORDINATORS US ECOLOGY – BEATTY, NEVADA					
EMERGENCY COORDINATOR (EC)	**NAME**	**JOB TITE**	**STREET ADDRESS**	**CONTACT NUMBERS**	
Primary Coordinator	Robert Marchand	Gen Mgr	1225 A Avenue North Beatty, Nevada 89003	Home	775-553-2367
				Cell	702-280-2596
1ST Alternate	Dan Church	OPS Mgr	3100 Prairie Ave. Pahrump, NV 89048	Cell	775-990-9826
2nd Alternate	Josue Partida	CMS Supr	901 2nd St. Beatty, NV 89003	Cell	775-537-5095
3rd Alternate	John Dyer	ENV Mgr	1100N A Ave., #A-7 Beatty, NV 89003	Cell	775-420-2197

Appendix B

Evacuation Routes Map



EVACUATION ROUTES
US Ecology Nevada, Inc.
HAZARDOUS WASTE MANAGEMENT FACILITY
BEATTY, NEVADA 89003

Appendix C

Coordination Agreement Letters

US ecology

P.O. Box 578, Beatty, NV 89003
P 800.239.3943 F 775.553.2942

DEC 0 3 2015

November 20, 2015

Nye County Volunteer Fire Department
PO Box 113
Beatty, Nevada 89003

Dear Sir/Madam,

As you are aware, US Ecology operates a chemical waste disposal facility near the location of your organization. The U.S. Environmental Protection Agency (USEPA) regulations pertaining to hazardous waste disposal require US Ecology to familiarize local emergency response personnel with our site operations and obtain verification from you that your organization will respond to any request for emergency assistance.

To acknowledge that you will provide such services, please have a representative of your agency date and sign the appropriate spaces provided below.

Also, this letter constitutes US Ecology's formal request that your agency participate in an orientation session, held at your convenience, dealing with the facility layout, potential hazards and special situations which could be encountered during an emergency response. Attached is a copy of US Ecology's **Emergency Contingency Plan** dated 11/20/2015 for your review. Should you be interested in an orientation or if you require additional information regarding this notice, please contact me at 800-239-3943 x 104.

Sincerely,

Bob Marchand
General Manager

Enclosure
Cc: Ms. Maureen Godbout, P.E., Staff Engineer-NDEP
Chrono – US Ecology
NDEP Correspondence File

.....

The Beatty Vol. Fire Dept. will respond to any US Ecology request for emergency assistance.

Date: 11/30/15 Signed: Michael [illegible]

☐ Decline orientation session

US ecology

P.O. Box 578, Beatty, NV 89003
P 800.239.3943 F 775.553.2942

DEC 0 3 2015

November 20, 2015

Beatty Ambulance Service
PO Box 875
Beatty, Nevada 89003

Dear Sir/Madam,

As you are aware, US Ecology operates a chemical waste disposal facility near the location of your organization. The U.S. Environmental Protection Agency (USEPA) regulations pertaining to hazardous waste disposal require US Ecology to familiarize local emergency response personnel with our site operations and obtain verification from you that your organization will respond to any request for emergency assistance.

To acknowledge that you will provide such services, please have a representative of your agency date and sign the appropriate spaces provided below.

Also, this letter constitutes US Ecology's formal request that your agency participate in an orientation session, held at your convenience, dealing with the facility layout, potential hazards and special situations which could be encountered during an emergency response. Attached is a copy of US Ecology's **Emergency Contingency Plan** dated 11/20/2015 for your review. Should you be interested in an orientation or if you require additional information regarding this notice, please contact me at 800-239-3943 X 4104.

Sincerely,

Bob Marchand
General Manager

Enclosure
Cc: Ms. Maureen Godbout, P.E., Staff Engineer-NDEP
Chrono – US Ecology
NDEP File

.....

The Beatty Vol Ambulance will respond to any US Ecology request for emergency assistance.

Date: 12/1/15 Signed: Allison Henderson

☒ Decline orientation session

US ecology

P.O. Box 578, Beatty, NV 89003
P 800.239.3943 F 775.553.2942

November 20, 2015

Nye County Sheriff
Beatty Sub Station
PO Box 805
Beatty, Nevada 89003

Dear Sir/Madam,

As you are aware, US Ecology operates a chemical waste disposal facility near the location of your organization. The U.S. Environmental Protection Agency (USEPA) regulations pertaining to hazardous waste disposal require US Ecology to familiarize local emergency response personnel with our site operations and obtain verification from you that your organization will respond to any request for emergency assistance.

To acknowledge that you will provide such services, please have a representative of your agency date and sign the appropriate spaces provided below.

Also, this letter constitutes US Ecology's formal request that your agency participate in an orientation session, held at your convenience, dealing with the facility layout, potential hazards and special situations which could be encountered during an emergency response. Attached is a copy of US Ecology's **Emergency Contingency Plan** dated 11/20/2015 for your review. Should you be interested in an orientation or if you require additional information regarding this notice, please contact me at 800-239-3943 x 4104.

Sincerely,

Bob Marchand
General Manager

Enclosure
Cc: Ms Maureen Godbout, P.E., Staff Engineer-NDEP
Chrono – US Ecology
NDEP Correspondence File

.....

The _____ will respond to any US Ecology request for emergency assistance.

Date: _____ Signed: _____

☐ Decline orientation session

US ecology

P.O. Box 578, Beatty, NV 89003
P 800.239.3943 F 775.553.2942

November 20, 2015

Mercy Air Ambulance
1541 E. Calvada Blvd
Pahrump, NV 89048-5807

Dear Sir/Madam,

As you are aware, US Ecology operates a chemical waste disposal facility near the location of your organization. The U.S. Environmental Protection Agency (USEPA) regulations pertaining to hazardous waste disposal require US Ecology to familiarize local emergency response personnel with our site operations and obtain verification from you that your organization will respond to any request for emergency assistance.

To acknowledge that you will provide such services, please have a representative of your agency date and sign the appropriate spaces provided below.

Also, this letter constitutes US Ecology's formal request that your agency participate in an orientation session, held at your convenience, dealing with the facility layout, potential hazards and special situations which could be encountered during an emergency response. Attached is a copy of US Ecology's **Emergency Contingency Plan** dated 11/20/2015 for your review. Should you be interested in an orientation or if you require additional information regarding this notice, please contact me at 800-239-3943 x4104.

Sincerely,

Bob Marchand
General Manager

Enclosure
Cc: Ms. Maureen Godbout, P.E., Staff Engineer-NDEP
Chrono – US Ecology
NDEP Correspondence File

.....

The _____ will respond to any US Ecology request for emergency assistance.

Date: _____ Signed: _____

☐ Decline orientation session

US ecology

P.O. Box 578, Beatty, NV 89003
P 800.239.3943 F 775.553.2942

November 20, 2015

Beatty Medical Clinic
PO Box 250
Beatty, Nevada 89003

Dear Sir/Madam,

As you are aware, US Ecology operates a chemical waste disposal facility near the location of your organization. The U.S. Environmental Protection Agency (USEPA) regulations pertaining to hazardous waste disposal require US Ecology to familiarize local emergency response personnel with our site operations and obtain verification from you that your organization will respond to any request for emergency assistance.

To acknowledge that you will provide such services, please have a representative of your agency date and sign the appropriate spaces provided below.

Also, this letter constitutes US Ecology's formal request that your agency participate in an orientation session, held at your convenience, dealing with the facility layout, potential hazards and special situations which could be encountered during an emergency response. Attached is a copy of US Ecology's **Emergency Contingency Plan** dated 11/20/2015 for your review. Should you be interested in an orientation or if you require additional information regarding this notice, please contact me at 800-239-3943 x 4104.

Sincerely,

Bob Marchand
General Manager

Enclosure
Cc: Ms. Maureen Godbout, P.E., Staff Engineer-NDEP
Chrono – US Ecology
NDEP Correspondence File

.....

The _____ will respond to any US Ecology request for emergency assistance.

Date: _____ Signed: _____

☐ Decline orientation session

Appendix D

List of Emergency Equipment

List of Emergency Equipment (Typical)		
Equipment	**Location**	**Physical Description / Capabilities**
SCBAs	H&S Van, Emergency Response Trailer, Stabilization Change Room, PCB Bldg, & CMS Building Control Room	Face piece covering eyes & air supply of 30 minutes. NIOSH approved. These units are not approved for fire fighting.
Spare Bottles for SCBA	Emergency Response Trailer	Air Supply of 30 minutes
Protective Outer Garments	Health and Safety Storage Room, Stabilization Area, CMS Bldg., PCB Bldg., and Landfill	One-piece coveralls
Gloves	Health and Safety Storage Room, Stabilization Area, CMS Bldg., PCB Bldg., and Landfill	Chemical resistant gloves
Face Shields	PCB Bldg., Laboratory, and Health and Safety Storage Room	Hard plastic shield for protecting eyes from splashes
Booties / Rubber Boots	Health and Safety Storage Room and PCB Bldg.	Water or chemical resistant boots or covers
Fire Extinguishers	Heavy Equipment, Stabilization Area, CMS Bldg., PCB Bldg., and Landfill	Various sizes and types for fighting incipient fires
Overpack Drums	PCB Bldg. and CMS Bldg.	For containing waste, spill residues
Absorbents / Pozzolons	Stabilization Area, PCB Bldg.	These materials are soils or materials for sorption of liquids
Spill Control Pads	PCB Bldg., CMS Bldg & Lab	These materials are for absorbing liquids
Emergency Showers & Eye Wash Units	Various locations	Deliver water for drenching contaminated personnel

WASTE ANALYSIS PLAN

US ECOLOGY NEVADA

March 2010

Revised October 2011

SECTION 8
WASTE ANALYSIS PLAN
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ATTACHMENT 4; Supplemental Analyses

ATTACHMENT 5; Other Analyses

8.1.0 INTRODUCTION

This Waste Analysis Plan (WAP) documents how US Ecology Nevada (USEN[1]) obtains detailed chemical and physical analysis of a representative sample before hazardous wastes are stored, treated or disposed. USEN uses a pre-acceptance process to determine if sufficient information exists, and to determine if the waste can be managed at the facility within permit limits. Pre-acceptance also determines how wastes will be treated and how employee safety will be protected. USEN inspects all incoming waste shipments and, if necessary, analyzes each shipment received at the facility to determine if it matches the identity of the waste specified on the accompanying manifest. In addition, post-treatment testing confirms that wastes meet land disposal restrictions prior to disposal.

This Waste Analysis Plan describes how USEN complies with these responsibilities. Specifically and in accordance with 40 CFR §264.13(b), this plan delineates the following:

- The waste analyses hazardous waste generators supply (Section 8.2.0);
- The sampling methods used to obtain a representative sample of the waste to be analyzed (Section 8.2);
- The parameters for which each hazardous waste will be analyzed and the rationale for the selection of these parameters [i.e.; how analysis for these parameters will provide sufficient information on the properties of the waste (Section 8.6.6);
- The test methods used to test for these parameters (Section 8.6.6);
- The frequency with which the initial analysis of the waste will be reviewed or repeated to assure the analysis is accurate and up to date (Section 8.4.0 and Section 8.6.7);
- The procedures used to inspect and, if necessary, analyze hazardous waste received on-site to assure it matches the identity of the waste designated on the accompanying manifest or shipping paper, including:
  - (i) the procedures used to determine the identity of waste managed at the facility (Section 8.6.0); and the sampling method used to obtain a representative sample of the waste to be identified (Section 8.2.0)
  - (ii) the procedures used to determine whether a hazardous waste generator or treater has added a biodegradable sorbent to the waste (Section 8.3.0).
  - (iii) The procedures used to document waste movements within the facility prior to off-site shipment or on-site disposal (Section 8.8.0)
  - (IV) The methods used to meet the additional waste analysis requirements for specific waste management methods as specified in 40 CFR §§264.17, 264.314, 264.341, and 268.7 (Section 8.8.0).
  - (V) Since the facility uses no surface impoundments exempted from land disposal restrictions under 40 CFR §268.4(a), no special procedures or schedules are provided for such surface impoundments.

[1] For the purpose of this WAP, "USEN" means any US Ecology Nevada and any other US Ecology laboratory, subsidiary/affiliated laboratory, or designated contract laboratory.

8.2.0 REPRESENTATIVE SAMPLING METHODS

Sampling and analysis are commonly performed by waste generators or their representatives to characterize wastes. Typically, when a waste shipment arrives on-site for treatment, storage, or disposal, a determination has already been made by the generator that the waste is either:

- a listed hazardous waste, as defined in Subpart D of 40 CFR Part 261;
- a characteristic hazardous waste, as defined in Subpart C of 40 CFR Part 261; or
- a solid waste which is not hazardous waste, as defined by 40 CFR §261.4(b).

USEN's instructions for its Waste Product Questionnaire[2] refer generators to 40 CFR Part 261, Appendix I for sampling procedures. This Appendix, in turn, references both ASTM methods and EPA methods. Samples collected using protocols for these types of wastes are considered by EPA to be representative samples.

The generator's waste characterization normally includes an analysis of a representative sample of the waste, however, in some cases, generator knowledge of the waste is sufficient. Waste generators may also provide data originally used to characterize wastes, or provide existing published or documented data on the hazardous waste or data on hazardous waste generated from similar processes. The generator or an independent laboratory (including USEN) may perform analyses using standard test methods (EPA, ASTM, AWWA, or other approved standards) or alternative methods approved in USEN's RCRA permit.

The generator also evaluates the candidate waste for additional characteristics that may exclude the waste from acceptance at USEN and certifies that the waste does not exhibit any of these characteristics. For example, wastes restricted from on-site management (i.e.; pyrophoric wastes) will not be approved for on-site management.

Each WPQ includes a generator certification statement that reads, "I certify under penalty of law that I am familiar with this waste stream through analysis and/or process knowledge, and that all information provided is true, accurate, representative and complete, and that all known or suspected hazards have been disclosed. Furthermore, I certify that this form was completed in accordance with the instructions provided."

See Attachment 1 for an example of the WPQ form and related instructions.

8.3.0 PRE-ACCEPTANCE REVIEW

USEN's pre-acceptance review determines whether adequate information is available to determine the acceptability of the waste for on-site management. Waste may be rejected or accepted based on the conditions or limitations of existing permits, the waste's compatibility with other wastes being managed on-site, or the waste's suitability for management utilizing the process options available on-site.

Pre-acceptance review commonly takes place on-site before waste is scheduled for delivery. Pre-acceptance information may also be collected at another US Ecology facility, or upon receipt of the load prior to waste acceptance.

USEN commonly obtains the following information for each new waste stream that is a candidate for on-site management:

- Pertinent chemical and physical data (i.e., waste characteristics) and, when appropriate, information concerning representative sampling methods and certification on the WPQ.
- A representative sample, unless pre-acceptance review determines that a representative sample is not necessary.
- Land Disposal Restriction (LDR) Notification/Certification and/or data, unless data is submitted with each load.

---

[2] Also commonly known as the "waste profile."

- Other supporting documentation as appropriate, including any information such as a description of the process generating the waste, additional analytical results, Material Safety Data sheets, product ingredients, etc.

The pre-acceptance review identifies the Fingerprint Analyses and any Supplemental Analyses necessary on a sample collected upon receipt of the waste. These additional analyses may be required in order to determine appropriate waste management techniques to be used.

Selected waste management techniques are based on:

- Management methods available;
- Conditions or limitations of existing permits and regulations;
- Capability to manage the waste in a safe and environmentally sound manner;
- WPQ description of the process generating the waste;
- WPQ description of the chemical and physical properties of the waste;
- Any additional documentation supplied by the generator, including information that the waste is subject to a Land Disposal Restriction of 40 CFR Part 268, if appropriate;
- Results of Fingerprint Analyses, if necessary;
- Results of Supplemental Analyses, as appropriate; and
- Management's technical experience and judgment.

The pre-acceptance evaluation concludes with a documented decision regarding the acceptability of the waste and the proposed method of management. Included within the documentation is the required notification to the generator that the waste is approved for management in accordance with the facility's permit and 40 CFR §264.12(b).

Copies of these decisions are sent to the NvDEP for review and for their concurrence, modification or rejection.

USEN maintains copies of generator-supplied and USE-developed information. This information may be accessed electronically or via hard copy.

8.3.1 NDEP RESTRICTED WASTES

Wastes that are identified by NDEP as "Restricted Wastes" are wastes that USEN are not authorized by NDEP to receive, treat, store, dispose of, or otherwise manage. The following steps will be taken to identify and avoid accepting restricted wastes:

- All USEN technical staff authorized to approve profiles will be aware of which wastes are considered restricted.
- Ask for additional analysis or MSDSs if needed.
- Request the assistance of the US Ecology Inc. Radiation Safety Officer for any material that may contain any radiological component.

8.4.0 WASTE PROFILE RE-EVALUATION

A waste profile is re-evaluated if:

- A generator notifies USEN that the process generating the waste has changed;

- The results of inspection or analysis indicate the waste received at the facility does not match the identity of the waste designated on the accompanying manifest (or shipping paper).

When the waste profile is re-evaluated, the generator may be asked to review and update the current waste profile, to supply a new profile, and/or to submit a sample for analysis. USEN may also develop new data by using a representative sample collected from a load of the waste.

8.5.0 WASTE TREATMENT RECIPE DEVELOPMENT

Typically, USEN requires a representative sample of wastes prior to on-site treatment to develop a treatment recipe. The waste sample is mixed in the lab with various reagents[3] to determine an acceptable mix design (recipe) by which the waste is ultimately treated to meet required standards.

In some cases, it may be appropriate to create mix designs after acceptance, but prior to treatment (e.g., when aggregated batches of mixed wastes streams are treated together). Recipes may also be adjusted after treatment if the recipe is unsuccessful or if more efficient treatment techniques are developed.

Treatment effectiveness is verified prior to disposal except when wastes from the same source are routinely received. In that case, samples are collected from the first batch of treated wastes, and at least once a year, thereafter[4]. Sampling frequency may be increased for waste streams that exhibit significant variable characteristics.

Since wastes are treated based on a developed or verified recipe, they are assumed to meet the applicable treatment standards and may be staged in storage or disposal units pending confirmatory analyses. If post-treatment analyses determine a treated batch does not meet applicable standards, the waste will be retrieved for re-treatment or off-site management.

A treatment certification is issued to the generator for each batch successfully treated.

8.6.0 INCOMING WASTE SHIPMENT INSPECTION AND SAMPLING

Each shipment of waste is inspected, sampled and analyzed before acceptance, except as noted below, to compare the actual waste identity with that determined in the pre-acceptance phase and ensure proper disposition of the waste for treatment, storage, and/or disposal. A USEN-approved subcontractor or a USEN employee operating off-site can provide the analyses required for acceptance. Waste shipments arriving on-site are in process until a final decision regarding waste acceptability is made. At such time, the wastes are accepted or rejected.

Subject to the exceptions below, bulk waste loads are sampled and analyzed, except where large volumes of a single waste stream are received from a single source, (e.g.; a site cleanup, a large volume generator, etc.). In such cases, all shipments are inspected and at least 10% of such loads are sampled and analyzed. Bulk waste may also be sampled in an original bulk container (rail cars, for example) prior to loading into trucks or other containers.

At least 10% of non-bulk containers from each waste stream in the shipment are sampled, except as noted below. Container samples from the same profile may be composited prior to analysis, providing the individual samples have similar physical descriptions. At a minimum, all remaining un-sampled containers are visually inspected for container integrity and labeling. If a significant discrepancy in waste type is discovered, the contents of all of the containers for that waste stream are inspected. In some cases, where the waste stream is consistent but packaged for ease of transportation or disposal (e.g., multiple cubic yard bags containing the same waste), the load may be managed as a bulk load.

8.6.1 Wastes Meeting the Treatment or Technology Standard upon Arrival

USEN frequently receives waste meeting applicable treatment standards that has been treated by the generator, treated by another treatment facility, or verified to meet the

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[3] Typical reagents used on-site include fly ash, portland cement, cement kiln dust, lime, gypsum, water, clays, oxidizers, and carbon, although other treatment reagents may be used, Including other wastes with characteristics appropriate for treatment.

[4] A sample of a treated waste stream may be used during one year to provide the annual verification testing for the following year. If this occurs, waste streams treated before or after this are not affected in any way as a result of the analytical results received or resultant recipe changes. The Lab Manager may change the recipe immediately or upon the new annual period.

standard as initially generated. These shipments must be accompanied by a proper notification and certification or, if determined to meet the standard by USEN, USEN may complete the correct certification. See Attachment 2 for a copy of the LDR Form. This form must include the applicable analytical data or reference to such data, in accordance with 40 CFR §268.7.

These wastes may be analyzed for conformance with the treatment standards during the pre-acceptance review, during the load acceptance review, or when USEN believes the waste may meet the appropriate standard or method.

8.6.2 Wastes Subject to LDRs

Initial waste shipments subject to the Land Disposal Restrictions which require treatment must be accompanied by a one-time notification to USEN of the appropriate treatment standard or prohibition, including any applicable data or reference to such data or documentation which must be met in accordance with 40 CFR §268.7, except as otherwise allowed. See Attachment 3 for a copy of this form.

When verifying that waste has been treated to meet LDR treatment standards, compliance with concentration level standards is based on grab sampling. When there is any uncertainty in achievement of treatment standards, the treated waste is resampled.

8.6.3 Wastes Which Are Not Sampled

Sampling and analysis of some waste materials is not required because the chemical and physical characteristics of the waste are known in sufficient and reliable detail, or the waste has been previously characterized and shipped from another generator, broker or TSDF, or visual inspection of these shipments is sufficient for verification of their identity. USEN may waive incoming waste load sampling and analysis where the pre-acceptance documentation supplies sufficient information to assure compliance with permit conditions and operational constraints, or any of the following conditions exist:

- Obtaining a representative sample poses an unnecessary hazard of acute or chronic exposure of USEN employees to carcinogenic, mutagenic, neoplastigenic, teratogenic, or other hazardous or sensitizing materials;
- The material may react violently with air or moisture;
- The material's odor causes a public nuisance when sampled; or
- A sample cannot be reasonably obtained, such as filter cartridges, tank clean-out sludge (prior to the clean-out), large pieces of contaminated material, or contaminated debris.

In these cases, the shipment will still be inspected for conformance with manifest and pre-acceptance documentation as previously described.

The following types of wastes are typically excluded from sampling and analysis upon receipt:

- Waste contained in a lab-Pack (combination packaging). Combination packaging is defined in 49 CFR §171.8 as "...one or more inner packagings secured in a non-bulk outer packaging" and is subject to the Department of Transportation shipping package requirements of 49 CFR Part 173.
- Commercial products or chemicals: off-specification, outdated, unused, contaminated or banned. This also includes products voluntarily removed from the market place by a manufacturer or distributor.
- "Empty" containers of waste materials, commercial products or chemicals. This applies to portable containers which have been emptied, but which may hold residues of the product, chemical, or containers containing other empty containers. Examples of containers are: tanks, drums, barrels, cans, bags, liners, etc. A container shall be determined "empty" according to the criteria specified at 40 CFR §261.7. These empty containers may be crushed, shredded, or landfilled intact.

- Residue and debris from the cleanup of spills or releases of chemical substances, previously approved wastes, commercial products, or a waste which would otherwise qualify as an exception.
- Waste that is visually identifiable through an inspection process. Examples may include cathode ray tubes, batteries, fluorescent light tubes, filters and filter cartridges, wire or tubing, paper products, metal sheeting and parts, crushed glass, piping, and other debris.
- Demolition wastes. This consists of waste produced from the demolition or dismantling of industrial process equipment or facilities contaminated with chemicals from the process. Knowledge of the process and chemicals used in the process allows characterization of the waste sufficient for safe management.
- Debris as defined at 40 CFR §268.2. These materials will be visually inspected prior to acceptance in order to ensure the waste meets the definition of debris.
- Articles, debris, non-RCRA wastes, equipment and clothing containing or contaminated with polychlorinated biphenyls (PCBs). This includes PCB capacitors, transformers, gloves or aprons from draining operations, empty drums that formerly held PCBs, etc.
- PCB drainings and flushings removed from PCB articles. This includes PCB articles flushed with a substance (e.g. toluene or unused diesel).
- USEN site-generated waste, including hazardous and non-hazardous waste.
- Household hazardous waste, pesticide, waste from small quantity generators, and/or small volume waste streams (<100 tons per year). For these exceptions, the generator will supply USEN with sufficient chemical and physical characteristics information for proper management of the waste.
- Controlled substances regulated by government agencies including drugs and/or materials from clandestine labs.
- Materials designated for storage and trans-shipment off-site. These materials are received for storage and subsequent trans-shipment only and are not otherwise actively managed on-site. If USEN processes a waste previously designated for storage and subsequent trans-shipment, the waste will be subject to the normal pre-approval process prior to on-site processing. For materials received at another regulated company and subsequently shipped to USEN, the other facility may transmit the relevant information to USEN for use in the pre-acceptance or load arrival review programs, as is appropriate.
- Wastes from remedial projects in which the waste characterization is known through a sampling plan that was approved by a federal or state agency (e.g.; CERCLA project) or other well-developed plan.
- Contaminated personnel protective equipment (PPE) (e.g., gloves, tyveks, respirator cartridges).
- Aerosol cans.
- Vitrified, Cemented, and Other Materials Exhibiting High Structural Integrity which are not conducive to sampling. Structural steel, tanks, pipe, cement, glass, empty drums, machinery, equipment, manufactured items, monolithic / cemented materials, and similar materials do not allow for normal sampling protocols. They are inspected and analyzed case-by-case.
- Environmental remediation wastes where a government clean-up agency, generator, or contractor has established a data base and waste characterization information. This information may be used in lieu of pre-acceptance analytical and incoming load analytical information, and the physical appearance screen will be used to confirm material acceptability upon arrival.
- Exempt Radioactive Waste (including NORM, NARM, etc).

8.6.4 SAMPLING METHODS, MATERIALS AND EQUIPMENT

Sampling methods used for specific materials are consistent with those referenced in 40 CFR Part 261, Appendix I. The sampling equipment and procedures described in this

WAP represent USEN's customary sampling protocol for general types of waste materials and containment. Specific waste materials or shipments may require different sampling techniques. For example, if examination indicates strata in the waste, then each layer may be composited in proportion to its estimated volume or analyzed separately. Deviations from the recommended protocol may occur based on waste inspection and testing, and such deviations are consistent with the purposes and practices of this WAP.

The equipment used for different materials is presented in the following table.

Table 1: Sampling Materials and Equipment

Material	Equipment
Extremely viscous liquid	Thief or COLIWASA/tube sampler
Crushed or powdered material	Tube sampler, trier, auger, scoop, or shovel
Soil-like material	Tube sampler, trier, auger, scoop, or shovel
Fly ash-like material	Tube sampler, trier, auger, scoop, or shovel
Containerized liquids	COLIWASA/tube sampler, weighted bottle, cup, bomb, or tank sampling port
Steel or Large Solid Objects (e.g.; tanks, process devices)	Drill

8.6.4.1 Container Sampling

USEN samples various container types, such as drums, tanks, portable transport units (e.g., tote bins, roll-off boxes, lugger boxes), tankers, or dump-type trucks. Sampling devices are selected depending on the size and type of the container and on the specific material involved.

Specific sampling procedures are dependent on both the distribution and the nature of the waste components in the container. Due to these variations, minor modifications may be needed to the recommended sampling procedure in order to obtain a sample. Although preferential sampling devices in Table 1, other devices identified in agency guidance or selected at the Lab Manager's direction may be used.

Methods for sampling small containers (e.g., drums, cartons, & other small units) vary with the nature of the waste. For flowable materials, the sampling device of choice is a Coliwasa or tubing. For non-flowable wastes, a tubing or trier is typically used to obtain a representative sample.

Large containers and tanks of flowable or solid materials may be either stationary or mobile. Liquids may be sampled with Coliwasa, tubing, weighted bottle, or bomb sampler to sample at various depths. Tank sampling may be accomplished through ports or taps located along the side of the tank or sampling through pumps or fittings. These samples may be composited to yield a representative sample. Light, dry powders and granules may be sampled with a scoop, tubing or thief. Heavier solids such as contaminated soils may be sampled by trier, shovel, or by coring with heavy tubing. Tank sediments may be sampled from the bottom-sampling valve when not readily sampled from above.

8.6.5 WASTE MANIFEST REVIEW & DISCREPANCY RESOLUTION

Upon arrival of a waste shipment at USEN, the accompanying manifest is reviewed for completeness and the shipment is inspected for agreement with the manifest information.

Waste is non-conforming if there is a significant discrepancy between the waste shipment and the manifest (as defined in 40 CFR §264.72), unless the discrepancy can be resolved through contact with the waste generator, transporter or broker. Non-conforming wastes may be rejected immediately, or may be re-evaluated for acceptance despite the inconsistency. Changes to the manifest or WPQ may be made with the customer's concurrence or at the customer's request. Any corrections or other changes made to the manifest or WPQ are initialed by the person making the change. Other manifest discrepancies may be corrected or noted on the manifest.

For bulk loads manifested by weight, the load is typically weighed on-site. However, if the scale is out of service, other methods may be employed to estimate the weight of the delivery. These include off-site scales, weight estimation techniques, and using tare weights to calculate approximate net weights. If a significant weight discrepancy is noted, the procedures of 40 CFR §264.72 are employed. For bulk loads manifested by volume, this mechanism is not appropriate as visual estimates are too subjective, settling may occur during transport, liquids are subject to phase separation, and specific gravity calculations can be inaccurate. For piece count deliveries (e.g., vans of containers, etc.), the piece count is confirmed.

Non-conformance is typically conducted upon delivery to the facility or during the load acceptance process. Occasionally, a load is delivered and staged prior to being approved or accepted, or small containers are contained within heat shrink material and cannot be counted prior to breaking the load. In these instances and consistent with 40 CFR §264.71(a)(3), the transporter is given a signed copy of the manifest. If a significant weight or piece count discrepancy is later discovered, USEN will attempt to reconcile the discrepancy. If this cannot be done within 15 days of discovery, notification of the discrepancy will be sent to the NvDEP, along with the steps taken to resolve the discrepancy.

Manifest discrepancies are resolved, if possible, by contacting the generator, transporter, or their representative to obtain the needed information. Entire loads or portions of loads may be rejected (e.g., a bulk load may contain un-profiled or unacceptable[5] materials). The requirements of 40 CFR 262 Subpart B "Manifests" are followed when documenting rejection of waste loads and their return to the generator.

8.6.6 FINGERPRINT TESTING UPON WASTE RECEIPT

USEN inspects waste shipments and conducts fingerprint testing to confirm consistency of received waste with pre–acceptance characterization contained in the Waste Product Questionnaire[6], waste analysis, or other information. The waste characterization on the WPQ provides information concerning the contaminant type and concentration and the nature of the waste.

All incoming wastes are inspected to assure that readily-observable characteristics (color, form, absence or presence of odors, size, etc.) are consistent with pre-acceptance data. Inspectors can also observe whether free liquids are present and determine whether additional fingerprint testing, such as a paint filter test, may be needed.

Fingerprint testing provides general waste identification and confirmation. Results are compared with pre-acceptance information to confirm that the waste is the same.

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5 The material may be "unacceptable" due to permit constraints or the inability of the facility to manage the waste..

6 Also commonly referred to as a "waste profile".

Results may be used in conjunction with other waste analyses and information to further identify a waste and/or ensure the type of on-site management chosen is suitable for that particular waste.

Specific fingerprint tests are established during pre-acceptance based on the characteristics of the waste and limits of fingerprint parameter variability. Certain types of waste streams that are not conducive to fingerprint sampling such as debris and solid resins, are not readily sampled and fingerprint testing may be limited to field testing and inspection. Other wastes may need additional testing due to the results of initial tests or due to direct observations.

The following Fingerprint Analyses may be employed:

- **Physical Description** is observed for every waste to determine its general properties (color, physical appearance, texture, presence of absence of odors, presence of free liquids).

- **pH Screen** measures the corrosive nature of the waste, but commonly is not used for organic wastes, oily waste, or other wastes which are not water soluble.

- **Water Reactivity Screen (Water Compatibility)** determines whether the waste has a potential to vigorously react with water to form gases or other byproducts or significant heat. The reactivity screen is not used for wastes that are already in contact with excess water or if sufficient analytical data indicate no potential reactivity with water.

- **Flammability Potential Screen** can be applied to all waste liquids, semi-solids or solids. It is used to identify obvious inconsistencies, such as a flammable sludge substituted for an inert solid. This test is not commonly performed on solids unless the waste contains free liquids.

- **Cyanides Screen** indicates whether the waste can produce hydrogen cyanide gas upon acidification below pH 2. It is not required if the pH of the waste is < 5.0, or if the waste is not water-soluble.

- **Sulfide Screen** indicates whether the waste has the potential to produce hydrogen sulfide gas upon acidification below pH 2. It is not required if the pH of the waste is < 5.0, or if the waste is not water-soluble.

- **Radioactive Screen** ensures compliance with Waste Acceptance Criteria, and is only used when radioactivity may be present.

8.6.7 SUPPLEMENTAL ANALYSES

USEN decides whether supplemental analyses are required for a particular waste based upon:

- Results of Fingerprint Analyses;
- Knowledge of generator and/or waste-generating process;
- Results of pre-acceptance evaluation;
- Waste codes.

Further testing will be conducted if inspections or fingerprint tests indicate inconsistencies with pre-acceptance analytical results, or if there is suspicion the waste composition has changed. USEN may obtain supplemental analyses to:

- Confirm and/or augment existing information on the waste;

- Further identify a waste;
- Further ensure the appropriate treatment, storage, or disposal processes can be used, or
- To provide operations information used for control of these processes.

Supplemental Analyses may also be performed on any waste sample, when necessary for pre-acceptance purposes, if the generator-supplied information is not sufficient.

The parameters which constitute Supplemental Analyses are described in Attachment 4 and primarily consist of standard analytical techniques (recognized by the EPA, ASTM or other authoritative sources).

USEN may use other standard analytical techniques and unique analyses (developed by USEN) to monitor operating equipment or treatment techniques where this use does not impact regulatory decisions or reporting. These supplemental tests are not specifically covered by this WAP. Analyses are not necessarily repeated for sequential activities or movement of the same waste within the facility unless required by changes in the waste's character. Facility Management may waive specific tests if performing the analysis presents a safety hazard in the laboratory (e.g., organic extraction on an oxidizing waste) or if the characteristic or constituent (e.g.; Underlying Hazardous Constituents) are not reasonably expected to be in the waste. See Attachment 5 for a list of other techniques and analyses.

8.7.0 GENERAL SAMPLING AND ANALYSIS ISSUES

8.7.1 Disposition of Samples

Samples of waste streams are commonly disposed in the same fashion as the waste stream itself. If, for example, a waste is approved for stabilization and landfilling, the sample may be stabilized in the lab, in containers, or mix bins and subsequently disposed. Samples received which are unauthorized for management on-site are typically returned to the generator (or representative) or aggregated (under the provisions of 40 CFR §262.34) and sent off-site to an authorized facility for subsequent management. To facilitate sample management, samples approved for the same management processes may be consolidated (e.g.; in tanks or containers) and managed under the provisions of 40 CFR §262.34. Should samples arrive on-site from an identified generator, but without proper waste identification, USEN will contact the generator to identify the associated waste and appropriate hazardous waste codes, if any. If sample identity cannot be resolved, USEN will return the sample to the generator, or manage the sample as on-site generated waste for the characteristics/contaminants reasonably expected.

8.7.2 Sampling Safety Precautions

Per the USEN Health and Safety Plan, personnel wear personal protective equipment. Load receipt personnel check the manifest or other shipping or pre-acceptance information to be familiar with the material and ensure necessary precautions are taken. Pre-acceptance reviews may result in specific requirements for personal protective equipment.

8.7.3 Remote Project Sampling and/or Analysis

In cases where USEN directs off-site sampling or analysis to assure that a waste meets Waste Acceptance Criteria, USEN will instruct off-site personnel in the requirements of this WAP, or a company representative will be present to assure compliance with the WAP.

8.7.4 Interim Processing Loads

Following treatment, the treated waste is sent to the landfill for final disposal and staged in the landfill while applicable verification testing is performed (See Section 8.6.2). A

maximum of 50 batches may be staged at any point in time for up to 10 working days. The staged waste will be isolated within the landfill and stored on a plastic liner.

USEN may submit an extension request to the NvDEP if additional time is needed to verify treatment due to sampling and analysis requirements (e.g., samples need to be sent offsite for analysis and results are not expected within 10 working days).

Wastes treated and staged in an interim processing area that do not meet treatment standards may be re-sampled for verification analyses. If the re-sampling indicates the waste meets treatment standards, the waste will be disposed. If re-sampling indicates the material does not meet treatment standards, the waste will be retrieved for further treatment.

8.7.5 Lab Packs

Lab pack materials which are proposed to be managed on-site are inventoried by the generator, and the inventories are sent to USEN for review for incompatibility of contained materials, land disposal restrictions, and use of appropriate packing materials. Since lab packs contain many small quantities of individual materials, they are not sampled, but are inspected to ensure adequate packing material is present and the drum is at least 90% full (if destined for direct landfilling). If necessary, absorbent material may be added until the lab pack is 90% full.

8.7.6 Management of Residues[7]

Waste residues and other miscellaneous equipment or debris originating from on-site management areas or activities may be characterized and managed as on-site-generated wastes. If on-site-generated waste is derived from a specific identifiable waste, it will be managed in accordance with the approved management conditions for that waste (e.g.; a spill of F002 material is managed as F002). If precluded by permit, regulation, or operational conditions, the waste may be subject to alternative management, as appropriate. Stabilization residues and other treatment residues will carry the waste code(s) of the last waste stream in the unit and will be managed in the same manner. For example, sludges removed from a stabilization mix bin which last received K061 wastes carry the K061 code and must meet appropriate treatment standards for K061 before being land disposed on-site. Residues from truck washouts and equipment washes conducted in the truck wash bay are managed as on-site-generated waste. Residues of "RCRA Empty" containers are not subject to this WAP since they are not solid or hazardous wastes.

8.7.7 Non-Hazardous Wastes (NHW)

USEN accepts wastes which are not hazardous as defined under RCRA. Although non-hazardous wastes are not subject to RCRA WAP requirements, USEN commonly uses this WAP to review non-hazardous wastes. Depending on the specific waste, specific sections of this WAP may not be applicable (e.g.; manifesting provisions, LDR verification of treated wastes, etc.).

8.7.8 Protectively-Characterized Wastes

Generators occasionally "protectively" characterize[8] wastes sent to off-site TSDFs for a variety of reasons (including public relations, legal reasons, financial incentives, lack of characterization experience, or lack of specific analytical information). When USEN collects specific analytical data or possesses process knowledge or regulatory knowledge, USEN may characterize waste during the pre-acceptance or load-arrival

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7 Residues is used to mean solids and liquids contained or generated in sumps, truck & equipment washing units, tank cleaning, equipment maintenance, repair, or replacement, pipes, valves, filters, filter media, miscellaneous samples, and personal protective equipment.

8 "Over-characterization" means the practice of applying waste codes or UHCs to a waste which do not regulatorily apply and/or to the practice of not applying appropriate LDR Notifications or Certifications.

process. Prior to disposal, USEN will complete appropriate notifications, and/or prepare an appropriate LDR Certification, as necessary.

8.8.9 Standard Profiles

"Standard profiles" may be used for waste streams which are similar in physical or chemical characteristics, or which are generated by similar industries or processes. All the wastes within a standard profile are generally managed at USEN using the same treatment process.

USEN reviews generator-provided information to evaluate whether an individual waste stream is sufficiently similar in physical and/or chemical characteristics to an established standard profile. The specific waste stream information must fall within the standard profile representative ranges in order to incorporate that waste stream into the standard profile. Specific candidate waste streams which conform to an existing approved standard profile will be managed under the waste management decision for that standard profile.

8.7.10 Trans-Shipped Wastes

Waste destined for other facilities may not be subject to this WAP since they will be subject to the waste analysis plan of the facility to which they will be forwarded. For proper segregation, the materials will be segregated into areas appropriate to the DOT Hazardous Class. For materials received at another USE affiliate company and subsequently shipped to the USEN Facility, the shipping facility will transmit the relevant analytical information to USEN for use in the pre-acceptance or load arrival review programs, as appropriate.

8.7.11 Changes in Rules and Procedures

References are made throughout this plan to regulations promulgated by the EPA regarding waste analysis requirements for hazardous waste management facilities. These requirements are generally found in 40 CFR Part 260 to 264, which has been adopted by reference in the rules of the Nevada Division of Environmental Protection (NvDEP). Unless otherwise specified herein, cited federal regulations have been adopted by reference by the NvDEP.

If underlying EPA regulations change, USEN will create a written protocol specifying the new testing and frequency requirements prior to processing regulated waste. USEN may also periodically revise the WAP to reflect scientific advances, additional land ban requirements, and/or other pertinent factors. If WAP revisions are necessary because of a new regulatory rule, the revisions will be submitted for NvDEP approval within 90 days of the regulatory change.

8.7.12 Special Procedures for CAMU-eligible Wastes

For each CAMU remediation waste proposed for acceptance, USEN will submit a CAMU-eligible waste stream information package for review by the Director unless exempted as provided below. The information package will document that:

1. The designation of CAMU-eligible waste has been performed by a duly authorized agency,
2. Principal hazardous constituents have been identified and are required to be treated to meet any of the standards referenced in 40 CFR §264.555 (a) (2),
3. The CAMU-eligible waste designating authority provided a public notice and an opportunity for public comment for both the CAMU designation and the placement of the CAMU in an off-site permitted hazardous waste landfill,
4. The approval is specific to a single remediation,
5. All information provided by the person seeking approval (the waste generator) to the duly authorized agency making the CAMU-eligible waste designation has been included in the information package.

For each CAMU-eligible waste proposed for acceptance, the Director and persons on the USEN mailing list will be notified of USEN's intent to receive CAMU-eligible wastes. This notification shall include the source of the remediation waste, the principal hazardous constituents in the waste, and the treatment requirements. The mailing list notice will be sent within 7 days of the request to the Director and will state that comments or objections to receipt of the waste may be submitted to the Director within 15 days of the notice. Proof of the mailing list notification will be submitted to the Director within seven (7) days of completion.

USEN must comply with 40 CFR § 268.7(b)(4) except the certification must state the CAMU wastes meet the referenced treatment requirements at 40 CFR § 264.555(a)(2). USEN must dispose of all CAMU-eligible wastes in permitted landfill cells only. Prior to disposal, all CAMU-eligible wastes must meet one of the standards as discussed in 40 CFR § 264.555(a)(2)(i), (ii), or (iii).

The Permittee may not receive any CAMU-eligible waste until written approval is received from the Director. The Director may take a 30-day review period, with an optional 30-day extension, from the date of receipt of the request from USEN.

The Director may object to USEN's acceptance of any specific CAMU-eligible waste stream. If such written objection is issued, USEN may not receive the specific CAMU-eligible waste stream. If at the end of the review period the Director has not notified USEN that he or she has chosen not to object, USEN may not receive the specific CAMU-eligible waste stream until the objection has been resolved, or USEN obtains a permit modification specifically authorizing receipt of the specific CAMU-eligible waste stream.

As part of the permit modification process, the Director may modify, reduce, or eliminate the notification requirements described in this section of the WAP as they apply to specific categories of CAMU-eligible waste, based on minimal risk.

8.8.0 PROCESS OPERATIONS

During movement of a waste within the facility, changes in its characteristics may occur. These changes may make the waste subject to additional inspection, sampling, and analysis to determine appropriate handling and management of the waste. Many of the analyses needed for the treatment, storage, and/or disposal functions are performed during incoming shipment identification and are not repeated unless waste characteristics may have significantly changed during storage or processing or new information is necessary for the safe management of the waste.

Existing and anticipated process operations at the facility, for which current and periodic sampling and analyses are important, include the following:

- Storage;
- Treatment; and
- Disposal

The analytical procedures for each of these processes are described separately below.

8.8.1 STORAGE

Before waste is placed into storage USEN assesses the compatibility of the waste with wastes already in storage.

8.8.1.1 Liquid Storage / Transfer

Liquid wastes may be transferred from containers to tanks or to trucks although a waste may be fed directly to the designated treatment unit (e.g.; stabilization tank).

Upon arrival, liquid waste will be tested as specified for waste identification and commingled waste compatibility test, as needed to assure safe storage. If a liquid load is exempted from sampling, the waste will be segregated from other wastes based on its compatibility class.

8.8.1.2 Containerized Storage

Using the predominant hazard classification on incoming containerized waste, a storage area will be designated to insure incompatible waste segregation.

Based on the initial hazard determination made by the generator on the WPQ and/or the final identification of the waste shipment, containerized waste will typically be segregated in the following manner: flammable, corrosive, and oxidizing waste materials will be separated from incompatible materials or stored in separate areas. Wastes are separated/maintained in separate storage areas until they are treated, transferred, or disposed.

8.8.1.3 Special Requirements for Ignitable or Reactive Wastes

Ignitable or reactive wastes will not be stored within 15 meters (50') of the facility's property line.

8.8.1.4 Special Requirements for Incompatible Wastes

In accordance with the requirements of 40 CFR §264.177, USEN has developed a program to prevent the accidental commingling or reaction of incompatible wastes, including:

- Proper identification of the hazardous characteristics of incoming waste streams during the waste stream approval process.
- Proper segregation of incompatible materials.
  - Incompatible wastes or materials will not be stored or placed in the same container.
  - Wastes will be segregated according to the designated compatibility group, and placed so as to prevent waste-to-waste contact that could lead to a reaction.
- Proper identification of the potential for incompatible reactions through the waste stream verification program including testing of incoming shipments in accordance with the WAP.

Compatibility between the waste and storage container will be ensured by placing waste into clean containers; or though use of technical knowledge of the waste and containers

8.8.2 TREATMENT AND TRANSFER OPERATIONS

This section discusses analyses for hazardous waste treatment operations and off-site transfer of material for combustion.

The treatment sampling & analysis program may be divided into three (3) segments:

- Pre-treatment analyses confirm the waste falls within the selected process design and allows adjustment of the process operational conditions during treatment;
- In-process analyses to monitor treatment progress; and
- Post-treatment analyses to confirm successful treatment and to determine characteristics of the process effluent. Process residues for LDR wastes will be analyzed and/or evaluated, as needed, against the appropriate treatment standards or prohibitions. Any residues or waste sent off-site for disposal or further management will have the appropriate notification and/or certification form (in accordance with 40 CFR Part 268).

8.8.2.1 Bulking for Treatment or Off-Site Shipment

Wastes aggregated for consolidated treatment or disposal are not typically identified during the pre-acceptance process. Instead, these wastes are typically reviewed upon receipt to determine appropriate waste characterization, and to develop treatment recipes. Liquid or solid wastes may be bulked for on-site consolidated treatment or disposal. In-process analyses may be performed to assure the aggregation/bulking of wastes does not create a reactivity or incompatibility issue and to confirm that the resultant waste is within the receiving facility's specifications. Grab samples are placed in a bucket or other container and observed to ensure no negative reaction occurs. Incidental mixing of wastes that occurs when several waste streams are bulked is not considered blending.

Wastes may also be aggregated for off-site delivery, for example to off-site incinerators, lime kilns or similar operations. Pre-acceptance analyses may be used to determine the acceptability of each waste stream as a fuel or heat source. Additional analysis for heat value may be required for materials destined for supplemental fuel. Bulking in this case typically involves pumping containerized liquid / semi-solid wastes into tank trucks or other large containers for delivery off-site. Wastes containing sufficient heating values for combustion are bulked with other suitable waste. Post-treatment analyses may be used to confirm that the bulked material is suitable for use as fuels or for incineration. The resultant bulked materials are used to provide heat content for combustion processes (either as hazardous waste derived fuel (HWDF) or as a hazardous waste, as applicable.

8.8.2.2 Specific Treatment Technologies

Federal regulations define distinct treatment technologies including Stabilization Chemical Oxidation, Chemical Reduction, Deactivation, Macro/Micro Encapsulation, Neutralization, Adsorption, Bio-remediation, Evaporation, and Precipitation.

Stabilization is defined by 40 CFR §268.42 as stabilization with the following reagents (or waste reagents) or combinations of reagents (1) Portland Cement; or (2) lime/pozzolans (e.g., fly ash and cement kiln dust). This definition does not preclude the addition of reagents (e.g., iron salts, silicates, and clays) designed to enhance the set/cure time and/or compressive strength, or to reduce leachability of hazardous constituents. A mix design is developed prior to the treatment of a waste stream. Stabilization may be performed within Mix Bin Tanks or Containers. Treatment may occur with the Container Building, at the outdoor stabilization unit, or within containers. Sampling, analysis verification of the treatment effectiveness and frequency of testing follows the guidelines presented in this WAP

Chemical Oxidation is a treatment process targeted primarily at organic constituents, (e.g., toluene and benzene) but may be used for inorganic constituents as well (e.g., cyanides and heavy metals such as mercury). An organic or inorganic species is oxidized when its respective chemical oxidation

number increases (i.e., the compound loses electrons). Consistent with 40 CFR 268.42, the following oxidation reagents (or waste reagents) may be used in part or whole: (1) Hypochlorite (e.g. bleach); (2) chlorine; (3) chlorine dioxide; (4) ozone or UV (ultraviolet light) assisted ozone; (5) peroxides; (6) persulfates; (7) perchlorates; (8) permanganates; and/or (9) other oxidizing reagents of equivalent efficiency. An approved mix design is formulated and tested prior to treatment.

Chemical oxidation may be performed within Mix Bin Tanks or Containers. Treatment is performed to meet EPA LDR standards. Sampling, analysis verification of the treatment effectiveness and frequency of testing follows the guidelines presented in this WAP.

Chemical reduction or redox occurs when the targeted component/constituent atoms change as a resultant transfer of electrons from one chemical species to another. The chemical oxidation number for the targeted components decreases (i.e., gains electrons) when the target constituents are reduced. Conversely, the reducing reagents used in this process lose electrons or become oxidized. Derived from 40 CFR 268.42, the following reducing reagents (or waste reagents) may be used in whole or part: (1) Sulfur dioxide; (2) sodium, potassium, (salts), or other alkali salts or sulfites, bisulfites, metabisulfites and polyethylene glycols (e.g., NaPEG and KPEG); (3) sodium hydrosulfide; (4) ferrous salts; and/or (5) other reducing reagents of equivalent efficiency. An approved mix design is formulated and tested prior to treatment.

Chemical reduction may be performed within Mix Bin Tanks or Containers. Treatment is performed to meet EPA LDR standards. Sampling, analysis verification of the treatment effectiveness and frequency of testing follows the guidelines presented in this WAP.

Deactivation treats wastes that exhibit the characteristics of ignitability, corrosivity, and/or reactivity. Appropriate use of this treatment technology is determined during the pre-acceptance process. A mix design is developed prior to the treatment of the waste stream. Deactivation may be performed within Mix Bin Tanks or Containers. Treatment is performed to meet applicable LDR standards. Sampling, analysis verification of the treatment effectiveness and frequency of testing follows the guidelines presented in this WAP.

Macro-encapsulation is a confining or immobilization technology used to treat all types of hazardous debris independent of the hazardous constituents involved (with the exception of cyanide-reactive debris). The macro-encapsulation process encases the debris to provide a physical barrier that prevents/minimizes potential leaching of hazardous constituents from the debris. The encapsulating barrier does not need to chemically bond to either the debris or hazardous constituents. Macro-encapsulation is defined in 40 CFR §268.42, Table 1 as the application of surface coating materials such as polymeric organics (e.g., resins, plastics) or use of a jacket of inert inorganic materials to substantially reduce surface exposure to potential leaching media. Inert non-waste material, or waste meeting appropriate LDRs, may be used for filler material.

Macro-encapsulation does not require specific testing for LDR constituent standards. This waste is treated at the facility to meet all requirements of the LDR treatment technology standard and is certified by USEI to meet these requirements prior to disposal. Macro-encapsulation may be performed at the Container Building or within the landfill.

The performance standard for the macro-encapsulation technology is described under 40 CFR Part §268.45, Table 1, entitled "Alternative Treatment Standards for Hazardous Debris". This standard states that "Encapsulating material must completely encapsulate debris and be resistant to degradation by the debris and its contaminants and materials into which it may come into contact after placement (leachate, other wastes, microbes)."

Micro-encapsulation is confining or immobilization technology that requires the stabilization of the debris with the following types of reagents (or waste reagents) such that the leachability of the hazardous contaminants is reduced: (1) Portland cement; or (2) lime/pozzolans (e.g., fly ash and cement kiln dust) (3) Additional reagents (e.g., iron salts, silicates, carbon, polymers or clays) as appropriate.

Micro encapsulation does not require specific testing for LDR constituent standards. Following the treatment process, the micro-encapsulated debris is visually inspected. Micro encapsulation may be conducted in tanks or containers. The performance standard for the micro-encapsulation technology is described under 40 CFR Part §268.45, Table 1 titled "Alternative Treatment Standards for Hazardous Debris". This standard states that "Leachability of contaminants must be reduced".

Neutralization renders corrosive matrices non-corrosive. According to 40 CFR 268.42, the following reagents (or waste reagents) in part or whole may be used for neutralization: (1) Acids; (2) Bases; or (3) water (including wastewater's) resulting in a pH greater than 2 but less than 12.5 measured in the aqueous residuals. An approved mix design will be formulated and tested before waste is treated by neutralization.

Neutralization may be performed within Mix Bin Tanks or Containers. Treatment is performed to meet EPA LDR standards. Sampling, analysis verification of the treatment effectiveness and frequency of testing follows the guidelines presented in this WAP.

Precipitation is the process by which regulated metals and/or inorganics are precipitated out as insoluble precipitates of oxides, hydroxides, carbonates, sulfates, chlorides, fluorides, or phosphates. This process entails adjusting the pH of the waste matrix between 9 and 11. This pH range is ideal for hydroxide precipitation. An alternative to this common standard practice is sulfide precipitation. Sulfide precipitates are less soluble and non-amphoteric (less pH dependent than hydroxyl precipitates). However, caution must be employed to ensure hydrogen sulfide is not released at harmful levels by maintaining a pH greater than 8 throughout the treatment process. Based on 40 CFR 268.42, the following reagents (or waste reagents) are typically used alone or in combination: (1) Lime (i.e., containing oxides and/or hydroxides of calcium and/or magnesium; (2) caustic (i.e., sodium and/or potassium hydroxides; (3) soda ash (i.e., sodium carbonate); (4) sodium sulfide; (5) ferric sulfate or ferric chloride; (6) alum; or (7) sodium sulfate. Additional flocculating, coagulation or similar reagents/processes that pertain to precipitation are not precluded from use. An approved mix design will be tested prior to treatment.

Precipitation may be performed within Mix Bin Tanks or Containers. Treatment is performed to meet EPA LDR standards. Sampling, analysis verification of the treatment effectiveness and frequency of testing follows the guidelines presented in this WAP.

Adsorption is the use of an appropriate reagent (e.g. activated carbon or treated clay) to remove chemical components from aqueous or compressed gas waste

streams. It is most commonly employed for the removal of organic compounds, although some inorganic constituents are effectively removed as well. This process is achieved through physical, chemical, and electrostatic interactions between the waste material and the adsorbent media. Pursuant to 40 CFR 268.42, Total Organic Carbon can be used as an indicator parameter for the adsorption of many organic constituents that cannot be directly analyzed in wastewater residues.

Adsorption primarily occurs in tanks, however it may be performed within Mix Bins, Tanks or Containers. Treatment is performed to meet EPA LDR standards. Sampling, analysis verification of the treatment effectiveness and frequency of testing follows the guidelines presented in this WAP.

Evaporation uses natural conditions to remove water from wastes. At USEN this takes place at the Evaporation Pad. The Evaporation Pad reduces the volume of waste by solar evaporation of liquids. Pre-acceptance evaluation and waste receipt controls are also used as part of the waste process controls. Wastes designated for placement in the Evaporation Pad are predominantly aqueous waste. No wastes subject to 40 CFR Part 264, Subpart CC management requirements are accepted for management in this unit. VOC testing will be performed annually to verify the unit meets Subpart CC requirements.

Bio-remediation is the use of biological mechanisms to destroy, transform, or immobilize environmental contaminants. Bio-remediation is normally conducted in-situ, however, there may be scenarios where it would be conducted within tanks or containers.

8.8.2.3 Treating Wastes Containing Free Liquids

When wastes contain free liquids, the wastes are treated to solidify free liquids. Free liquids may be detected with a paint filter test or by direct observation. If free liquids are observed, USEN can conclude the waste has free liquids without testing. Direct observation may also be used to determine that free liquids are not present and that a paint filter test is not needed.

If free standing liquids are present, they are:

- Removed by vacuum, decanting, or bailing,
- stabilized by placing a stabilization agent in the container,
- stabilized by placing the contents into a stabilization tank and crushing or shredding the container, or
- stabilized by shredding the container and its contents and stabilizing the shredded material.

If free liquids are removed, any remaining material containing free liquids will be stabilized using appropriate reagents prior to landfilling.

Bulk loads, which otherwise do not contain significant quantities of free standing liquids may be "spot stabilized" in order to meet the requirements of 40 CFR §264.314(a)(2) as is sometimes necessary for otherwise dry wastes which have received visible precipitation during transportation. Stabilized wastes will be tested using the Paint Filter Liquids test if the presence of free liquids is still suspected. If free-standing liquids are not observed, then the waste may be landfilled directly. If wastes have been inspected and/or tested and incidental water is detected during the off-loading process, free liquids will be stabilized *in situ.*

8.8.2.2.5 Treating Wastes to an Approved Delisting Requirement

Wastes treated to an approved delisting requirement shall be sampled and analyzed in accordance with the specific delisting requirements. Such sampling and analysis may be documented by the regulated delisting facility / activity.

8.8.2.2.4 Universal Waste

USEN is a Destination Facility[9] for Universal Waste. Universal Waste managed at a destination facility is subject to all applicable requirements of 40 CFR Parts 264, 265, 266, 268, 270, and 124.

8.8.2.2.5 Hazardous Debris Treatment

USEN manages RCRA Hazardous debris according to the treatment standards specified in 40 CFR Part 268.45. As stated in 40 CFR Part 268.2:

"Debris means solid material exceeding a 60 mm particle size that is intended for disposal and that is: A manufactured object; or plant or animal matter; or natural geologic material. However, the following materials are not debris: Any material for which a specific treatment standard is provided in Subpart D, Part 268, namely lead acid batteries, cadmium batteries, and radioactive lead solids; Process residuals such as smelter slag and residues from the treatment of waste, wastewater, sludges, or air emission residues; and Intact containers of hazardous waste that are not ruptured and that retain at least 75% of their original volume. A mixture of debris that has not been treated to the standards provided by Sec. 268.45 and other material is subject to regulation as debris if the mixture is comprised primarily of debris, by volume, based on visual inspection."

RCRA Hazardous Debris is debris that contains a hazardous waste specified in 40 CFR Part 261. The land disposal restrictions (LDR) of Part 268 require that certain wastes meet treatment standards before land disposal. Treatment standards are either concentration-based or technology-based. A waste with a concentration-based standard may be treated to meet LDR using any effective treatment method (except impermissible dilution). A technology-based standard requires treatment by the specified technology. Appropriate technologies for treatment of hazardous waste are identified as "Alternative Treatment Standards."

40 CFR Part 268.45 outlines alternative treatment standards for hazardous debris. If a waste stream meets the debris definition, it may be treated using a technology based treatment standard, and land disposed in a Subtitle C landfill. Technology based treatment standards authorized for debris treatment include, extraction, destruction, and immobilization technologies. USEN currently performs the following immobilization treatment for hazardous debris:

Microencapsulation – As defined in 40 CFR Part 268.45, Table 1, microencapsulation is "Stabilization of the debris with the following reagents (or waste reagents) such that the leachability of the hazardous contaminants is reduced: (1) Portland cement; or (2) lime/ pozzolans (e.g., fly ash and cement kiln dust). Reagents (e.g., iron salts, silicates, and clays) may be added to enhance the set/cure time and/or compressive strength, or to reduce the leachability of the hazardous constituents."

Microencapsulation treatment is performed in the indoor or outdoor stabilization unit.

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[9] As defined at 40 CFR §273.9.

Macroencapsulation – As defined in 40 CFR Part 268.45, Table 1 macroencapsulation is "Application of surface coating materials such as polymeric organics (e.g., resins and plastics) or use of a jacket of inert inorganic materials to substantially reduce surface exposure to potential leaching media."

In some cases, it is advantageous to macroencapsulate debris subject to this standard in the landfill. The debris is placed in a suitable final location within the landfill, and macro-encapsulation is performed in-place with the selected reagent(s) or materials (e.g.; HDPE, LDPE, Portland cement, etc).

Hazardous debris that has been treated by immobilization technologies remains hazardous, but meets the alternative treatment standards. Immobilized hazardous debris is disposed in the landfill.

8.8.3 LANDFILL DISPOSAL

USEN's sampling & analyses program is an integral part of this phase of operation as the results serve to evaluate compliance with permit constraints and land disposal restrictions, and determine safety constraints. Wastes destined for direct landfill disposal generally require only pre-disposal analyses. Wastes to be landfilled are typically subject to the Fingerprint Analyses for pre-acceptance samples and incoming waste shipments.

8.9.0 QUALITY ASSURANCE/QUALITY CONTROL

The following quality assurance/quality control (QA/QC) information for this facility is being provided as required by 40 CFR §270.30(e) and in accordance with the following EPA guidance documents:

- *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, SW-846*, Third Edition, Final Update I, U.S. EPA, Office of Solid Waste, Washington, DC, July 1992, Chapter One, as updated
- *Handbook for Analytical Quality Control in Water and Wastewater Laboratories*, EPA 600/4-79-019, March 1979, US Environmental Protection Agency (USEPA), Environmental Monitoring and Support Laboratory (EMSL), Cincinnati, OH..

Quality protocols are applicable to both sampling and analytical techniques. This section does not provide specific QA/QC performance standards for individual sampling and analysis techniques. Such specifics are defined in the USEN Laboratory QA/QC Plan The specific performance standards are dynamic and are revised as warranted to reflect technological advances in sampling and analytical techniques. These performance standards are described in policies maintained and used at USEN. USEN has developed a program of analytical quality practices and procedures to ensure that precision and accuracy are maintained. These programs include use of control standards, duplicates, spikes, and blanks. Third party laboratories employed by USEN demonstrate quality control practices that are comparable to USEN's practices. Good laboratory practices which encompass sampling, sample handling, housekeeping and safety are required by specific USEN procedures.

Sampling and analytical quality practices help ensure the data obtained are precise and accurate for the waste stream being sampled. The analytical results are used by facility management to decide whether or not to accept a particular waste and, upon acceptance, to determine the appropriate method of treatment, storage, and disposal. Results are also important to ensure that wastes are managed properly by the facility and that incompatible wastes are not inadvertently combined. The quality of these results are as important as the results themselves. Thus, the quality of the analytical data, the thoroughness and care with which the sampling and analyses are performed and reported, provides an important basis for day-to-day operational decisions.

ATTACHMENT 1

WPQ Form and Instructions

USEcology
an American Ecology company

Fax (775) 553-2125
☐ US Ecology Idaho (Grand View)
Fax (208) 834-2919

Fax (361) 387-0794

Phone #: _____

*Waste as shipped will be : ☐ Industrial ☐ NON - Industrial *(Texas customers only)*

Generator: _____

Facility Address : _____
(No PO Box) _____

Mailing Address _____

City/State/Zip: _____

Technical Contact: _____

Phone: _____ Fax: _____

☐ Check if Billing is Same

Billing Company: _____

Billing Address: _____

City/State/Zip: _____

Billing Contact: _____

Phone No.: _____ Fax No.: _____

Email:

NAICS# _____ ☐ CESQG ☐ SQG ☐ LQG EPA ID: _____ State ID# _____

1. US DOT Shipping Name _____ 2. Hazard Class _____

3. UN/NA # _____ 4. Packaging Group _____ 5. RQ _____

6. Container Type: ☐ Bulk ☐ Totes ☐ Pallet Size _____ 7. Frequency: ☐ Year ☐ QTR ☐ Month

☐ Boxes ☐ Bags ☐ Drums ☐ Other _____ Quantity _____ ☐ 1 Time ☐ Other _____

1. Common name for this waste _____

2. Process generating the material _____

(include additional sheets as necessary) _____

3. Describe Physical Appearance of Waste _____

4. Describe odor of waste: ☐ None ☐ Slight ☐ Strong Describe: _____

5. Knowledge is from: ☐ Lab Analysis ☐ MSDS ☐ Process/Generator knowledge ☐ Other (specify) _____

☐ Yes ☐ No Is the material <500 PPMW VOC as generated

☐ Yes ☐ No Waste Subject to Benzene NESHAP regulations

☐ Yes ☐ No State waste codes

☐ Yes ☐ No CERCLA Regulated (Superfund) Waste

☐ Yes ☐ No EPA Haz. Waste (list codes)

☐ Yes ☐ No Is the waste restricted under EPA Land Disposal Restrictions (40 CFR 268), if yes please complete LDR form

☐ Wastewater ☐ Non-wastewater ☐ Debris

☐ Yes ☐ No Exempt Waste: If yes, list ref. 40 CFR _____

☐ Yes ☐ No Contains UHCs/Constituents of Concern: List in section D

☐ Yes ☐ No Has the waste been treated after the initial point of generation?

☐ Yes ☐ No Subpart XX

☐ Yes ☐ No Alternative standards for Soil ?

Source Code G _____ Form Code W _____ Mgt. Method H _____

(Range Total > or = 100%) Values are ☐ TCLP ☐ TOTALS

(include additional sheets as necessary)

	typical value	unit	range

☐ Yes ☐ No Oxidizer

☐ Yes ☐ No Explosive

☐ Yes ☐ No Organic Peroxide

☐ Yes ☐ No Shock Sensitive

☐ Yes ☐ No Tires

☐ Yes ☐ No Pyrophoric

☐ Yes ☐ No Radioactive**

☐ Yes ☐ No Exempt RAD**

☐ Yes ☐ No React. Sulfides _____ ppm

☐ Yes ☐ No React. Cyanides _____ ppm

☐ Yes ☐ No Water/Air (Pyrophoric) React.

☐ Yes ☐ No Thermally Unstable

☐ Yes ☐ No TSCA Regulated PCB Waste

☐ Yes ☐ No Regulated Medical/Infectious Waste

☐ Yes ☐ No Compressed Gasses

**Additional Radiological info is provided in USEI's WAC Addendum

☐ Yes ☐ No Halogenated Organic Compounds? (per 40 CFR 268, Appendix III)

1. Flash Point: _____ °F (if <140°F) 2. Typical pH: _____ pH Range: ☐ ≤2 ☐ >2, <12.50 ☐ ≥12.5

☐ Yes ☐ No Possibility of incidental liquids from transportation?

☐ Yes ☐ No Does waste pass the EPA specified paint filter test?

☐ Yes ☐ No **I certify this material may be disposed of without further treatment.**

Certification Statement: I certify under penalty of law that I am familiar with this waste stream through analysis and/or process knowledge, and that all information provided is true, accurate, representitive and complete, and that all known or suspected hazards have been disclosed. Furthermore, I certify that this form was completed in accordance with the instructions provided.

Print Name: _____

Signature: _____ Title: _____ Date: _____

Disclaimer

This information was prepared by American Ecology Corporation. It is not legal advice, and may not be current. AEC is not a law firm, nor does it provide legal advice on specific State and Federal regulatory interpretations. Therefore, this information does not create, expressly or impliedly, an attorney-client relationship. This information is not a substitute for legal advice from an attorney licensed in the reader's state or country. AEC is not responsible for actions taken or not taken as a result of this information, nor for any errors or omissions it may contain. Hazardous waste regulations are lengthy and complex, and this guidance is not intended to define all hazardous waste generator and disposal scenarios. For further guidance, please use the following link to access the Code of Federal Regulations:
http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=%2Findex.tpl

Introduction

This guidance document helps customers prepare the US Ecology (USE) Waste Product Questionnaire (WPQ) that is used for waste stream review. A current copy of the WPQ is available from US Ecology's Customer Service Representatives or in electronic form from American Ecology's website at (www.americanecology.com). For specific waste acceptance questions, please contact US Ecology's Customer Service team at one of the locations below:

US Ecology - Nevada	**US Ecology- Idaho**	**US Ecology- Texas**
PO Box 578	PO Box 400	PO Box 307
Hwy 95, 11 mi. South	20400 Lemley Road	3.5 mi. S. on Petronila Rd.
Beatty, NV. 89003	Grand View, ID. 83624	Robstown, TX. 78380
T- (800) 239-3943	T- (800) 274-1516	T- (800) 242-3209
T- (775) 553-2203	T- (208) 834-2275	T- (361) 387-3518
F- (775) 553-2742	F- (208) 834-2919	F- (361) 387-0794

Section A- Customer Information:

Provide the Generator's name, facility address, and the mailing address (if different from facility address). Provide a technical contact name and telephone number for technical inquiries and resolution of off-spec (non-conforming waste) loads. Identify generator status as Industrial or Non-industrial if shipping waste to Texas. If the waste is state regulated (for example, Cal-Haz), provide the state EPA ID number.

Use 40 CFR § 261.5 and § 262.44 to determine EPA generator status. If the material is a RCRA hazardous waste, provide the Generator's EPA status (e.g. CESQG, SQG, LQG) and EPA ID number. Include the State EPA ID number if applicable. Texas Class 1 industrial non-hazardous wastes must have both EPA and Texas State ID numbers. An EPA ID number is not required for Conditionally Exempt Small Quantity Generators (CESQG) or for non-RCRA and/or non-hazardous wastes. Please use "N/A" for EPA ID numbers for Non Regulated/Non RCRA material and "CESQG" for Conditionally Exempt Small Quantity Generators.

Include the customer's National Industry Classification Code (NAICS). The following link provides the most current code list: http://www.census.gov/epcd/www/naics.html

If the billing company is different from the customer, provide the billing/broker information. If you wish electronic invoices, please provide the appropriate email address.

Section B- Shipping Description

If the waste is not a "hazardous material" per Department of Transportation rules, enter "Non-DOT Regulated Waste Material"

If the waste is a hazardous material per DOT and RCRA regulations[10], please:

1. Provide the Proper Shipping Name that will appear on the manifest[11].
2. Provide the Hazard Class per DOT regulations.
3. Provide the UN or NA number per DOT regulations.
4. Provide the packing group per DOT regulations
5. Provide the reportable quantity (RQ), per DOT regulations, if applicable.

For all wastes:

6. Provide the container type(s) that will be used for shipments. Provide an estimated annual quantity and size of container in tons, yards, gallons, etc. If estimates are not known, please write "unknown".
7. Provide estimated frequency [12] of waste shipments.

Section C- General Material & Regulatory Information:

1. Provide the common name for this waste (e.g. lead contaminated soil, bag house dust, etc.).
2. Describe the process that generated the waste, include additional sheets as necessary. Please provide as much information as possible to enable US Ecology to identify safety hazards and determine if this process is specifically "listed" under RCRA, or if the waste may contain characteristic wastes[13].
3. Describe the physical appearance of the waste (e.g., soil with scrap metal) to enable US Ecology to perform a visual confirmation.[14]
4. Describe any odor that the waste may have.
5. Enter the source of knowledge used to determine the waste's regulatory status[15]. Check all boxes that apply. Please attach the appropriate information, such as lab results and/or Material Safety Data Sheets (MSDS).

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[10] Refer to the Department of Transportation regulations found in 49 CFR §105 through §180, and RCRA 40 CFR § 262, Subpart B- Manifesting

[11] Refer to 49 CFR §172.101- Hazardous Materials Table, and 49 CFR §172.101 Appendix A for reportable quantities (RQ's).

[12] This information enables USE to determine if the profile will need to be renewed on its anniversary date, which USE may be required to do by the facility permit.

[13] Refer to 40 CFR §261- Identification and Listing of Hazardous Waste, and §262 for Standards Applicable to Generators of Hazardous Waste

[14] Any material that does not reasonably match the physical description will be placed on hold and off-loading delayed while US Ecology contacts the broker/generator to resolve the discrepancy.

[6] Refer to 40 CFR §262.11- Hazardous Waste Determinations.

Notes on Other Information in Section C

- 40 CFR §264.1080 and §265.1080- Subpart CC regulate waste material greater than 500 ppmw VOC's managed in tanks, containers and surface impoundments.
- 40 CFR §61.340 subpart FF clean air rules contain the Benzene NESHAP regulations. Waste generated from chemical manufacturing, coke-by-product recovery plants, petroleum refineries or treaters of such waste are subject to subpart FF requirements.
- US EPA waste codes are found in 40 CFR Part 261-Identification And Listing Of Hazardous Waste
- 40 CFR §268 covers Land Disposal Restrictions. If wastes are subject to LDRs, please provide a completed LDR form, which is available from your customer service representative or on-line at (www.americanecology.com)
- 40 CFR §268.2 defines US EPA's "Treatment sub-categories" for wastes requiring LDR treatment.
- 40 CFR §268.2 and §268.40- Treatment Standards for Hazardous Wastes define "Underlying Hazardous Constituents" (UHCs).
- US EPA defines "treatment" of hazardous waste in 40 CFR §260.10 – Definitions.
- Subpart XX standards apply to ethylene production facilities
- 40 CFR §268.2(k) provides EPA's definition of soils subject to the LDRs under 40 CFR §268.49- Alternate LDR Treatment Standards for Contaminated Soils[16].
- For form codes, source codes and management codes, see EPA's Hazardous Waste Report Instructions and Forms at: http://www.epa.gov/epaoswer/hazwaste/data/br05/forms.htm

Section D- Material Composition (Physical/Chemical)

Describe the physical nature of the material and identify important chemical constituents. For example, if a waste is primarily soil and debris and is contaminated with gasoline, then describe the percentage and range of soil and debris and quantify the concentrations of gasoline compounds measured in the mixture.

The description should be as informative as possible, for example "brown, clay soil" and "debris such as PPE, rocks, wood, metal, and pipes." The sum of the percentages must equal or exceed 100%.

Chemical concentrations must include appropriate units of measure and differentiate TCLP results from Total results. List the typical value or range of concentrations. For example: Benzene "typical value"- 50 mg/l Total and range 30-100. If additional space is needed, please attach a list. Please list all TRI reportable components.

Sections E- Does the waste exhibit or contain the following:

- The EPA classifies oxidizers with an EPA waste code of D001. The correct DOT reference for oxidizers is 49 CFR §173.127. In general if the material has a DOT hazard class of 5.1, it is an EPA waste code of D001.
- Is the waste explosive?* See 40 CFR §261.23

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[16] Wastes may be directly disposed if all the constituents are within 10 times the value found in the Universal Treatment Standard. In addition PCBs alone or in combination with other Halogenated Organic Compounds (Appendix III in 40 CFR §268) may be disposed without treatment if less than 1,000 ppm. See §268.32 - Soils Containing Metals And Containing PCB's - for guidance.

- Does the waste contain organic peroxide?*
- Is the waste shock sensitive?* See 40 CFR §261.23
- Does the waste contain tires? *
- Is the pyrophoric?* See 40 CFR §261.21 and 23
- Is the waste Radioactive? **
- Is the waste Exempt radioactive material? **
- Does the waste contain Halogenated Organic Compounds? See §268 Appendix III.
- Does the waste contain reactive sulfides? If "Yes" provide the concentration in ppm- See 261.23
- Does the waste contain reactive cyanides? If "Yes" provide the concentration in ppm-. See 261.23. If the material contains reactive cyanides that cause the material to be classified as waste code D003, then the amenable portion of the cyanides will need to be determined. Amenable cyanides are amenable to treatment by chlorination. Prior to land disposal, both the total and the amenable cyanides must meet the LDR treatment standards (i.e. 590 ppm and 30 ppm, respectively).
- Is the waste reactive to air or water?* See 40 CFR 261.23
- Is the waste thermally unstable?* See 40 CFR 261.21 and 23
- Is the waste TSCA PCB regulated? ***
- Is the waste medical/infectious? *
- Are there compressed gasses? ****

* If the answer to this question is "Yes," please contact your customer service representative for guidance.
** If the answer to this question is "Yes" and you are shipping to US Ecology's Idaho facility, please complete the Waste Acceptance Criteria (WAC) addendum and submit to your customer service representative for approval.
*** Consult your US Ecology customer service representative for guidance on handling RCRA/TSCA wastes.
**** Generally cylinders containing compressed gasses are not acceptable at US Ecology facilities. However empty cylinders that no longer have an intact valve may be acceptable. Different states regulate "aerosol cans" differently. Please contact your customer service representative for guidance.

Section F- Physical Properties:

1. Is the waste flashpoint <140^0 F? See 40 CFR §261.2 If "Yes", provide the flash point.
2. Provide the typical pH range. See 40 CFR §261.22
3. If the material is a solid, determine whether or not the material has the potential for the presence of incidental liquids due to transport (rain, etc.) or other reasons.
4. Does the waste pass the paint filter test when shipped?

Section G- Certification:

If the material is:

- non-RCRA and may be disposed of without further treatment (assume non-RCRA liquids are solidified prior to landfill) mark the box "Yes" In Texas a non-RCRA liquid industrial waste requires "treatment" prior to land disposal; or
- a restricted waste meeting LDR, mark the box "Yes"; and submit the appropriate LDR signed certification with the first shipment.
- A restricted waste needing treatment prior to landfill, mark the box "No" and submit the appropriate LDR.

ATTACHMENT 2

Land Disposal Restriction (LDR) CERTIFICATION FORM

American Ecology Corporation Land Disposal Restriction Form

GENERATOR: _____ EPA I.D. NUMBER: _____

WASTE STREAM or PROFILE NUMBER: _____ MANIFEST DOC. NO. _____ LINE NO. _____

WASTE IS A: ☐ WASTEWATER ☐ NON-WASTEWATER ☐ DEBRIS

NOTIFICATION FREQUENCY: ☐ ONE TIME ☐ REQUIRED WITH EACH SHIPMENT

EPA WASTE CODES (from 40 CFR 268.40): _____ _____ _____ _____ _____ _____

_____ _____ _____ _____ _____ _____

UNDERLYING HAZARDOUS CONSTITUENTS (from 40 CFR 268.48): _____

_____

A. ☐ **Restricted Waste Meets Treatment Standards (40 CFR 268.7(a) (3))**

The restricted waste identified above meets the treatment standards in 40 CFR 268.40 or **Alternative LDR treatment standards for contaminated soil 40CFR268.49** and can be landfill disposed without further treatment. I have attached all supporting analytical data, where available.

I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR Part 268 Subpart D. I believe that the information I submitted is true, accurate and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

B. ☐ **Restricted Waste Treated To Treatment Standards (40 CFR 268.7(b) (I) & 268.7 (b) (2))**

The treatment residue, or extract of such residue, or the restricted waste identified above has been tested to assure that the treatment residues or extract meet all applicable treatment standards in 40 CFR 268.40 and/or performance standards in 40 CFR 268.45. I have attached all supporting analytical data, where available.

I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR Part 268 Subpart D. I believe that the information I submitted is true, accurate and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

C. ☐ **Restricted Waste With Technology Based Treatment Standards (40 CFR 268.7(b) (4))**

I certify under penalty of law that I personally have examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that based on my inquiry of those individuals immediately responsible for obtaining this information. I believe that the treatment process has been operated and maintained properly so as to comply with the treatment standards specified in 40 CFR 268.40, without impermissible dilution of the prohibited waste. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

D. ☐ **Restricted Waste Decharacterized But Requires Treatment For UHC (40 CFR 268.9)**

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic. This decharacterized waste contains Underlying Hazardous Constituents (UHC) that require further treatment to meet the universal treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

E. ☐ **Restricted Waste Subject To Treatment (40 CFR 268.7(a) (2))**

The restricted waste identified above must be treated to the applicable treatment standards in 40 CFR 268.40, or treated to comply with applicable prohibitions set forth in Part 268.32 or RCRA Section 3004(d). I have attached all supporting analytical data, where available.

F. ☐ **Hazardous Debris Subject To Treatment (40 CFR 268.45)**

This hazardous debris identified above must be treated to the alternative treatment standards in 40 CFR 268.45.

G. ☐ **Restricted Waste Subject To A Variance or Extension (40 CFR 268.7(a) (4))**

This restricted waste identified above is subject to a case by case exemption under 40 CFR 268.5, an exemption under 40 CFR 268.6 or a nationwide capacity variance under Subpart C of 40 CFR 268, and is not prohibited from land disposal. LDR prohibitions become effective on _____ (date) for this restricted waste. The corresponding treatment standard(s) are promulgated in 40 CFR 268.40. I have attached all supporting analytical data, where available.

H. ☐ **Restricted Waste Managed In A "Lab Pack" (40 CFR 268.7(a) (9))**

I certify under penalty of law that I personally have examined and am familiar with the waste and that the lab pack contains only waste that have been excluded under appendix IV to 40 CFR Part 268 and that this lab pack may be sent to a combustion facility in compliance with the alternative treatment standards for lab packs at 40 CFR 268.42(c). I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

I certify and warrant that the information that appears on this form, and appended documents, is true and correct. I have correctly indicated how my waste is to be managed in accordance with 40 CFR 268. My certification is based on personal examination of the information submitted, or is based on my inquiries of those individuals responsible for obtaining the information.

Authorized Signature _____ **Title** _____ **Date** _____

UHC list from 40 CFR Part 268.48 available upon request

ATTACHMENT 3

LDR FORM

IDENTIFIES TREATMENT NEEDED

American Ecology Corporation Land Disposal Restriction Form

GENERATOR: _____ EPA I.D. NUMBER: _____

WASTE STREAM or PROFILE NUMBER: _____ MANIFEST DOC. NO. _____ LINE NO. _____

WASTE IS A: ☐ WASTEWATER ☐ NON-WASTEWATER ☐ DEBRIS

NOTIFICATION FREQUENCY: ☐ ONE TIME ☐ REQUIRED WITH EACH SHIPMENT

EPA WASTE CODES (from 40 CFR 268.40): _____ _____ _____ _____ _____ _____

_____ _____ _____ _____ _____ _____

UNDERLYING HAZARDOUS CONSTITUENTS (from 40 CFR 268.48): _____

_____

A. ☐ **Restricted Waste Meets Treatment Standards (40 CFR 268.7(a) (3))**

The restricted waste identified above meets the treatment standards in 40 CFR 268.40 or **Alternative LDR treatment standards for contaminated soil 40CFR268.49** and can be landfill disposed without further treatment. I have attached all supporting analytical data, where available.

I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR Part 268 Subpart D. I believe that the information I submitted is true, accurate and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

B. ☐ **Restricted Waste Treated To Treatment Standards (40 CFR 268.7(b) (I) & 268.7 (b) (2))**

The treatment residue, or extract of such residue, or the restricted waste identified above has been tested to assure that the treatment residues or extract meet all applicable treatment standards in 40 CFR 268.40 and/or performance standards in 40 CFR 268.45. I have attached all supporting analytical data, where available.

I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR Part 268 Subpart D. I believe that the information I submitted is true, accurate and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

C. ☐ **Restricted Waste With Technology Based Treatment Standards (40 CFR 268.7(b) (4))**

I certify under penalty of law that I personally have examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that based on my inquiry of those individuals immediately responsible for obtaining this information. I believe that the treatment process has been operated and maintained properly so as to comply with the treatment standards specified in 40 CFR 268.40, without impermissible dilution of the prohibited waste. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

D. ☐ **Restricted Waste Decharacterized But Requires Treatment For UHC (40 CFR 268.9)**

I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 to remove the hazardous characteristic. This decharacterized waste contains Underlying Hazardous Constituents (UHC) that require further treatment to meet the universal treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

E. ☐ **Restricted Waste Subject To Treatment (40 CFR 268.7(a) (2))**

The restricted waste identified above must be treated to the applicable treatment standards in 40 CFR 268.40, or treated to comply with applicable prohibitions set forth in Part 268.32 or RCRA Section 3004(d). I have attached all supporting analytical data, where available.

F. ☐ **Hazardous Debris Subject To Treatment (40 CFR 268.45)**

This hazardous debris identified above must be treated to the alternative treatment standards in 40 CFR 268.45.

G. ☐ **Restricted Waste Subject To A Variance or Extension (40 CFR 268.7(a) (4))**

This restricted waste identified above is subject to a case by case exemption under 40 CFR 268.5, an exemption under 40 CFR 268.6 or a nationwide capacity variance under Subpart C of 40 CFR 268, and is not prohibited from land disposal. LDR prohibitions become effective on _____ (date) for this restricted waste. The corresponding treatment standard(s) are promulgated in 40 CFR 268.40. I have attached all supporting analytical data, where available.

H. ☐ **Restricted Waste Managed In A "Lab Pack" (40 CFR 268.7(a) (9))**

I certify under penalty of law that I personally have examined and am familiar with the waste and that the lab pack contains only waste that have been excluded under appendix IV to 40 CFR Part 268 and that this lab pack may be sent to a combustion facility in compliance with the alternative treatment standards for lab packs at 40 CFR 268.42(c). I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

I certify and warrant that the information that appears on this form, and appended documents, is true and correct. I have correctly indicated how my waste is to be managed in accordance with 40 CFR 268. My certification is based on personal examination of the information submitted, or is based on my inquiries of those individuals responsible for obtaining the information.

Authorized Signature _____ **Title** _____ **Date** _____

UHC list from 40 CFR Part 268.48 available upon request

ATTACHMENT 4
SUPPLEMENTAL ANALYSES

Supplemental Analyses identify wastes, provide safety information, and/or provide process control information. The results of these analyses provide additional confidence concerning the proper management methods. Most of the parameters, which constitute the Supplemental Analyses use the most recent standard analytical techniques recognized by EPA, ASTM and other authoritative sources or have been developed by US Ecology (USE) through its operating experience for general waste identification and/or proper waste management. Standard supplemental analytical parameters are identified in the following table; the referenced method or equivalent standard method will be used for analyses of these parameters.

Sample Work Up Techniques:	
Method	**Reference**
General Extractions	
EP Toxicity	1-1310A
TCLP	1-1311
Metals Acid Digestion	
Flame atomic absorption spectroscopy (AAS) or inductively coupled plasma spectroscopy (ICP)	1-3005, 3010
Microwave assisted	1-3015, 2-3030, 3-D4309, D5258
Graphite furnace atomic absorption spectroscopy (GFDAA)	1-3020
Oils, greases, or waxes	1-3031
Dissolution procedure for oils, greases, waxes	1-3040
Sludges, soils, and oils	1-3050
Microwave assisted	1-3051
Alkaline digestion	1-3060
Parr acid bomb digestion	3-E886, E926
Organic Extractions and Cleanups	
Extraction Procedure for Oily Wastes	1-1330
Organic Extraction and Sample Preparation	1-3500
Waste Dilution	1-3580, 3585
Separatory funnel liquid-liquid extraction	1-3510
Continuous liquid-liquid extraction	1-3520
Soxhlet extraction	1-3540, 3541
Sonication extraction	1-3550
Purge and Trap	1-5030
Solid phase extraction (SPE)	1-3535
Hexadecane Extraction and Screening of purgeable organics	1-3820
Alumina cleanup	1-3610, 3611
Florisil cleanup	1-3620
Silica gel cleanup	1-3630
Gel-permeation cleanup	1-3640
Acid-base partition cleanup	1-3650
Sulfur cleanup	1-3660
Sulfuric acid / permanganate cleanup	1-3665
Inorganic analytical methods:	
Inductively coupled plasma atomic emission spectroscopy	1-6010, 6020
Antimony	
Atomic absorption, direct aspiration method	1-7040, 4-204.1
Atomic absorption, furnace method	1-7041, 4-204.2
Arsenic	
Atomic absorption, furnace method	1-7060, 4-206.2

Sample Work Up Techniques:	
Method	**Reference**
Atomic absorption, gaseous hydride method	1-70614-206.3
Barium	
Atomic absorption, direct aspiration method	1-7080, 4-208.1
Atomic absorption, furnace method	1-7081, 4-208.2
Beryllium	
Atomic absorption, direct aspiration method	1-70904-210.1
Atomic absorption, furnace method	1-7091, 4-210.2
Cadmium	
Atomic absorption, direct aspiration method	1-7130, 4-213.1
Atomic absorption, furnace method	1-7131, 4-213.2
Calcium	
Atomic absorption, direct aspiration method	1-7130, 4-213.1
Atomic absorption, furnace method	1-7131, 4-213.2
Chromium	
Atomic absorption, direct aspiration method	1-7190, 4-218.1
Atomic absorption, furnace method	1-7191, 4-218.2
Hexavalent chromium: Co-precipitation	1-7195
Hexavalent chromium: Colorimetric	1-7196, 2-3500CrD
Hexavalent chromium: Chelation-extraction	1-7197, 4-218.4
Hexavalent chromium: Diff. phase polarography	1-7198
Copper	
Atomic absorption, direct aspiration method	1-7210, 4-220.1
Atomic absorption, furnace method	1-7211, 4-220.2
Iron	
Atomic absorption, direct aspiration method	1-7380, 4-236.1
Atomic absorption, furnace method	1-7381, 4-236.2
Phenanthroline method (ferrous)	2-3500FeD
Lead	
Atomic absorption, direct aspiration method	1-7420, 4-239.1
Atomic absorption, furnace method	1-7421, 4-239.2
Magnesium	
Atomic absorption, direct aspiration method	1-7450, 4-242.1
Manganese	
Atomic absorption, direct aspiration method	1-7460, 4-243.1
Atomic absorption, furnace method	1-7461, 4-243.2
Mercury (manual cold-vapor technique	
In liquid waste	1-7470
In solid or semisolid waste	1-7471
Nickel	
Atomic absorption, direct aspiration method	1-7520, 4-249.1
Atomic absorption, furnace method	1-7521, 4-249.2
Osmium	
Atomic absorption, direct aspiration method	1-7550
Atomic absorption, furnace method	1-7551
Selenium	
Atomic absorption, furnace method	1-7740, 4-270.2
Atomic absorption, gaseous hydride method	1-7741, 4-270.3
Atomic absorption, gaseous hydride method	1-7742, 4-206.3
Silver	
Atomic absorption, direct aspiration method	1-7760, 4-272.1
Atomic absorption, furnace method	1-7761, 4-272.2
Thallium	
Atomic absorption, direct aspiration method	1-7840, 4-279.1

Sample Work Up Techniques:	
Method	**Reference**
Atomic absorption, furnace method	1-7841, 4-279.2
Vanadium	
Atomic absorption, direct aspiration method	1-7910
Atomic absorption, furnace method	1-7911
Zinc	
Atomic absorption, direct aspiration method	1-7950, 4-289.1
Atomic absorption, furnace method	1-7951, 4-289.2
Organic Analytical Methods:	
Gas Chromatographic Methods	
Halogenated volatile organics	1-8010, 8021
Non-halogenated Volatile Organics	1-8015
Aromatic Volatile Organics	1-8020, 8021
Acrolein, Acrylonitrile, Acetonitrile	1-8031
Phenols	1-8040, 8041
Phthalate Esters	1-8060, 8061
Nitrosamines	1-8070
Organochlorine pesticides, halowaxes, and PCB's	1-8080, 8081
PCBs	1-8080, 8082
Nitroaromatics and cyclic ketones	1-8090, 8091
Polynuclear Aromatic Hydrocarbons	1-8100
Haloethers	1-8110, 8111
Chlorinated Hydrocarbons	1-8120, 8121
Organophosphate Pesticides	1-8140, 8141
Chlorinated Herbicides	1-8150, 8151
Gas Chromatographic/Mass Spectroscopy Methods	
Volatile Organics	1-8240, 8260, 7-624
Semi-volatile Organics:	1-8250, 8270, 7-625
Other Organic Methods	
Qualitative infrared (IR) spectroscopy method	1-8410, 8430, 8440, 3-D2621, D4053
GC/FTIR method	1-8410
Heating value, bomb combustion method	1-5050, 3-D240, D2015
Halogen and Sulfur Content	
Chlorine content	3-D808, D2361, D4327
Halogen content	3-D808, D2361, D4327
Sulfur content	3-D129, D3177, D4327
Oil and Grease	1-4030, 9070, 9071, 2-5520, 4-413.1, 413.2
Petroleum hydrocarbons, total recoverable	2-5520, 4-418.1
Solvent distillation	4-D86, D1078
Total organic carbon	1-9020, 9060, 2-5310, 3-D2579
Total Organic Halides (TOX)	2-506
Screening Methods	
Physical Description	3-D4979
Flammability Screen	3-D4982
Water Compatibility	3-D5058
Oxidizer Screen	3-D4981
pH Screen	3-D4980
Sulfide Screen	3-D4978
	Gas Detection Tubes (e.g.; Dragger, Sensidyne, MSA)
Cyanide Screen	3-D5049
	Gas Detection Tubes (e.g.; Dragger, Sensidyne, MSA)

Sample Work Up Techniques:	
Method	**Reference**
Commingled Liquid Waste Compatibility Test	3-D5058
Polymerization Potential	3-D5058
Paint Filter Test	1-9095
Bulk Density and Apparent Specific Gravity Screen	3-D5057
Polychlorinated Biphenyls (PCBs) screen	1-4020, 9097
Liner Compatibility Screen	1-9090
Miscellaneous Analytical Methods:	
Acidity	2-2310
Alkalinity	2-2320
Ammonia	2-4500NH_3, 4-350.3
Anions	
By ion chromatography	1-9056, 3-D4327, 4-300.0
Chlorides	1-9250, 9251, 9252, 9253, 2-4500Cl^-, 4-300.0, 325.3
Sulfates	1-9035, 9036, 9038, 2-4500SO_4^{2-}, 4-300.0, 375.3
Nitrates	1-9200, 9210, 2-4500NO_3^-, 4-300.0, 352.1, 353.2
Fluoride	1-9214, 2-4500F^-, 4-300.0, 340.2, 340.3
Bromides	1-9211, 2-4500Br^-, 4-300.0, 320.1
Phosphates	2-4500P, 4-300.0, 365.1
% Ash	2-2540, 3-D482, D3174
Conductivity / conductance	1-9050, 2-2510, 3-D1125, 4-120.1
Cyanides	
Total and amenable cyanides	1-9010, 9012, 9013, 2-4500CN^-, 4-335.1
Dissociable cyanides	1-9213, 2-4500CN^-
Test Method to Determine Hydrogen Cyanide Released from Wastes (Reactive Cyanides)	1-7.3.3.2
Flash point / Ignitability	
Pensky-Martens closed-cup method	1-1010, 3-D93
Setaflash closed-cup method	1-1020, 3-D3278
Cleveland open-cup method	3-D1498
Oxidation / reduction (redox) potential (ORP)	3-D1498
pH measurement	1-9040, 9041, 9045, 2-4500H^+, 3-E70, 4-150.1
Solids	
Total (TS) at 103/105°C	2-2540, 4-160.3
Dissolved (TDS) at 180°C	2-2540, 4-160.1
Total suspended (TSS) at 103/1`05°C	2-2540, 4-150.2
Fixed and volatile at 500°C	2-2540, 4-160.4
Total Solids (moisture content)	Various (e.g.; Ohaus, Microwave Oven)
Specific Gravity	1-9030, 2-2710F, 3-D70, D891, D1217, D1429
Sulfides	
Extractable sulfides	1-9031
Soluble sulfides	1-9215, 2-4500S^{2-}
Test Method to Determined Hydrogen Sulfide Released from Wastes (Reactive Sulfides)	1-7.3.4.2
Total sulfides	1-9030A, 2-4500S^{2-}
Viscosity	3-D88, D446, D2983

Sample Work Up Techniques:	
Method	**Reference**
Water Content	3-D95, D3173, D4006, E203

The above referenced procedures are described in the following publications (although the latest update to any of the below referenced documents are acceptable). The first digit of the reference numbers above are keyed to the numbers shown below:

1.	***Test Methods for Evaluating Solid Waste***, SW-846, U.S. Environmental Protection Agency, Office of Water and Waste Management, Washington, D.C. 20406
2.	***Standard Methods for the Examination of Water and Waste Water***, American Public Health Association (APHA), American Water Works Associations, Water Environment Federation
3.	***Annual Book of ASTM Standards***, American Society for Testing Materials (ASTM), 100 Barr Harbor Drive, West Conshohocken, PA 19428
4.	***Methods for Chemical Analysis of Water and Wastes***, EPA-600/4-79-020, U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory (EMSL), Cincinnati, Ohio 45268
5.	"Infrared Analysis Method," IERL-RTP Procedures Manual: level I Environmental Assessment, EPA-600/7-78-201
6.	"Acid Digestion Bombs," Bulletin 4745, Parr Instrument Company, Moline, IL 61265
7.	"Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater," Title 40, Part 136, Appendix A, CFR, USEPA, EMSL
8.	Bellar, T.A., and Lichtenberg, J.J., "The Determination of Polychlorinated Biphenyls in Transformer Fluid and Waste Oils," EPA-600/4-81-045, USEPA, EMSL

ATTACHMENT 5
ADDITIONAL ANALYSES

Standard analytical procedures not listed here, which may be needed, will be taken from the sources referenced in Attachment 4 or other recognized sources (e.g.; Official Methods of Analysis of the Association of Official Analytical Chemist (AOAC), 15th Edition, AOAC, Arlington Virginia, 1990) or more recent supplements or editions.

- Beilstein Screen indicates the presence of halogenated organics in aqueous and organic wastes.
- Bench-Scale Treatment Evaluation to determine the appropriate ratios of wastes to reagents or waste-to-waste to be used in the treatment process to produce the desired reaction / result.
- Chlorides determines if the major acid component is hydrochloric acid or its salt.
- Cyanides Peroxide Amenability determines the effectiveness of H2O2 for cyanide treatment.
- Cyanides Chlorination Amenability (Sodium Hypochlorite or direct Chlorination) determines the effectiveness of hypochlorite for cyanide treatment.
- Cyanides Conversion Amenability determines the effectiveness of other types of reagents treatment for cyanides.
- Filter Time determines filterability of waste.
- Filterable Residue quantifies the suspended solids present to determine filtration requirements in process operations.
- Flash Point/Ignitability further identifies ignitable wastes to establish proper storage mode and conformance with permit conditions.
- Gas Chromatographic Scan identifies specific organic compounds.
- Qualitative IR Spectroscopy provides a fingerprint spectrum of organic wastes.
- Liquid Waste Compatibility determines whether liquid wastes which are to be combined together are compatible. This is a required supplemental analysis when combining different wastes.
- Load Bearing Capacity Test determines structural integrity of stabilized material to be landfilled.
- Metals Content may be determined to quantify metals concentrations for process operating parameters or potential salt precipitation for monitoring certain processes.
- Nitrates determine if the major acid component is nitric acid or its salt.
- Non-Filterable Residue quantifies the dissolved solids present to determine acceptability for certain processes.
- Oil and Grease quantifies the amount of oil and grease so as not to impact certain processes.
- Organic Content (OC) provides a conservative measure of organic carbon in a waste. This determination may use the procedure for Total Organic Carbon (for suitable waste forms), or may be calculated based on the results of a water content test using Karl Fisher or Dean Stark methods. Organic content is conservatively determined as the difference of water and ash from the total sample.
- Oxidizer Screen indicates the oxidation characteristics of a waste stream.
- Paint Filter Test indicates if free liquids are present in a solid or semi-solid material.
- PCB Screening indicates whether or not PCBs are present in a waste.
- PCBs in Aqueous Liquids determines whether PCBs are present in liquid waste.
- Percent Acidity determines the acidity in the waste. It may be performed if the waste is aqueous and below a pH of 4.
- Percent Alkalinity determines the amount of alkalinity in the waste. It may be performed if the waste is aqueous and above a pH of 7.
- Percent Ash determines the ash content in waste feeds to the indirect thermal desorber.
- Percent Solids by Centrifuge determines the percentage of suspended solids by centrifugation.
- pH provides a more precise measurement of pH and an indication of corrosivity when determining process parameters.
- Phosphates determines if the major acid component is phosphoric acid or its salt.

- Soluble Sulfides are analyzed to provide quantitative backup to the reactive sulfides screen.
- Solvent Screen identifies the presence of LDR solvent constituents.
- Specific Gravity / Bulk Density indicates density of the waste. This information convert weight of materials to volumes (and visa versa).
- Stabilization Treatment Studies determines if a waste is amenable to stabilization and to determine the appropriate reagent-to-waste ratio.
- Sulfates determine if the major acid component is sulfuric acid or its salt.
- Sulfide Peroxide Amenability determines the effectiveness of H2O2 for sulfide treatment.
- Sulfide Conversion Amenability determines the effectiveness of other types of reagents treatment for sulfides.
- Sulfur Content determines the sulfur content of waste to be incinerated and thus its capability to generate SO2 (SOX) gases.
- Total and Amenable Cyanides quantifies the concentration of all free and most complexed cyanides (total cyanides) and/or cyanide species amenable to alkaline chlorination (amenable cyanides). Results may be used for treatability determinations, to monitor treatment processes, and/or to meet disposal restrictions including Land Disposal Restrictions.
- TOC determines the organic concentration in waste and may be used as a surrogate for UHCs and other organic analyses.
- TOX determines the organic-chloride concentration in waste and may be used as a surrogate for chlorinated organic analyses.
- Total Solids quantifies suspended and dissolved solids and moisture content for selected processes.
- Total Sulfides quantifies the concentration of total sulfides to back up the sulfides screen.
- Viscosity determines the waste pumpability.
- Visual Oil and Grease provides a qualitative assessment of filterability and organic contents.
- Waste Compatibility is tested to determine whether wastes stored or processed together are compatible.
- Waste Compatibility determines whether the waste has a potential to react vigorously with water, to form gases, other products, or to generate extreme heat and to determine if it is soluble in water. This test does not apply to wastes already in contact with excess water nor to wastes known to be water reactive.
- Water Content determines the percent of water present in a waste.

Other standard analytical techniques parameters not listed here may be added used as required by changes in regulations, company policy, etc. These techniques will be taken from recognized sources (e.g.; SW-846, ASTM, AWWA, etc.).

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CONTAINER MANAGEMENT REPORT

US ECOLOGY BEATTY

March 2010

Revised June 2015

SECTION 9
CONTAINER MANAGEMENT REPORT

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APPENDICES

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Appendix 9 B CMU #1 PCB Building
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Appendix 9 D CMU #16 Container Management Building
Appendix 9 E REMOVED
Appendix 9 F CMU #6 Dry Hazardous Waste Storage Area #2
Appendix 9 G CMU #10 Dry Hazardous Waste Storage Area #3
Appendix 9 H Secondary Containment Calculations
Appendix 9 I Photos Laboratory Tanks and Containment Area

CONTAINER MANAGEMENT PRACTICES

This chapter provides specific process information for container management units and activities at the US Ecology Nevada (USEN) Facility.

9.1.0 Hazardous Waste Container Management Units

References are made throughout this plan to regulations promulgated by the EPA regarding container management requirements for hazardous waste management facilities. These requirements are found at 40 CFR Part 264, Subpart I, which has been adopted by reference in the rules of the Nevada Division of Environmental Protection (NvDEP).

Containers are used on-site to manage hazardous wastes with and without free liquids. A general layout of on-site container management units is shown in Appendix A. These containers vary in size from small vials and pails to large roll-off containers. Containers ranging in size up to 3 yd^3 capacity (including but not limited to 5, 15, 35, 55, 85 & 110 gallon drums, supersacks, and other containers) are considered non-bulk containers, although any size container may be managed as a container under this plan if it can be accommodated in an area permitted for container management.

This plan describes container management practices used on-site for all permit-required RCRA container management units (CMUs), including the units described below. These area are shown on the figure in Appendix A

- **CMU #1**. The unit is an internal (roofed) area with secondary containment, meeting RCRA (and TSCA) container management requirements for solid and / or liquid wastes. Waste with free liquids or with waste codes F020, F021, F023, or F027 may be stored in this area without additional containment. This unit is also called "The PCB Building" and it is located on the northeast side of the facility. This area is shown on the Figure in Appendix B.
- **CMU #6**. The Dry Hazardous Waste Storage Area #2 (DHWSA #2) is located on the east side of the facility, east of the CMS Building and is utilized as a general containerized waste storage area. The unit is an external area, meeting RCRA container management requirements for waste without free-standing liquids. This area is shown on the Figures in Appendix F.
- **CMU #7**. The Bin Storage Pad is located on the east side of the facility south of the stabilization processing area, north of the Container Management Building (CMU #16) and is utilized as a general containerized waste storage area. The unit is an external area with secondary containment, for waste with or without free-standing liquids. All waste (including waste codes F020, F021, F023, or F027) may be stored in this area. The area is covered to prevent the contact of rainwater with the containerized waste. This area is shown on the Figures in Appendix C.
- **CMU #8**. A lab waste storage area operated under 40 CFR §262.34.

- **CMU #16** area is called the Container Management Building (CMB). The CMB is the primary RCRA containerized processing area onsite. Containers are brought to this unit predominantly for subsequent management elsewhere on the facility. Typically, containerized waste is stored, consolidated into larger containers (e.g.; roll-offs) either within the unit, at the associated dock, or at the other permitted CMUs for subsequent treatment (e.g.; stabilization). If appropriate, some treatment can occur at the CMU. The unit meets RCRA container management requirements for wastes without free-standing liquids. Waste with free-standing liquids must either be moved to an area with secondary containment, the liquid must be treated (e.g.; solidified), it must be decanted, or the container must be placed in containment by the end of the next work day following receipt. This area is shown on the Figures in Appendix D.
- **CMU #17** The Dry Hazardous Waste Storage Area #3 (DHWSA #3) will be located on the northeast side of the facility, on top of the closed Trench 10 landfill, and will be used as a general containerized waste storage area. The unit is an external area, meeting RCRA container management requirements for waste without free-standing liquids. This area is shown on the Figures in Appendix G.

Table 1 – Summary of Container Management Units

CMU	Common Name			Secondary Containment Capacity [gal]	Storage Capacity		
	Common Name	Status	Permit Required[1]		Gallons	55-gallon Drums	yds^3
#1	PCB Building	Existing	Yes	26,928	59,400	1080	294
#6	Dry Hazardous Waste Storage Area #2	Existing	Yes	0	250,696	4,588	1,241
#7	Bin Storage Pad	Existing	Yes	20,287[2]	80,778	1,469	400
#8	Lab Waste Storage Area	Existing	No	0	700	13	3.5
#16	Container Management Building	Existing	Yes	61,630	246,520	4,482	1,220
#17	Dry Hazardous Waste Storage Area #3	Existing	Yes	0	694,516	12,627	3,438

The locations of these units are shown in Appendix A. Specific permit modification rules apply to changes to container management units with no more than 25% increase in capacity.

9.2.0 Use and Management of Containers

The following section addresses the issues specifically identified in 40 CFR Part 264, Subpart I [Use and Management of Containers].

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1 Separate permits are not required for CMUs operated under the provisions of 40 CFR §262.34, temporary staging areas in support of facility operations, units located within permitted areas or units which are ancillary to or supportive of other facility operations.

2 There are 10 bays @ 271.2 ft^3 each for a total of 2,712 ft^3. There are 7.48 gallons / ft^3, for a total of 20,287 gallons of secondary containment capacity.

9.2.1 Condition of Containers

If a container holding hazardous waste is not in good condition (e.g., severe rusting, severe structural defects, other conditions that could reasonably contribute to the release of the contents) or if it begins to leak, USEN personnel shall immediately transfer the hazardous waste from such container to a container that is in good condition or otherwise manage the waste in compliance with the conditions of 40 CFR §264.171 (e.g.; place the entire container in a containment device such as a containment pallet or place a containment device under the container or, for large containers, under the leaking part of the container.

9.2.2 Compatibility of Waste With Containers

USEN will only use containers that are compatible with the waste. If containerized waste is received which is incompatible with the waste, USEN will comply with the conditions of 9.2.1, above.

9.2.3 Container Management Practices

Containers are initially packaged off-site by the generator of the waste and shipped to USEN, but waste may be re-packaged on-site in any of the CMUs. Containers are accepted for management based on the following criteria:

- The hazardous waste must be compatible with the container in which it is stored;
- The waste contents must be authorized in accordance with the facility's permit; and
- Each container must display a label identifying its contents.

Hazardous waste management activities in CMUs may consist of various operations. The operations and their order may vary for containers received and managed at the facility. Hazardous waste management activities in CMUs include:

- Waste acceptance and inspection
- Repackaging
- Storage
- Decanting
- Consolidation
- Container reuse
- Crushing

The following paragraphs describe each of these operations and their limits/controls.

9.2.3.1 Waste Acceptance

Waste acceptance follows five steps:

1. Waste arrives at the facility;

2. Waste is staged at either a CMU or a truck staging area;
3. The waste is reviewed in accordance with waste acceptance procedures (WAP);
4. If the review reveals a discrepancy, the waste is rejected (or put on hold pending resolution) and held in designated staging areas until the discrepancy is resolved; or
5. If the waste is consistent with the profile, the waste is received into a CMU or other RCRA unit for treatment, storage, or disposal.

Initial unloading and staging of containerized waste may occur at any of the CMUs. Many functions may be performed during the unloading and staging process including inspection, opening and closing, unloading, repackaging, labeling, filling, and sampling of containers.

Bulk wastes are staged while undergoing load acceptance processing in accordance with the WAP or for treatment, disposal, or shipment off-site. Bulk or non-bulk wastes may be staged in any of the permitted CMUs in accordance with the capacities listed in Table 1 and their ancillary areas (e.g.; dock areas, loading & unloading areas) or in a landfill in areas with established cover[3].

The procedures for staging wastes are dependent on the unloading schedule and any subsequent process scheduling. Because many different waste types arrive at the facility on any given day, it is not possible to specify the exact type of waste to be staged on a given day in a given staging area. Unless it has been established in accordance with the procedures described in the WAP that non-bulk or bulk containers being unloaded are compatible with the wastes already staged or stored in the unit, containers will be staged either with a minimum separation of 36" from other waste(s), in an area for which the wastes are compatible, in separate containment pallets, or in segregation areas (such as is provided in CMUs #1 and #7).

Containers may be opened for sampling and inspection during staging and, when that process is complete, the containers are closed unless they are to be directly processed (e.g.; consolidated, emptied into a stabilization unit, roll-off container, or disposed on-site).

Bulk containers (e.g., end dumps, dump trucks and pups, roll-offs, etc.) may be initially staged in the receiving area and/or in the inactive portion of the active landfill. The only activities occurring in the staging areas are waste staging and WAP-related / authorized activities (e.g.; inspection, sampling, and the tarping and untarping of shipments.

9.2.3.2 Storage and Labeling

Containers are maintained in a closed condition unless:

- Waste is being added or removed;
- The container contents are being inspected or sampled;

[3] This is necessary to avoid any determination of improper placement under HSWA.

- Reagents are being added; or
- Treatment in the container is occurring.

Drums and boxes may be double-stacked while in storage. No containers are stacked more than two (2) containers high except banded or shrink-wrapped pallets or "nestable" containers[4]. These types of containers are often several units high.

Adequate aisle space is provided within each CMU to permit easy access to all containers for routine inspections and emergency access. Minimum aisle spaces of 36" between rows are maintained. A row typically consists of two (2) containers or pallets placed on either or both sides of the aisle. With this layout, every container in a CMU can be readily inspected to check for leaks or deterioration. If a leaking container is identified, access is available to handle the container as necessary.

All containers should arrive on-site with proper hazardous waste and DOT labels. These labels should provide enough information where as they can be properly checked in and referenced with the appropriate manifest. Containers that will require additional treatment (stabilization, neutralization, chemical oxidation and/or deactivation) and be stored at the facility will be identified with a US Ecology label. These US Ecology labels will be fixed to the container within 24 hours (M-F) of receipt. Containers that will be processed immediately such as direct landfill and solidification will not be issued an US Ecology label unless they will not be processed within 24 hours. At all times the contents of the containers will be identified by either a generator applied label or US Ecology applied label. Container storage is not to exceed 1 year from the date of receipt. USEN will perform a physical inventory at a minimum frequency of once per month. Reports generated by AESOP (or NEWTON once released) will be utilized to ensure all containers are disposed of within 1 year of receipt.

9.2.3.3 Decanting

This section addresses the decanting of liquids from containers while the container is within a CMU. It does not address the removal of drum contents at the stabilization area, or the consolidation of drums into larger containers.

All drums or containers known to have free-standing liquids will be unloaded at CMUs with secondary containment. If secondary containment does not exist, then temporary secondary containment devices (e.g.; containment pallets or pans) may be used, or the container will be moved to a CMU with secondary containment by the end of the next workday. Alternatively, the free-standing liquids can be removed or eliminated.

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4 For example, a 35-gallon drum can be safely "nested" on the top of a 55-gallon drum.

When possible, only containers from a single waste stream or waste type will be decanted together. Occasionally, small amounts from several waste streams will require decanting and subsequent mixing of the waste streams will occur.

Decanting is achieved by removing the liquids by vacuum or through the use of a drum tilter/decanter. Typically, a vacuum truck or unit are used to withdraw the liquids from the containers. The unit is staged adjacent to the container(s) and a vacuum hose connected to the unit accesses the containers.

9.2.3.4 Consolidation

Containerized waste is aggregated and the contents placed into a large (bulk) containers for subsequent treatment or disposal allowing for the efficient utilization of the stabilization process for similar wastes. Full larger containers (e.g.; roll-offs) may remain in the off-loading area through the end of the next operating day and then be placed into a container storage area (if the waste is hazardous) or treated. Typically, containerized waste is aggregated into larger roll-offs for the purpose of common treatment. Once aggregated, the contents of the roll-off may be homogenized and frequently a sample is taken of the aggregated material for characterization and/or recipe development.

9.2.3.5 Container Reuse

Containers may be reused or recycled if they are RCRA empty. Containers targeted for reuse will be staged in any area of the facility. In addition, USEN may use recycling units which are not permit-required units for recycling metal containers (including aerosol can recycling).

9.2.3.6 Container Crushing

Containers to be disposed in a landfill must be 90% full or crushed, shredded, or similarly reduced in volume to the maximum practical extent before burial in the landfill (40 CFR §264.315). Containers can be crushed utilizing a drum crusher, heavy equipment (e.g.; excavators, bulldozers, compactors, or loaders), or in a stabilization tank. Alternatively, containers may be disassembled in any waste management unit prior to burial. Large containers (e.g.; tanks) can be placed in the landfill and either crushed & / or filled prior to final burial.

9.2.4 Containment

Waste with the F020, F021, F022, F023, F026 and F027 listing may only be stored in CMUs with appropriate secondary containment or in containment pallets or similar devices. The CMUs with secondary containment are: CMU #1 and CMU #7 and CMU #16 although any CMU can be modified in the future, through the use of a Class 1 permit modification, to add secondary containment.

9.2.4.1 Secondary Containment System Design and Operation

CMU #1 is an existing, enclosed, un-subdivided receiving, storage, and treatment area for containers with or without free liquids. It is curbed and constructed of reinforced concrete for containment.

CMU #7 is an existing, unenclosed, subdivided storage, processing, and receiving area for containers with or without free liquids. It is curbed and constructed of reinforced concrete for containment. The storage area also is covered to prevent rainwater from entering.

CMU #16 is an un-subdivided receiving, storage, and treatment area for containers with or without liquids. The container storage area is curbed and constructed of reinforced concrete for containment. The storage area also is covered to prevent rainwater from entering.

9.2.4.2 Requirement for the Base or Liner to Contain Liquids

All of the CMUs which contain containers with free-liquids are maintained free of cracks or gaps (to the extent practicable) that could allow the infiltration of liquid through the containment barrier. As an alternative, containment pallets or pans may be used in any container management area or unit for the storage of containers with free-liquids. Significant cracks[5] found in the flooring or curbing of the CMUs are fixed, as necessary, to maintain compliance with 40 CFR §264.175(b).

9.2.4.3 Containment System Capacity

Calculations of the containment system capacity are provided in the Appendix H to this report. Table 1 summarizes the total permitted volume of free liquids within the CMU. Additionally, Table 1 demonstrates:

1) for unenclosed CMUs, the containment system for each CMU managing liquids has sufficient capacity to contain the greater of 25% of the volume of all the containers that can be stored in an area plus the precipitation from a 25-year, 24-hour storm event, or the volume of the largest container, plus the precipitation from a 25-year, 24-hour storm event, whichever is greater and

2) for enclosed CMUs, each CMU managing liquids has sufficient capacity to contain the greater of 25% of the volume of all the containers that can be stored in an area, or the volume of the largest container, whichever is greater.

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5 Hairline cracks or intermittent coating "flaking" are not considered significant for the USEN facility due to its remote arid location.

Since the facility also maintains a Toxic Substance Control Act (TSCA) permit, USEN will follow the more stringent secondary containment regulations found in 40 CFR §761.65. These regulations require secondary containment capacity to be 25% of the storage capacity where as the RCRA regulations in 40 CFR §264.175 require only 10%.

CMUs #1, #7 and #16 are currently designed for the storage of liquids and other CMUs can be utilized for the storage of liquids with the utilization of containment devices (such as containment pallets) or after construction of secondary containment pads. In no case will the maximum drum inventory of containers with free liquids inventory be exceeded in a given CMU, however, if the containers do not contain free liquids, the limits summarized in Table 1 may be exceeded if all other operating procedures are maintained.

9.2.4.4 Removal of Liquids or Residues from Containment System

Spilled or leaked wastes and accumulated precipitation are removed from the containment systems in a timely manner to prevent overflow of the containment system. Typical equipment used to remove these liquids includes shovels, vacuum trucks, portable submersible pumps, hoses, fixed piping, etc. If any recoverable liquids are discovered in the containment systems removal of the material is scheduled and implemented within 2 working days, unless the liquid is frozen. Within 2 working days after the liquid is no longer frozen, the liquids are removed. Rain water is removed as soon as practicable. Residues from the containment systems are handled as described in the WAP.

9.2.5 Special Requirements for Ignitable or Reactive Wastes

Ignitable or reactive wastes will not be stored within 15 meters (50') of the facility's property line.

9.2.6 Special Requirements for Incompatible Wastes

In accordance with the requirements of 40 CFR §264.177, USEN procedures prevent the accidental commingling or reaction of incompatible wastes, including:

- Proper identification of the hazardous characteristics of incoming waste streams during the waste stream approval process.
- Proper segregation of incompatible materials.
  - Incompatible wastes or materials will not be stored or placed in the same container.
  - Wastes will be segregated according to the designated compatibility group, and placed so as to prevent waste-to-waste contact that could lead to a reaction.
- Proper identification of the potential for incompatible reactions through the waste stream verification program including testing of incoming shipments in accordance with the WAP.

- Compatibility between the waste and storage container will be ensured by placing waste into clean containers; or though use of technical knowledge of the waste and containers.

9.2.7 Closure

At closure of any unit, all hazardous waste and hazardous waste residues from the containment system will be removed and managed in accordance with the procedures listed in the WAP. Area-wide closure activities will be managed in accordance with the procedures listed in the Closure Plan.

9.2.8 Air Emission Standards

Subpart CC standards applicable to containers of hazardous wastes are found in 40 CFR §§264.1086 and 265.1087. There are three (3) levels of air emission controls for containers based on container size, contents and whether the container is used in a waste stabilization process. Table 3 provides a matrix for determining the applicable control level for a container. The term "in Light Material Service" means a container that is used to manage a material for which both of the following conditions apply:

1) the vapor pressure of one or more of the organic constituents in the material is greater than 0.3 kilopascals (kPa) at 20° C; and

2) the total concentration of the pure organic constituents have a vapor pressure greater than 20% by weight. Note that 0.3 kPa equals approximately 0.043 psi.

Table 2 - Determination of Applicable Level of Control for Containers Subject to Subpart CC Regulations

Container Design Capacity	Containers in Light Material Service	Does Waste Stabilization Occur in the Container?	Level of Control
<0.1 m^3 (~ 26 gals)	Yes	Yes	Exempt
	No	No	
	No	Yes	
	Yes	No	
0.1 m^3 & < 0.46 m^3 (~ 119 gals)	Yes	Yes	Container Level 2
	No	No	Container Level 1
	No	Yes	Container Level 2
	Yes	No	Container Level 1
0.46 m^3	Yes	Yes	Container Level 2
	No	No	Container Level 1
	No	Yes	Container Level 2
	Yes	No	Container Level 1

Container Level 1 controls require that the hazardous waste is stored in an approved DOT container, a container equipped with a cover and closure devices for each opening, or an open top container with an organic vapor-suppressing barrier (e.g.; tarp).

Container Level 2 controls require that the hazardous waste is stored in an approved DOT container, a container that operates with no noticeable organic emissions, or a demonstrated vapor-tight container.

Container Level 3 controls require that the hazardous waste is stored in a container that is either vented directly to an air emission control device or located inside an enclosure that is vented through a closed vent system to a control device.

Table 3 - Determination of Acceptable Container Types Under Subpart CC	
Container Level	**Acceptable Container Types**
1	An approved DOT container
	A container equipped with a cover and closure device for each opening
	An open top container with an organic vapor suppressing barrier (e.g.; tarp)
2	An approved DOT container
	A container that operates with no noticeable organic emissions
	A container with a demonstrated vapor-tight lid
3	A container that is either vented directly to an air emission control device
	A container located inside an enclosure that is vented through a closed vent system to a control device

If hazardous waste is in a container when a facility first accepts it, the facility performs a visual inspection of the container within 24 hours after its arrival and at least once a year thereafter. All containers are customarily inspected during the load acceptance process. Repairs of defects are completed within five (5) days of detection or the contents of the container are transferred to a container that complies with Subpart CC standards. If a non-DOT container larger than 0.40 m^3 (~ 119 gallons) is used with Container Level 1 controls, records of the procedure used to determine that the container is not managing hazardous waste in "Light Materials Service" must be maintained. The Subpart CC standards contain special record keeping and inspection requirements for Level 3 containers and their associated closed-vent systems, enclosures and control devices. All containers subject to the Subpart CC regulations will be identified on the USEN bar code label with "*Subpart CC*" and be segregated from all other waste streams.

Containers subject to Subpart CC regulation must be kept closed except:

- While adding or removing waste or within 15 minutes after which no additional material has been added or removed from the container,
- When sampling the waste or accessing other equipment inside the container,
- When a pressure relief device is used for maintaining internal pressure within the container and the device operates as designed in accordance with the container design specifications,
- When opening a safety device, as defined in 40 CFR §265.1081 to avoid an unsafe condition, or
- When the container meets the definition of empty as defined in 40 CFR §261.7(b).

Table 4 – Control Levels

CMU Unit	Common Name	Control Levels
#1	PCB Building	Level 1 or Level 2
#6	Dry Hazardous Waste Storage Area #2	Level 1 or Level 2
#7	Bin Storage Pad	Level 1 or Level 2
#8	Lab Waste Storage Area	Level 1 or Level 2
#16	Container Management Building	Level 1 or Level 2
#17	Dry Hazardous Waste Storage Area #3	Level 1 or Level 2

9.3.0 Special Requirements for Laboratory Drain Totes

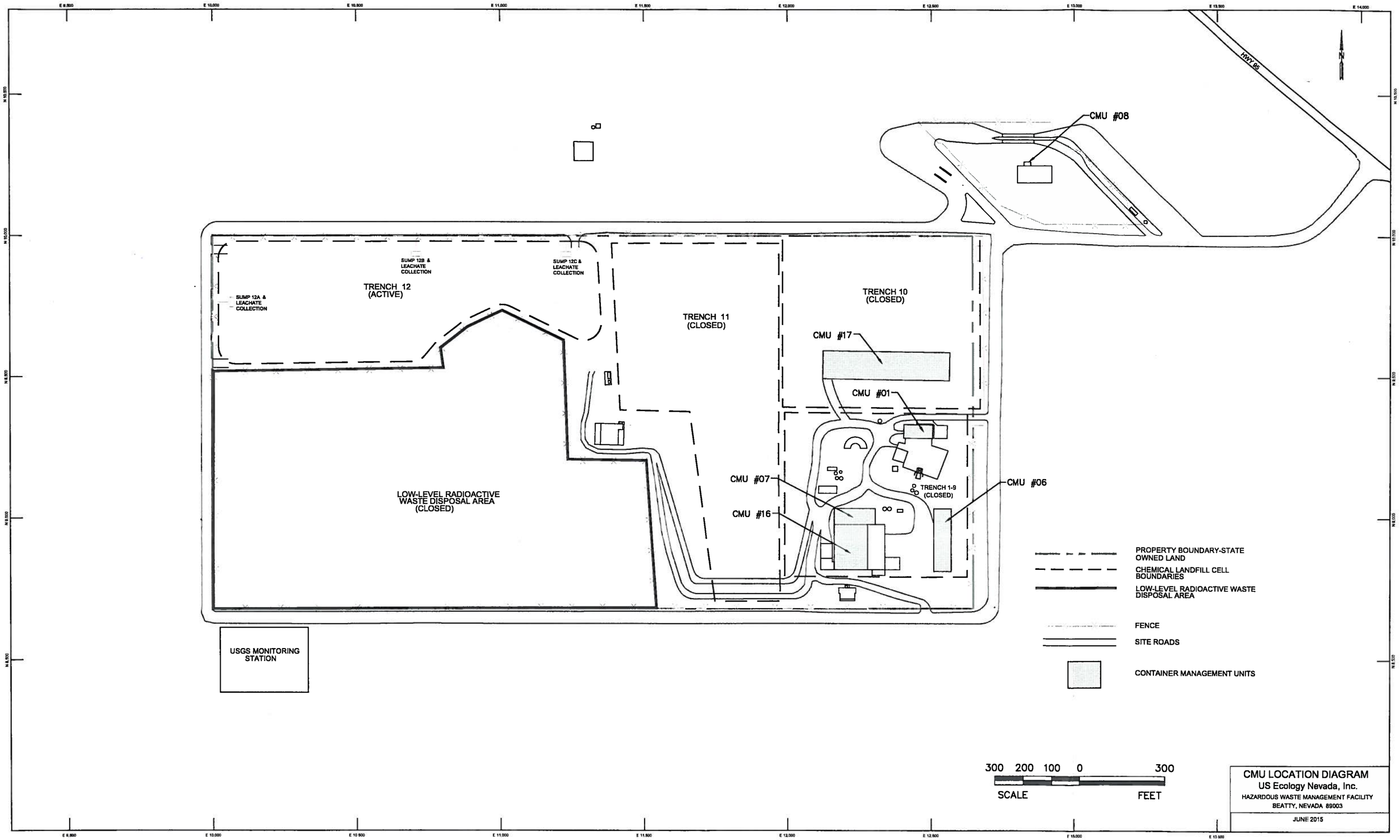
All laboratory sink wastewater will drain directly into underground storage totes. The water collected has been determined to be characteristic for metals and carry the D004-D011 codes. In addition the waste water will carry all RCRA listed codes (F, K, U, and P). USEN considers this a 90 day accumulation area per 40 CFR §262.34. Once the totes are full or 90 days has been reached the totes will be emptied either by removing the totes from the containment area or using the on-site vacuum truck. The preferred method is using the vacuum truck. The full totes or vacuum truck will then be emptied into T-11.

The totes will be stored in an underground containment area that is built of concrete blocks. The blocks will be coated with a chemical resistant epoxy. Photos of the totes and containment area are included in Appendix I.

APPENDIX A

CMU GENERAL LOCATION MAP

-updated 7-15-2015



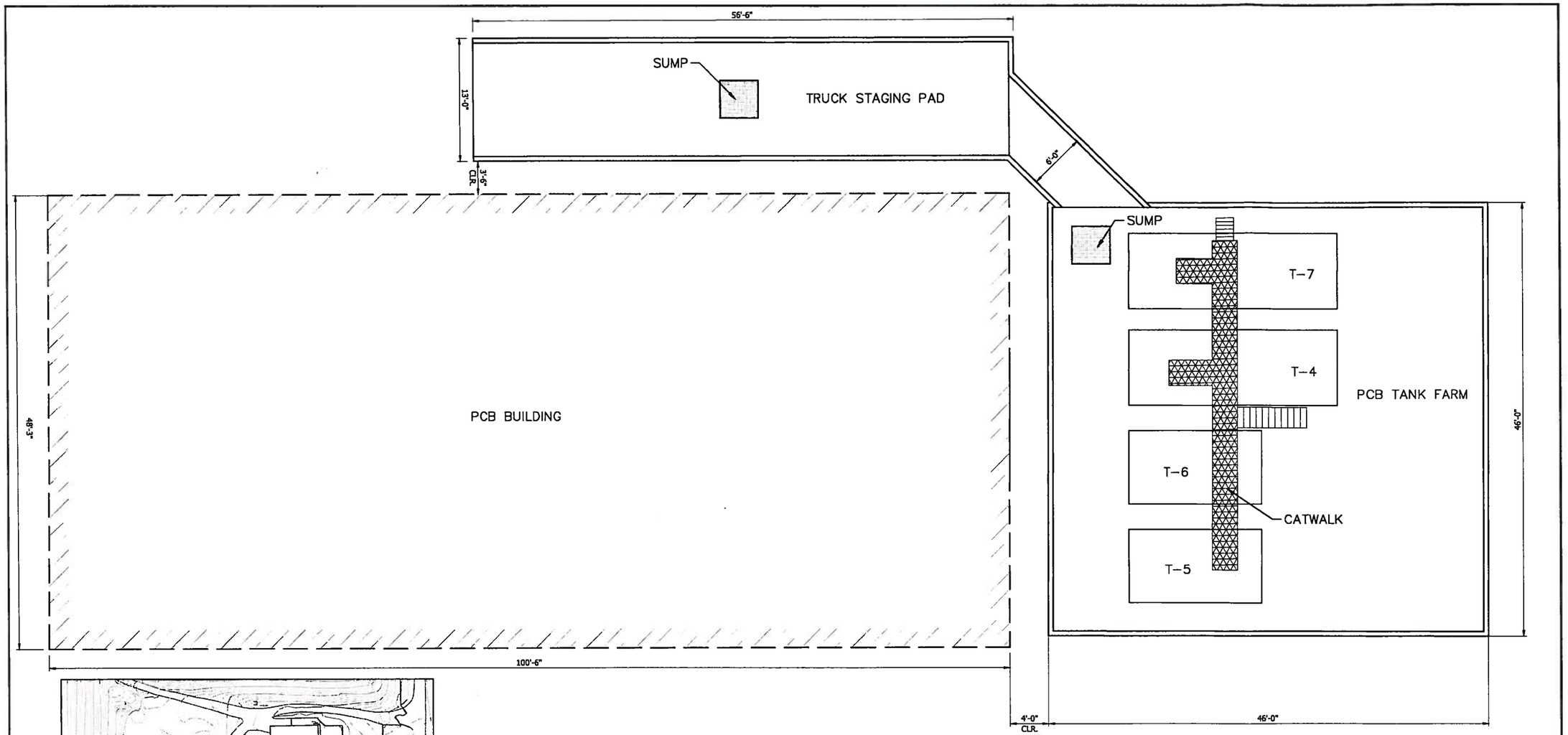
CMU LOCATION DIAGRAM
US Ecology Nevada, Inc.
HAZARDOUS WASTE MANAGEMENT FACILITY
BEATTY, NEVADA 89003
JUNE 2015

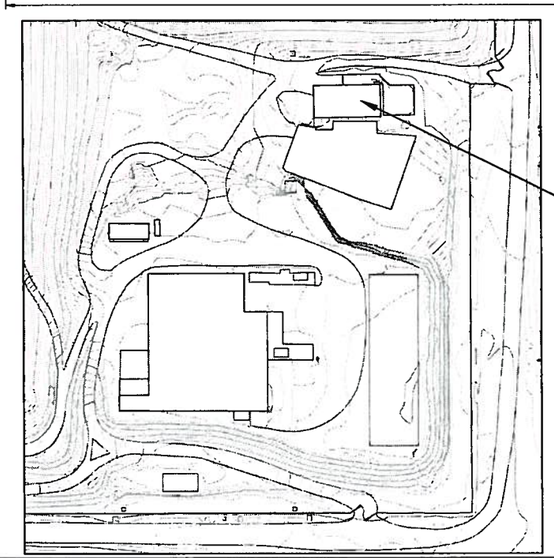
APPENDIX B

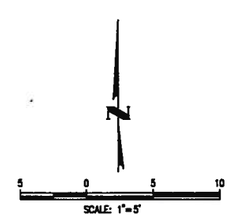
CMU #1

PCB BUILDING

-updated 7-15-2015







REV. #	DESCRIPTION	DATE
0		
1		
2		
3		

US ecology

BEATTY NEVADA
HAZARDOUS WASTE
MANAGEMENT FACILITY

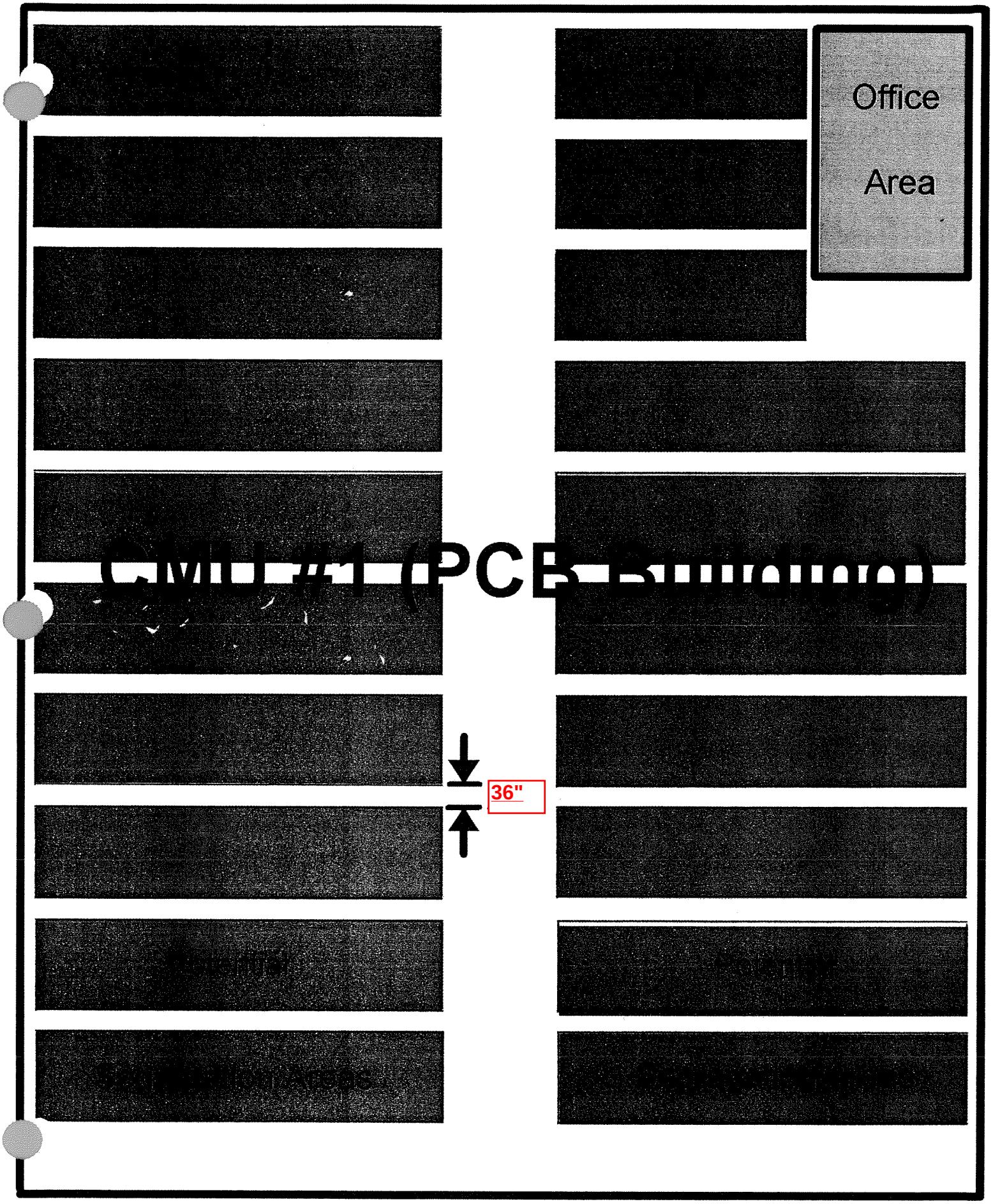
PCB PROCESSING BUILDING,
TANK FARM, AND STAGING PAD

PROJECT NUMBER:

AquAeTer

DRAWN BY	DATE	CHKD. BY	DATE	APPROV. BY	DATE	SCALE
CWK	06/10/15					1"=5'

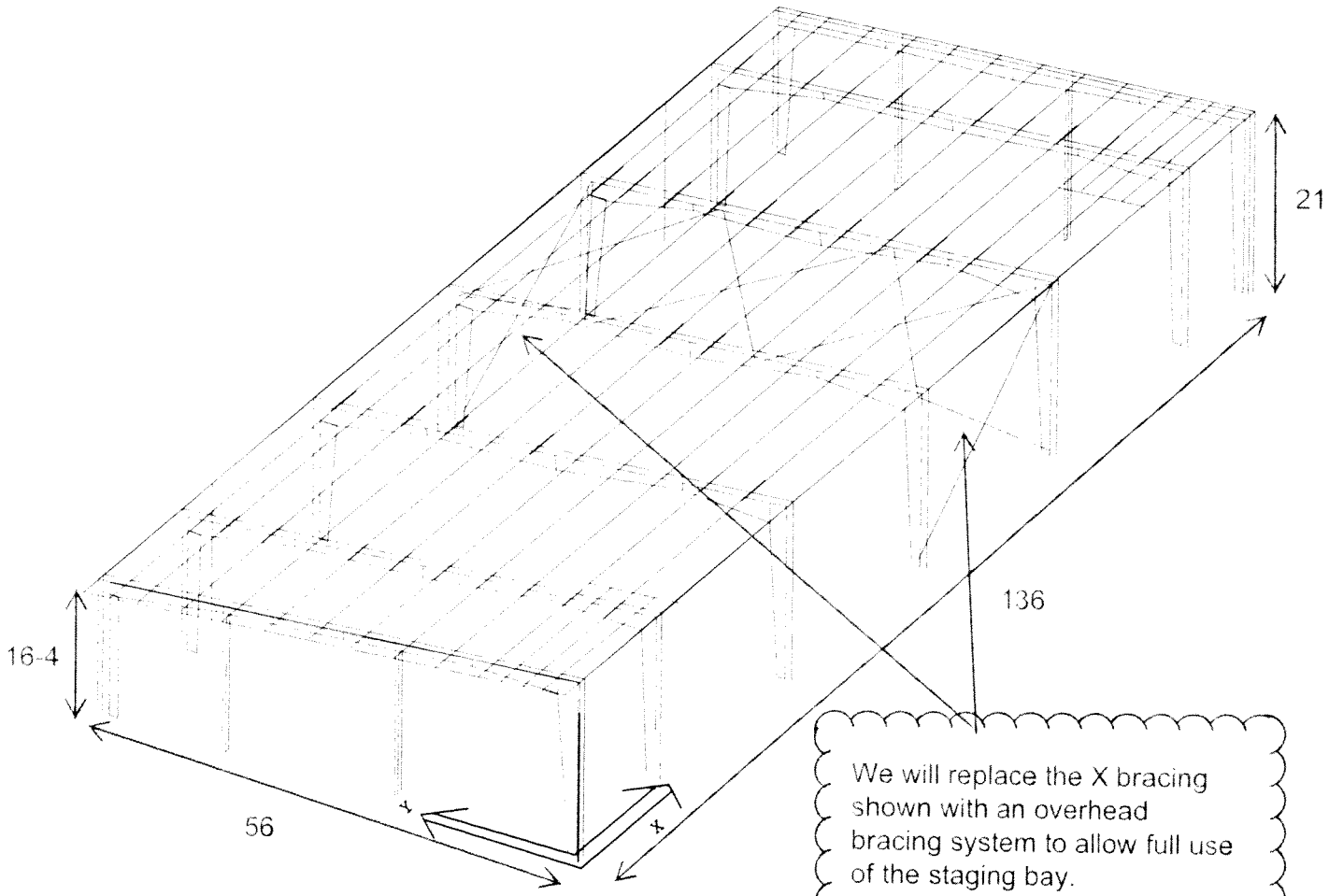
DRAWING NO:


Office
Area
36"

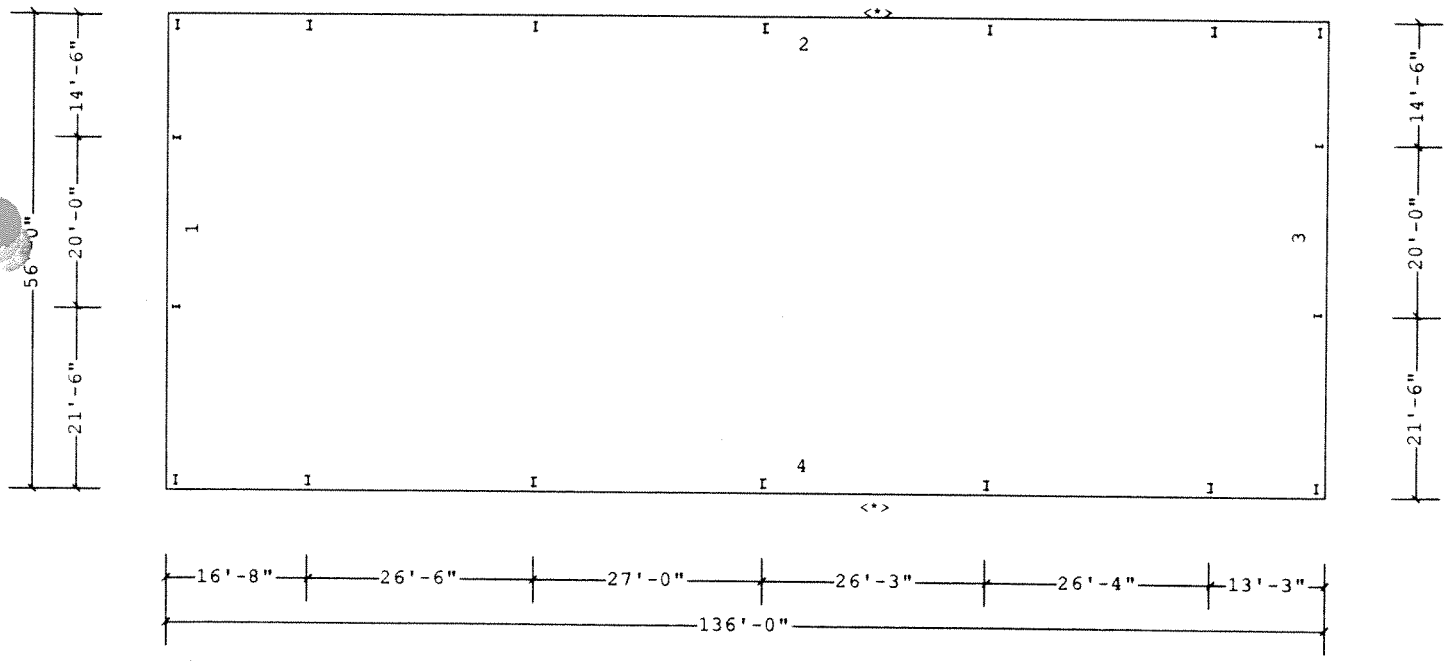
APPENDIX C

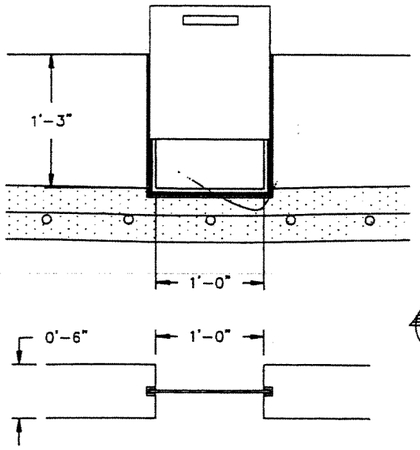
CMU #7

Bin Storage pad

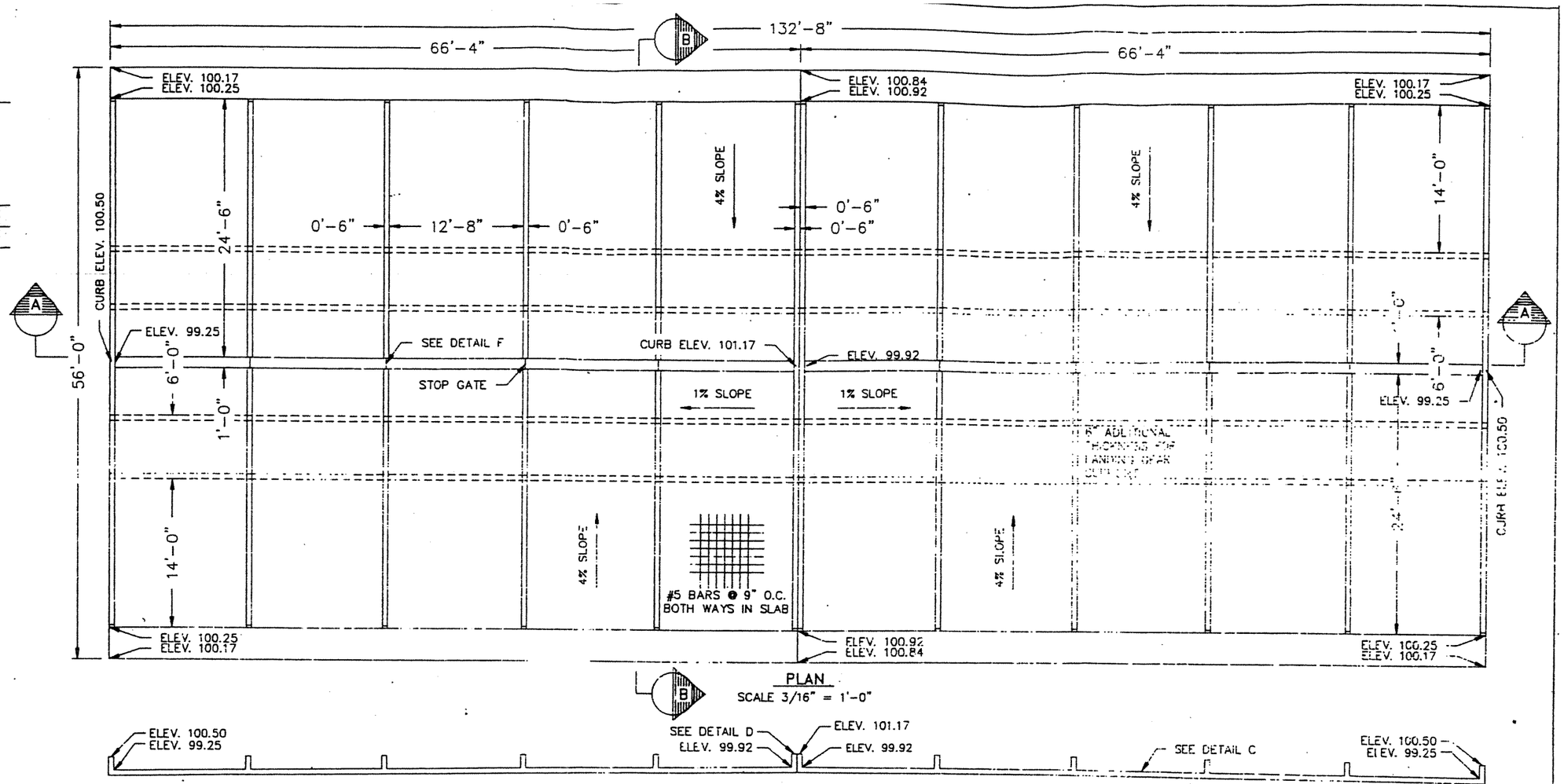


We will replace the X bracing shown with an overhead bracing system to allow full use of the staging bay.


56'-0"
14'-6"
20'-0"
21'-6"
1
2
3
4
<*>
<*>
16'-8"
26'-6"
27'-0"
26'-3"
26'-4"
13'-3"
136'-0"

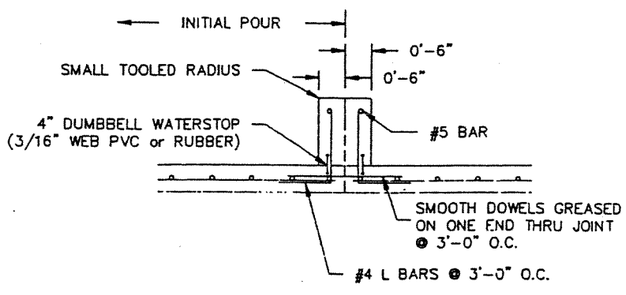


DETAIL F
SCALE 1 1/2" = 1'-0"

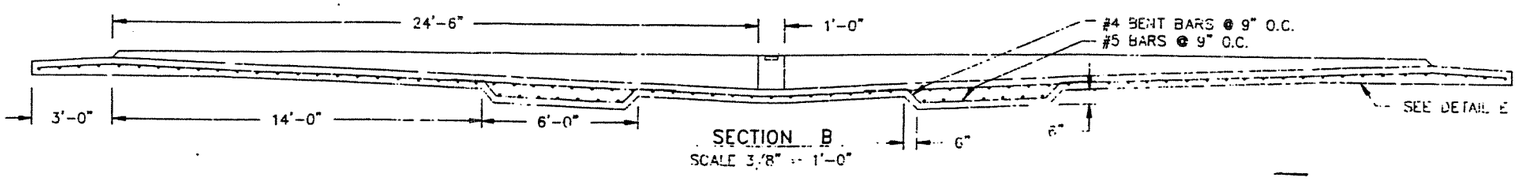


PLAN
SCALE 3/16" = 1'-0"

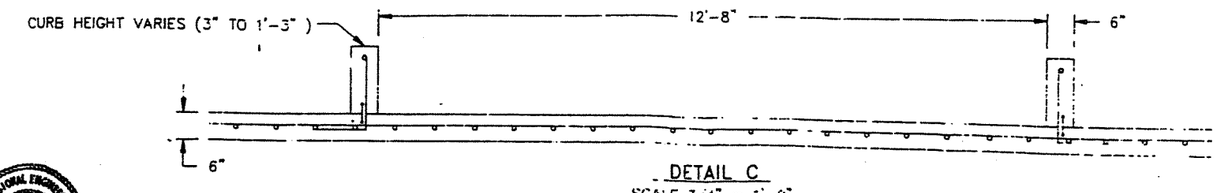
SECTION A
SCALE 3/16" =1'-0"



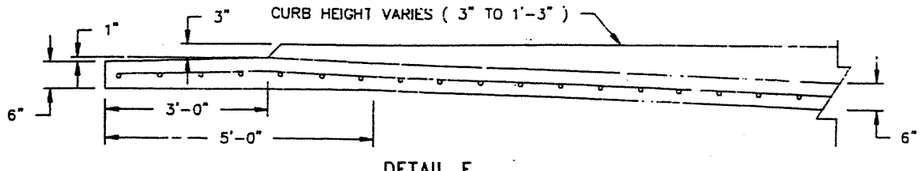
DETAIL D
SCALE 3/4" = 1'-0"



SECTION B
SCALE 3/8" = 1'-0"



DETAIL C
SCALE 3/4" = 1'-0"



DETAIL E
SCALE 3/4" = 1'-0"

NOTE: ELEVATIONS ARE BASED ON A DATUM ELEVATION OF 100.00.

REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA
HOWARD W. ALTHOUSE
CIVIL
MARCH 13, 1990

Rev	Drawn	Check	Appr	PE Appr	Date	Description
1	MOM				3.13.90	CORRECTED LANDING GEAR LOCATION IN SECTION B
0	PAB	KEC		HWA	1.18.90	ISSUED FOR CONSTRUCTION

REVISIONS

US Ecology
an American Ecology company
US Ecology Inc.
9200 Shelbyville Road
Suite 300
Louisville, Ky 40222

Drawn By MOM
Checked By
Appr. By
PE Appr. By HWA
Date 9/13/88
Scale NOTED
Project No. 050059

Reference Drawings

TRUCK PARKING
HAZARDOUS WASTE MANAGEMENT FACILITY
US Ecology, Inc.
BEATTY, NEVADA

Drawing No.
NV-104-CON-001

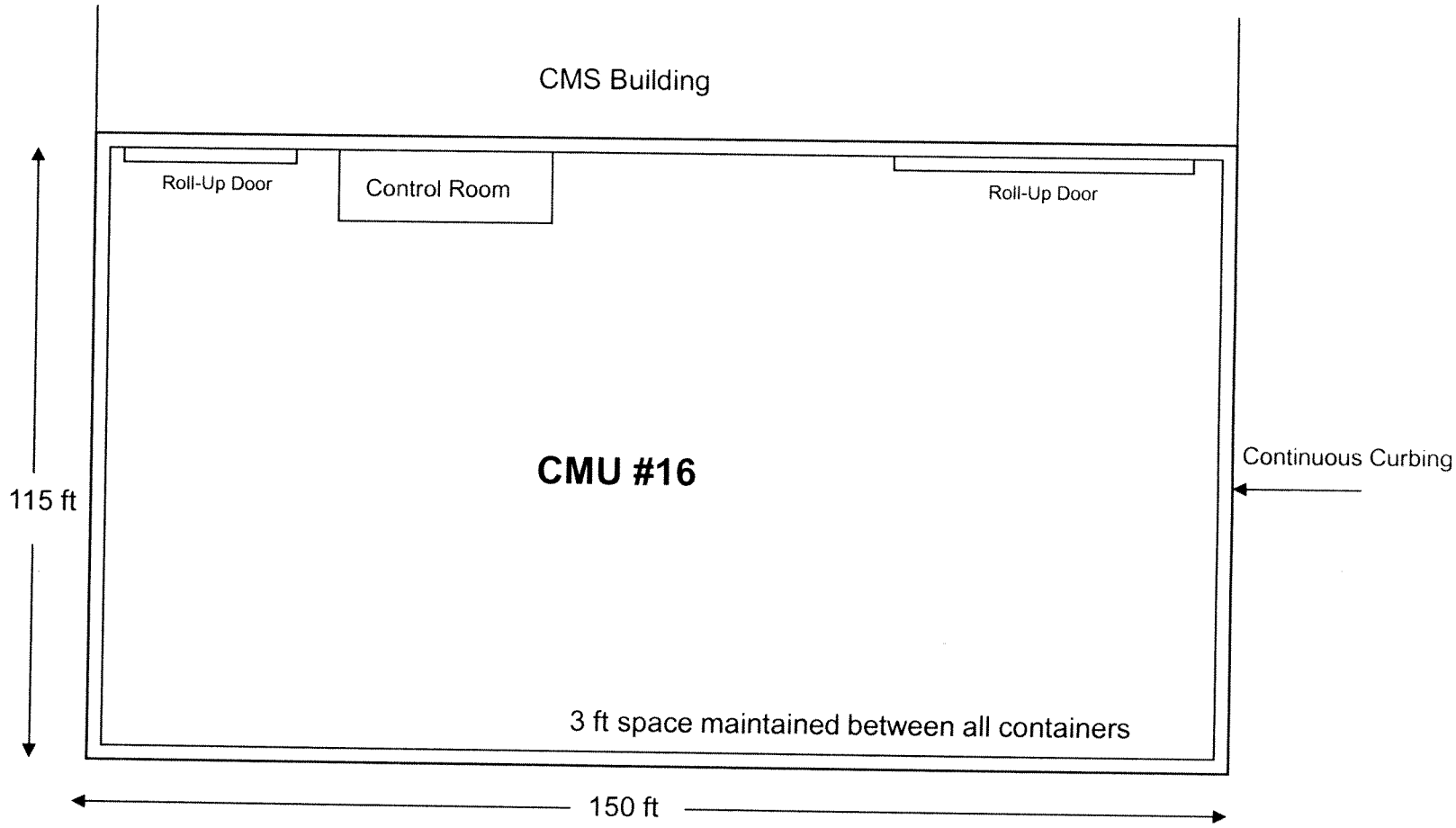
Revision No.

APPENDIX D

CMU #16

Container Management Building

Container Management Pad



US Ecology Nevada

October 2011

Letter of Certification

Contact:
Name: RSCI
Address: 1854 E Lanark

City, State: Meridian, Idaho 83642
Country: United States

Project: US Ecology Container Management
Builder PO #:
Jobsite:

City, State: Beatty, Nevada 89003
County, Country: Nye, United States

This is to certify that the above referenced VP BUILDINGS project has been designed for the applicable portions of the following Building Code and in accordance with the order documents which have stipulated the following applied environmental loads and conditions:

Overall Building Description

Shape	Overall Width	Overall Length	Floor Area (sq. ft.)	Wall Area (sq. ft.)	Roof Area (sq. ft.)	Max Eave Height	Min Eave Height 2	Max Roof Pitch	Min. Roof Pitch	Peak Height
Container Management	150/0/0	111/0/0	16650	11899	17308	21/0/0	21/0/0	1.000:12	1.000:12	27/3/0

Loads and Codes - Shape: Container Management

City: Beatty **County:** Nye **State:** Nevada **Country:** United States
Building Code: 2003 International Building Code
Building Use: Standard Occupancy Structure
Built Up: 89AISC
Cold Form: 04AISI
Rainfall: 4 00 inches per hour

Dead and Collateral Loads
Collateral Gravity:7 00 psf
Collateral Uplift: 0 00 psf

Roof Covering + Second Dead Load: Varies
Frame Weight (assumed for seismic):4 00 psf

Live Load
Live Load: 20 00 psf Reducible

Wind Load
Wind Speed: 90 00 mph
Wind Exposure (Factor): B (0 701)
Parts Wind Exposure Factor: 0 701

Wind Enclosure: Partially Enclosed
Wind Importance Factor: 1 000

Topographic Factor: 1 0000

NOT Windborne Debris Region
Base Elevation: 0/0/0
Primary Zone Strip Width: 16/9/10
Parts / Portions Zone Strip Width: 8/4/13
Basic Wind Pressure: 12 35 psf

Snow Load
Ground Snow Load: 5 00 psf
Design Snow (Sloped): 3 85 psf
Snow Exposure Category (Factor): 2 Partially Exposed (1 00)
Snow Importance: 1 000
Thermal Category (Factor): Kept just above freezing (1 10)
Ground / Roof Conversion: 0 70
% Snow Used in Seismic: 0 00
Seismic Snow Load: 0.00 psf
Unobstructed, Slippery Roof

Seismic Load
Mapped Spectral Response - Ss:87 00 %g
Mapped Spectral Response - S1:30 00 %g
Seismic Hazard / Use Group: Group 1

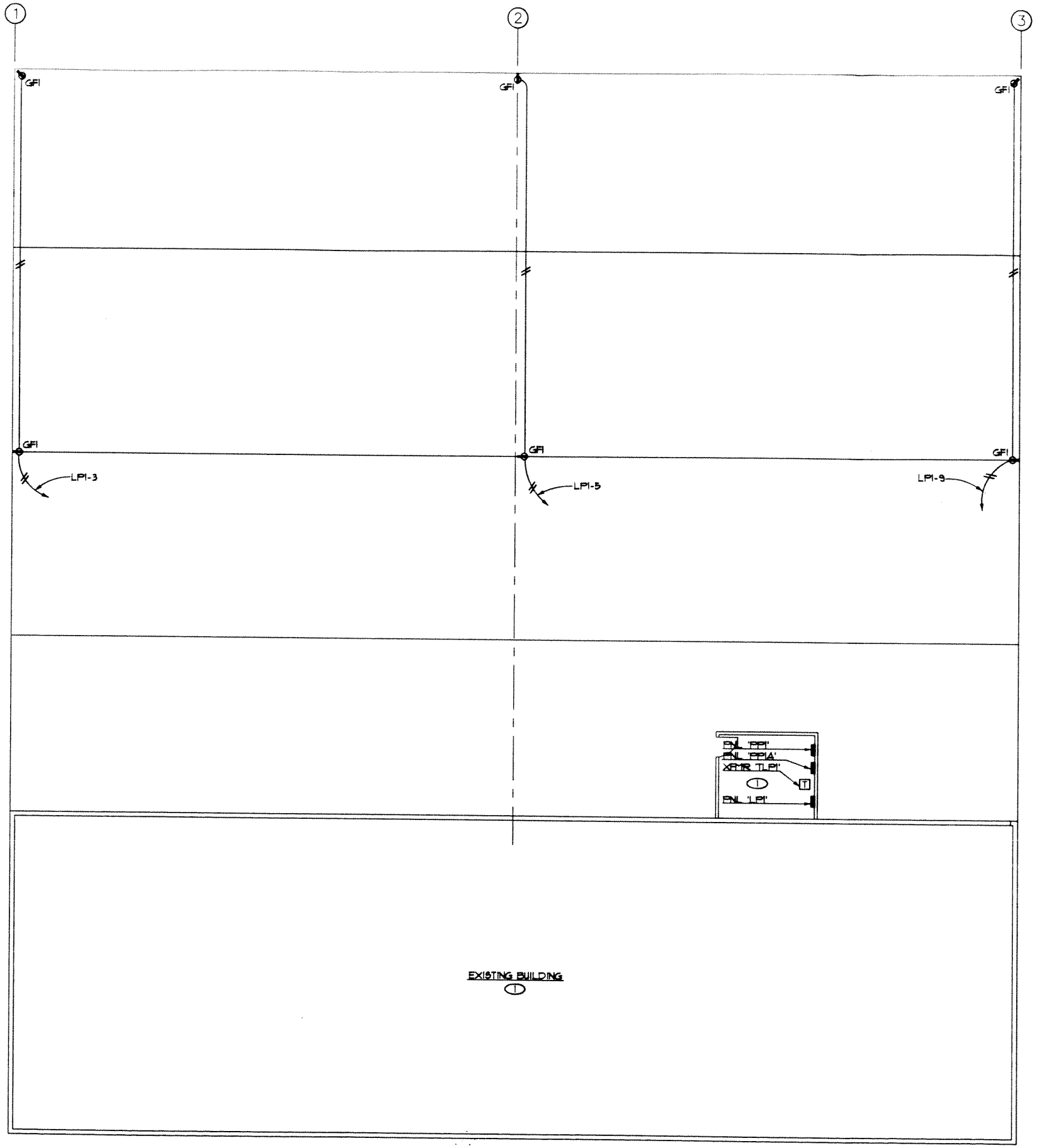
Seismic Importance: 1 000
Seismic Performance / Design Category: D

Framing Seismic Period: 0 3198
Bracing Seismic Period: 0 1962
Framing R-Factor: 3 5000
Bracing R-Factor: 3 5000
Soil Profile Type: Stiff soil (D, 4)
Frame Redundancy Factor:1 3744
Brace Redundancy Factor:1 5000
Frame Seismic Factor (Cs): 0 1909 x W
Brace Seismic Factor (Cs): 0 1909 x W

Per Article 2 9 in the Builder Agreement, VP Buildings assumes that the Builder has called the local Building Official or Project Engineer to obtain all code and loading information for this specific building site

The steel design is in accordance with VP BUILDINGS standard design practices, which have been established based upon pertinent procedures and recommendations of the following organizations :

American Institute of Steel Construction (AISC)
American Iron and Steel Institute (AISI)
American Welding Society (AWS)
American Society for Testing and Materials (ASTM)
Canadian Standards Association
CSA W59-Welded Steel Construction
Limit State Design of Steel Structures
Metal Building Manufacturers Association (MBMA)
VP Buildings is certified by:
- AISC-MB Certified (Design and Manufacturing)
- CSA A660 Certified (Design and Manufacturing)
- IAS Approved Fabricator
- Canadian Welding Bureau Div 1 Certified



POWER PLAN (A) E-3

1/8" = 1'- 0"

PANEL 'PP1' 277 /480 VOLT 3 PHASE 4 WIRE 400 AMPERE MAIN L.O. : 400 AMPERE BUS

LOCATION CONTROL ROOM MOUNTING SURFACE A.I.C. 22,000

CKT	LOAD LINE A	LOAD LINE B	LOAD LINE C	LOAD DESCRIPTION	CIRCUIT BREAKER POLES	TRIP	BUS A B C	CIRCUIT BREAKER TRIP	POLES	LOAD DESCRIPTION	LOAD LINE A	LOAD LINE B	LOAD LINE C	CKT
1	2070			EPN 9 & 12	2	15		15	3	ADD. ROTARY FDRL	270			2
3		2070		-								270		4
5			2880	LIGHTS	1	20							270	6
7	1540			VIBRATORY CONVEY.	3	15		15	3	ADD. ROTARY FDRL	270			8
9		1540										270		10
11			1540										270	12
13	3480			XFMR TLP1'	3	100		100	3	PNL 'PP1A'	6120			14
15		1540										3600		16
17			1830										3600	18
19	-			BUSSED SPACE	1	-		-	1	BUSSED SPACE	-			20
21		-										-		22
23			-										-	24
25	-										-			26
27		-										-		28
29			-										-	30
31														32
33														34
35														36
37														38
39														40
41														42
				SUB TOTALS										

NOTES:

	LINE A	LINE B	LINE C
LINE TOTALS	1880	2070	2410
LCL ADDER	480	480	120
TOTAL	2360	2550	2530
LINE AMPS	67		
TOTAL KVA LOAD		44.1	

PANEL PP1A 277 /480 VOLT 3 PHASE 4 WIRE 200 AMPERE MAIN - : 200 AMPERE BUS

LOCATION - MOUNTING SURF A.I.C. -

CKT	LOAD LINE A	LOAD LINE B	LOAD LINE C	LOAD DESCRIPTION	CIRCUIT BREAKER POLES	TRIP	BUS A B C	CIRCUIT BREAKER TRIP	POLES	LOAD DESCRIPTION	LOAD LINE A	LOAD LINE B	LOAD LINE C	CKT
1	2880			CANOPY LIGHTS	2	20		20	1	HEAT TRACE	1800			2
3		2880		CANOPY LIGHTS						SPARE		-		4
5			3220	FLOOD LIGHTS	1	20							-	6
7	-			SPARE							-			8
9		-										-		10
11			-										-	12
13														14
15														16
17														18
19														20
21														22
23														24
25														26
27														28
29														30
31														32
33														34
35														36
37														38
39														40
41														42
				SUB TOTALS										

NOTES:

	LINE A	LINE B	LINE C
LINE TOTALS	5480	2880	3220
LCL ADDER	720	720	800
TOTAL	6120	3600	4020
LINE AMPS	22		
TOTAL KVA LOAD		13.1	

PANEL 'LP1' 120 /208 VOLT 3 PHASE 4 WIRE 200 AMPERE MAIN C.B. : 225 AMPERE BUS

LOCATION CONTROL ROOM MOUNTING SURFACE A.I.C. -

CKT	LOAD LINE A	LOAD LINE B	LOAD LINE C	LOAD DESCRIPTION	CIRCUIT BREAKER POLES	TRIP	BUS A B C	CIRCUIT BREAKER TRIP	POLES	LOAD DESCRIPTION	LOAD LINE A	LOAD LINE B	LOAD LINE C	CKT
1	1360			EXIST GARAGE DOOR OPER.	1	20		20	1	EXIST GAR. DOOR OPER.	1360			2
3		720		NEW RECEPTS						SPARE		-		4
5			540	NEW RECEPTS						SPARE			-	6
7	540			EXIST RECEPTS						EXIST RECEPTS	900			8
9		360		NEW RECEPTS						EXIST BAGHOUSE CONTR.		360		10
11			900	EXIST BAGHOUSE CONTR.						EXIST EXTER. LIGHTS			630	12
13	840			EXIST EXTER. LIGHTS						EXIST RECEPTS	360			14
15		360		NEW RECEPTS						SPARE		-		16
17			-	SPARE									-	18
19	360			EXIST CONTR. RM LIGHTS							-			20
21		-		SPARE								-		22
23			-										-	24
25	-										-			26
27		-										-		28
29			-										-	30
31														32
33														34
35														36
37														38
39														40
41														42
				SUB TOTALS										

NOTES:

	LINE A	LINE B	LINE C
LINE TOTALS	3280	1540	1670
LCL ADDER	280	-	-
TOTAL	3480	1540	1670
LINE AMPS	46		
TOTAL KVA LOAD		9.2	

NOTES (THIS SHEET ONLY)

(1) EXISTING AREA TO REMAIN EXCEPT AS NOTED.

OWNER APPROVED

DATE:

REVISION

PREPARED FOR THE EXCLUSIVE USE OF:

MAXIM ELECTRICAL CONTRACTORS
JON KING
OFF: 702-633-8800
CELL: 702-376-4036
FAX: 702-399-5737
1306 W. CRAIG RD. ST. 'F'
BOX 181, N. LV, NV 89032
maximelectric@yahoo.com
maximelectric@cox.net

THE ENGINEER OF RECORD HAS PERFORMED ALL DESIGN WORK REGARDING ELECTRICAL CALCULATIONS AND SHOWN ON THESE PLANS PROVIDES COMPLY WITH NEC 810-16(a) PPM NO. 4

ELECTRICAL ENGINEERING
OFF: (702) 451-0148
FAX: (702) 451-2860
5229 JAROM STREET
LV NV 89120
I2K INC.

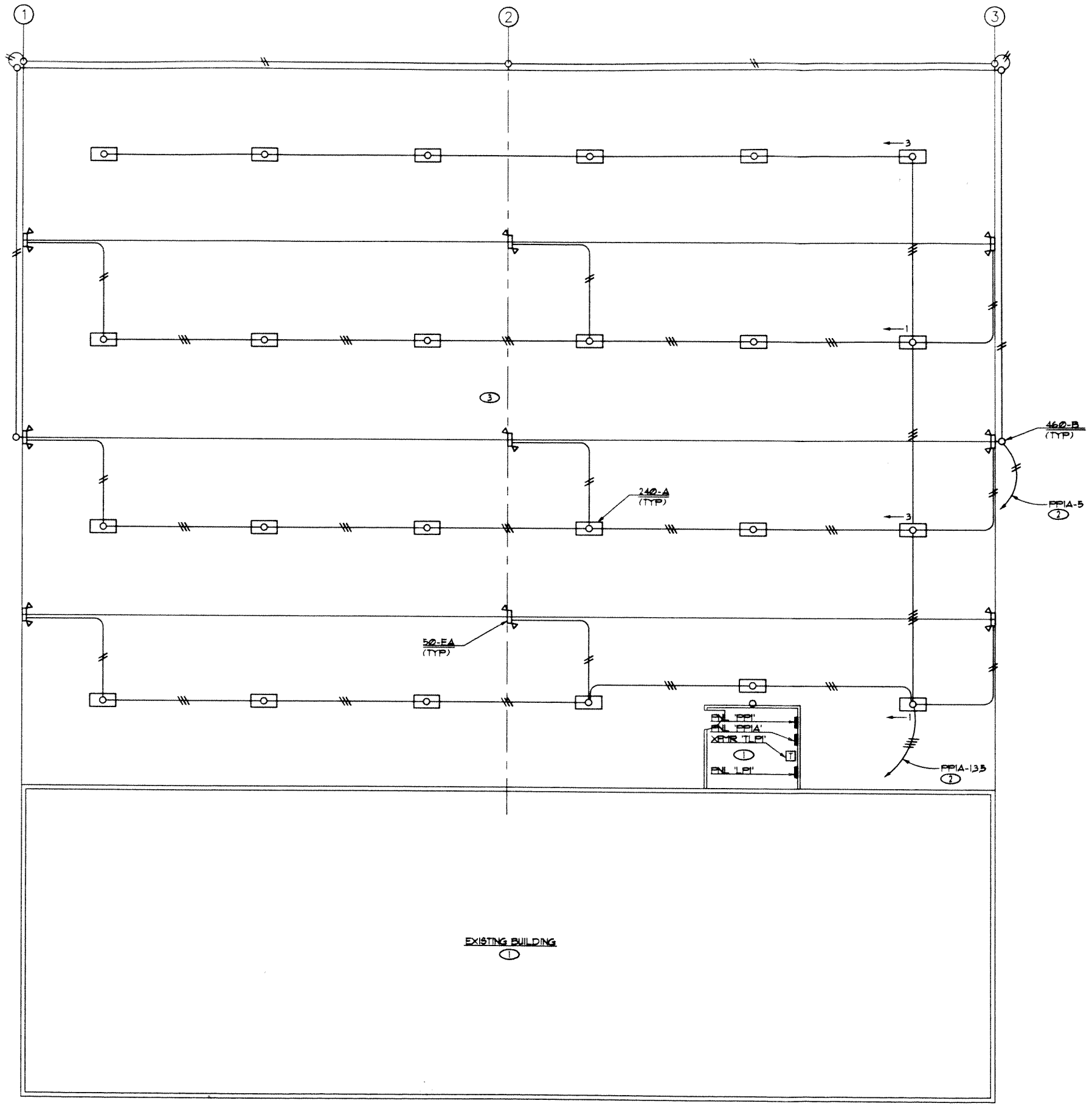
US ECOLOGY
CANOPY ADDITION
BEATTY, NEVADA

POWER PLAN

DATE :
SCALE
DRAWN
JOB
SHEET

E-3

OF SHEETS



LIGHTING PLAN (A / E-2)
1/8" = 1'- 0"

NOTES (THIS SHEET ONLY)

1. EXISTING AREA TO REMAIN EXCEPT AS NOTED.
2. ALL LIGHTING WILL BE CONTROLLED IN CONTROL ROOM BY TIME SWITCH SYSTEM.
3. ENTIRE CANOPY AREA IS ELECTRICALLY NON-HAZARDOUS PER THE OWNER.

OWNER APPROVED

DATE:

REVISION

PREPARED FOR THE EXCLUSIVE USE OF:

MAXIM ELECTRICAL CONTRACTORS
JON KING
OFF: 702-633-8800
CELL: 702-376-4036
FAX: 702-399-5737
1306 W. CRAIG RD. ST. 'E'
BOX 181 N. L.V., NV 89032
maximelectric@yahoo.com
maximelectric@cox.net

THE ENGINEER OF RECORD HAS PERFORMED ALL REQUIRED VOLTAGE DROP AND FAULT CURRENT CALCULATIONS AND ALL BRANCH CIRCUITS AND FEEDERS COMPLY WITH NEC 210-19(a) FPN NO. 4

H2A INC.
ELECTRICAL ENGINEERING
OFF: (702) 451-0146
FAX: (702) 451-2650
5229 JAROM STREET
LV NV 89120

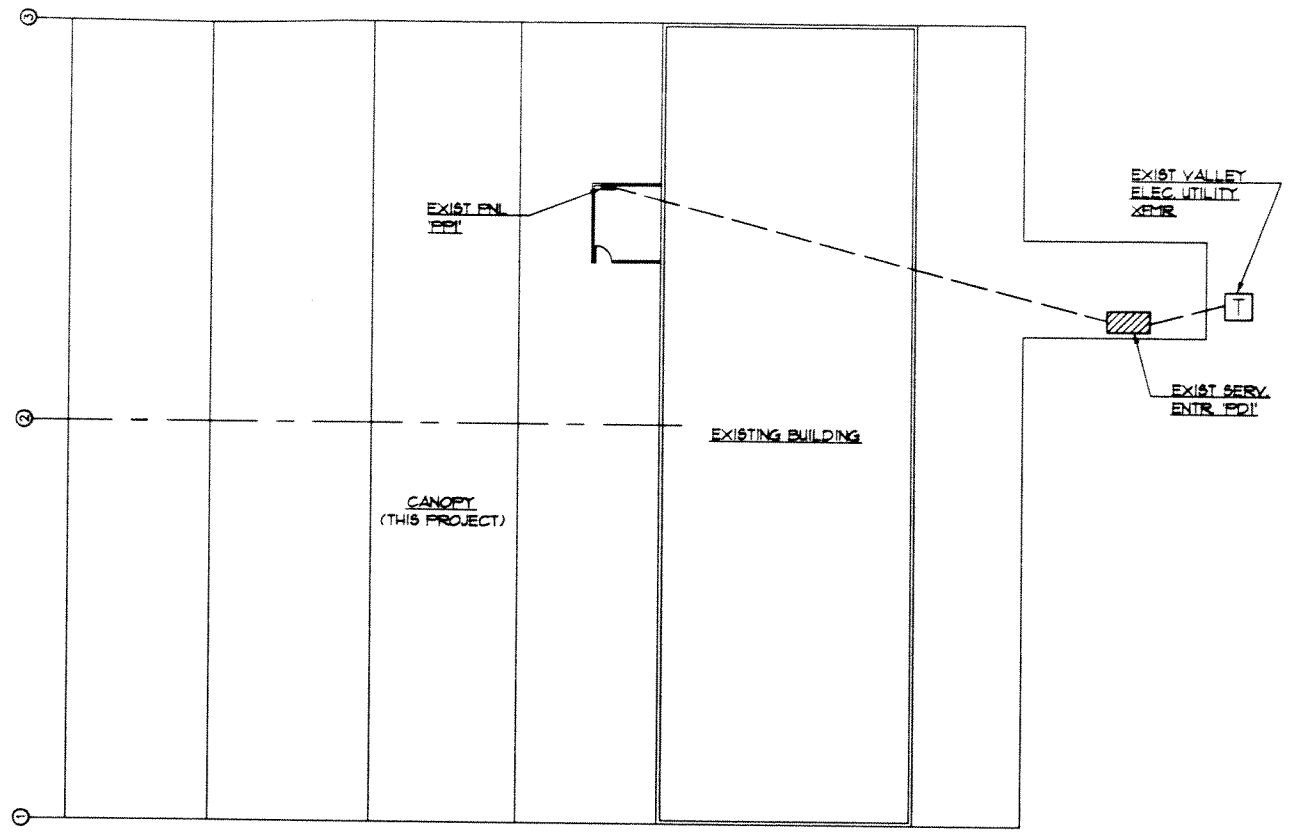
US ECOLOGY
CANOPY ADDITION
BEATTY, NEVADA

LIGHTING POWER

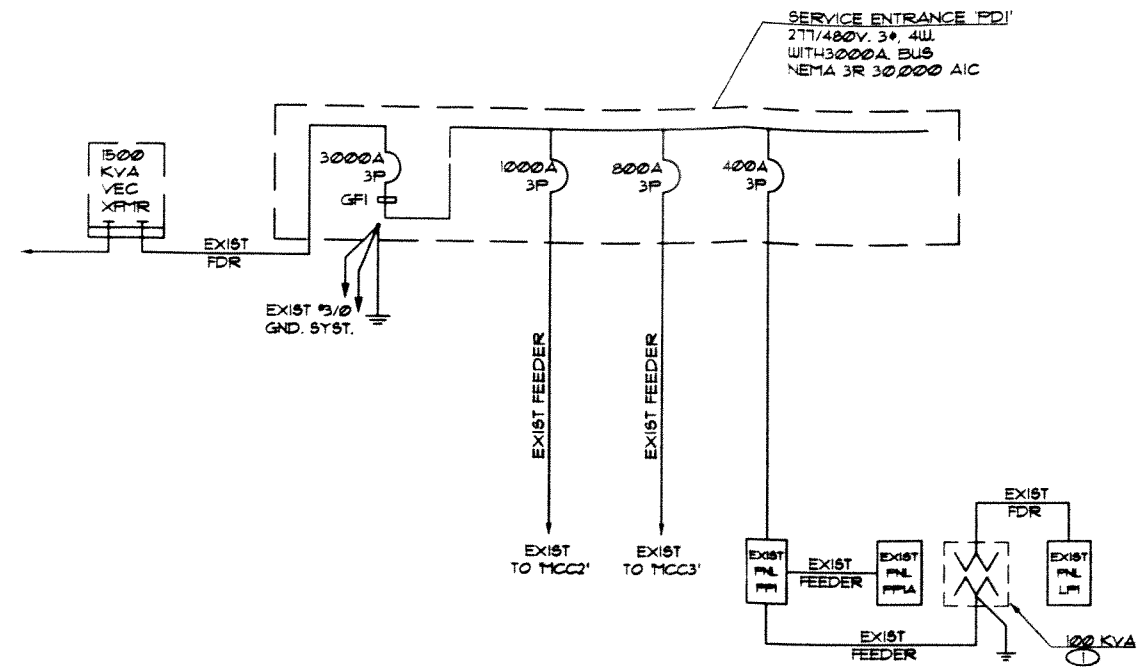
DATE :
SCALE
DRAWN
JOB
SHEET

E-2

OF SHEETS



LOCATION PLAN (A / E-1)
1/16" = 1'- 0"



SINGLE LINE DIAGRAM (1 / E-1)
NO SCALE

FIXTURE SCHEDULE

FIXT. TYPE	MANUFACTURER OR EQUAL NAME	MANUFACTURER OR EQUAL CATALOG NUMBER	WATTS	EFFICACY	MTG.	MTG. HT.	LAMP TYPE	REMARKS	VOLTS
A	LITHONIA	1B-454L-WDS-277-T5HO	240	81	SURF	+22'-0"	4-F54 TFHO	FLUORESCENT HIGH-BAY	277V
B	LITHONIA	TFR400M-TA-TB-IS-LP1	460	75	ROOF	-	400W METAL HALIDE	FLOOD LIGHT & BRACKETS	480V
EA	LITHONIA	ELM2	50	-	WALL	VERIFY	FURN. W/UNIT	EMERGENCY LIGHTING UNIT WITH DUAL LIGHT HEADS	277V

OWNER APPROVED

DATE:

REVISION

PREPARED FOR THE EXCLUSIVE USE OF:

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H2A INC.
ELECTRICAL ENGINEERING
OFF: (702) 451-0146
FAX: (702) 451-2850
5229 JAROM STREET
LV NV 89120

US ECOLOGY
CANOPY ADDITION
BEATTY, NEVADA

LOCATION PLAN, SINGLE LINE DIAGRAM

DATE :
SCALE
DRAWN
JOB
SHEET

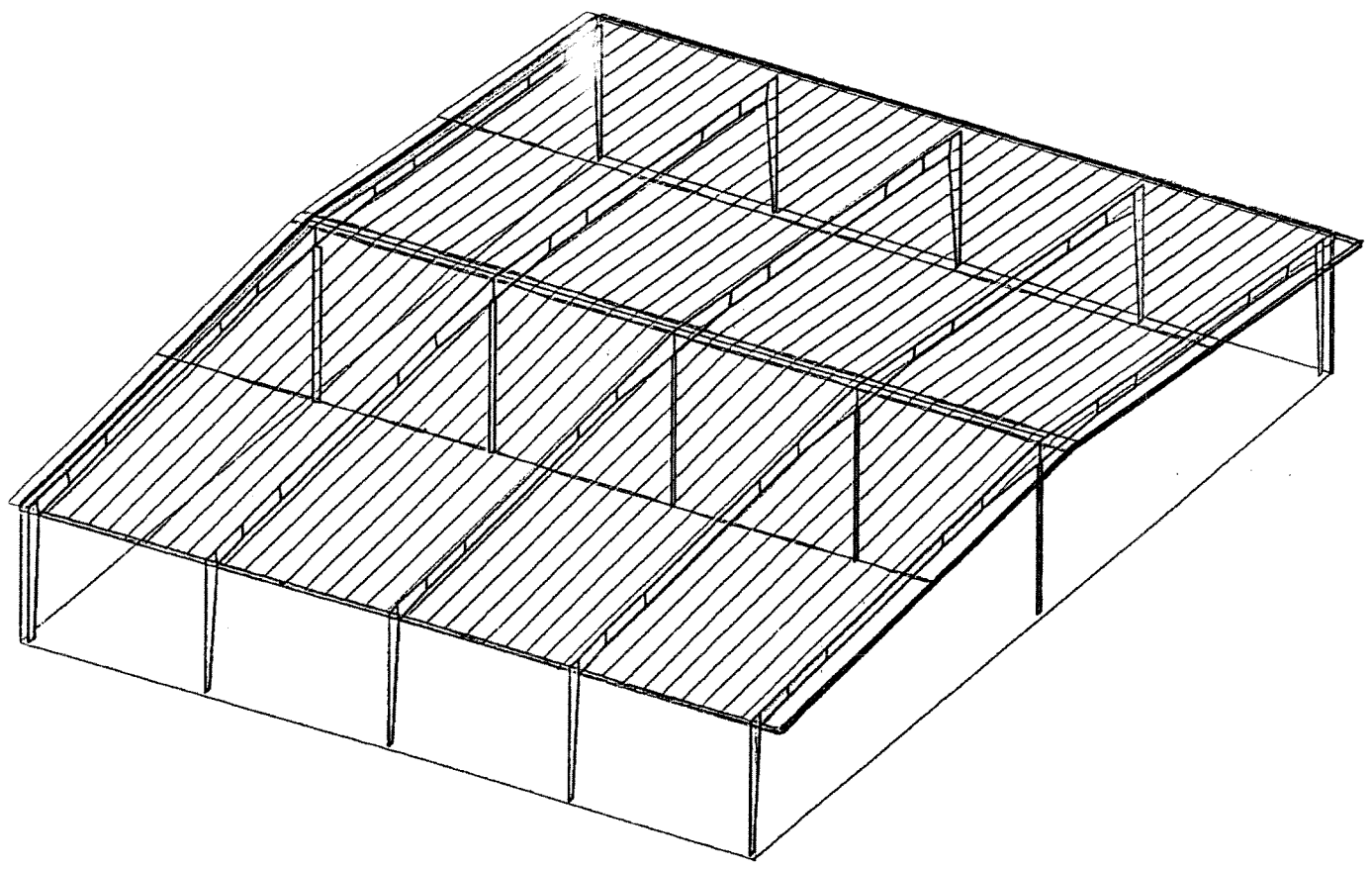
E-1

OF SHEETS

VP BUILDINGS
VARCO-PRUDEN

DRAWING INDEX	
DRAWING TITLE	PAGES
Cover Sheet	1
Notes	2
Anchor Rod Plan	3-4
Primary Structural	
Secondary Structural	
Covering	
Special Drawings	
Standard Erection Details	

DRAWING RELEASE HISTORY		
TYPE	DATE	DESCRIPTION
AR PLAN	12/8/2006	FOR CONSTRUCTION



VP Buildings, Inc. 3200 Players Club Circle Memphis TN 38125

GENERAL NOTES

MATERIALS

	ASTM DESIGNATION	
3 PLATE WELDED SECTIONS	A529, A572. A1011 SS	GRADE 50
COLD FORMED LIGHT GAGE SHAPES	A1011 SS	GRADE 55
BRACE RODS	A572	GRADE 65
HOT ROLLED MILL SHAPES	A36, A572. A529. A992	GRADE 36 KSI OR GRADE 50
HOLLOW STRUCTURAL SECTION (HSS)	A500	GRADE B
CLADDING	A653, A792	GRADE 50 CLASS 2 OR GRADE 80

A325 BOLT TIGHTENING REQUIREMENTS

IT IS THE RESPONSIBILITY OF THE ERECTOR TO INSURE PROPER BOLT TIGHTNESS IN ACCORDANCE WITH APPROPRIATE REGULATIONS THE FOLLOWING CRITERIA IS IN COMPLIANCE WITH THE LATEST SPECIFICATIONS. HOWEVER THE ERECTOR IS RESPONSIBLE TO VERIFY LOCAL AUTHORITY REQUIREMENTS.
ALL CONNECTIONS MADE WITH A325 BOLTS MAY BE TIGHTENED TO THE "SNUG TIGHT" CONDITION AS PERMITTED BY THE SPECIFICATION FOR STRUCTURAL JOINTS USING A325 OR A490 BOLTS (2004 ED). UNLESS INDICATED AS "PRE-TENSIONED" ELSEWHERE IN THESE DRAWINGS. OR AS INDICATED BELOW

PRE-TENSION BOLTS ON PRIMARY FRAMING, BOLTED BRACING, AND STRUT CONNECTIONS IF LOCATED IN IBC SEISMIC PERFORMANCE / DESIGN CATEGORY D, E OR F, UBC ZONE 3 OR 4. NBCC ZONES 3 OR GREATER SEE CODES AND LOADS NOTES BELOW FOR SEISMIC DESIGN CATEGORY.

PRE-TENSION BOLTS ON PRIMARY FRAMING. BOLTED BRACING, STRUTS AND CRANE RUNWAY CONNECTIONS IF BUILDING SUPPORTS A CRANE WITH A CAPACITY GREATER THAN 5 TONS

CONNECTIONS THAT SUPPORT RUNNING MACHINERY AND OTHER SOURCES OF IMPACT OR STRESS REVERSAL MUST BE PRE-TENSIONED.

ALL SLIP CRITICAL CONNECTIONS AS INDICATED IN THESE DRAWINGS WITH -SC DESIGNATION MUST BE PRE-TENSIONED SC TYPE CONNECTIONS MUST BE FREE OF PAINT. OIL OR OTHER MATERIALS THAT REDUCE THE FRICTION AT CONTACT SURFACES

SECONDARY MEMBERS AND FLANGE BRACE CONNECTIONS ARE ALWAYS "SNUG TIGHTENED". EVEN IF ABOVE CONDITIONS EXIST, UNLESS SPECIFICALLY NOTED OTHERWISE ON DETAILS
WASHERS ARE NOT REQUIRED FOR "SNUG-TIGHT" CONNECTIONS PRE-TENSIONED CONNECTIONS TIGHTENED USING THE TURN-OF-THE-NUT METHOD DO NOT REQUIRE WASHERS

CODES AND LOADS

WHEN MULTIPLE BUILDINGS ARE INVOLVED, SPECIFIC LOAD FACTORS FOR DIFFERING OCCUPANCIES. BUILDING DIMENSIONS. HEIGHTS, FRAMING SYSTEMS, ROOF SLOPES. ETC., MAY RESULT IN DIFFERENT LOAD APPLICATION FACTORS THAN INDICATED BELOW SEE CALCULATIONS FOR FURTHER DETAILS

Building Code: 2003 International Building Code
Container Management: Building Use:Standard Occupancy Structure, Collateral Gravity: 7 00 psf (Not Including bldg wt)
LIVE LOADS AND RAINFALL
Live Load 20.00 psf (Reducible)
Rainfall: 4.00 inches per hour

SNOW LOAD
Ground Snow: 5.00 psf, Flat Roof Snow: 3 85 psf
Snow Exposure Category (Factor): 2 Partially Exposed (1.00)
Snow Importance: 1 000 Thermal Category (Factor): Kept just above freezing (1 10)

WIND LOAD
Wind Speed: 90 00 mph, Wind Exposure: B
Basic Wind Pressure: 12 35 psf
Wind Importance Factor: 1.000, Ft= Topographic Factor: 1 0000
Wind Enclosure: Partially Enclosed, 0.550
Note: All windows, doors, skylights and other covered openings must be designed for the specified above wind loads

EARTHQUAKE DESIGN DATA
Lateral Force Resisting Systems using Equivalent Force Procedure
Mapped Spectral Response - Ss:87.00 %g. S1:30 00 %g
Seismic Hazard / Use Group: Group 1
Seismic Performance / Design Category: D (See Bolt Tightening Note Above)
Seismic Snow Load: 0.00 psf
Seismic Importance: 1.000
Soil Profile Type: Stiff soil (D, 4)
Design Spectral Response - Sds: 0 6682. Sd1: 0 3600

Ordinary Steel Moment Frames
Frame Redundancy Factor:1 3744
Framing R-Factor: 3.5000, Frame Seismic Factor (%s): 0.1909. Design Base Shear = 0 1909 W
Ordinary Steel Concentric Braced Frames
Brace Redundancy Factor:1 5000
Bracing R-Factor: 3.5000. Brace Seismic Factor (%s): 0 1909. Design Base Shear = 0 1909 W

REVIEWED BY: KPT 12/08/06

THE VP ENGINEER'S SEAL APPLIES ONLY TO THE WORK PRODUCT OF VP AND DESIGN AND PERFORMANCE REQUIREMENTS SPECIFIED BY VP. THE VP ENGINEER'S SEAL DOES NOT APPLY TO THE PERFORMANCE OR DESIGN OF ANY OTHER PRODUCT OR COMPONENT FURNISHED BY VP EXCEPT TO ANY DESIGN OR PERFORMANCE REQUIREMENTS SPECIFIED BY VP

THIS DRAWING, INCLUDING THE INFORMATION HEREON, REMAINS THE PROPERTY OF VP BUILDINGS.

IT IS PROVIDED SOLELY FOR ERECTING THE BUILDING DESCRIBED IN THE APPLICABLE PURCHASE ORDER AND SHALL NOT BE MODIFIED, REPRODUCED OR USED FOR ANY OTHER PURPOSE WITHOUT PRIOR WRITTEN APPROVAL OF VP BUILDINGS.

THE GENERAL CONTRACTOR AND/OR ERECTOR IS SOLELY RESPONSIBLE FOR ACCURATE, GOOD QUALITY WORKMANSHIP IN ERECTING THIS BUILDING IN CONFORMANCE WITH THIS DRAWING, DETAILS REFERENCED IN THIS DRAWING, ALL APPLICABLE VP BUILDINGS ERECTION GUIDES, AND INDUSTRY STANDARDS PERTAINING TO PROPER ERECTION, INCLUDING THE CORRECT USE OF TEMPORARY BRACING.

CANICSA A660 QUASAR Certified

VP BUILDINGS, INC.
AISC CATG. MB CERTIFIED

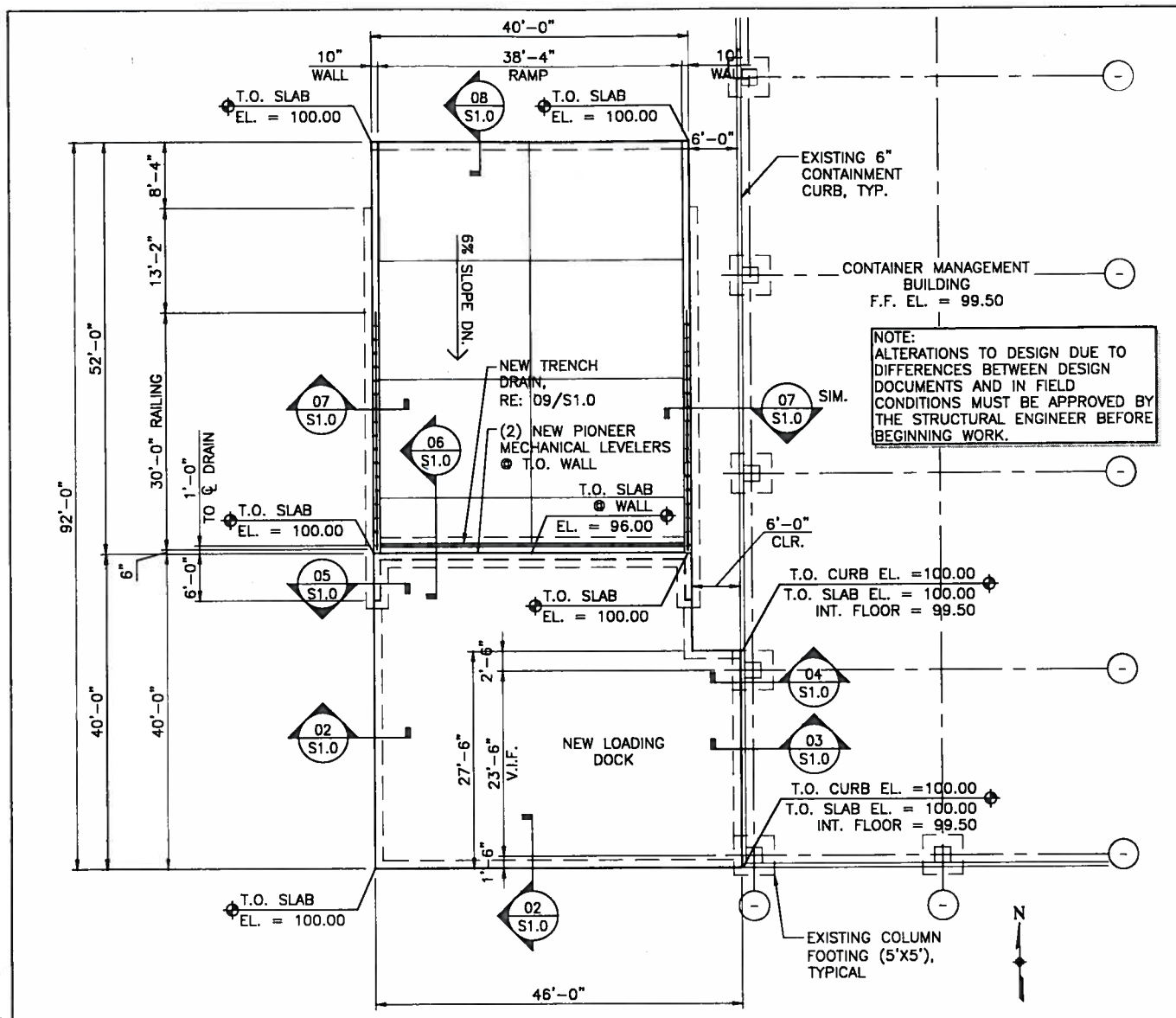
BUILDER	RSCI
CUSTOMER	
LOCATION	Beatty, Nevada
PROJECT	US Ecology Container Management
BUILDERS POs	

COVER SHEET

VP BUILDINGS VARCO-PRUDEN
VPC VERSION: 5 6a

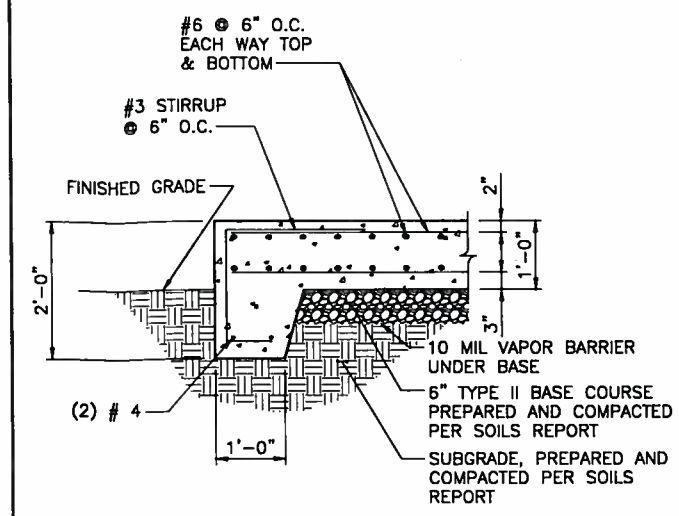
JOB #	CA0601917-02
DATE	12/8/2006
DRAWN / CHECK	AH
PAGE	1

12/8/2006 10:29:45 FILENAME: CA0601917-02OE1 VPC



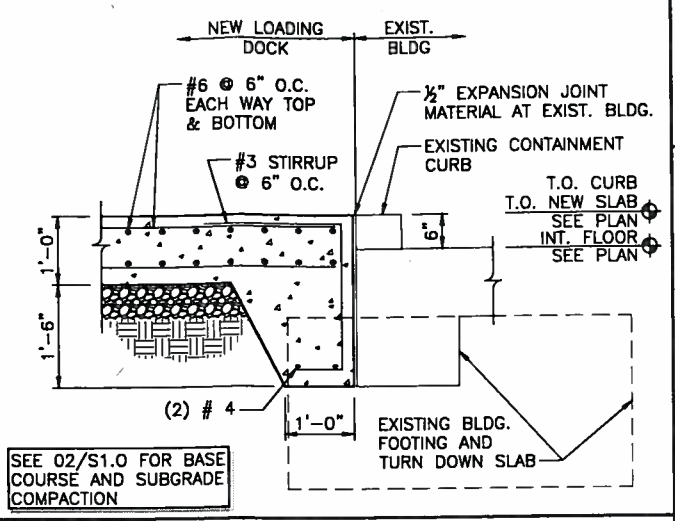
01 PROPOSED CONTAINER MANAGEMENT BUILDING TRUCK LOADING DOCK 1

1" = 10'-0"



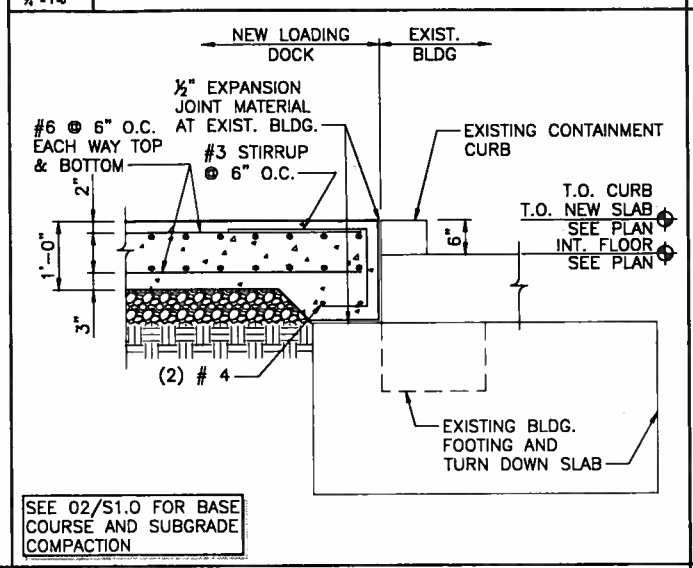
02 LOADING DOCK SLAB TURN DOWN 1

½" = 1'-0"



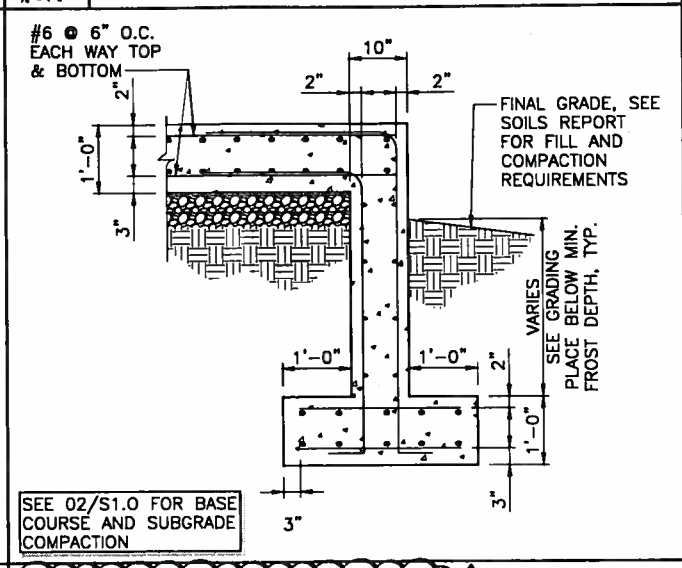
03 LOADING DOCK SLAB AT EXISTING BUILDING

½" = 1'-0"



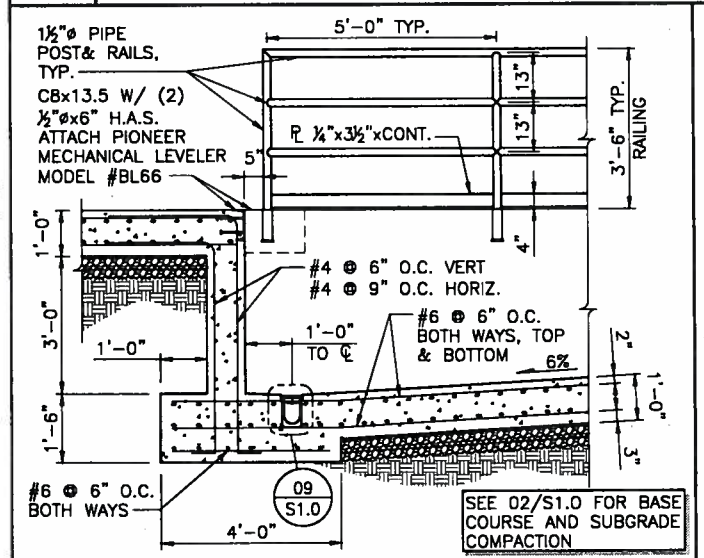
04 NEW LOADING DOCK SLAB OVER EXISTING FOOTING

½" = 1'-0"



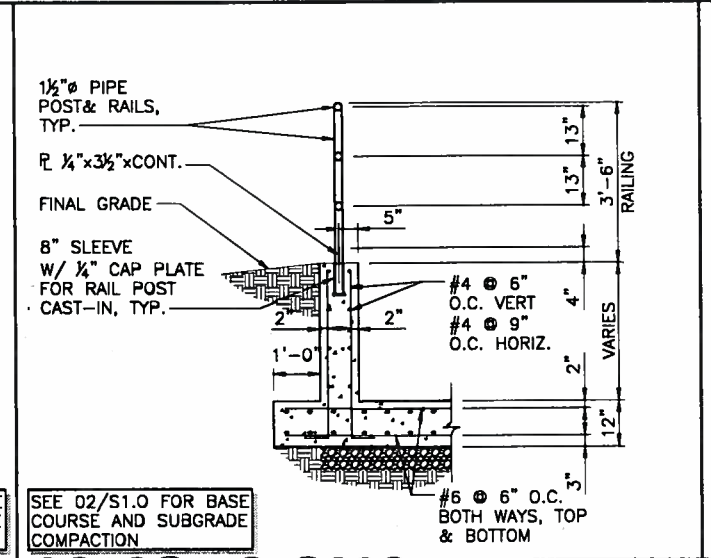
05 LOADING DOCK AT RETAINING WALL 1

½" = 1'-0"



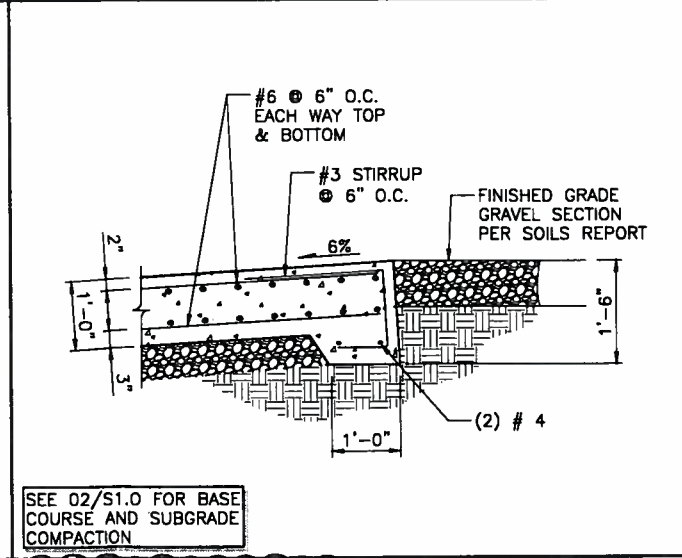
06 SECTION AT RAMP 1

½" = 1'-0"



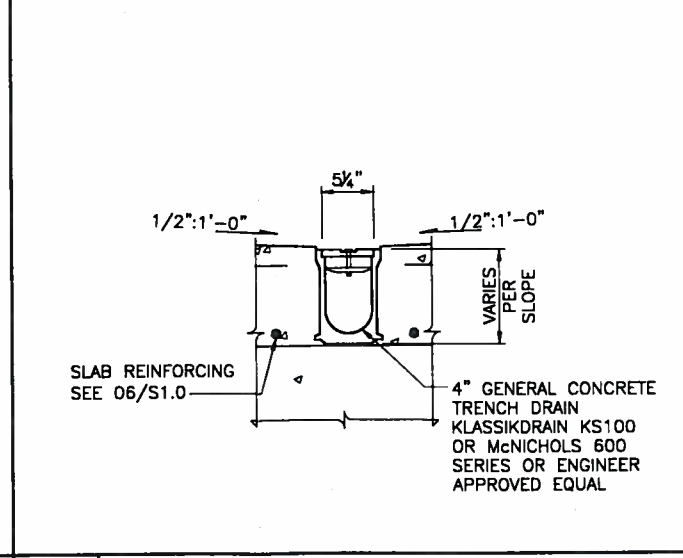
07 SECTION AT RAMP & RAILING 1

½" = 1'-0"



08 SECTION AT TRUCK RAMP 1

½" = 1'-0"



09 TRENCH SUMP DETAIL

N.T.S.

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REV NO.	DATE	REVISION RECORD
1	05-28-13	PROJECT COORDINATION

benesch
engineers • scientists • planners
1700 Broadway, Suite 1512
Denver, CO 80290
(303) 620-0098

Drawn By:	DAK
Checked By:	JPI
Approved By:	JPI
Date: 05/02/2013	
Project No.	00150513.00

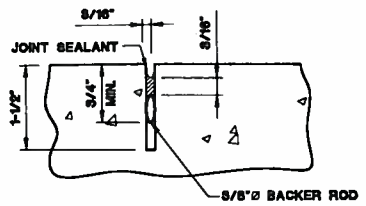
USEcology, Inc.
BEATTY, NV FACILITY
CONTAINER MANAGEMENT BUILDING

PROPOSED TRUCK LOADING DOCK PLAN

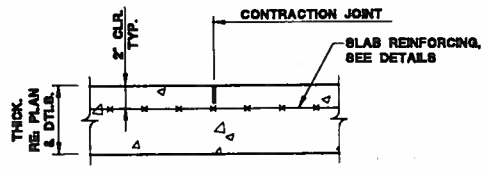
Sheet No. S1.0

DRAWER NO. 150513.00
2 OF 2

F:\2012\01 BENESCH\00150513.00- US Ecology Project\drawings\20130528-REVISIONS\CMS TRUCK DOCK\150513.00 - USEN CMS Truck Ramp.dwg - Current tab: S1.0 - Print Time: Wed, 29 May 2013 - 11:50am By: dkrell Last Save: Wed, 29 May 2013 - 11:50am



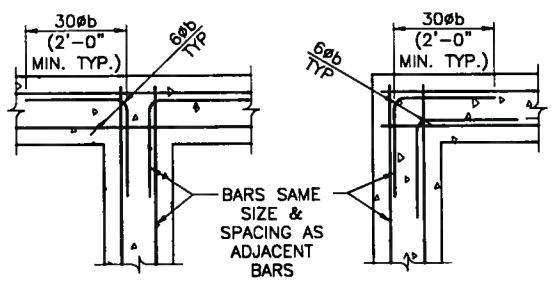
SEAL @ CONTR. & CONST. JOINTS



CONTRACTION JOINT

01 TYPICAL CONTRACTION & CONSTRUCTION JOINTS

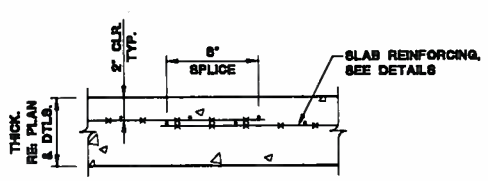
N.T.S.



INTERSECTIONS CORNERS

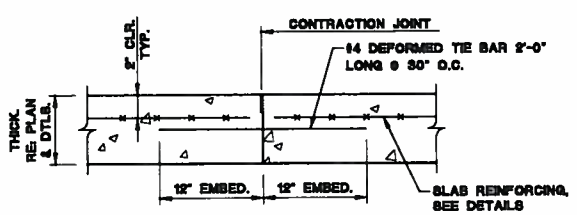
02 TYPICAL CORNER BAR DETAILS

N.T.S.



NOTE:
NO CONTRACTION JOINTS SHALL BE PERMITTED WITHIN LIMITS OF THE SPLICE.

TYPICAL REINFORCEMENT SPLICE



TYPICAL CONSTRUCTION JOINT

03 TYPICAL SPLICE DETAIL & CONSTRUCTION JOINTS

N.T.S.

GENERAL STRUCTURAL NOTES

GENERAL:

1. STRUCTURAL DESIGN IS BASED ON THE 2009 INTERNATIONAL BUILDING CODE (2009 I.B.C.)
2. ELEVATIONS SHOWN ON CONCRETE OR STEEL MEMBERS ARE TO THE TOP OF THE MEMBER, UNLESS NOTED OTHERWISE.
3. THE CONTRACTOR SHALL BRACE AND SHORE NEW AND EXISTING STRUCTURES AS REQUIRED TO PREVENT DAMAGE OR COLLAPSE DUE TO WIND, EARTH, CONSTRUCTION OR OTHER LOADS.
4. SECTION MARKS ARE SHOWN ONLY ONCE ALONG EACH STRUCTURAL ELEMENT UNLESS SPECIFICALLY EXCEPTED, THE SECTION MARK APPLIES TO THE TOTAL LENGTH OF THAT LINE AND ANY OTHER LINES OR ELEMENTS OF SYMMETRICAL OR SIMILAR POSITION.
5. ALL EXISTING UTILITY LOCATIONS SHALL BE VERIFIED WITH AVAILABLE CIVIL, UTILITY, MECHANICAL, ELECTRICAL, PLUMBING DRAWINGS, AND UTILITY ENTITIES PRIOR TO CONSTRUCTION.
6. ANY CHANGES IN THE DESIGN REQUESTED BY THE CONTRACTOR AND REQUIRING EVALUATION BY THE DESIGN ENGINEER OF RECORD, SHALL BE SUBJECT TO AN ADDITIONAL REVIEW FEE, PAID TO THE DESIGNER AND CHARGED AT THE RATE OF $145.00 PER HOUR.
7. ANY MODIFICATION OR ALTERATION OF THESE CONSTRUCTION DOCUMENTS OR CHANGES IN CONSTRUCTION FROM THE INTENT OF THESE DOCUMENTS BY THE CONTRACTOR WITHOUT PRIOR WRITTEN APPROVAL OF THE ENGINEER SHALL REMOVE ALL PROFESSIONAL RESPONSIBILITY AND LIABILITY ON THE PART OF THE ENGINEER.

DESIGN CRITERIA:

THE STRUCTURAL DESIGN WAS BASED ON THE DESIGN CRITERIA:

1. BUILDING CODE: 2009 INTERNATIONAL BUILDING CODE
2. BUILDING OCCUPANCY CATEGORY: II
3. FLOOR LIVE LOAD: 100 PSF
4. ROOF DEAD LOAD: N/A
5. ROOF LIVE LOAD: N/A
6. GROUND SNOW LOAD, p_g: 30 PSF
   6.1. SNOW LOAD IMPORTANCE FACTOR, I_s: 1.0
   6.2. SNOW EXPOSURE FACTOR, C_e: 1.0
   6.3. THERMAL COEFFICIENT, C_t: 1.0
7. WIND LOAD
   7.1. BASIC WIND SPEED (3-SECOND GUST): 90 MPH
   7.1. WIND IMPORTANCE FACTOR, I_w: 1.0
   7.2. WIND EXPOSURE: C
   7.3. PRESSURES PER ASCE 7-05
8. SEISMIC LOAD:
   8.1. SEISMIC DESIGN CATEGORY: D
   8.1. SITE CLASS: D
   8.2. LATITUDE: 36.77
   8.3. LONGITUDE: -116.69
   8.4. S_{DS} = 0.586 g
   8.5. S_{D1} = 0.354 g
9. MECHANICAL UNITS: N/A
10. SPECIAL LOADS: HS-20 TRUCK

FOUNDATION AND SOILS:

GEOTECHNICAL REPORT INFORMATION:

SOIL REPORT BY: CESARE, INC.
REPORT NUMBER: 12.1121A
DATE: NOVEMBER 19, 2012

1. MINIMUM ALLOWABLE SOIL BEARING CAPACITY FOR DEEP FOUNDATION = 2500 PSF (3,500 MAX.), WITH A 25% INCREASE WHEN TRANSIENT LOADS ARE INVOLVED.
2. NOTE – FOR FOUNDATIONS ADJACENT TO RETENTION AREAS OR PLANTERS, PROVIDE MIN. 8" OF ADDITIONAL EMBEDMENT.
3. ALL EARTHWORK, FOOTING DEPTHS, AND EXCAVATIONS FOR FOUNDATIONS SHALL BE INSPECTED BY SOILS ENGINEER LICENSED IN THE STATE OF NEVADA TO VERIFY ASSUMED ALLOWABLE SOIL BEARING AND LOW SETTLEMENT AND SWELL POTENTIAL, AND TO MAKE ANY ADDITIONAL RECOMMENDATIONS.
4. EARTHWORK PREPARATION REQUIRED BELOW SLABS ON GRADE OR FOOTINGS SHALL BE PERFORMED AS REQUIRED BY THE SOILS REPORT AND NOTED IN THE ENGINEERING ANALYSIS AND RECOMMENDATIONS SECTION.
5. ALL EXTERIOR FOOTINGS SHALL EXTEND BELOW THE MAXIMUM ANTICIPATED DEPTH OF FROST.
6. THE CONTRACTOR SHALL NOTIFY THE ARCHITECT OR ENGINEER OF RECORD IMMEDIATELY IN THE EVENT THAT THE SOILS CONDITIONS ENCOUNTERED VARY FROM THOSE SHOWN ON THE BORING LOGS.
7. ALL FOUNDATION EXCAVATIONS SHALL BE INSPECTED BY A SOILS TESTING LABORATORY PRIOR TO PLACEMENT OF CONCRETE.

REINFORCED CONCRETE:

1. ALL CONCRETE SHALL BE IN ACCORDANCE WITH THE "AMERICAN CONCRETE INSTITUTE BUILDING CODE" (ACI 318) AND WITH "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS" (ACI 301) LATEST EDITIONS.
2. USE OF EXTENDED SET ADMIXTURES FOR LONG HAUL DURATIONS PER ACI EDUCATION BULLETIN E4-03.
3. ALL NORMAL WEIGHT CONCRETE (145 PCF) SHALL OBTAIN THE FOLLOWING MINIMUM 28 DAY COMPRESSIVE STRENGTHS (f'_c)
   SLABS ON GRADE 4,500 PSI
   FOOTINGS & GRADE BEAM 4,500 PSI
4. ALL CONCRETE SUBJECT TO EXTERIOR EXPOSURE SHALL BE AIR ENTRAINED AS RECOMMENDED BY ACI 318.
5. PORTLAND CEMENT SHALL BE TYPE V. MAXIMUM W/C RATIO = .45.
6. ALL DETAILING, FABRICATION AND ERECTION OF REINFORCING BARS SHALL COMPLY WITH THE CURRENT ACI "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES" (ACI 315) AND THE CURRENT EDITION OF THE CRSI "MANUAL OF STANDARD PRACTICE".
7. MINIMUM CONCRETE PROTECTION (COVER) FOR REINFORCING STEEL SHALL CONFORM TO THE FOLLOWING:
   7.1. CONCRETE PLACED AGAINST EARTH: 3"
   7.2. CONCRETE EXPOSED TO EARTH OR WEATHER:
      #6 AND LARGER BARS: 2"
      #5 BAR, W31 OR D31 WIRE, AND SMALLER: 1-1/2"
   7.3. NOT EXPOSED TO WEATHER OR IN CONTACT WITH GROUND:
      SLABS, WALLS, JOISTS (INTERIOR FACE): 3/4"
      BEAMS, COLUMNS (TO TIES OR STIRRUPS): 1-1/2"
8. REINFORCING BARS SHALL CONFORM TO ASTM A-615, GRADE 60, EXCEPT #3 BARS MAY BE GRADE 40.
9. ALL BARS IN CONCRETE WALLS SHALL BE CONTINUOUS AROUND CORNERS OR CORNER BARS OF EQUAL SIZE AND SPACING SHALL BE PROVIDED. TOP MAIN BARS IN BEAMS AND GRADE WALLS SHALL BE SPLICED AT MIDSPAN UNLESS NOTED OTHERWISE. BOTTOM MAIN BARS SHALL BE SPLICED (12" MIN.) AT SUPPORTS.
10. LAP LENGTHS SHALL CONFORM TO THE REQUIREMENTS OF ACI 318 & THE CURRENT EDITION OF THE CRSI "MANUAL OF STANDARD PRACTICE FOR CONDITIONS PRESENT".
11. THE FOLLOWING TABLE GIVES THE MINIMUM LAP SPLICE LENGTH FOR BLACK REINFORCING BARS PLACED IN ACCORDANCE WITH THE PROVISIONS FOUND IN ACI-318. THESE SPLICE LENGTHS SHALL BE INCREASED BY 25% FOR BARS SPACED AT LESS THAN 6" ON CENTER.

CLASS B SPLICE LENGTHS			
BAR SIZE	#4	#5	#6
SPLICE LENGTH FOR 4,500 PSI CONCRETE	2'-8"	3'-4"	4'-0"

12. ALL EXPOSED EDGES OF BEAMS, COLUMNS, WALLS, ETC., SHALL HAVE A 3/4" X 45° CHAMFER.
13. LOCATE CONSTRUCTION JOINTS IN FOUNDATION WALLS AND GRADE BEAMS AT THIRD POINTS BETWEEN POINTS OF BEARING UNLESS OTHERWISE DETAILED, AND PROVIDE 2 X 4 SHEAR KEYS FOR 15% MINIMUM OF CONTACT AREA, AT GRADE BEAMS ONLY
14. ALL TOOLED OR SAWN JOINTS SHALL BE FILLED WITH A NON-TRACKING, SEALANT TYPE DESIGNATED BY OWNER WHERE CONCRETE FLOOR IS EXPOSED.
15. ALL REINFORCING SHOWN BUT NOT OTHERWISE CALLED OUT SHALL BE #5 MINIMUM.
16. PROVIDE (2) #5 ADDITIONAL REINFORCEMENT AROUND EACH SIDE OF EACH OPENING. EXTEND REINFORCEMENT 2'-0" MINIMUM BEYOND EACH FACE OF OPENING.
17. TEST CYLINDERS SHALL BE MADE AND TESTED AS OUTLINED IN CHAPTER 16 OF ACI-301.
18. PROVIDE ALL ACCESSORIES NECESSARY TO SUPPORT REINFORCEMENT AT POSITIONS SHOWN ON THE PLANS AND DETAILS. PLASTIC COATED ACCESSORIES SHALL BE USED IN ALL EXPOSED CONCRETE WORK.
19. THE GENERAL CONTRACTOR SHALL CHECK WITH ARCHITECTURAL, MECHANICAL AND ELECTRICAL DRAWINGS AND THE SUB-CONTRACTORS FOR OPENINGS, SLEEVES, ANCHORS, HANGERS, INSERTS, SLAB DEPRESSIONS AND OTHER ITEMS RELATED TO THE CONCRETE WORK AND SHALL ASSUME RESPONSIBILITY FOR THEIR PROPER LOCATION.
20. ALL POST-INSTALLED ANCHORS IN CONCRETE SHALL CONFORM TO AND FOLLOW THE GUIDELINES SET FORTH IN ICC ES REPORT ESR-1771, DATED MARCH 1, 2007. ALL EPOXY ANCHORS SHALL CONFORM TO AND FOLLOW THE GUIDELINES SET FORTH IN CC ES REPORT ESR-1771, DATED MARCH 1, 2007.
21. CONCRETE SURFACES WILL BE SEALED WITH COROPOXY POLYAMIDE EPOXY (1101 LINE) OR EQUIVALENT SELECTED OR APPROVED BY OWNER.

STRUCTURAL STEEL:

1. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST AISC SPECIFICATIONS AND CODE OF STANDARD PRACTICE.
2. STRUCTURAL STEEL SHALL CONFORM TO THE FOLLOWING ASTM SPECIFICATIONS:
   A. ANCHOR RODS F1554, GRADE 36
   B. STRUCTURAL SHAPES (M, S, C, MC, PLATES) A36
3. ALL WELDING ELECTRODES SHALL BE E70-XX. ALL SHOP AND FIELD WELDING SHALL BE MADE IN ACCORDANCE WITH A.W.S. D1.1 "CODE FOR WELDING IN BUILDING CONSTRUCTION" AND SHALL BE MADE BY CERTIFIED WELDERS.
4. ALL STEEL SHALL BE SHOP PRIMED.

STEEL RAILING:

1. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST AISC SPECIFICATIONS AND CODE OF STANDARD PRACTICE.
2. STRUCTURAL STEEL SHALL CONFORM TO THE FOLLOWING ASTM SPECIFICATIONS:
   A. STRUCTURAL SHAPES (M, S, C, MC, PLATES) A36
   B. STRUCTURAL PIPE A53 GRADE B
3. ALL WELDING ELECTRODES SHALL BE E70-XX. ALL SHOP AND FIELD WELDING SHALL BE MADE IN ACCORDANCE WITH A.W.S. D1.1 "CODE FOR WELDING IN BUILDING CONSTRUCTION" AND SHALL BE MADE BY CERTIFIED WELDERS.
4. ALL RAILING COMPONENTS SHALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION.
5. MAXIMUM SPACING OF RAILING POSTS SHALL BE FIVE FEET (5') ON STRAIGHT ALIGNMENTS, SPACING SHALL BE UNIFORM ALONG ALIGNMENTS.
6. PROVIDE SLIP JOINTS AT STAIRWAY AND RAMP EXPANSION JOINTS OR AT EVERY 24 FEET ON CENTER, MAXIMUM.
7. ALL RAILS AND ADJACENT SURFACES TO IT SHALL BE FREE OF ANY SHARP OR ABRASIVE ELEMENTS. EDGES SHALL HAVE A MINIMUM RADIUS OF ⅛ INCH.
8. ALL FIELD WELDS AS REQUIRED SHALL BE GROUND SMOOTH. GALVANIZED COATING SHALL BE REPAIRED AFTER FIELD WELDING.
9. 90 DEGREE BEND RADIUS TO THE CENTER OF PIPE SHALL BE TWO (2) TO THREE (3) TIMES OF NOMINAL DIAMETER OF THE PIPE.

SPECIAL INSPECTIONS:

1. SPECIAL INSPECTIONS SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 1704 OF IBC AND THE OWNER SHALL EMPLOY ONE OR MORE SPECIAL INSPECTORS TO PROVIDE INSPECTIONS DURING CONSTRUCTION ON THE TYPES OF WORK LISTED UNDER SECTION 1704. THE FOLLOWING AREAS OF WORK REQUIRE SPECIAL INSPECTIONS IN ACCORDANCE WITH THE LISTED 2006 IBC SECTIONS/LOCATIONS:
   A. SOILS – SECTION 1704.7 PER TABLE 1704.7.
   B. CONCRETE – SECTION 1704.4 PER TABLE 1704.4.
   C. STEEL – SECTION 1704.3 PER TABLE 1704.3.

MISCELLANEOUS:

1. ALL DIMENSIONS ON STRUCTURAL DRAWINGS TO BE CHECKED AGAINST ARCHITECTURAL, MECHANICAL AND ELECTRICAL DRAWINGS BY THE GENERAL CONTRACTOR AND ANY DISCREPANCIES ARE TO BE REPORTED TO THE ARCHITECT IMMEDIATELY.
2. THE CONTRACTOR SHALL ASSUME RESPONSIBILITY, UNRELIEVED BY REVIEW OF SHOP DRAWINGS OR PERIODIC OBSERVATION OF CONSTRUCTION, FOR COMPLIANCE WITH THE CONTRACT DOCUMENTS, FOR FABRICATION PROCESSES AND CONSTRUCTION TECHNIQUES, AND FOR SAFE CONDITIONS ON THE JOB SITE.
3. DO NOT SCALE THE DRAWINGS.

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SECTION OR DETAIL IDENTIFICATION
CROSS REFERENCE DRAWING NUMBER
(IF BLANK, REFERENCE IS TO SAME SHEET)

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1	05-28-13	PROJECT COORDINATION

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engineers • scientists • planners
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Date: 05/02/2013
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Drawn By: DAK
Checked By: JPI
Approved By: JPI

USEcology, Inc.
BEATTY, NV FACILITY
CONTAINER MANAGEMENT BUILDING

GENERAL STRUCTURAL NOTES & DETAILS

Sheet No. S0.0

DRAWER NO. 150513.00
1 OF 2

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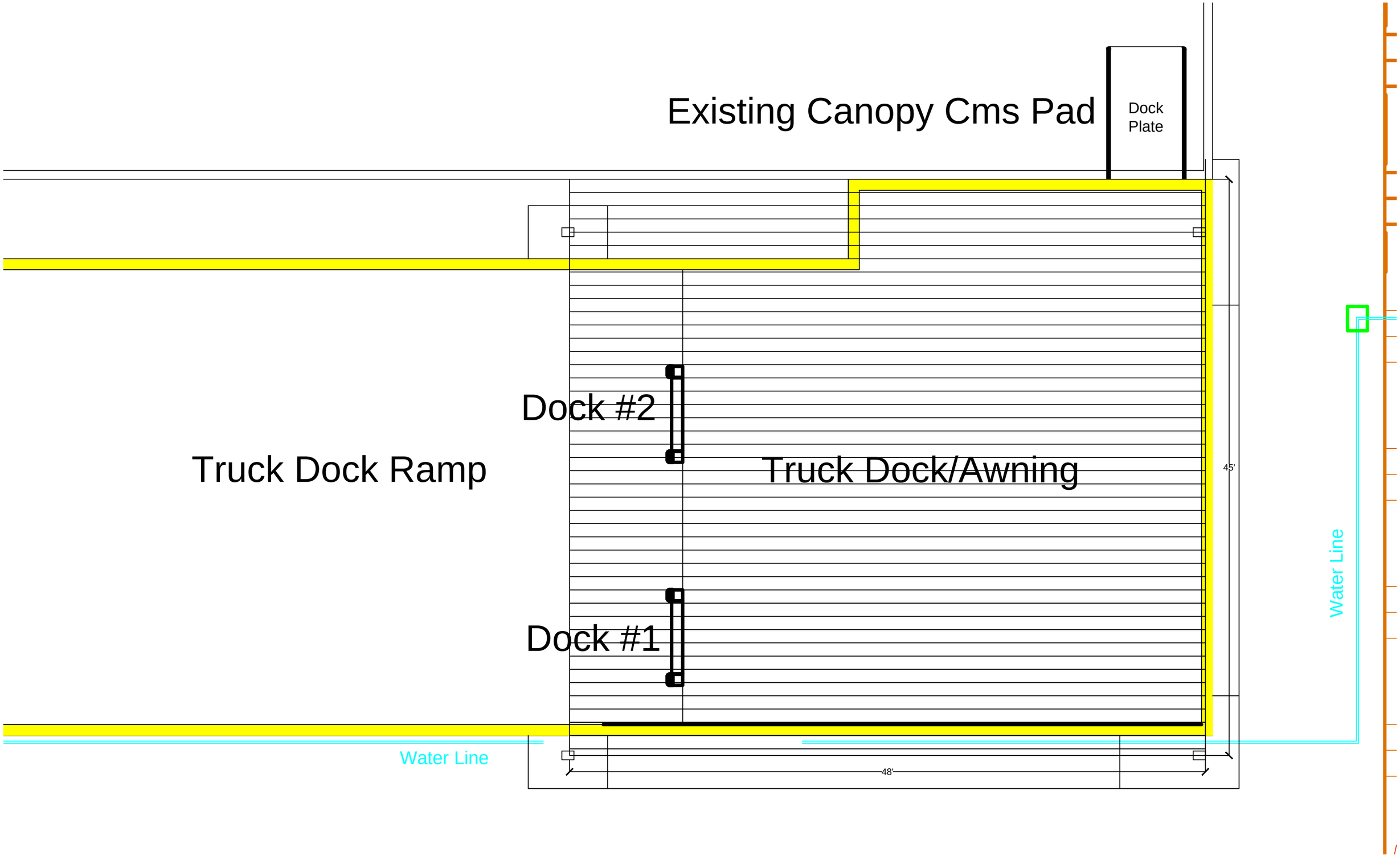

US Ecology Beatty,Nv New Dock Awning 5-30-14

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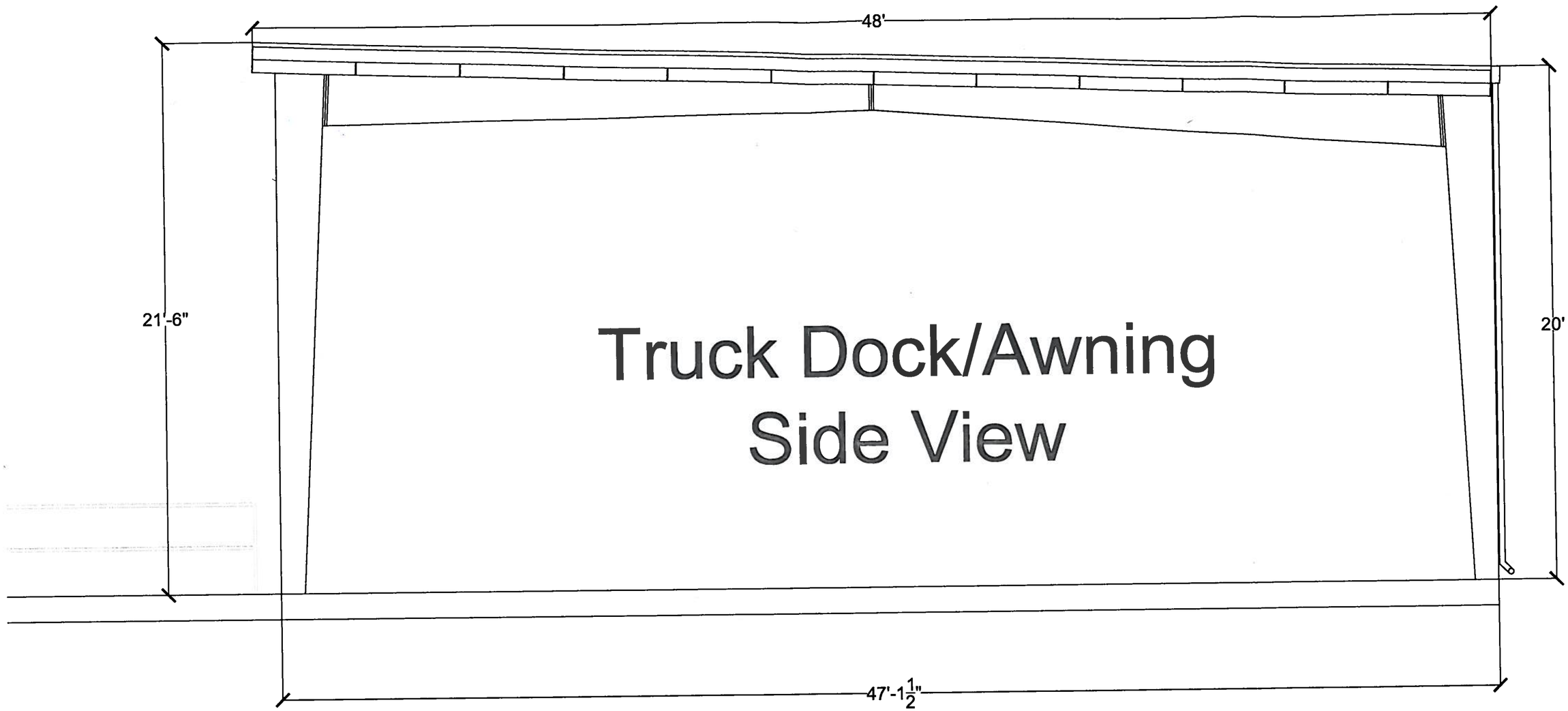

US Ecology Beatty,Nv New Dock Awning 6-11-14

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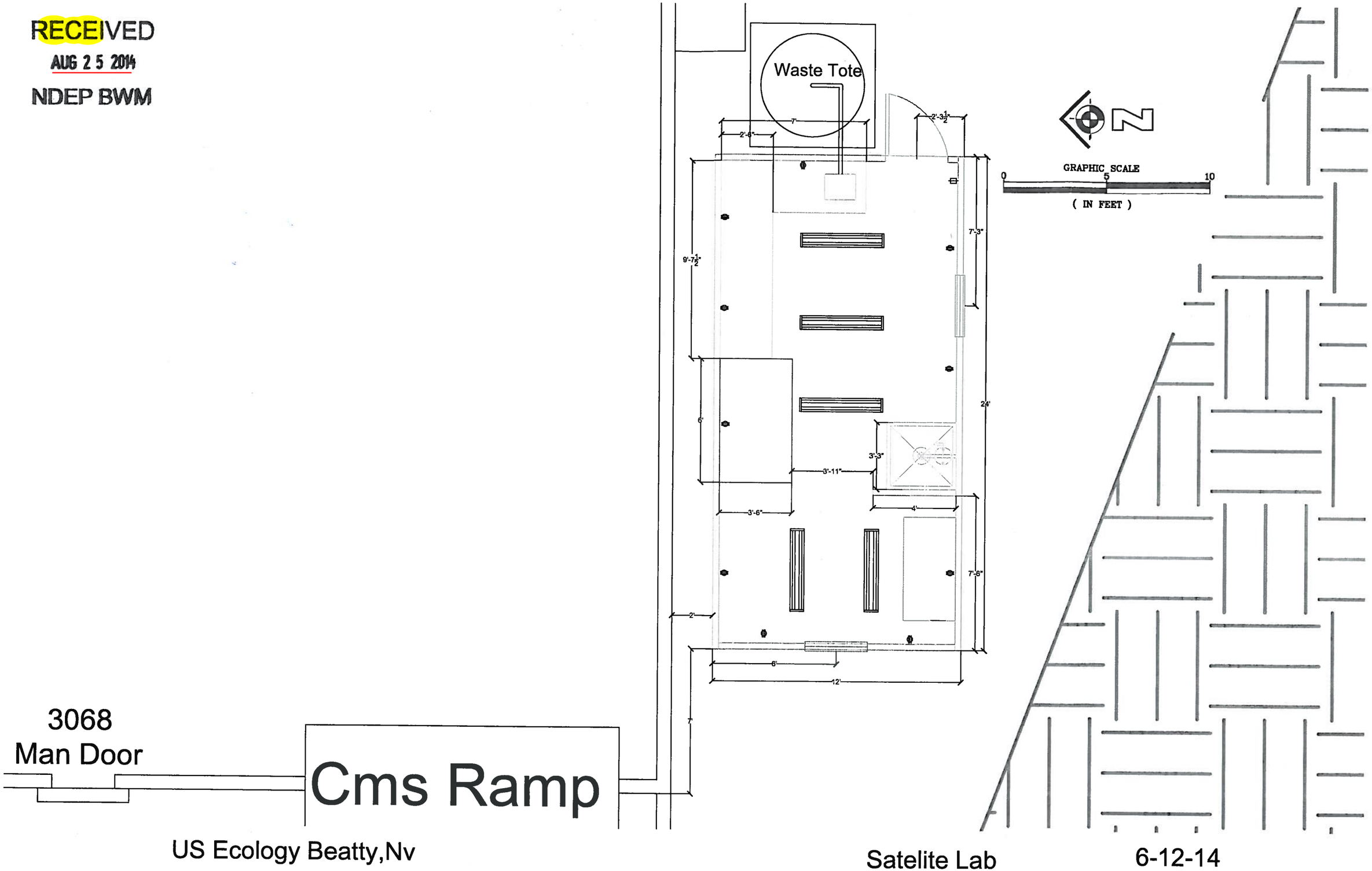

US Ecology Beatty,Nv

Satelite Lab

6-12-14

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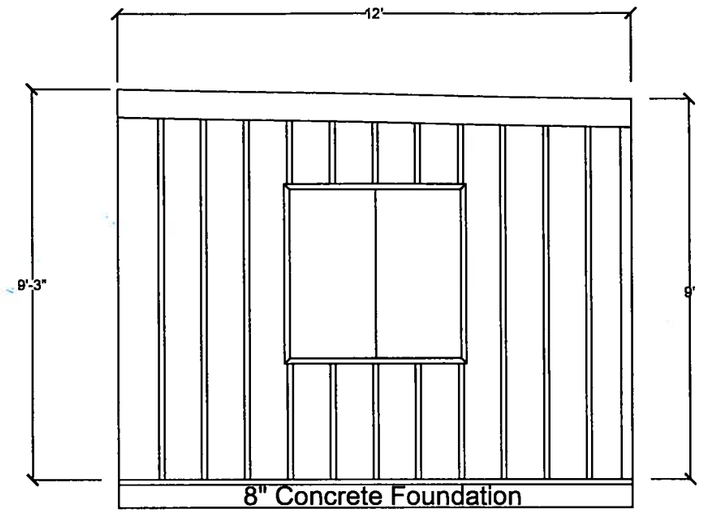
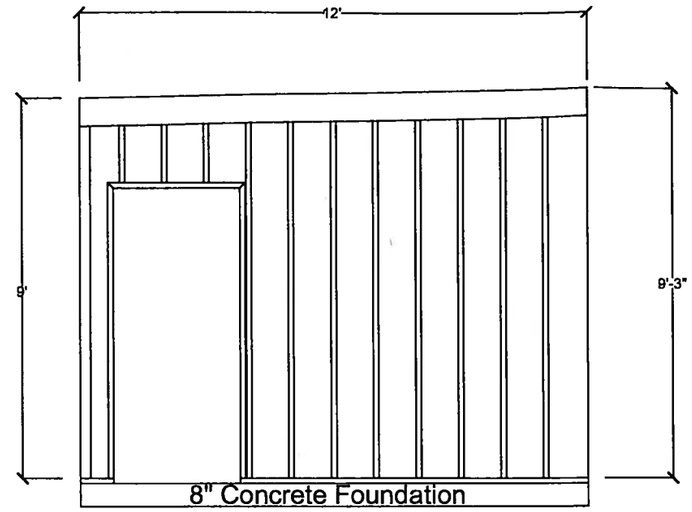


West Elevatiom



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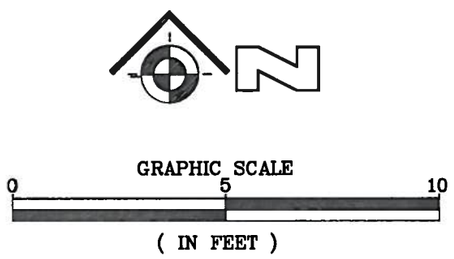

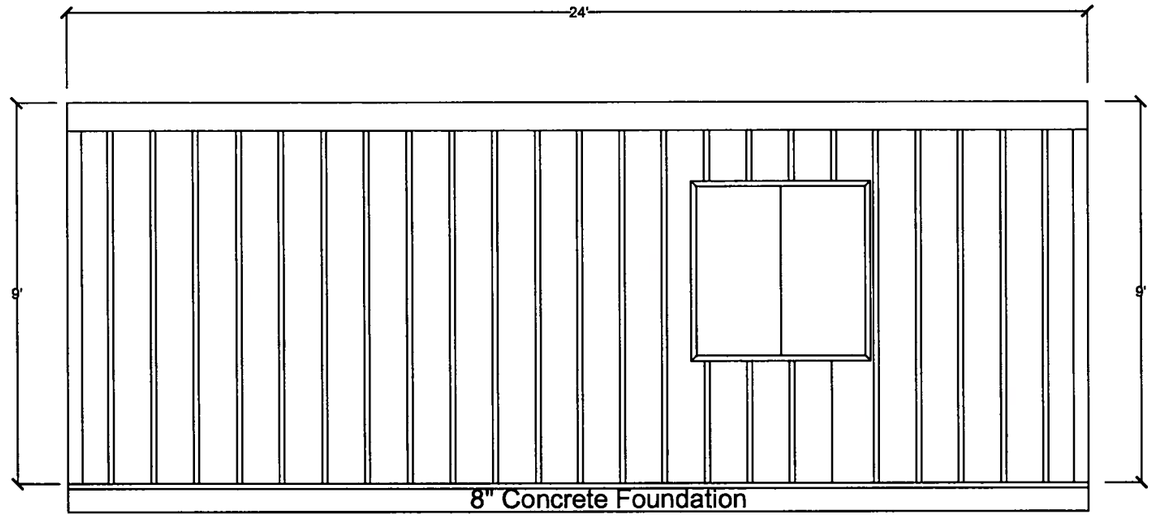

South Elevation

US Ecology Beatty,Nv

Satelite Lab

6-17-14

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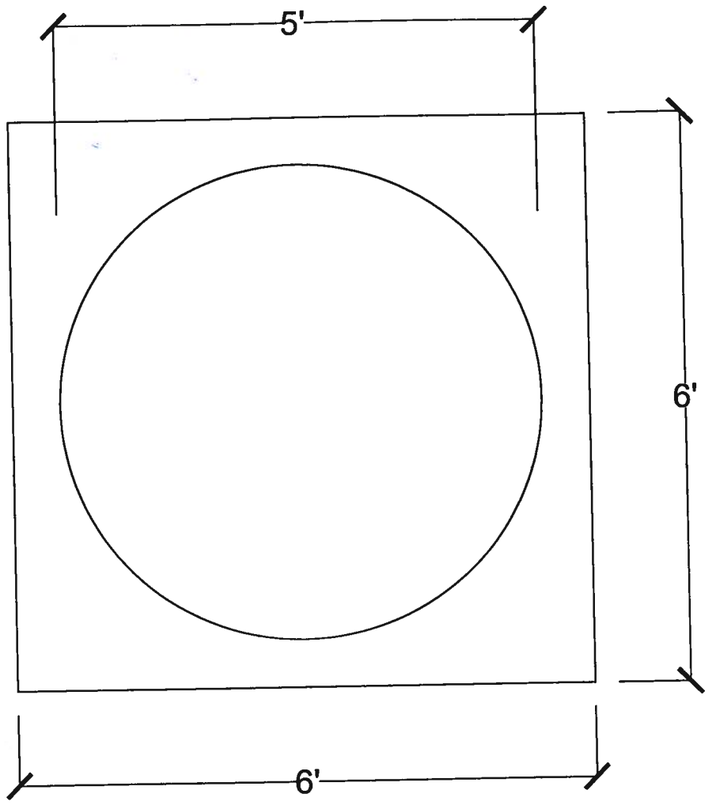
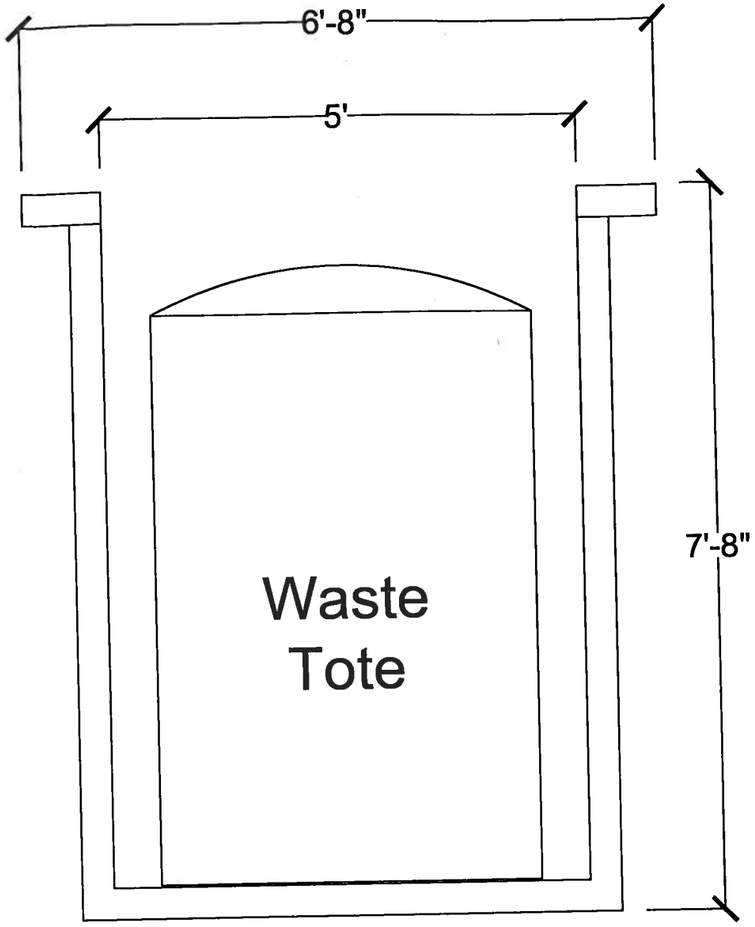


Top View
4" Concrete Work
Waste Tote
Containment



Side View
4" Concrete work
Waste Tote
Containment

US Ecology Beatty,Nv

Satelite Lab
Double Containment

6-12-14

APPENDIX E

CMU #5

Dry Hazardous Waste Storage Area #1

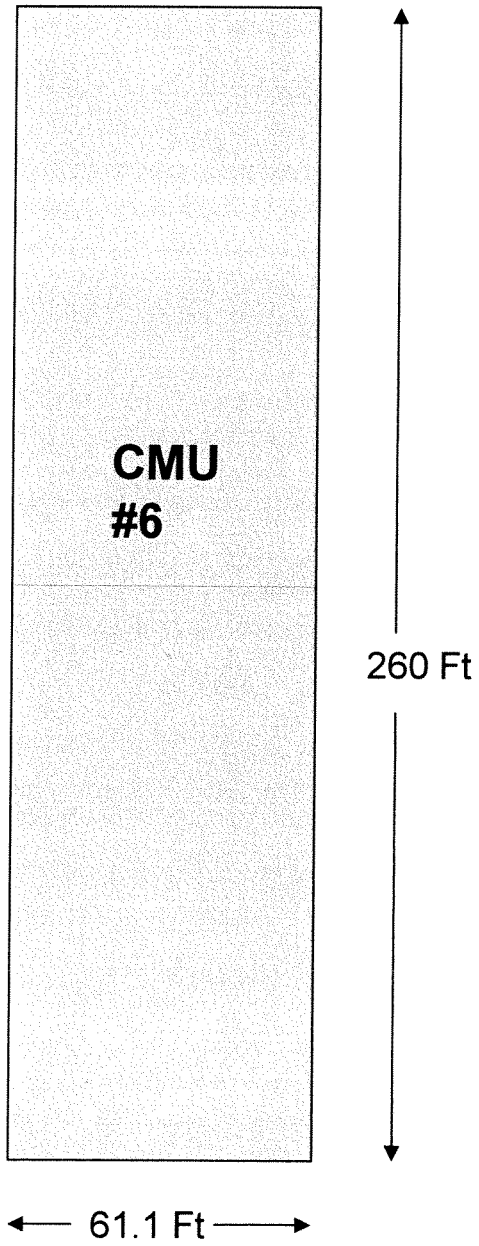
UNIT HAS BEEN CLOSED

APPENDIX F

CMU #6

DRY HAZARDOUS WASTE STORAGE AREA #2

Dry Hazardous Waste Storage Area #2



US Ecology Nevada

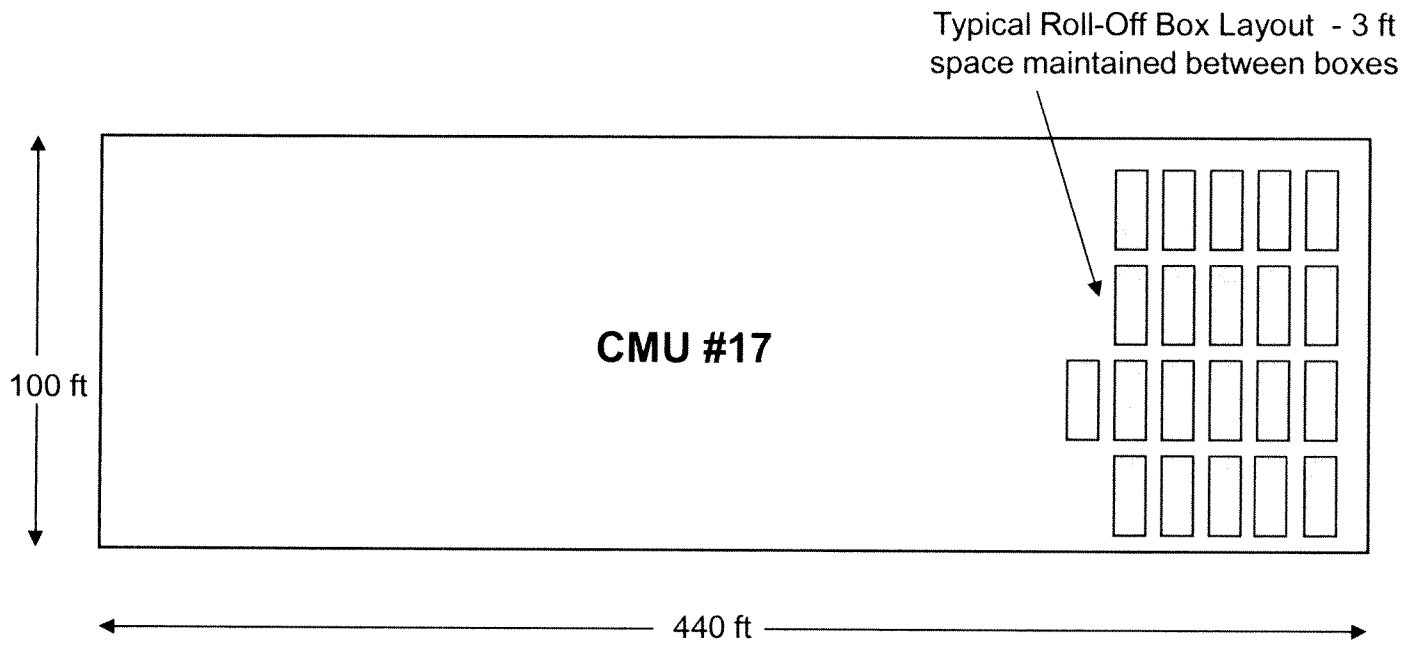
October 2009

APPENDIX G

CMU #17

DRY HAZARDOUS WASTE STORAGE AREA #3

Dry Hazardous Waste Storage Area #3



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October 2011

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APPENDIX H

Secondary Containment Calculations

CMU #1

CMU #7

CMU #16

PCB Storage Area (CMU 1) Secondary Containment Calculations

PCB storage permitted capacity = 59,400 gallons (1,080 55 gallon drums or equivalent)

Requirement:
25% of the total capacity *or* twice the volume of the largest container. Whichever is greater. (Precipitation is not taken into consideration since the building in enclosed)

25% of the total capacity = 71,816 gallons x 0.25 = *14,850 gallons*
or
Twice the volume of largest container = 2 x 115 gallons = 230 gallons

Containment Capacity Available = 48ft x 100ft x 0.75ft x 7.48gal/ft^3 = *26,928 gallons*

Must take drum space into account to determine actual containment volume.
Assumptions:

- Only the bottom 9" of the 55 gallon drum will take up containment volume.
- A maximum of 540 drums will be "on the floor" at any give time. This is 50% of the 1,080 drums permitted capacity. Drum will be stacked 2 high.
- A 55 gallon steel drum is 2 feet in diameter.

Volume of containment that each drum takes up = (3.14 x $radius^2$) x height
= 2.35 ft^3

2.35 ft^3 x 540 drums = 1,271.7 total ft^3.

Total volume in gallons the drums take up in the containment space.
Gallons = 7.48 gallons/ft^3 x 1,271 ft^3
= 9,512.3 gallons

Total volume available for secondary containment:
= total containment volume of CMU 1 – volume of drums in storage
= 26,928 – 9,512.3
= 17,415.7 gallons
Volume required 14,850 gallons

Based on a maximum capacity of 1,080 55 gallon drums CMU 1 would have an excess secondary containment of 2,565.7 gallons.

The precipitation event considered in the design of the PCB Tank Farm is the 25-year, 24-hour storm. At the facility location, the 25-year, 24-hour storm event is a 2-inch rainfall. This rainfall amount was considered in the design of the PCB Tank Farm containment structure should the design storm occur during a tank failure.

Containment Capacity (as required by 40 CFR 761.65(b)(1)(ii)

Capacities of tanks within the PCB Tank Area:	2 tanks (5,000 gal. each)
	2 tanks (7,500 gal. each)
Total volume =	25,000 gallons

Containment capacity required is the larger of:

25% of total liquid storage capacity = 25% of 25,000 gallons = 6,250 gallons

200% of liquid storage capacity of largest tank = 2 x 7,500 gallons = 15,000 gallons

Containment capacity required by 40 CFR 761.65(b)(1)(ii) = 15,000 gallons

USEN conservative determination of PCB Tank Farm containment holding capacity

= 15,000 gallons + design storm precipitation

Design Storm precipitation volume = [2 in / 12 in/ft] x 45 ft x 45 ft x 7.48 gal/cu ft = 2,524.5 gals

Minimum containment capacity required = 17,524.5 gallons

Supports

2 Concrete Cradles – 2*(2 ft wide by 10 ft long by 1.67 ft high) = 66.67 cu ft

6 Metal Supports – 6*(1 ft by 1 ft by 2 ft high) = 12 cu ft

2 Concrete Pipe Supports – 2*(1 ft diameter by 1.04 ft high) = 0.14 cu ft

8 Concrete Supports –8*(2.083 ft by 2.083 ft by 0.67 ft high) = 23.3 cu ft

Total Support Volume = 66.67+12+0.14+23.3 = 102.11 cu ft

= 102.11 x7.48 gal/cu ft

= 763.8 gal

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Containment capacity available	=	45 ft wide by 45 ft long by 1.5 ft deep – Supports
	=	3,037.5 cu ft x 7.48 gal/cu ft – Supports
	=	22,720.5 gallons – 763.8 gallons
	=	21,986.7gallons*

* Actual total capacity is somewhat greater since containment depth at low point (sump pit) actually is 23 inches.

<u>21,986.7 gallons > 17,525 gallons, liquid holding capacity satisfies 40 CFR 761.65(b)(1)(ii)</u>

Excess capacity is 21,986 – 17,525 gallons = 4,461 gallons

4,461 gallons is equivalent to 3.5 inches of freeboard above the design liquid height

Secondary Containment Calculations

CMU #7 – Bin Storage Area

There are 10 bays @ 271.2 ft^3 each for a total of 2,712 ft^3.

2,712 ft^3 x 7.48 gallons/ft^3 = 20,287 gallons of secondary containment capacity.

CMU #16 – CMS Building

Area of entire pad = 115 ft x 150 ft = 17,250 square feet
(Area of control room on CMS pad = 772 square feet)

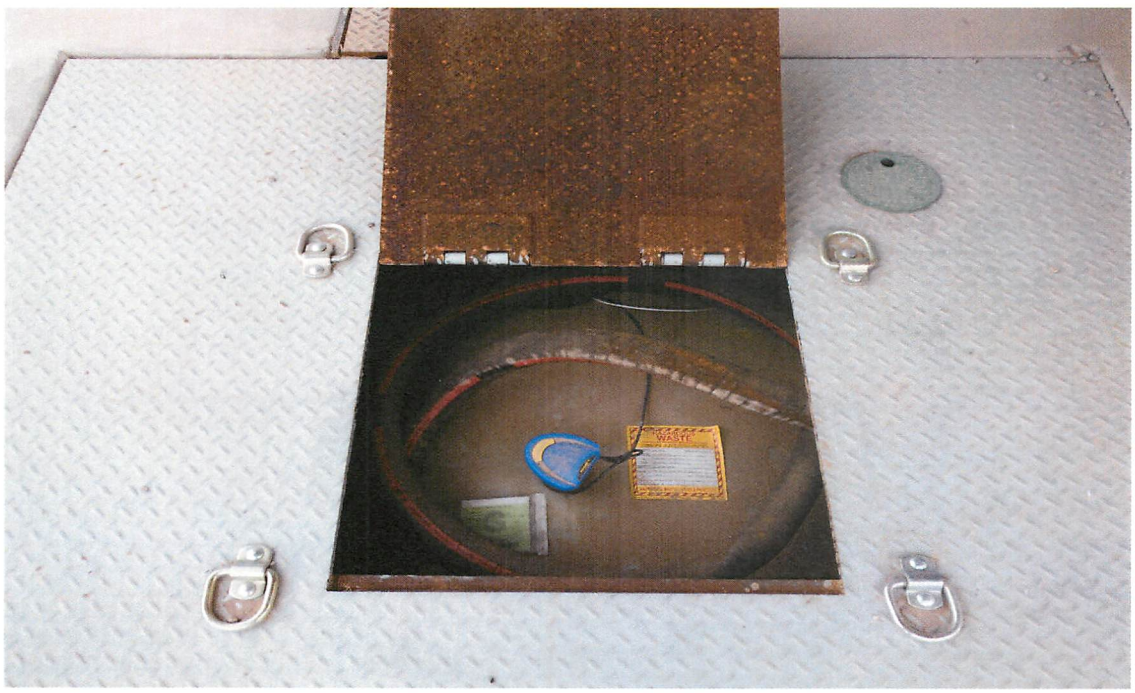
Actual area of CMS pad = 17,250 ft^2 - 772 ft^2 = 16,478 square feet.

Volume = 16,478 ft^2 x 0.5 ft x 7.48 gallons/ft^3 = 61,630 gallons

Appendix I

Photos – Laboratory Totes and Containment Area

Photos – Laboratory waste water accumulation tank and containment area, by Admin building.



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TANK SYSTEMS REPORT

US ECOLOGY NEVADA

March 2010

Revised June 2015

SECTION 10

TANK SYSTEMS REPORT

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MANAGEMENT OF HAZARDOUS WASTES IN TANKS

US Ecology – Beatty, Nevada (USEN) manages hazardous waste[1] in tanks in five different scenarios:

- Waste Stabilization / Treatment Units
- Polychlorinated Biphenyl (PCB) Tank Farm
- Evaporation Pad & Associated Tank

Table 1 – Summary of Tank Management Units

Tank	Common Name			Capacity [gallons]
	Common Name	Status	Permit Required	
#1	Stabilization Tank (Pan 1)	Existing	Yes	6,400
#2	Stabilization Tank (Pan 2)	Existing	Yes	35,500
#3	Stabilization Tank (Pan 3)	Existing	Yes	35,500
#4	PCB Storage Tank	Existing	Yes	~~5,000~~ 7,500
#5	PCB Storage Tank	Existing	Yes	~~7,500~~ 5,000
#6	PCB Storage Tank	Existing	Yes	5,000
#7	PCB Storage Tank	Existing	Yes	7,500
#11	Evaporation Tank	Existing	Yes	10,000
#18	Stabilization Tank (Pan 4)	Existing	Yes	17,250
#19	Stabilization Tank (Pan 5)	Existing	Yes	17,250

10.1.0 STABILIZATION TANKS

10.1.1 Process Description

USEN operates five stabilization tanks to solidify wastes containing free liquids, transfer wastes between containers, and to treat hazardous waste debris to comply with LDR standards or alternative treatment methods.

Stabilization Tanks 1-3 are capable of processing 75 tons/hour of waste and Tanks 4 and 5 are capable of processing 50 tons/hour. An excavator, backhoe, rotary mixing head, front-end loader, and/or other equipment may be used as mixing tools. Potential air emissions are minimized with the use of water sprays and/or fog systems.

10.1.1.1 Debris Treatment

Hazardous debris is treated by microencapsulation and macroencapsulation as discussed in the Section 11 Landfill Report and the Section 8 Waste Analysis Plan. Microencapsulation may be completed within stabilization tanks.

---

[1] Here-in-after "waste" or "wastes."

10.1.1.2 Waste Stabilization Activities

Five (5) existing tanks stabilize wastes by mixing waste and stabilization reagents. A design drawing for the stabilization vessels is provided in the integrity assessment included in Appendix E.

Reagent selection is typically determined from the stabilization recipe developed in the laboratory, scaled up to the net weight of the load. In those cases where recipes are not predetermined, [2] the treated waste is tested to ensure the appropriate treatment standard or method is achieved.

Once the operator determines the waste and reagents have been adequately mixed, the stabilized material is typically taken to the active cell for disposal, containerized and placed in the Dry Hazardous Waste Storage Area, or, as an alternative, staged in a segregated portion of the active landfill while being analyzed, but before being disposed.

Conformational testing is conducted on treated waste to verify compliance with applicable LDR treatment standards. As described in the WAP, samples are collected from treated waste streams to confirm the waste meets applicable LDR standards. Absence of free liquids is also confirmed on each treated waste stream using a visual inspection and/or the Paint Filter Liquids Test (PFLT), if the presence of free liquids is in question.

10.1.2 Tank Installation Certification

Appendix E contains integrity assessments certified by an independent professional engineer, registered in the State of Nevada, on the structural integrity of the stabilization tank systems and their suitability to manage the hazardous wastes intended. USEN also inspected the stabilization tanks prior to placing them in service to ensure proper installation.

10.1.3 Diagram of Piping, Instrumentation and Process Flow

Operation of the batch stabilization vessels does not require piping or instrumentation as these are batch-operated units.

10.1.4 Description of Secondary Containment Structure

The waste stabilization units are double-walled steel tanks. Two (2) of the tanks (Stabilization Tanks #2 & #3) are adjacent to each other, another tank (Stabilization Tank #1) is located in a near-by, but separate location. Two stabilization tanks 4 and 5 (Tanks 18 and 19) are located inside the Container Management Building. The primary tank holds the waste materials and the external secondary tank serves as a secondary containment system. Each secondary tank slopes to a collection sump. In addition, a steel pan covered with 12" of sacrificial soil is provided around the outdoor units. This secondary containment

---

[2] As can be the case for commonly treated materials such as lead contaminated wastes.

device drains into the stabilization tanks and is surrounded by a concrete curb to prevent run-on and run-off. A tertiary, high-density, polyethylene (HDPE) liner is located under Stabilization Tank #1 and serves as further protection. Stabilization pan 4 and 5, located inside the Container Management Building, are surrounded by a concrete floor system to contain wastes managed around the tanks.

10.1.5 Preventing Spills and Overflows

Trained facility personnel oversee loading, unloading and treatment activities to ensure operations minimize spillage of waste outside the treatment units or containment systems. The outdoor units are equipped with a steel secondary containment pan covered with sacrificial soil to contain spillage. Spillage is promptly removed and placed in the treatment tanks or otherwise managed in accordance with the WAP. Pans 4 and 5 are surrounded by a concrete floor system. Waste spilled in the area can be washed into the pan system for management.

The quantity of waste in the vessel is limited to minimize spillage during mixing. Spillage or residue is contained within the containment structure and returned to the mixing vessel or managed in accordance with the WAP.

10.2.0 PCB STORAGE TANKS

The tank processing system consists of the PCB Building, where storage, handling, draining and flushing of transformers and capacitors take place, and four (4) carbon steel tanks located outside the building for the temporary storage of drained liquid PCBs, rinsate, and other organic wastes until transported off-site. These tanks are to be used for TSCA regulated PCB contaminated liquids only.

10.2.1 Tank Description

The PCB storage tanks have a combined capacity of 25,000 gallons, consisting of two (2) 7,500-gallon tanks (Tanks #4 & #7), and two (2) 5,000-gallon tanks (Tanks #5 & #6). The 5,000-gallon tanks are 8 feet in diameter and 14 feet in length with four (4) supports, while the 7,500-gallon tanks are 8' in diameter and 20' long; one tank has six (6) supports, the second is supported by two (2) concrete cradles. All tanks are carbon steel, with a nominal ¼" shell thickness.

No internal corrosion protection measures are necessary for the tanks, since carbon steel is not subject to corrosion by PCB oil, transformer flush fluid, or other organic wastes.

The PCB storage tanks (Tanks #4 - #7) are vented through a carbon filtration system. The filtration system consists of 2 carbon canisters in series and connects to the storage tanks vents. When PCB liquids are being transferred to the storage tanks the air/vapors are pulled through the filtration system to prevent PCBs from possibly entering the atmosphere. Pictures of the system are included in Appendix G.

10.2.2 Tanks System Integrity Assessment

In accordance with 40 CFR §264.191, tank integrity assessments are required on tank systems in existence as of July 14, 1986, if the system is not provided with secondary containment. Since this tank

system is an existing system with secondary containment, no integrity assessment is provided for this unit. Ultrasonic testing of the tanks will be conducted annually as a precautionary measure and reported in the Annual Report. These tests demonstrate that tank shell thickness exceeds the recommended minimum for horizontal carbon steel tanks. Results of the leak test, and an excerpt from UL 142 "Steel Aboveground Tanks for Flammable and Combustible Liquids" illustrating shell thickness requirements, are included in Appendix F.

10.2.3 Description of Feed Systems and Safety Cut-Off Systems

An automatic or emergency cut-off system is not required since the pumping of PCB liquid and other organic wastes is conducted as a batch operation rather than as continuous flow. The storage tanks are provided with overfill control equipment consisting of high-level alarms audible inside the PCB Building, which alert the operator when the tank level is approaching maximum capacity.

10.2.4 Diagram of Piping, Instrumentation, and Process Flow

Appendix G contains a diagram illustrating the piping, instrumentation and process flow for this system, and design drawings for each tank.

10.2.5 Containment and Detection of Releases

The storage tanks are located in a 45-feet by 45-feet containment area with a 1.5 feet high containment wall. The containment area floor and walls are constructed of reinforced concrete. The tanks are elevated to allow leak detection during daily inspections. Drawings are included in Appendix H to illustrate the design configuration of the secondary containment system.

Appendix I includes calculations demonstrating the ability of the system to contain twice the volume of the largest tank capacity (7,500 gallons), in addition to precipitation resulting from a 100-year, 24-hour storm event.

10.2.6 Description of Practices to Prevent Spills and Overflows

Trained facility personnel oversee loading, unloading and treatment activities to minimize spillage of waste outside the treatment units or containment systems. Spillage is promptly removed and managed in accordance with the WAP. All loading of PCB-contaminated liquids for off-site shipment will be done on the PCB Tank Truck Loading Pad. The Truck Loading Pad is a 12-feet wide by 56-feet long reinforced concrete pad. Drawings are included in Appendix H to illustrate the Tank Truck Loading Pad.

10.3.0 EVAPORATION TANK

An Evaporation Tank (Tank #11) manages wash water generated from vehicle decontamination.

10.3.1 Evaporation Pad Description

The evaporation pad was constructed as a monolithic reinforced concrete unit, designed to resist cracking. The unit's bottom and walls are coated with a chemical resistant epoxy coating.

Appendix A contains the design drawings for the evaporation pad. Volume calculations illustrating the net capacity of the tank are included as Appendix B. The unit's net volume accounts for the containment required for a 100-year, 24-hour storm event, and maintenance of a 6" freeboard at all times.

10.3.2 Tank Integrity Assessment

Appendix C contains a written assessment certified by an independent, qualified, professional engineer, on the structural integrity of the unit and its suitability to handle the hazardous wastes placed in the unit and the certification report on the quality assurance observed during unit installation.

10.3.3 Description of Feed and Cut-Off Systems

The evaporation tank is not equipped with any feed and cut-off systems. The unit receives wastes from several sources which are placed in the unit on a batch process.

10.3.4 Diagram of Piping and Process Flow

As described above, no piping or instrumentation is associated with the unit's waste feed mechanisms.

10.3.5 Description of Secondary Containment Structure

The evaporation tank is equipped with a liner and leak detection system consisting of a 4-millimeter-thick vapor barrier, followed by open graded sand underlain by a 40-millimeter, high-density polyethylene (HDPE) flexible membrane. The HDPE membrane covers the full height of the tank walls (up to the freeboard), and is sealed at the edges to prevent rainfall from entering the system.

The design of the evaporation pad secondary containment system satisfies the 40 CFR §264.193(d)(3) description of a doubled-walled tank, where the HDPE flexible membrane functions as the outer shell capable of containing any release from the inner tank. The system is equipped with an 8" steel pipe riser, which is inspected daily to allow detection of a release within 24 hours, or at the earliest practicable time.

10.3.6 Description of Practices to Prevent Spills and Overflows

Trained facility personnel oversee loading, unloading and treatment activities to minimize spillage of waste outside the treatment units or containment systems. Spillage is promptly removed and managed in accordance with the WAP.

Daily inspection of the pad ensures that a minimum 6" freeboard is maintained in the tank to prevent overtopping due to wind action.

10.4.0 LOW TEMPERATURE THERMAL DESORPTION UNITS

Removed, April 2013 revision

10.5.0 LEACHATE STORAGE TANK

Removed, June 2015 revision

10.6.0 SUBPART AA, BB AND CC STANDARDS

10.6.1 Subpart AA

The requirements of 40 CFR Part 264, Subpart AA are not applicable to the tanks discussed.

10.6.2 Subpart BB

The requirements of 40 CFR Part 264, Subpart BB are not applicable to the tanks discussed with the exception of Tanks T-4 through T-7 (PCB storage tanks). To comply with Subpart BB each piece of equipment has been identified and tagged with a unique number. Appendix G contains detailed schematics of this system. Per 40 CFR §264.1063 USEN will perform monthly Method 21 inspections using a portable Photo Ionization Detector (PID) to verify no equipment leaks. Any leaks detected will be fixed immediately and documented.

10.6.3 Subpart CC

The requirements of 40 CFR Part 264, Subpart CC are not applicable to the tanks discussed. The Subpart CC Air Emission Standards for the five stabilizations tanks (T-1, T-2, T-3, T-18, and T-19) will not apply because USEN will not accept for treatment hazardous waste with volatile organic compounds (VOC) concentrations greater than 500 ppm. All generator profiles are reviewed by USEN technical staff to ensure VOCs are below these limits. The four PCB storage tanks (T-4 through T-7) will not be subject to the Subpart CC regulations because concentrations of VOCs will not be greater than 500 ppm.

10.7.0 MANAGING INCOMPATIBLE, IGNITABLE OR REACTIVE WASTES

In accordance with the requirements of 40 CFR §264.17, USEN has developed a program to ensure that necessary precautions are taken to prevent the accidental commingling or reaction of incompatible and/or reactive wastes, or ignition of ignitable materials. The program encompasses the following elements:

- Identification of the hazardous characteristics of the waste streams during the approval process as described in the WAP;
- Segregation of reactive or incompatible materials according to USEN's segregation and classification system;
- Identification of the potential for incompatible reactions through the waste stream verification program described in the WAP. Verification testing of incoming shipments includes water

reactivity tests and compatibility checks on waste streams intended for bulking or combined treatment. When the potential for inadvertent reactions is anticipated, precautions are taken as appropriate; and

- Identification of sources of ignition and necessary precautions.

10.7.1 Precautions for the Management of Incompatible Materials

Conducting compatibility testing between any loads intended for simultaneous treatment prevents inadvertent reactions in the batch stabilization units. No waste will be added to the treatment unit until all potentially incompatible waste or residues have been removed to the maximum extent possible.

Where the potential for incompatibility exists, USEN documents in the operating record the precautions observed to prevent violent reactions and/or generation of extreme heat, toxic mists, fumes or gases. Such documentation may consist of waste analysis results, results of compatibility tests, or the results from management of similar wastes under similar operating conditions.

10.7.2 Precautions for Management of Ignitable or Reactive Wastes

Ignitable or reactive wastes will only be placed in the tank system such that the waste is treated, rendered, or mixed before or immediately after placement in the tank so that:

- the resulting waste, mixture, or dissolved material no longer meets the definition of ignitable or reactive waste under 40 CFR §§261.21 or 261.23, and
- the waste is separated and protected from sources of ignition or reaction including but not limited to: open flames, smoking, cutting and welding, hot surfaces, frictional heat, sparks (static, electrical, or mechanical), spontaneous ignition (e.g., from heat-producing chemical reactions), and radiant heat. While ignitable or reactive waste is being handled, smoking and open flames will be confined to specially designated locations. "No Smoking" signs are conspicuously placed wherever there is a hazard from ignitable or reactive waste; or
- the waste is stored or treated in such a way that it is protected from any material or conditions that may cause the waste to ignite or react.

10.8.0 RESPONSE TO LEAKS OR SPILLS AND DISPOSITION OF UNFIT TANKS

The tank system or secondary containment system from which there has been a leak or spill, or that becomes unfit for use, will be removed from service. USEN will stop the flow of hazardous waste into the system and inspect it to determine the cause of the release. All material will be removed from the tank and associated secondary containment within 24 hours of becoming aware of the situation, or at the earliest practicable time, if removal is not possible within 24 hours. Since all hazardous waste tanks at the facility are provided with secondary containment, no release to the environment is anticipated. However, in the unlikely event of such a release, USEN will visually assess the extent of the release, and

based on that assessment, determine the measures necessary to prevent further migration of the leak or spill to soils or surface water. Any visible contamination will be promptly removed and properly managed.

Notification of a reportable release will be provided to the NDEP Administrator within 24 hours of detection. No notification will be provided if the release involves a waste quantity of one (1) pound or less, and it is immediately contained and cleaned up. Within 30 days of detection of the release to the environment, USEN will submit to the Administrator a written report containing the following information:

- Likely route of migration of the waste;
- Characteristics of the surrounding soil (soil composition, geology, hydrogeology, climate, etc.);
- Results of any monitoring or sampling conducted in connection with the release (if available);
- Proximity to down-gradient drinking water, surface water, and populated areas; and
- Descriptions of response actions taken or planned.

If the cause of the release was a spill that did not damage the containment system's integrity, the system will be returned to service once the released waste is removed and all necessary repairs are made. If major repairs of the tank system are required (e.g., installation of an internal liner, repair of a ruptured[3] primary or secondary containment structure), a certification by an independent, qualified, registered, professional engineer will be obtained indicating that the repaired system is capable of handling hazardous waste without a release for the rest of the unit's service life. This certification will be obtained prior to returning the system to service, and will be submitted to the NDEP Administrator within seven (7) days of returning the system to use.

If the system cannot be repaired, the tank system will be closed according to procedures described in the approved Closure Plan.

10.9.0 INSPECTION OF TANKS AND COMPLIANCE WITH 40 CFR §264.194 AND §264.195

Treatment and storage tanks are inspected in accordance with the Section 5 Inspection Plan. All tanks will be inspected at least once per operating day with any deficiencies reported directly to the Facility Manager or designee. The following (if applicable) will be inspected:

- Overfill/spill control equipment to ensure it is in good working order
- Above ground portions of the tank system to detect corrosion or releases of waste
- The construction materials and the area immediately surrounding the externally accessible porting of the tank system, including secondary containment.
- The level of waste in the tank to ensure adequate freeboard

---

[3] Ruptures do not include breaks in welds or in the tank shell due to normal wear & tear. Most tank repair events at USEN are due to excavator wear on the steel surface of the tank & are not "ruptures" as that term is used in 40 CFR §264.196 nor are the repairs typically "major tank repairs."

- On a bi-monthly basis, the cathodic protection on Tanks 1, 2, and 3 will be inspected

All daily tank inspections will be turned into the Compliance Department and maintained as part of the facility operating record.

10.10.0 CLOSURE OF TANKS[4]

At closure, all hazardous waste and hazardous waste residue will be removed from the tanks or tank systems described in this section, treated and/or disposed of in the landfill, or sent to an off-site facility for treatment and/or disposal. All tank systems, including tank vessels, piping, ancillary equipment and contaminant structures will either be removed and properly managed (e.g.; disposed of in the on-site landfill), or decontaminated in accordance with procedures described in the Closure Plan.

10.11.0 ONE YEAR STORAGE

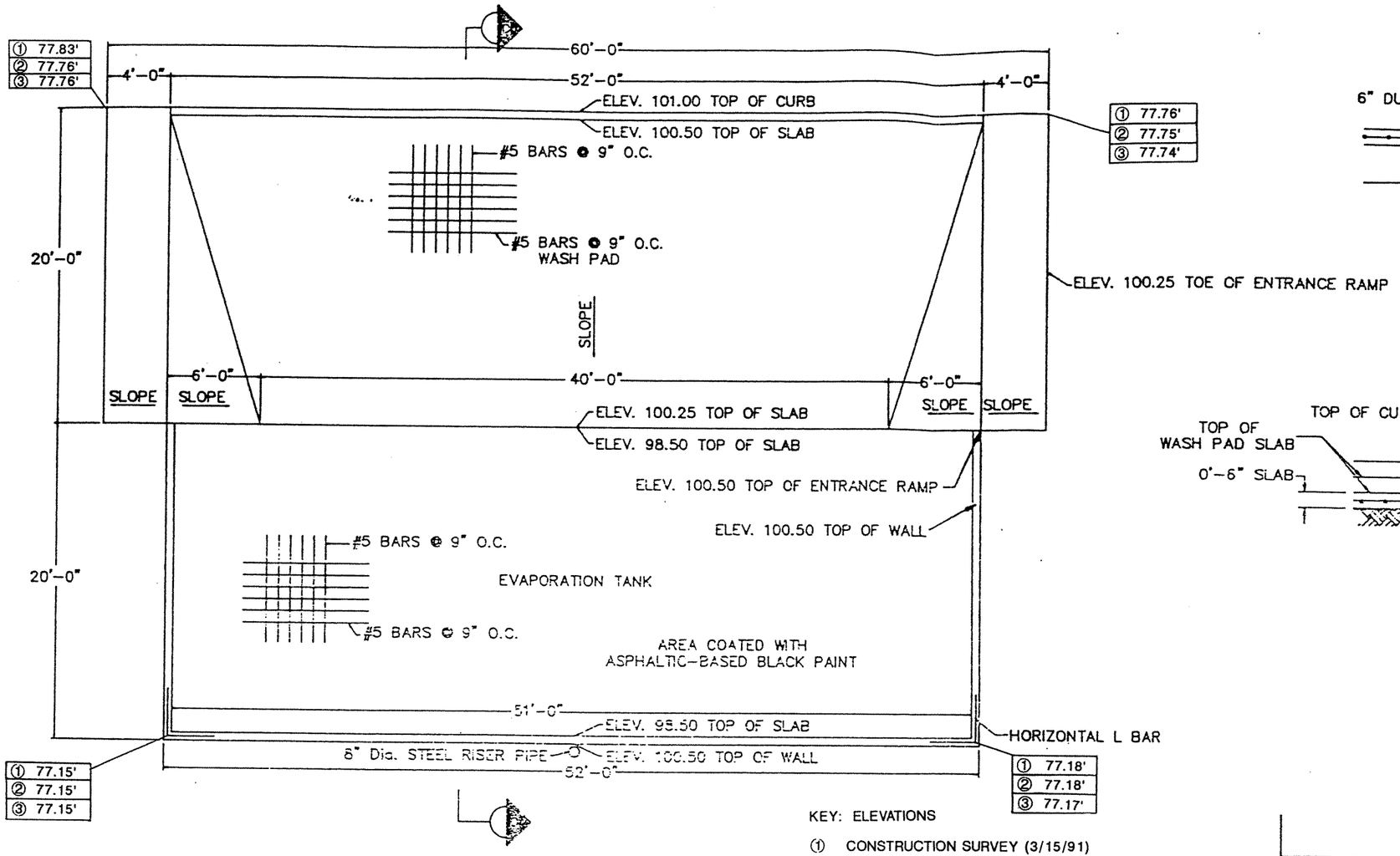
Waste placed in a tank is not to exceed 1 year from the date of receipt. At a minimum frequency of once per month USEN will perform an inventory of waste being stored in tanks. Reports generated by AESOP (or NEWTON once released) will be utilized to ensure all received wastes are disposed of within 1 year of receipt.

---

[4] The Closure Plan governs any discrepancy between the general description of closure activities and this section since it is the authoritative document on closure issues.

APPENDIX A

EVAPORATION PAD DESIGN DRAWINGS



PLAN

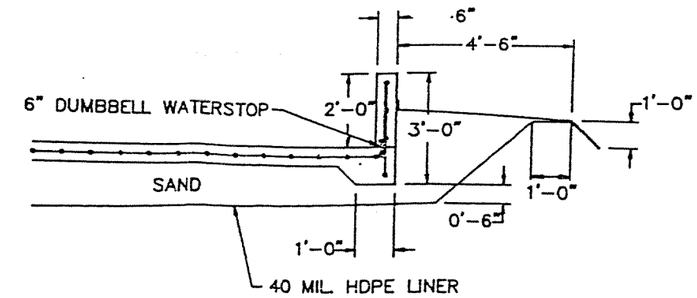
0 4 8
SCALE IN FEET

KEY: ELEVATIONS

① CONSTRUCTION SURVEY (3/15/91)

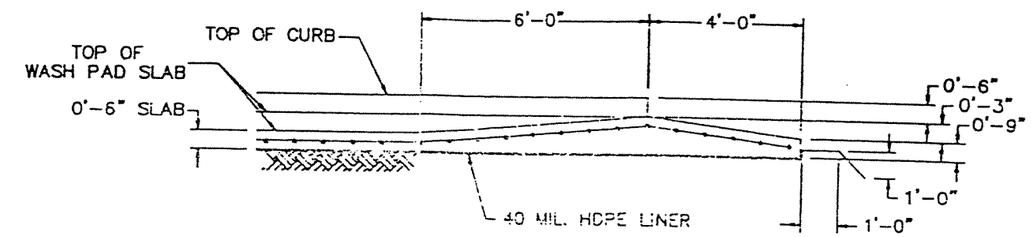
② EMPTY PAD (5/13/93)

③ LOADED PAD (5/13/93)



DETAIL B

0 2 4
SCALE IN FEET



DETAIL A

0 2 4
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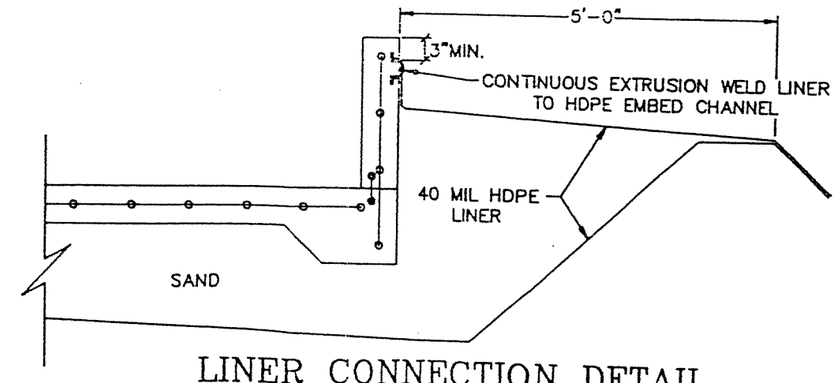
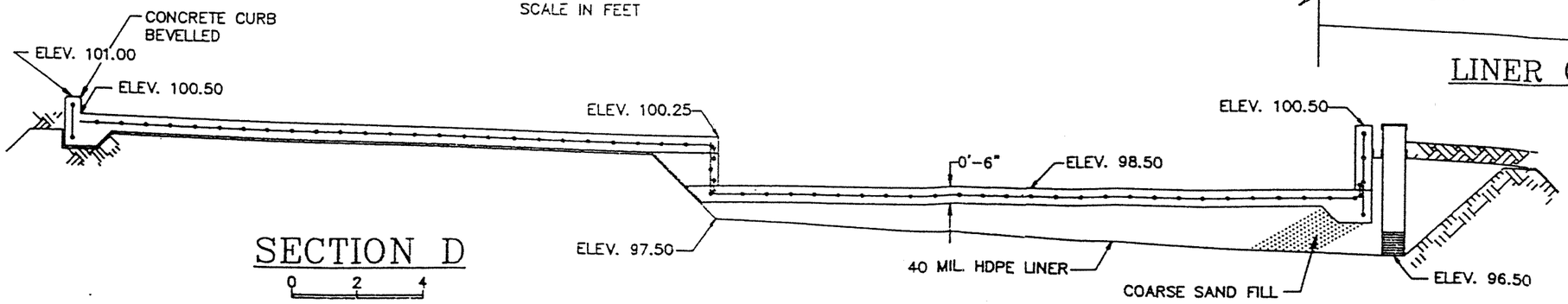


LINER CONNECTION DETAIL

0 1 2
SCALE IN FEET



SECTION D

0 2 4
SCALE IN FEET

NAME: U S ECOLOGY HAZARDOUS WASTE MANAGEMENT FACILITY			
FOR: U S ECOLOGY, BEATTY, NEVADA			
Woodward-Clyde Consultants			
SCALE: NOTED	DRAWN BY: P.R. CHECKED BY:	DATE: 6-26-91 DATE:	FILE NO. 90H3121C
CONCRETE WASHPAD			FIGURE

APPENDIX B

EVAPORATION PAD VOLUME CALCULATIONS

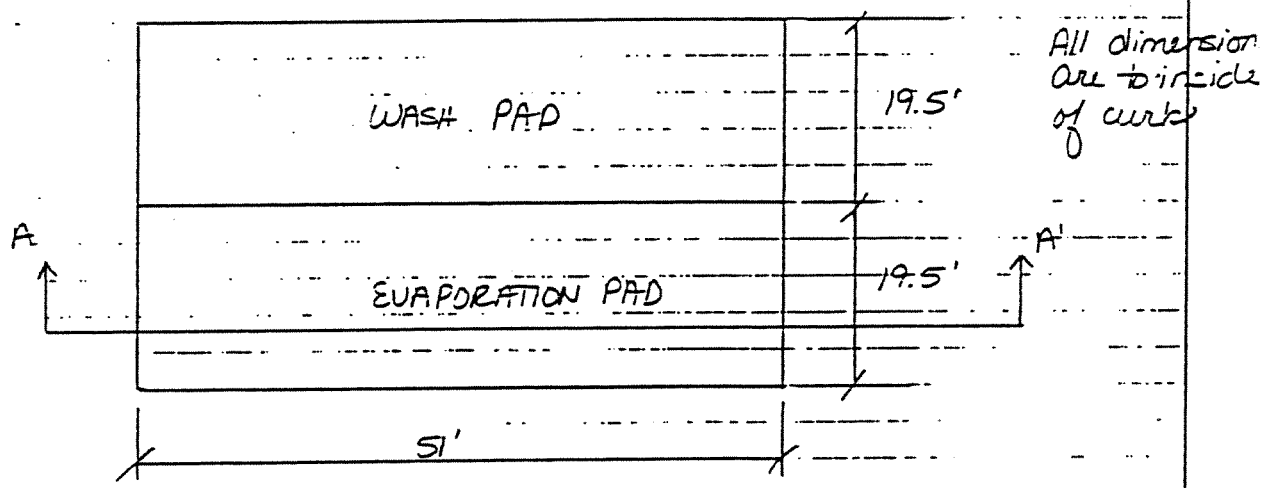
American Ecology

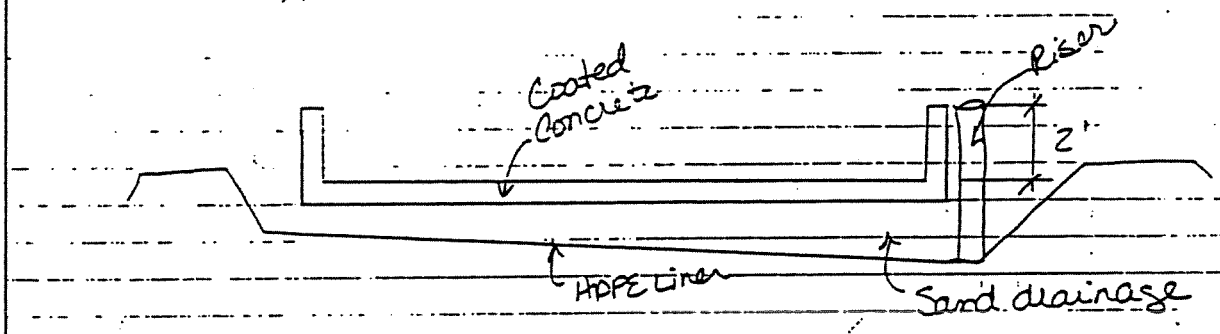
SHEET NO. 1 OF 1
CALC. NO. NV148 - 040
DATE 6/27/95
COMPUTED BY [illegible]
CHECKED BY [illegible]
REV 1 REV 2 REV 3

PROJECT BEATTY PERMIT RENEWAL
SUBJECT EVAPORATION PAD VOLUME CALCULATIONS

Calculate the volume of the evaporation pad.

Dimensions of pad are (Ref. Drwg. NV-105-CON-001 in Appendix B of Section IVC, Tank System Report of Permit renewal application)





Section A-A' (Typ.)

Gross Vol. of evaporation pad = (51')(19.5')(2') = 1989 ft^3

$1989\ ft^3 \left(\frac{7.48\ gal}{ft^3}\right) = 14{,}878\ gal$

Allowing for rainfall and freeboard

25 yr., 24 hr. storm = 2.8 in (Precipitation-Frequency Atlas of the Western U.S., Vol. VII - Nevada)

Effective depth for waste liquids = 1.33'

Effective Vol. for waste liquids = (51')(19.5')(1.33') = 1323 ft^3

$1323\ ft^3 \left(7.48\ gal/ft^3\right) = 9896\ gal.$

APPENDIX C

EVAPORATION PAD CONSTRUCTION QUALITY

ASSURANCE AND INTEGRITY ASSESSMENT REPORTS

Houston, Texas 77055
(713) 688-9111
Telecopy (713) 688-6253

June 14, 1991

U S Ecology, Inc.
9200 Shelbyville Road, Suite 300
P.O. Box 7246
Louisville, Kentucky 40257-0246

Attention: Mr. Howard Althouse
Project Engineer

Subject: Construction Quality Assurance Services For:
Reinforced Concrete Washpad U S Ecology's
Hazardous Waste Management Facility
Beatty, Nevada
WCC File: 90H3121C

Dear Mr. Althouse:

This report summarizes the quality assurance monitoring services provided by Woodward-Clyde Consultants for the construction of a reinforced concrete washpad at the U S Ecology's Hazardous Waste Management Facility near Beatty, Nevada.

The report summarizes the monitoring activities and includes the conclusion of these activities.

Should you have any questions or if we can be of further service, please do not hesitate to contact us.

Sincerely,

Don. L. Colbourne
Project Manager

DLC:llm

\dlc\7172cl

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coarse sandfill leak detection layer on top of the HDPE liner under the area defined as the evaporation tank; and the construction of the reinforced concrete structure. Following the completion of the concrete structure the HDPE liner was carried up and mechanically fastened to the top of the outside perimeter of the concrete structure.

1.3 SCOPE OF WORK

WCC was retained by US Ecology to implement the CQA program for the construction of the washpad. WCC's services included the observation and documentation of construction activities including the preparation of the subbase, placement of the HDPE liner, coarse sandfill and reinforced concrete. WCC observed the field testing of the concrete by ETEC Testing Laboratory, Inc. (ETEC) of Las Vegas, Nevada. The off-site concrete testing was carried out by ETEC. WCC observed the HDPE liner Contractor's testing of the HDPE liner site seams. WCC reviewed the Contractors' quality control test results and provided on-site records management and system control.

The services provided by WCC were performed in accordance with our contract and the documentation provided by US Ecology, which included the following:

- Bid documents which included:
  - Request for Proposal letter dated November 13, 1990
  - Specification No. 167-C-001, Pages 1-13, For Structural Concrete US Ecology, November 16, 1990, Revision 0
  - Specification No. 140-C-001, Pages 1-79, US Ecology, October 23, 1990, Revision 5 (for HDPE liner reference)
  - Plan Sheet No. NV-105-CON-001, U.S. Ecology, November 3, 1991, Revision 1

1.4 PROJECT TEAM ORGANIZATION

The project team consisted of the following firms and individuals:

Entity/Individuals	Position
• US Ecology, Inc. Louisville, Kentucky	- Owner and Designer
- H. Althouse, P.E. - D. Adrian	- Project Engineer - Project Manager
• US Ecology, Inc. Beatty, Nevada	
- R. Marchand - W. Marchand	- Site Superintendent - Construction Foreman
• Woodward-Clyde Consultants Houston, Texas Oakland, California	- Construction Quality Assurance
- Don L. Colbourne - H. Richard Soennichsen, P.E. - Scott Davis - Bill Snyder	- Project Manager - Project Certifying Engineer - CQA Site Manager - Senior Technician Soils/Geosynthetics
• T & J Concrete Beatty, Nevada	- Concrete Contractor
- Tom Nickell	- Superintendent
• Poly-America, Inc. Dallas, Texas	- Geomembrane Installation
- M. Jett - C. Piper	- Sales Manager - Site Superintendent

Entity/Individuals	Position
• National Seal Company Palatine, Illinois	- Geomembrane Manufacturer
• ETEC Testing Laboratories Las Vegas, Nevada	- Concrete/Testing

1.5 CHRONOLOGY OF CONSTRUCTION

WCC's CQA manager arrived on site December 11, 1990. The preparation of the subbase was ready for the placement of the 40 mil HDPE liner December 12, 1990 and the construction activities were generally completed in the following sequence:

- December 17, 1990 placement of HDPE liner.
- December 21, 1990 placement of sand on top of HDPE liner as part of leak detection system. Placement of reinforcing steel and concrete form work in process.
- January 8, 1991 completion of concrete placement.
- January 18, 1991 hydrostatic testing of washpad and leak repairs; completion of attaching HDPE liner to outside perimeter of washpad.
- The surface of the concrete was coated while WCC's representative was not on site. The coating application was observed by WCC's representative upon return to the site. The evaporation tank area was coated with a two-component coating (Hi-Build Tneme Tar) manufactured by Tnemec Protective Coating of Kansas City, Missouri; the wash area was coated with a two-component coating (UI 7012) manufactured by Urethane Plastics, Inc. of Placentia, California.

1.6 CONSTRUCTION QUALITY ASSURANCE

The documentation provided by US Ecology for: a) Specification for Structural Concrete and b) Specification for Trench 11 provided the initial guidelines for the CQA procedures necessary to evaluate, with a reasonable degree of certainty, that the completed facility meets the design criteria through the contractors' conformance to the approved Design Drawings and Specifications. In addition a CQA Plan was submitted by WCC to US Ecology.

The CQA elements outlined in the Specifications and CQA Plan include: (1) defining the responsibility and authority of all organizations and key personnel involved, (2) presenting the qualifications of CQA personnel and construction Contractors, (3) summarizing the observation and testing activities to be used to monitor the construction and, (4) describing the documentation to be performed, collected and stored. Documentation summarizing the CQA monitoring activities are presented in the following appendices.

- Appendix A: Preconstruction Meeting
- Appendix B: Improvements/Adjustments
- Appendix C: Woodward-Clyde Consultants' Reports
  - C1 - Daily Reports
  - C2 - Summary of Site Activities
- Appendix D: Concrete Testing
- Appendix E: Geomembrane Installation
  - E1 - Contractor's Documentation
    - Daily Reports
    - Subgrade Acceptance
    - HDPE Welding Rod QC Report
  - E2 - Woodward-Clyde Consultants' Site Documentation
    - Panel Placement Log
    - Trial Seam Log
    - Seaming Log
- Appendix F: Record Drawing

1.7 CONSTRUCTION MEETINGS

A preconstruction meeting was held December 11, 1990 at US Ecology's, Beatty, Nevada site. The meeting was held to review the requirements for the construction of three projects which included the washpad. Minutes of the preconstruction meeting are presented in Appendix A. As a result of the limited construction activities formal daily/weekly meetings were not held, normal daily on-site discussions took place for review of progress and construction activities. Points discussed are noted in the CQA Site Manager's daily reports (Appendix C1). The progress of construction is outlined in the CQA Site Managers' weekly report (Appendix C2).

1.8 FIELD IMPROVEMENTS/ADJUSTMENTS

All design field improvements/adjustments were approved by US Ecology's Project Engineer. The improvements/adjustments are as follows:

- The mechanical connection of the HDPE liner to the outside perimeter of the washpad was replaced with Poly-America's product Poly-Lock, which is designed specifically for this task.

- A 6-inch waterstop was used in place of the minimum 4-inch waterstop specified. The latter product was not available.

- The 40 mil HDPE liner used was manufactured by the National Seal Company. This liner had been inventoried on site following the completion of an earlier project. Quality Control documentation for this liner was included in the Certification Report for the 1988 Trench 11 project. This documentation is not included in this report.

- The test results of the concrete indicated that the concrete strength did not meet the compressive strength of 4,000 psi required in the specification. The tests results indicated concrete strength of approximately 3,500 psi. Consideration was given to the specification requirements, set deliberately high to avoid unacceptably weak concrete, the use of rein-

forcing steel bars and the fact that washpads with concrete having similar compressive strengths as the new washpad had shown no structural weaknesses during use and no structural weaknesses were observed, by US Ecology, when the old washpad was demolished. As a result of these observations, the new washpad was approved. Documentation relating to the concrete laboratory testing is presented in Appendix D "Concrete Testing."

- The slopes of the concrete slab and ramps, in the equipment cleaning area, were adjusted to prevent low trailers and trucks from impacting the concrete as they entered and exited the area, as had been experienced with prior washpads.

- The concrete curb ends were beveled to avoid contact with (damaging) equipment tires.

Documentation outlining these improvements is presented in Appendix B "Improvements/Adjustments," and Appendix A "Preconstruction Meeting."

2.0
CONCLUSION

The services reported herein have been performed by WCC within the scope presented in the US Ecology's Quality Assurance requirements and in accordance with the current standards of practice and standard of care for the profession ordinarily exercised by other professions under similar circumstances.

Our conclusions are based upon observations performed at various locations and at specific times during the course of the work.

Test and sample locations were spaced in an attempt to obtain a representative measure of the in-place characteristics of each component of construction.

WCC's Quality Assurance monitoring of the construction of the washpad included visual observation of the work, observing collection of samples, laboratory testing of concrete and observation of field testing. The concrete laboratory and field testing were performed by ETEC Testing Laboratory to compare results with the approved Design Drawings and Specifications. In our opinion, WCC's CQA monitoring, confirmation of record drawing configurations and the results of the performance testing, indicate that the washpad was constructed in substantial conformance with the intent of the Design Drawings, Specifications and Quality Assurance requirements for this project.

The Professional Engineer's certification below represents a declaration of his professional judgment. Also, it should be understood that WCC's observations and monitoring of the work of other parties on a project shall not relieve such other parties from their responsibility for performing their work in accordance with applicable plans, specifications and safety requirements.

Don L. Colbourne
Project Manager

H.R. Soennichsen, P.E.
Project Certifying Engineer

REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA
H. RICHARD SOENNICHSEN
CIVIL
No. 4901

Expiration Date 6/30/92

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APPENDIX A

PRECONSTRUCTION MEETING

88103909.

Woodward-Clyde Consultants

PROJECT NAME: Beatty NV.

PROJECT NO.: 90H312K

CLIENT: U.S. Ecology

DATE 1-18 91

DAY AM PM | S | M | T | W | TH | X

WEATHER	Snow	Clear AM	Brite Sun	Overcast	Fog	Rain
TEMP.	To 32	32-50 AM	50-70	70-85	85-90	90-
WIND	Still		Moder 1	High	Report No.	
HUMIDITY	Dry X		Moder	Humid	29	

DAILY REPORT

0700 - @ site Poly America on site

0730 - P.A Preforms bore welds on Ext.

0800 - Pre welds pass Detail work Begins on Trench 10 Cap - P.A. Attaching Geomembrane to Poly Lock @ wash pad - U.S. Ecology filling Evap. tank with water for Hydrostatic testing Leaks have Developed Leaks will Be Grouted to stop Leakage.

0900 - P.A. off loads Geotextile Fabric No Damage was observed

1200 - Lunch -

1300 - P.A. Continues to attach Liner to Poly Lock @ wash pad. P.A has completed Detail work on Trench 10 cap. Deployment of Geotextile Begins -

1500 - U.S. Ecology Grouting Leaks in Evap tank @ wash pad P.A. Continues to Deploy Geotextile then Continuously Sewing Seams - 32,000 Sq ft Fabric.

1700 - Exit site - Scott Davis W.C.C. - C. Piper 3 techs. 2 Labor Poly America.

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88103909

Woodward-Clyde Consultants

PROJECT NAME: Beatty NV.

PROJECT NO.: 90H312K - Trench 10

CLIENT: U.S. Ecology

DATE 1-17-91

DAY AM PM S M T W Th F

WEATHER	Snow	Clear Ad/Dry	Brite Sun	Overcast	Fog	Rain
TEMP.	To 32	32-50 AM	50-70 PM	70-85	85-90	90-
WIND	Still		Moder	High ✓	Report No.	
HUMIDITY	Dry X		Moder	Humid	28	

DAILY REPORT

0700 - @ site Poly America on site -

0800 - P.A. preforming pre welds on Equip. U.S. Ecology Placing Soil on Completed Geo Synthetics in an 18" Loose Lift then compacting with Vibratory Drum Roller making 8+ passes - No Damage was Se

0830 - Pre welds pass P.A. Begins Detail work and final Tie In Seaming.

1200 - Lunch -

1300 - 3 Destructive Seam Samples Received for testing

1400 - Destructive Samples pass -

1500 - U.S. Ecology Continues to place Soil on Completed GeoSynthetics in 18" Loose Lift then Compacting with Vibratory Drum Roller making 8+ passes No Damage was observed. P.A. attaching Geomembrane to Polylock @ wash pad - others continue Detail work on Trench 10 Geosynthetic Cap.

1700 Exit Site Scott Davis W.C.C. - C. Piper, 3 techs 2 Laborers Poly America -

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80103909

Woodward-Clyde Consultants

PROJECT NAME: Beatty NV

PROJECT NO.: 90H3R1C - Trench 10

CLIENT: U.S. Ecology

DATE: 1-16-91

DAY: AM / PM — S | M | T | W X | Th | F

WEATHER	Snow	Clear AM	Brite Sun	Overcast	Fog	Rain
TEMP.	To 32	32-50 AM	50-70	70-85	85-90	90-
WIND	Still		Moder	High X	Report No.	
HUMIDITY	Dry X		Moder	Humid	27	

DAILY REPORT

0700 - @ site - D.A. on site

0800 - P.A. Preforming Pre weld tests - U.S. Ecology filling Evap tank @ wash pad for Hydro static test.

0830 - Pre welds Pass Detail work & Seaming Begins. P.A. Deploying Geomembrane.

0900 - Evap tank @ wash pad Developed leak @ water stop T&J will Great leak.

1200 - Lunch

1230 - P.A. Preforming pre welds

1300 - Pre welds Pass - Detail & Seaming Begins - P.A. Deploys

1330 ~~Last~~ Panel #36 at trench 10 cap -

1400 - 3 Destructive Seam Samples marked on Completed Seams

1530 - Destructive Seams Samples Received for testing.

1650 - Destructive testing complete All Samples Pass

1700 - Exit Site - 15,825 Sq ft Geomembrane Installed - Scott

∴ W.C.C. - Cpiper, 3 techs - 5 Laborers Poly America

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88103909

Woodward-Clyde Consultants

PROJECT NAME: Beatty NV.

PROJECT NO.: 90H312K Trench 10

CLIENT: U.S. Ecology

DATE 1-11-91

DAY AM PM | S | M | T | W | Th | X

WEATHER	Snow	Clear AM	Brite Sun	Overcast	Fog	Rain
TEMP.	To 32	32-50 AM	50-70 PM	70-85	85-90	90-
WIND	Still	X	Moder	High	Report No.	
HUMIDITY	Dry	X	Moder	Humid	23	

DAILY REPORT

Trench 10

0700 @ site Poly American on site No freezing was observed overnight @ wash pad

0800 - P.A. Preforming Pre weld test on Ext. & Mouse - P.A. Air Pressure ~~& Vac~~ testing Completed Seams & Vaccum testing Completed Repair

0900 - Preweld's pass - Detailwor Begins -

0930 - Recive four Destructive Samples for testing - P.A. Begins Deployment of Geotextile Fabric with proper overlap and Continuesly Sewing Seams -

1030 - Destructive testing Complete All Samples PASS - P.A. Seaming North Tie In Seam

1200 Lunch

1230 - P.A. Preforms Pre weld test on Extruder - Continues Deploying Geotextile Fabric with continuesly Sewn Seams - test pass on Ext. U.S. Ecology Placing Soil on completed Geo Syntactics in 18" Loose Lift No Damage was observed - U.S. Ecology Using ~~SP~~ Ingersoll Rand - SP 48 DD Vibratory Drum Roller Making 8+ passes on Loose Lift.

1430 - P.A. Preforms Preweld test on Mouse test pass.

1500 - P.A. Deploys H.D.P.E. Liner - Seaming Begins U.S. Ecology Continues to Place Soil on Completed Geo Syn. In 18" Loose Lifts No Damage was observed ~~to~~ Drum Roller Making 8+ passes on Place Soil.

1700 - Exit Site Scott Davis w.c.c. C. Piper, 3 tech, 5 Labours 54,000 Sq ft Geotextile - 6,600 Sq ft Geomembrane Installed

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Woodward-Clyde Consultants

PROJECT NAME: U.S. Ecology Beatty NV.

PROJECT NO.: 90H3121C-Trench 10

CLIENT: U.S. Ecology

DATE 1-10-91

DAY AM PM

WEATHER	Snow	Clear Arm	Brite Sun	Overcast	Fog	Rain
TEMP.	To 32	32-50 Arm	50-70	70-85	85-90	90-100
WIND	Still X		Moder	High	Report No.	
HUMIDITY	Dry X		Moder	Humid	22	

DAILY REPORT

Trench 10

0700 @ Site Poly America on Site No Freezing was Observed @ Wash pad Concrete

0830 - Poly America Preforming Pre weld test - Mice & Extruder And Deploying Geotextile Fabric with proper overlap and continue Sewing Seams -

0900 - test pass on Mouse & Extruder - Detail work Begins P.A. Begins Deployment of H.D.P.E Liner

1000 - Deployment of Geosynthetics continues -

1030 - Results from 7 Day Break on First Set of Cylinders from wash pad 2290 psi at Break -

Poly America Air Pressure testing of Completed Seams - Vaccum Testing of Completed Repairs -

1200 - Lunch -

1230 - P.A. Preforming Pre welds on Mouse & Ext - U.S. Ecology Placing Soil on Completed Geosynthetics - In 18" Lift No Damage was Observed - P.A Continues to Deploy Geotextile Fabric & H.D.P.E Liner - Air pressure testing - Vaccum testing of Repairs & Tie In Seam (North)

1300 - Pre weld tests on Mouse pass - Seaming Begins

1400 - Pre weld (Extruder) pass Repair & work Begins

1600 - U.S. Ecology Placing Soil on Completed Geosynthetics In 18" Loose Lift No Damage was Observed

1700 Exit site - 33,000 Sqft Geomembrane Installed - 50,400 Sqft Geotextile Installed - Scott Davis W.C.C., C piper 3 techs, 5 Laborers Poly America

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Woodward-Clyde Consultants

PROJECT NAME: U.S. Ecology Beatty NV.

PROJECT NO.: 90H312K - Trench 10

CLIENT: U.S. Ecology

DATE: 1-9-91

DAY: AM / PM — S M T W X TH F

WEATHER	Snow	Clear	Brite Sun	Overcast AM	Fog	Rain
TEMP.	To 32	32-50 AM	50-70	70-85	85-90	90-1
WIND	Still X		Moder	High	Report No.	
HUMIDITY	Dry		Moder X	Humid	21	

DAILY REPORT

Trench 10

0700 - @ site Poly America on Site - Concrete Contractor Covered Concrete Poured 1-8-91 with Plastic No freezing was observed over night - Plastic remained in place

0900 - P.A. Preform; Preweld test - And Air Testing of Seams completed 1-8-91. All passed -

0930 - Preweld's pass - (Mouse & Extruder) North Tie In Seam Being seamed - & Detail work - 4 Destructive Samples were mark for Poly America to Demore as Extruder work to Locations

0900 - Poly America Deploying Geotextile Fabric on Accepted Subgr. And H.D.P.E. Liner - Fabric Being placed with proper over lap then continuesly Sewn.

1100 - Recived 4 Destructive Samples from P.A. for testing Slight Rain Stops work with Extruder. P.A Continu Deploying Geotextile Fabric

1200 - Lunch

1300 - P.A Preforms Preweld test on Mouse & Ext test pass. Panel & Fabric Deployment continues

1400 - Destructive Samples are tested All pass. U.S. Ecology Placing Soil on Completed Geosynthetics East → west in 18" Loose Lift no Damage was observed.

1600 - P.A Continues Deploying Fabric continuesly Sewing Seams - U.S. Ecology Continues Placing Soil 18" Loose Lift no Damage was observed

1700 - Exit Site Scott Davis W.C.C. - C. Piper 3 techs 5 Laborers - Poly America 26,400 Sq ft H.D.P.E. Liner - 43,200 sq ft Geotextile installed.

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Woodward-Clyde Consultants

PROJECT NAME: U.S. Ecology Beatty NV

PROJECT NO.: 90H3121C – Trench 10

CLIENT: U.S. Ecology

DATE 1-8-91

DAY AM PM | S | M | X | W | TH | F

WEATHER	Snow	Clear Am/Pm	Brite Sun	Overcast	Fog	Rain
TEMP.	To 32	32–50 Am	50–70 Pm	70–85	85–90	90–
WIND	Still X		Moder	High	Report No.	
HUMIDITY	Dry X		Moder	Humid	20	

DAILY REPORT

Trench 10

0700 – @ site Poly America on site

0730 – P.A. Deploying Geotextile Fabric with proper overlap and continuously Sewing Seams

0805 – First concrete truck arrives for wash pad pour

0900 – ETEC arrives for testing of concrete

1000 – P.A. performs pre weld test – test pass – P.A. Begins Deployment of H.D.P.E. Liner over previously Deployed Geotextile Fabric and Seaming with mouse

1100 – Concrete test preformed 4" slump – 4.3% Air Concrete temp 55°F Ambient 52°F – Concrete Contractor using Vibrator as concrete is placed.

1200 – Lunch

1230 – P.A. preforms pre weld – test pass – P.A. Continue Deploying Geomembrane and Seaming with mouse

1330 – P.A. Begins Air press testing of completed seam

1400 – Final pour of walls at wash pad by concrete Contractor. Using Vibrator as wall is poured.

1500 – P.A. Continues Deployment of Fabric & H.D.P.E. Liner – Continuously Sewing Seams – and welding Seams –

1700 – 39,800 Sq ft H.D.P.E. Liner Installed, 47,000 Sq ft Geotextile Fabric Installed.

Exit site Scott D Avis W.C.C. C. Piper, I. Jorc B. Cole, D Londoun & two Laborers – Poly America

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Woodward-Clyde Consultants

PROJECT NAME: U.S. Ecology Beatty NV.

PROJECT NO.: 90H3121C Trench 10

CLIENT: U.S. Ecology

DATE 1-9-91

DAY AM PM

WEATHER	Snow	Clear	Brite Sun	Overcast X	Fog	Rain
TEMP.	To 32	32-50 AM	50-70	70-85	85-90	90-
WIND	Still X		Moder	High	Report No.	
HUMIDITY	Dry		Moder X	Humid	17	

DAILY REPORT

Trench 10

0700 @ site - Poly America on site. No freezing at site was observed over night. Plastic Sheet Remained In Place over Concrete.

0800 - Poly America Begins Deployment of Geotextile Fabric for Cap Trench 10. Installing with proper over lap then continuesly sewing seams

0900 - Pre weld preformed on Mouse (Fusion Seam welder) test pass

1030 - Poly America Begins Deployment of Geomembrane

1100 - Richard Soennichsen of Woodward Clyde Arrive to the site Trench 10, Trench 11, Washpad.

1200 Lunch

1230 - Pre welds preformed on Mouse (Fusion Seam welder) test pass

1300 - Geotextile Fabric & Geomembrane Deployment Continues

1400 - Richard Soennichsen Exits Site -

1500 - Seaming of Panels Continues -

1700 - Exit Site - 19,800 Sq ft of Geotextile & Geomem Deployed on Trench 10 cap - Scott Davis w. C. Piper, T. Jordan, D. Lonbow, 3 Laborers Poly America -

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00103909

Woodward Clyde Consultants

PROJECT NAME: U.S. Ecology Beatty NV

PROJECT NO.: 90H3121C – Trench 10

CLIENT: U.S. Ecology

DATE

DAY AM PM

WEATHER	Snow	Clear	Brite Sun	Overcast X	Fog	
TEMP.	To 32	32–50 AM	50–70	70–85	85–90	90–
WIND	Still	X	Moder	High	Report No.	
HUMIDITY	Dry		Moder X	Humid	16	

DAILY REPORT

Trench 10

0700 @ Site Poly America on site preparing to place ~~at~~ Geotextile fabric for Trench 10 cap by stockpiling materials at locations around prepared subgrade

0830 – Concrete Contractor on site they will pour wash pad tank floor today

1030 – First concrete truck arrives concrete pouring begins –

1100 – Concrete tests pass – 3" slump, 4.2% air, concrete 53°F ambient 50°F 4 cylinder made

1330 – Concrete pour complete. Crew setting up forms for walls to be poured 1-8-91

1400 – Poly America Exit site, C. Piper, I. Jordan, D. ~~Us~~ Plastic sheet placed on concrete for overnight pro

1500 Exit site Scott Davis W.C.C.

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00103905

PROJECT NAME: U.S. Ecology Beatty NV

PROJECT NO.: 90H3121C - Trench 10

CLIENT: U.S. Ecology

DAY	AM PM					
WEATHER	Snow	Clear X	Brite Sun	Overcast	Fog	Rain
TEMP.	To 32 AM	32-50 Hmpn	50-70	70-86	86-90	90-
WIND	Still X		Moder	High	Report No.	
HUMIDITY	Dry X		Moder	Humid	15	

DAILY REPORT

Trench 10

0730 @ Site

0900 - Poly America on site setting up trailer

0930 - Concrete Contractor on site Installing water Stop at wash pad in preperation for pour 1-3-91

1100 - Poly America Setting up equipment

1200 - Lunch

1230 - Concrete Contractor complete setting up for pour 1-3-91

1530 - Exit Site

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Woodward-Clyde Consultants

PROJECT NAME: U.S. Ecology Beatty NV.

PROJECT NO.: 90H3121C - WASH PAD

CLIENT: U.S. Ecology

DAY	AM PM	S	M	T	W	TH	F	S
						X		

WEATHER	Snow	Clear ✓	Brite Sun	Overcast	Fog	Rain
TEMP.	To 32	32-60 AM	60-70	70-85	85-90	90-100
WIND	Still	X	Moderate	High	Report No.	
HUMIDITY	Dry	X	Moderate	Humid	12	

DAILY REPORT

WASH PAD

0530 - @ site Concrete Contractor on site Setting Forms, Rebar and Poly Lock at Wash Pad as per Plans & Specs

1200 - Lunch

1300 - Wash Pad Concrete Forms Complete as per Plans & Specs.

1330 - Exit Site Scott Davis W.C.C.

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PROJECT NAME: U.S. Ecology, Beatty NV

PROJECT NO.: 90H321C

CLIENT: U.S. Ecology

WEATHER	Snow	Clear	Bit Sun	Overcast	Fog	Rain
TEMP.	To 32	32-50	50-70	70-85	85-90	90-
WIND	Still		Moderate	High	Report No.	
HUMIDITY	Dry		Moist	Humid	11	

DAILY REPORT

NO WORK X MASS Holidays 12-22 -> 26-90 -

CHK'D BY: [illegible]

SIGNATURE: [illegible]

8010390

PROJECT NAME: U.S. Ecology Beatty NV.

PROJECT NO.: 904312/C - WASH PAD

CLIENT: U.S. Ecology

DAY AM PM	S	M	T	W	Th	F
WEATHER	Snow	Cloudy ✓	Partly Sun	Overcast	Fog	Rain
TEMP.	To 32 Ave	32-50	50-70	70-85	85-90	90-
WIND	Still		Moderate ✓	High	Report No.	
HUMIDITY	Dry		Moderate ✓	Humid	10	

DAILY REPORT

WASH PAD

0900 On Site

0830 - Concrete Contractor on site Building Forms & Placing Steel for wash pad concrete

1100 - Concrete Contractor & U.S. Ecology Placing Sand on wash pad liner using CAT 416 Backhoe & Square point Shovels No Damage to H.D.P.E. Liner was observed

1200 - Lunch

1300 - Concrete Contractor continues erecting forms & placing Steel for wash pad concrete as per plans & Specifications

1600 Exit Site W.C.C. - Scott Davis

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Woodward-Clyde Consultants

PROJECT NAME: U.S. Ecology Beatty, NV.

PROJECT NO.: 90H3RIC - WASH PAD

CLIENT: U.S. Ecology

DATE 12-20-90

DAY AM PM

WEATHER	Snow	Cloudy X	Bright Sun	Overcast	Fog	Rain
TEMP.	To 32 AM	32-50 PM	50-70	70-85	85-90	90-10
WIND	Still	Breezy AM	Moderate	High	Report No.	
HUMIDITY	Dry	X	Moderate	Humid	9	

DAILY REPORT

WASH PAD

0700 - @ site

0800 - Shipped Bentonite Sample to Western Clay for Comparison - Wyo-Ben-Envirogel → Western Clay Product.

0830 - Concrete Crew on site they will continue plain sand & setting up forms for wash pad.

1030 - Concrete Contractor continues to place sand using square point shovels no damage was observed to H.D.P.E Liner at wash pad.

1200 - Lunch

1300 - Concrete Contractor continues to place sand at wash pad using square point shovels no damage was observed to H.D.P.E. Liner.

1530 - Exit Site Scott Davis W.C.C.

CHK'D BY: _____ SIGNATURE: _____

88103909

Woodward-Clyde Consultants

PROJECT NAME: U.S. Ecology/Beatty NV.

PROJECT NO.: 90H3121C - WASH PAD

CLIENT: U.S. Ecology

DATE 12-19-90

DAY AM PM | S | M | T | W X | TH | F

WEATHER	Snow	Clear X	Brite Sun	Overcast	Fog	Rain
TEMP.	To 32 AM	32-50 PM	50-70	70-85	85-90	90
WIND	Still AM		Moderate	High PM	Report No. 8	
HUMIDITY	Dry X		Moderate	Humid		

DAILY REPORT

WASH PAD

0700 - @ site.

0900 - Concrete Contractor on site preparing forms for wash pad pour - 12-27-90

1000 - U.S. Ecology preparing surface to perform sand/water mix ~~in~~ stockpile for wash pad

1100 - Form building & ~~water~~ sand/water ~~mix~~ blending continues

1200 - Lunch -

1230 - U.S. Ecology placing sand on wash pad liner & concrete contractor placing sand by hand using square point shovels no damage observed to H.D.P.E. wash pad liner

1430 - Concrete contractor & U.S. Ecology continue to place sand on wash pad liner using square point shovels no damage was observed

1600 - Exit site Scott Davis W.C.C.

CHK'D BY: [signature] SIGNATURE: [signature]

88103909

Woodward-Clyde Consultants

PROJECT NAME: U.S. Ecology Beatty, NV.

PROJECT NO.: 90H3121C - Wash Pad

CLIENT: U.S. Ecology

DATE 12-18-90

DAY AM PM

WEATHER	Snow	Clear ✓	Brite Sun	Overcast	Fog	Re
TEMP.	To 32	32-50 AM	50-70	70-85	85-90	90
WIND	Still		Moder ✓	High	Report No.	
HUMIDITY	Dry ✓		Moder	Humid		

DAILY REPORT

WASH PAD

0700 - @ site Poly American Loading Utility trailer to leave site today will Return 1-2-91.

0830 - Attended meeting with U.S.E., Welsh, P.A. - See meeting Report #01 - 12-18-90 for Details -

0930 - P.A. Exits site -

1100 - Exit Site, Scott Davis W.C.C.

CHK'D BY: [signature] SIGNATURE: [signature]

80103909

Woodward-Clyde Consultants

PROJECT NAME: U.S. Ecology Beatty NV.

PROJECT NO.: 90H3121C - WASH PAD

CLIENT: U.S. Ecology

DATE 12-17-90

DAY AM PM | S | M X | T | W | TH | F

WEATHER	Snow	Clear X	Brite Sun	Overcast	Fog	Rain
TEMP.	To 32	32-50 Amber	50-70	70-85	85-90	90-1
WIND	Still		Moder	High X	Report No.	
HUMIDITY	Dry X		Moder	Humid	6	

DAILY REPORT

WASH PAD

0700 @ site Poly America on site. High winds During Weekend of 12-15, 16-90 have Blown WASH PAD Liner OFF OF PAD P.A. will attempt to pull Liner Back Into place

0830 - P.A. has Liner In place NO MAJOR DAMAGE NO OBSERVED P.A. will Repair minor DAMAGE AS NEEDED - Pre welds are Pre formed

0930 - Pre welds Pass - P.A. Begins Repair work Geotextile FABRIC ARRIVES P.A UNLOADS MATERIAL

1030 - FABRIC UNLOADED NO DAMAGE OBSERVED P.A. has PLACED Rolls OF FABRIC AND Liner AS BALLAST to prevent Another Blow out

1300 - 2ND LOAD OF Geotextile FABRIC ARRIVED P.A. UNLOADS NO DAMAGE OBSERVED -

1430 - Repairs Completed

~~1430~~ 1530 Exit site - SCOTT DAVIS W.C.C., C. Piper, K.B. I. Jordan, D London, Poolan Poly America

CHK'D BY: [signature] SIGNATURE: [signature]

B81003909

Woodward-Clyde Consultants

PROJECT NAME: U.S. Ecology - Beatty

PROJECT NO.: 90H3121C

CLIENT: U.S. Ecology

DATE 12-16-90

DAY AM PM

WEATHER	Snow	Clear	Some Sun	Overcast	Fog	
TEMP.	To 32	32–50	50–70	70–85	85–90	
WIND	Still		Moderate	High	Report No. 5	
HUMIDITY	Dry		Moderate	Humid		

DAILY REPORT

NO WORK TODAY

CHK'D BY: [illegible] SIGNATURE: [illegible]

Woodward-Clyde Consultants

PROJECT NAME: U.S. Ecology Beatty

PROJECT NO.: 90H3821C

CLIENT: U.S. Ecology

DATE 12-13-90

DAY AM PM | S | M | T | W | Th | F

WEATHER	Snow	Clear	Bright Sun	Overcast	Fog	Au
TEMP.	To 32	32–50	50–70	70–85	85–90	90
WIND	Still		Moderate	High	Report No.	
HUMIDITY	Dry		Moderate	Humid	4	

DAILY REPORT

NO WORK TODAY

CHK'D BY: [illegible]

SIGNATURE: [illegible]

00103909

88103909

Woodward-Clyde Consultants

PROJECT NAME: U.S. Ecology Beatty NV.

PROJECT NO.: ~~90H3023~~ 90H3121C-WASHPAD

CLIENT: U.S. Ecology

DATE 12-14-90

DAY AM PM | S | M | T | W | TH | X

WEATHER	Snow	Clear X	Brite Sun	Overcast	Fog	Cl
TEMP.	To 32 AM	32-50 AM PM	50-70 PM	70-85	85-90	90
WIND	Still X		Moder	High	Report No. 3	
HUMIDITY	Dry X		Moder	Humid		

DAILY REPORT

WASH PAD

0700 @ Site Poly America on site -

0730 - P.A. Vacuum Box testing of Repairs made 12-13-90.
V. Box Pass -

0800 - P.A. Marcin Repairs on Equipment as needed -

1030 - Sent Conformance Sample of 80 mil HDPE to
Lab for testing -

1200 - Lunch

1300 - P.A. Continues Repairs on Equipment -

1630 - Exit Site - Scott Davis W.C.C., C. Piper, K Be
I Jordan D. Poolan D Londoen Poly America

CHK'D BY: [signature] SIGNATURE: [signature]

88103909

Woodward-Clyde Consultants

PROJECT NAME: U.S. Ecology Beatty NV.

PROJECT NO.: 90H3121C - WASH PAD

CLIENT: U.S. Ecology

DATE 12-13-90

DAY AM PM

WEATHER	Snow	Clear X	Brite Sun	Overcast	Fog
TEMP.	To 32	32-50 Am	50-70	70-85	85-90
WIND	Still X		Moder	High	Report No. 2
HUMIDITY	Dry X		Moder	Humid	

DAILY REPORT

WASH PAD

0700 - @ Site Poly America on site.

0730 - Shipment of 80mil HDPE Arrives P.A. Offloading
Also Boxes of Welding Rod., Stockpiling Sandbag
Trench 10 cap.

0830 - Offloading of Liner complete No Damage wa
Observed - Inventory taken of All Materials Recover

0930 - P.A. Filling Sand Bags for Future use -

1000 - P.A. Setting up Extruder to Repair Wash Pad
Liner preforming Pre weld.

1030 - Pre weld Pass - Extruding Begins

1100 - Repairs Completed.

1200 - Lunch -

1300 - P.A. Continues filling Sandbags -

1430 - P.A. Prefabricating Holding tank Liner As per U.S. Ecol
Request -

1630 - Exit site, Scott Davis W.C.C., C. Pirer, I. Jordan K.B
D. Poolaw, D. Lundow Poly America -

CHK'D BY: [signature] SIGNATURE: [signature]

SOUTHWEST GEOTECHNICAL CONSULTANTS

3280 WEST HACIENDA, SUITE 201
LAS VEGAS, NEVADA 89118
TELEPHONE (702) 795-7515

FOUNDATION INVESTIGATIONS
EXPLORATORY DRILLING
STEEL ERECTION INSPECTION

SOILS, ASPHALT, CONCRETE
QUALITY CONTROL
FOR CONSTRUCTION

Concrete Mix Design for: T and J Construction
Project No.: RLV-2090
Issue Date: January 30, 1990

Concrete Mix Design: T & J D 2
4000 psi at 28 days - Type V Cement - 6.5 sack/yd.^{3}
W/C = 0.443
Slump: 4" Maximum
Aggregate: Lathrop Wells Pit

Mix Proportion for 1 cubic yard:

		Batch Weight (lbs)	Absolute Volume (Ft.^{3})
W.C. Sand	42%	1150	7.650
Coarse Aggregate (No. 67)	58%	1780	10.565
Water (5.0 gal/sack)		271	4.327
Cement (6.5 sack)		611	3.108
Entrained Air: 5% Maximum		--	1.350
		3812	27.000

Admixture: Airin X - 4.0 fl.oz./100 lbs. cement
Master Builders Pozzolith 322N - 5.0 fl.oz./100 lbs. cement

Note: For water in sand in excess of 5.0%, make weight corrections: for each 1.0% excess of water, deduct 12 lbs. (1.5 gallons) mixing water and add 12 lbs. sand.

Theoretical Unit Weight = 141.2 lbs./cu.ft.

Information utilized for Mix Design Computations:

	Fine Aggregate	Coarse Aggregate
F.M.	2.88	-
S.G.	2.41	2.70
Absorption	2.51	2.27

Respectfully submitted,

SOUTHWEST GEOTECHNICAL CONSULTANTS

REGISTERED PROFESSIONAL ENGINEER - STATE OF NEVADA
JIMMY H. SINGH
CIVIL

Received 12-11-90
[illegible] W.C.C.

FIELD/LABORATORY DATA - COMPRESSIVE STRENGTH TESTS

Client: US ECOLOGY Job No.:

Address:

Project: US ECOLOGY BEATTY

Location in Structure: WASH PAD TANK FLOOR

Source of Sample: WEST END OF TANK FLOOR

Contractor: T&J Ticket No:

Arch/Engineer: Measured Slump. in.: 3"

Material Supplier: T&J Measured Air Content: 4.2%

Batch Size/CY: 10 CYS Concrete Temp., °F: 53°

Mix Identification: Ambient Air Temp, °F: 50°

Design Strength PSI: 4000 / 28 Days Plastic Unit Weight, pcf: /

Nominal Size Aggregate: 3/4 No. of Cylinders Molded: 4

Time Sampled: 1145 Specimen Size: 6X12

Field Curing Conditions: CURE BOX Area, sq.in.: 28.27

Sampled By: SCOTT THORNE Date: 1·3·91 Time in Mixer: Hr Mi

Submitted By: SCOTT THORNE Date: · · Water Added on Job: 4 Gal

Authorized By: Date: Test Procedure: ASTM C39-8

REMARKS: CONCRETE PLACED BY CHUTE

Specimen Marking If Any	Date Tested	Specimen Age In Days	Compressive Strength Maximum Load		Type Fracture if Other Than Cone	Defects in Specimens/ Caps If Any	Tested By
			Pounds Force	p s i			
1	1·10	7					
2	1·31	28					
3	1·31	28					
4	1·31	HOLD					
						1-31-91	

ETEC TESTING LABORATORIES, INC.
4150 W. Pioneer Ave., Suite A • Las Vegas, NV 89102
(702) 367-0100

LABORATORY REPORT
COMPRESSIVE STRENGTH OF CYLINDRICAL CONCRETE SPECIMENS

CLIENT: Woodward - Clyde Consultants
7330 Westview Drive
Houston, Texas 77055

JOB NO.: 12037- 1
DATE OF REPORT: 01-11-91

Project: US ECOLOGY - Beatty, Nevada (WCC #90H3121C)
Location in Structure: Wash Pad Tank Floor
Source of Sample: West End of Tank Floor
Contractor: T & J
Ticket No: NA
Arch/Engineer: NA
Measured Slump: 3 in
Material Supplier: T & J
Measured Air Content: 4.2%
Batch Size/CY: 10
Concrete Temp: 53
Mix Identification: 6.0 Sacks
Ambient Air Temp: 50
Design Strength PSI: 4000 / 28 Days
Plastic Unit Weight, pcf: ---
Nominal Size Aggregate: 3/4
No. of Cylinders Molded: 4
Sampled By: S.Thorne/ETEC Date: 01-03-91
Time in Mixer: NA Hr. NA
Submitted By: S.Thorne/ETEC Date: 01-08-91
Water Added on Job: 4
Authorized By: S.Davis/WCC Date: ---
Test Procedure: ASTM C39-8

NOTE: Cylinders are 6"x 12": Area = 28.27 sq. in. unless otherwise

REMARKS: Concrete placed by chute and vibrated into place

Specimen Marking If Any	Date Tested	Specimen Age In Days	Compressive Strength Maximum Load		Type Fracture if Other Than Cone	Defects Specimens Caps If Any	Tes E
			Pounds Force	p s i			
1A	01-10-91	7	64764	2290			
1B	01-31-91	28					
1C	01-31-91	28					
1D	01-31-91	HOLD					

CC: (1/M) Client; Don Colbourne

REVIEWED BY: Kulwant S. Sahi, P

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(702) 367-0100

LABORATORY REPORT
COMPRESSIVE STRENGTH OF CYLINDRICAL CONCRETE SPECIMENS

CLIENT: Woodward - Clyde Consultants
7330 Westview Drive
Houston, Texas 77055

JOB NO.: 12037- 1
DATE OF REPORT: 01-11-91
01-17-91

Project: US ECOLOGY - Beatty, Nevada (WCC #90H3121C)
Location in Structure: Wash Pad Tank Floor
Source of Sample: West End of Tank Floor
Contractor: T & J
Ticket No: NA
Arch/Engineer: NA
Measured Slump: 3 i
Material Supplier: T & J
Measured Air Content: 4.2%
Batch Size/CY: 10
Concrete Temp: 53
Mix Identification: 6.0 Sacks
Ambient Air Temp: 50
Design Strength PSI: 4000 / 28 Days
Plastic Unit Weight, pcf: ---
Nominal Size Aggregate: 3/4
No. of Cylinders Molded: 4
Sampled By: S.Thorne/ETEC Date: 01-03-91
Time in Mixer: NA Hr. NA
Submitted By: S.Thorne/ETEC Date: 01-08-91
Water Added on Job: 4
Authorized By: S.Davis/WCC Date: ---
Test Procedure: ASTM C39-

NOTE: Cylinders are 6"x 12"; Area = 28.27 sq. in. unless otherwise

REMARKS: Concrete placed by chute and vibrated into place

Specimen Marking If Any	Date Tested	Specimen Age In Days	Compressive Strength Maximum Load		Type Fracture if Other Than Cone	Defects Specimens Caps If Any	Te
			Pounds Force	p s i			
1A	01-10-91	7	64764	2290			
1B	01-17-91	14	77134	2730			
1C	01-31-91	28					
1D	01-31-91	28					

CC: (1/M) Client; Don Colbourne

REVIEWED BY: Kulwant S. Sahi
Kulwant S. Sahi,

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(702) 367-0100

LABORATORY REPORT
COMPRESSIVE STRENGTH OF CYLINDRICAL CONCRETE SPECIMENS

CLIENT: Woodward - Clyde Consultants
7330 Westview Drive
Houston, Texas 77055

JOB NO.: 12037- 1
DATE OF REPORT: 01-11-91
01-17-91
02-04-91

Project: US ECOLOGY - Beatty, Nevada (WCC #90H3121C)
Location in Structure: Wash Pad Tank Floor
Source of Sample: West End of Tank Floor
Contractor: T & J
Ticket No: NA
Arch/Engineer: NA
Measured Slump: 3 i
Material Supplier: T & J
Measured Air Content: 4.2%
Batch Size/CY: 10
Concrete Temp: 53
Mix Identification: 6.0 Sacks
Ambient Air Temp: 50
Design Strength PSI: 4000 / 28 Days
Plastic Unit Weight, pcf: ---
Nominal Size Aggregate: 3/4
No. of Cylinders Molded: 4
Sampled By: S.Thorne/ETEC Date: 01-03-91
Time in Mixer: NA Hr. NA
Submitted By: S.Thorne/ETEC Date: 01-08-91
Water Added on Job: 4
Authorized By: S.Davis/WCC Date: ---
Test Procedure: ASTM C39-

NOTE: Cylinders are 6"x 12"; Area = 28.27 sq. in. unless otherwise

REMARKS: Concrete placed by chute and vibrated into place

Specimen Marking If Any	Date Tested	Specimen Age In Days	Compressive Strength Maximum Load		Type Fracture if Other Than Cone	Defects Specimens Caps If Any	Te
			Pounds Force	p s i			
1A	01-10-91	7	64764	2290			
1B	01-17-91	14	77134	2730			
1C	01-31-91	28	97420	3450			
1D	01-31-91	28	96316	3410			

CC: (1/M) Client; Don Colbourne

REVIEWED BY: Kulwant S. Sahi,

FIELD/LABORATORY DATA - COMPRESSIVE STRENGTH TESTS

Client: U.S. ECOLOGY Job No.: 12037-2

Address:

Project: U.S. ECOLOGY BEATTY

Location in Structure: WASH PAD

Source of Sample: CENTER OF WASH PAD

Contractor: T&J Ticket No:

Arch/Engineer: Measured Slump. in.: 4"

Material Supplier: T&J Measured Air Content: 4.3%

Batch Size/CY: 8 CYS Concrete Temp., °F: 55°

Mix Identification: Ambient Air Temp, °F: 52°

Design Strength PSI: 4000 / 28 Days Plastic Unit Weight, pcf: /

Nominal Size Aggregate: 3/4 No. of Cylinders Molded: 4

Time Sampled: 1100 Specimen Size: 6X12

Field Curing Conditions: CURE BOX Area, sq.in.: 28.27

Sampled By: SCOTT THORNE Date: 1·8·91 Time in Mixer: Hr Mi

Submitted By: SCOTT THORNE Date: · · Water Added on Job: 5 Gal

Authorized By: Date: Test Procedure: ASTM C39-8

REMARKS: CONCRETED PLACED BY CHUTE AND VIBRATED INTO PLACE

Specimen Marking If Any	Date Tested	Specimen Age In Days	Compressive Strength Maximum Load		Type Fracture if Other Than Cone	Defects in Specimens/ Caps If Any	Tested By
			Pounds Force	p s i			
2A	1·15	7					
2B	2·5	28					
2C	2·5	28					
2D	2·5	HOLD					
						1-8-91 CD	

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LABORATORY REPORT
COMPRESSIVE STRENGTH OF CYLINDRICAL CONCRETE SPECIMENS

CLIENT: Woodward - Clyde Consultants
7330 Westview Drive
Houston, Texas 77055

JOB NO.: 12037- 2
DATE OF REPORT: 01-16-91

Project: US ECOLOGY - Beatty, Nevada (WCC #90H3121C)
Location in Structure: Wash Pad
Source of Sample: Center of Wash Pad
Contractor: T & J
Ticket No: NA
Arch/Engineer: NA
Measured Slump: 4 in
Material Supplier: T & J
Measured Air Content: 4.3%
Batch Size/CY: 8
Concrete Temp: 55
Mix Identification: NA
Ambient Air Temp: 52
Design Strength PSI: 4000 / 28 Days
Plastic Unit Weight, pcf: ---
Nominal Size Aggregate: 3/4
No. of Cylinders Molded: 4
Sampled By: S.Thorne/ETEC Date: 01-08-91 Time in Mixer: NA Hr. NA
Submitted By: S.Thorne/ETEC Date: 01-10-91 Water Added on Job: 5
Authorized By: S.Davis/WCC Date: --- Test Procedure: ASTM C39-8

NOTE: Cylinders are 6"x 12"; Area = 28.27 sq. in. unless otherwise

REMARKS: Concrete placed by chute and vibrated into place

Specimen Marking If Any	Date Tested	Specimen Age In Days	Compressive Strength Maximum Load		Type Fracture if Other Than Cone	Defects Specimens Caps If Any	Tes E
			Pounds Force	p s i			
2A	01-15-91	7	70796	2500			
2B	02-05-91	28					
2C	02-05-91	28					
2D	02-05-91	HOLD					

CC: (1/M) Client; Don Colbourne

REVIEWED BY: Kulwant S. Sahi
Kulwant S. Sahi, P

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LABORATORY REPORT
COMPRESSIVE STRENGTH OF CYLINDRICAL CONCRETE SPECIMENS

CLIENT: Woodward - Clyde Consultants
7330 Westview Drive
Houston, Texas 77055

JOB NO.: 12037- 2
DATE OF REPORT: 01-16-91
02-06-91

Project: US ECOLOGY - Beatty, Nevada (WCC #90H3121C)
Location in Structure: Wash Pad
Source of Sample: Center of Wash Pad
Contractor: T & J
Ticket No: NA
Arch/Engineer: NA
Measured Slump: 4 inc
Material Supplier: T & J
Measured Air Content: 4.3%
Batch Size/CY: 8
Concrete Temp: 55
Mix Identification: NA
Ambient Air Temp: 52
Design Strength PSI: 4000 / 28 Days
Plastic Unit Weight, pcf: ---
Nominal Size Aggregate: 3/4
No. of Cylinders Molded: 4
Sampled By: S.Thorne/ETEC Date: 01-08-91 Time in Mixer: NA Hr. NA
Submitted By: S.Thorne/ETEC Date: 01-10-91 Water Added on Job: 5 G
Authorized By: S.Davis/WCG Date: --- Test Procedure: ASTM C39-84
NOTE: Cylinders are 6"x 12"; Area = 28.27 sq. in. unless otherwise i

REMARKS: Concrete placed by chute and vibrated into place

Specimen Marking If Any	Date Tested	Specimen Age In Days	Compressive Strength Maximum Load		Type Fracture if Other Than Cone	Defects Specimens Caps If Any	Test By
			Pounds Force	p s i			
2A	01-15-91	7	70796	2500			C
2B	02-05-91	28	95515	3380			F
2C	02-05-91	28	95769	3390			F
2D	03-05-91	56					

CC: (1/M) Client; Don Colbourne

REVIEWED BY: Kulwant S. Sahi
Kulwant S. Sahi, P.

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(702) 367-0100

LABORATORY REPORT
COMPRESSIVE STRENGTH OF CYLINDRICAL CONCRETE SPECIMENS

CLIENT: Woodward - Clyde Consultants
7330 Westview Drive
Houston, Texas 77055

JOB NO.: 12037- 2
DATE OF REPORT: 01-16-91
02-06-91
03-06-91

Project: US ECOLOGY - Beatty, Nevada (WCC #90H3121C)
Location in Structure: Wash Pad
Source of Sample: Center of Wash Pad
Contractor: T & J
Ticket No: NA
Arch/Engineer: NA
Measured Slump: 4 in
Material Supplier: T & J
Measured Air Content: 4.3%
Batch Size/CY: 8
Concrete Temp: 55
Mix Identification: NA
Ambient Air Temp: 52
Design Strength PSI: 4000 / 28 Days
Plastic Unit Weight, pcf: ---
Nominal Size Aggregate: 3/4
No. of Cylinders Molded: 4
Sampled By: S.Thorne/ETEC Date: 01-08-91 Time in Mixer: NA Hr. NA
Submitted By: S.Thorne/ETEC Date: 01-10-91 Water Added on Job: 5
Authorized By: S.Davis/WCC Date: --- Test Procedure: ASTM C39-8
NOTE: Cylinders are 6"x 12"; Area = 28.27 sq. in. unless otherwise i

REMARKS: Concrete placed by chute and vibrated into place

Specimen Marking If Any	Date Tested	Specimen Age In Days	Compressive Strength Maximum Load		Type Fracture if Other Than Cone	Defects Specimens Caps If Any	Tesi By
			Pounds Force	p s i			
2A	01-15-91	7	70796	2500			D
2B	02-05-91	28	95515	3380			R
2C	02-05-91	28	95769	3390			R
2D	03-05-91	56	101840	3600			R

CC: (1/M) Client; Don Colbourne

REVIEWED BY: Kulwant S. Sa
Kulwant S. Sahi, P.

E1 - CONTRACTOR'S DOCUMENTATION

- DAILY REPORTS
- SUBGRADE ACCEPTANCE
- HDPE WELDING ROD QC REPORT

POLY-FLEX, INC.

daily field report
construction management services

project no.

date 1/18/91

project name U.S. Ecology

weather Clear

project location Beatty Nev.

contract days remaining

contractor's equipment

contractor's personnel

observations

Went to work @ 7:00 A.M.
Finished repairs and testing.
Truck load of fabric arrived.
Worked on wash pad.
Laid 6 panels of fabric 450' long.
32,400 sq ft

Total to Date
Fabric - 340,600 sq
Liner - 219,200 sq

photo meeting change order problem sheet conversati

time arrived 7:00

time departed 5:00

signature

PF-009-5-90

Attachme

POLY·FLEX, INC.

daily field report
construction management services

project no.

date 4/17/91

project name U.S. Ecology

weather Clear + Windy

project location Beatty Nev.

contract days remaining

contractor's equipment

contractor's personnel

observations Went in @ 7:00 A.M.
Worked on testing and repairs.
Worked the afternoon on the wash pad.

Total To Date
Fabric - 305,200
Liner - 219,200

photo meeting change order problem sheet conversatio

time arrived 7:00 time departed 5:00

signature

PF-009-5-90

Attachme

POLY-FLEX, INC.

daily field report
construction management services

date ~~12/3/90~~ 1-3-91

project no. G-1075

project name U.S. Ecology

project location Beatty Nev

weather Cloudy

contract days remaining

contractor's equipment

contractor's personnel

observations
- Loader arrived this morning.
- They started pouring WASPAR.
- We trimmed back exposed liner on cap.
- Sent techs home @ 2:00 pm because there was no area ready for us.
- I traveled to Las Vegas to pick up Alfonso and Agustin

☐ photo ☐ meeting ☐ change order ☐ problem sheet ☐ conversatio

time arrived 7:00 am time departed 2:00 pm

signature

PF-009-5-90

1-6-91

Attachme

POLY·FLEX, INC. daily field report
construction management services

project no.
date 12/4/90
project name U.S. Ecology
weather Clear
project location Beatty Nevada
contract days remaining

contractor's equipment

contractor's personnel

observations Went to work @ 7:00
Made sure all equipment was in work order.
Vac tested repairs on wash pad.
Filled sand bags.

Worked 10 hrs

photo meeting change order problem sheet conversation

time arrived 7:00
time departed 5:00
signature

PF-009-5-90

12-15-90

Attachme

POLY·FLEX, INC.

daily field report
construction management services

project no. _____ date 12/13/90

project name U.S. Ecology weather Clear

project location Beatty Nevada contract days remaining _____

contractor's equipment _____

contractor's personnel _____

observations
Went to work at 7:00 A.M.
Unloaded truck load of 50 mil gad
welding rod
Had crew haul bags out of trench 11
for cap
- Repaired seams on wash pad
Filled sand bags for rest of the day
Worked 10 hrs.

☐ photo ☐ meeting ☐ change order ☐ problem sheet ☐ conversation

time arrived _____ time departed _____ signature [signature]

PF-009-5-90 12-14-90 Attachment

POLY-FLEX, INC.

daily field report
construction management services

project no. _____ date 12/12/90

project name U.S. Ecology weather Cloudy

project location Beatty Nevada contract days remaining _____

contractor's equipment _____

contractor's personnel _____

observations
- Went in at 7:00 A.M
- Backhoe arrived from Hertz
- Unloaded work trailer and organized
- Deployed fabric and 40 mil on wash pad
all material was U.S. Ecology's
- Wedge welded and air tested all good
- Unloaded truck load of 50 mil sheet

40 mil - 2400 sq > Installed on wash pad
Fabric - 2400 sq

photo | meeting | change order | problem sheet | conversati

time arrived 7:00 A.M time departed 5:00 P.M

[signature]
signature

12-13-90

Attachme

POLY-FLEX, INC. geomembrane air/vacuum test record

project no. ..... project name U.S. Ecology

project location BEATTY NEVADA

vacuum box no. ..... make ..... model .....

air testing

seam interval tested	tester's name	time	psi	pass/fail	date
Wash Pad 1/2	C J Pipes	3:30	30 psi	Pass	12/12/9
Wash Pad 2/3	"	"	"	"	"
Wash Pad 3/4	"	"	"	"	"

vacuum testing

seam interval tested	tester's name	test failure location	test failure no.	repair date	retest approval
Wash Pad 1/2	Danny Pooler	None	None	12/13/90	C.J.
Wash Pad 2/3	"	"	"	"	"

inspected by C.J. Pipes date 12/14/90

PF-006-5-90

12-15-90

Attachme

POLY-FLEX, INC.

certificate of acceptance of soil subgrade

project name: U.S. Army

project no.:

location: Reilly Newark

installation contractor representative: C.J. Piper

area to be accepted: Wash Pad

I, the undersigned, duly authorized representative of the installer, do hereby accept the soil subgrade surface conditions and shall be responsible for maintaining its integrity and suitabi in accordance with the specifications. I do not accept any responsibility for the conditions or character of the subsurface soil, or any effects the soil might have on the liner system.

signature	title	date
A.J. Pfau	Superintendent	12/12/90

PF-003-5-90

12-12-90

Attachme

POLY-AMERICA Inc.
2000 W. Marshall Drive Grand Prairie, Texas 75051
800-527-3322 214-647-4374 Telex 79-2851

FAX 214-988-833

January 4, 1991

Ms. Jeanette Lear
U.S. Ecology, Inc.
9200 Shelbyville Rd. Suite 300
Louisville, KY 40222

Re: HDPE Welding Rod QC Report
US Ecology Trench 10 & 11 Construction
Beatty, NV

Dear Ms. Lear:

The following welding rod rolls were shipped to Beatty, NV for the above referenced project.

5mm Rod Roll No.	5mm Rod Roll No.	4mm Rod Roll No.
284	317	218
285	318	382
286	328	385
287	329	431
291	331	
292	332	
293	336	
295	337	
296	338	
302	339	
307	388	
308	389	
312	414	
313	424	

All 5mm rods were manufactured of Railcar RAIX 60671, Lot 431933
All 4mm rods were manufactured of Railcar CCBX 55230, Lot 431183
The resin QC and QA reports are attached.

Sincerely,

George M. Hall

George M. Hall
Plant Manager

RAILCAR RESIN REPORT

P. O. # 4770 Weight 185600

Date Received 10-11-90 Resin Code

BUY INFORMATION

Railcar # RAIX 60671 Film Rating ____ Slip ____

Vendor UC Melt Index ____ Antiblock ____

Lot # ____ Density ____ Antioxidant ____

Blend DEGD 1526 VA ____ EVA ____

Type: LDPE ____ LLDPE ____ Comments geo. Poly-Flex EA ____

Other HDPE Other ____

Pressure: High ____ Low ____

C.HB

CAR CAPACITY

Pellets ✓ Granular ____ Car Type 5250

Measurements:

inches: A 12 CA 14 CB 11 B 12 TOTAL ____

weight: A ____ CA ____ CB ____ B ____ TOTAL 151

Release Information:	Date	Time	Initials
Released to Production			
Released to Railroad			

+100

Comments ____

LABORATORY TESTING REPORT

R=

Resin Evaluation: Melt Index: A .13 (.12) CA .13 (.15) CB .13 (.14) B .14 (.14) Avg. .14

Density: A .947 CA .948 CB .947 B .948 Avg. .947

Film Evaluation: Gauge: Range ____ Average ____

Width: ____ Dart Impact: ____

COF ____ C-Black Content: 2.4%

IR Analysis: Slip ____ VA ____ EA ____ AO ____

AB ____ EVA ____ Other (specify) ____

Comments: Pol.-Flex

Film Use: Pol-flex Approved By: JN 10/11

PUMPING INFORMATION

Released for Pumping: ____ (Whse) ____ (Date) ____ (Approved)

	Time Started	Time Finished
Compartment A		
Compartment C		

RAILCAR RESIN REPORT

P. O. # 1914 Weight 18070

Date Received 11-2-89 Resin Code ÷

BUY INFORMATION

Railcar # CCRX55230 Film Rating NA Slip ____

Vendor UC Melt Index 0.15 Antiblock ____

Lot # ____ Density .950 Antioxidant ____

Blend DE6D1525 VA ____ EVA ____

Type: LDPE ____ LLDPE ____ Comments Poly Flex EA ____

Other HDPE Other ____

Pressure: High ____ Low ____ Black

CAR CAPACITY

Pellets ✓ Granular ____ Car Type 5250

Measurements:

inches:	A	15	CA	32	CB	13	B	10	TOTAL ____
weight:	A	____	CA	____	CB	____	B	____	TOTAL 18

Release Information:

	Date	Time	Initials
Released to Production	____	____	____
Released to Railroad	11-9-89	4:30pm	[illegible]

Comments ____

LABORATORY TESTING REPORT

Resin Evaluation: Melt Index: A .949 CA .949 CB .949 B .950 Avg. 0.20

Density: A .949 CA .950 CB .949 B .949 Avg. 0.949

Film Evaluation: Gauge: Range ____ - ____ Average ____

Width: ____ Dart Impact: ____

COF ____ C.B/K.Ash Content: A 2.2, CA 2.1, CB 2.1, B

IR Analysis: Slip ____ VA ____ EA ____ AO ____

AB ____ EVA ____ Other (specify) ____

Comments: Poly-Flex - MI slightly higher normal

Film Use: Poly-Flex Approved By: JN 11/2

PUMPING INFORMATION

Released for Pumping: SIL #20 (Where) 11-2-89 (Date) [illegible] (Approved)

	Time Started	Time Finished
Compartment A	____	____
Compartment CA	____	____

PRODUCT QUALITY REPORT

FAX NO. 214-647-4374 EXT. 233
DR NO. 214-447-8061
POLY AMERICA INC.
GRAND PRAIRE, TX 75051
ATTN: G. URVIS

UNION CARBIDE CORPORAT
POLYOLEFINS DIVISION
P.O. BOX 186
PORT LAVACA, TEXAS 77

OCTOBER 24, 1989

PRODUCT NAME DEGD-1525 BK

BLEND NUMBERS	445668	431183
QUANTITY, LBS.	90,350	90,350
CONTAINER	CCBX55230	CCBX55230
CUSTOMER ORDER NO.	VBL	
UCC ORDER NO.	440762	
SHIPPING DATE	10/24	

SHIPPED TO: GRAND PRAIRIE, TX

THE FOLLOWING TEST DATA WAS OBTAINED:

	445668	431183
[illegible] INDEX	0.15	0.16
[illegible] ITY ASTM	0.9500	0.9495
[illegible] TIME 200 C MIN	117.	110.
CARBON BLACK	2.4	2.3
ANALYSIS NO.	1041020	601022

P.O. 1914

Wayne Dagger
QUALITY CONTROL DEPARTMENT
SEADRIFT PLANT LABORATORY

PRODUCT QUALITY REPORT

FAX NO. 214-647-8061 X 208
POLY AMERICA INC.
GRAND PRAIRE, TX 75051
ATTN: SHAWNEE DORADO

UNION CARBIDE CHEMICALS
AND PLASTICS COMPANY INC.
POLYOLEFINS DIVISION
P.O. BOX 186
PORT LAVACA, TEXAS 77979

OCTOBER 9, 1990

PRODUCT NAME DEGD-1525 BK

BATCH END NUMBERS	431933	431934
QUANTITY, LBS.	92,800	92,800
CONTAINER	RAIX60671	RAIX60671
CUSTOMER ORDER NO.	4770	
UCC ORDER NO.	447476	
SHIPPING DATE	10/05	

SHIPPED TO: GRAND PRAIRIE, TX

THE FOLLOWING TEST DATA WAS OBTAINED:

	431933	431934
MELT INDEX	0.15	0.11
I21	16.	14.
DENSITY ASTM	0.9485	0.9490
CARBON BLACK	2.2	2.4
IN TIME 200 C MIN	113.	116.
ANALYSIS NO.	741003	1761003

Wayne Boggs
QUALITY CONTROL DEPARTMENT
SEADRIFT PLANT LABORATORY

E2 - WOODWARD-CLYDE CONSULTANTS' DOCUMENTATION

- PANEL PLACEMENT LOG
- TRIAL SEAM LOG
- SEAMING LOG

88103907

Woodward-Clyde Consultants

PANEL PLACEMENT LOG

PROJECT NAME: Beatty NJ - USE, Wash PAD PROJECT NO.: 90H312K

DATE / TIME	PANEL #	ROLL #	LOT # BATCH	REPAIRS YES / NO	REPAIRS REPAIRED	REPAIRS TESTED	AREA L / W	AREA ± SQ. FT.
12-12 PM	1	N.S.C. MATERIAL		NO	—	—	60/14.5	870
12-12 PM	2	↓	↓	↓	↓	↓	60	↓
12-12 PM	3	↓	↓	↓	↓	↓	60	↓
12-12 PM	4	↓	↓	↓	↓	↓	60	↓

COMMENTS:

THICKNESS

TOTAL	348
FR. SHT. #	—
ACCUM. TOTAL	348

CHK'D BY: [signature] SIGNATURE: [signature]

8810390X

EQUIP. TYPE: Fusion/Extrusion

PROJECT NAME: U.S. Ecology - Beatty, NV. WASH PAD

PROJECT NO.: 90H3121C

SAMPLE # / DATE	TRIAL SEAM INFORMATION								TIME	TEST RESULTS				
				TEMP INF						PEEL		SHEAR		MILS
	EQUIP #	TECH	TIME	AMB	SHEET					#/BRK	P/F	#/BRK	P/F	
1 / 12-12	634F	IJ	PM	47	52	300			PM	110/100	P	145/145	P	40
1 / 12-13	2450E	IJ	AM	52	55	470	450		AM	75/80	P	140/140	P	40
1 / 12-17	04E	IJ	AM	43	52	460	500		AM	85/95	P	125/120	P	40
1 / 1-17-91	2330E	IJ	PM	55	62	475	500		PM	110/100	P	135/120	P	40
1 / 1-18-91	2330E	IJ	AM	47	52	450	500		AM	90/95	P	120/125	P	40
2 / 1-18	2330E	IJ	PM	55	62	450	500		PM	95/110	P	130/135	P	40
1 / 1-19	2330E	IJ	AM	48	51	485	500		AM	95/100	P	125/130	P	40
2 / 1-19	2330E	IJ	PM	58	65	485	500		PM	105/90	P	140/130	P	40

CHK'D BY: [illegible] SIGNATURE: [illegible]

88103900

PROJECT NAME: BUS Ecology-Beatty NV. Wash P.A.D PROJECT NO.: 90H3121C

SEAM #	TACH'D	SEAM'D	EQUIP. #	TECH.	TEMP. SHEET	TEMP. AMB	WIND	TEST TYPE*	REPAIRS Y/N	REPAIRS #	REPAIRS REP'D/TEST'D	DESTRUCTIVE SAMPLE #	DESTRUCTIVE SAMPLE REP'D/TEST	LENGTH FT.
1/2	—	—	634	IJ	52	47	M	AP	Y	1	12/3-90	—	—	60
2/3	—	—	634	IJ	52	47	M	AP	Y	1	12/3-90	—	—	60
3/4	—	—	634	IJ	52	47	M	AP	N		—	—	—	60

COMMENTS:

TOTAL	180
FR SHT #	—
ACCUM. TOTAL	180

* V-VACUUM, S-SPARK, AP-AIR PRESSURE, VI-VISUAL, I-IMPACT, AL-AIR LANCE

CHK'D BY: [signature] SIGNATURE: [signature]

88103905

Woodward-Clyde Consultants

PROJECT NAME: Beatty - U.S. Ecology

PROJECT NO. 90H3821C - WASHPAD

CLIENT: U.S. Ecology

DATE 12-12-92

DAY AM PM | S | M | T | W X | TH

WEATHER	Snow	Clear	Brite Sun	Overcast X	Fog
TEMP.	To 32	32-50 PM	50-70	70-85	85-90
WIND	Still X		Moder	High	Report No.
HUMIDITY	Dry		Moder X	Humid	1

TRIAL SEAMS

SAMPLE #	TRIAL SEAM INFORMATION: EQUIP # / TYPE	TECH	TIME	TEMP INF: AMB	SHEET				TIME	TEST RESULTS: PEEL #/BRK	PEEL P/F	SHEAR #/BRK	SHEAR P/F
1	634 F	I.J.	PM	47	52	340			PM	FTB/110	P	FTB/145	P
										11 100	P	11/105	P

PANEL PLACEMENT

TIME	TEMP	PANEL #	ROLL #	LOT # BATCH	REPAIRS: Y/N	#	REPAIRED	TESTED	AREA: L / W	± SQ
PM	47	1	N.S.C. Material		N				60/25	
11	11	2			11				11	
11	11	3			11				11	
11	11	4			11				11	

THICKNESS TOTAL

WASHPAD

SEAMING

SEAM #	TACH'D	SEAM'D	EQUIP #	TECH	TEMP: SHEET	AMB	WIND	TEST TYPE*	REPAIRS: Y/N	#	REP'D/TEST'D	DESTRUCTIVE SAMPLE: #	REP'D/TEST
1-2			634	IJ	52	47	S	A.P	N				
2-3			11	11	52	11	11	11	N				
3-4			11	11	11	11	11	11	N				

* V-VACUUM, S-SPARK, AP-AIR PRESSURE, I-IMPACT, AL-AIRLANCE, VI-VISUAL TOTAL

CHK'D BY: [signature] SIGNATURE: [signature]

88103905

Woodward-Clyde Consultants

PROJECT NAME: U.S. Ecology - Beatty NV.

PROJECT NO. 90H3121C - WASU PAD

CLIENT: U.S. Ecology

DATE 12-13-90

DAY AM PM | S | M | T | W | Th X

WEATHER	Snow	Clear X	Brite Sun	Overcast	Fog	R
TEMP.	To 32	32-50 AM	50-70	70-85	85-90	9
WIND	Still X		Moder	High	Report No.	
HUMIDITY	Dry (		Moder	Humid	2	

TRIAL SEAMS

SAMPLE #	TRIAL SEAM INFORMATION: EQUIP # / TYPE	TECH	TIME	TEMP INF: AMB	SHEET	D	P.H.		TIME	TEST RESULTS: PEEL #/BRK	PEEL P/F	SHEAR #/BRK	SHEAR P/F
1	2450 Ex	IJ	AM	52	55	470	450		AM	FT 3/75	D	FTB-140	D
										11 /80	11	11	.1

PANEL PLACEMENT

TIME	TEMP	PANEL #	ROLL #	LOT # BATCH	REPAIRS: Y/N	#	REPAIRED	TESTED	AREA: L / W	± SQ.
		1	N.S.C							
		2								
		3								
		4								

THICKNESS TOTAL

SEAMING

SEAM #	TACH'D	SEAM'D	EQUIP #	TECH	TEMP: SHEET	AMB	WIND	TEST. TYPE*	REPAIRS: Y/N	#	REP'D/TEST'D	DESTRUCTIVE SAMPLE: #	REP'D/TEST	LE

* V-VACUUM, S-SPARK, AP-AIR PRESSURE, I-IMPACT, AL-AIRLANCE, VI-VISUAL TOTAL

CHK'D BY: [signature] SIGNATURE: [signature] for S.A.

88103905

Woodward-Clyde Consultants

PROJECT NAME: US Ecology Beatty N.J.

PROJECT NO. 90H3121C - Wash PAD

CLIENT: U.S. Ecology

DATE 12-17-90

DAY AM PM: S X T W Th F

WEATHER	Snow	Clear X	Brite Sun	Overcast	Fog	Rain
TEMP.	To 32	32-50 PM-A	50-70	70-85	85-90	90-
WIND	Still		Moder	High X	Report No.	
HUMIDITY	Dry X		Moder	Humid	3	

TRIAL SEAMS

SAMPLE #	TRIAL SEAM INFORMATION: EQUIP # / TYPE	TECH	TIME	TEMP INF: AMB	SHEET				TIME	TEST RESULTS: PEEL #/BRK	PEEL P/F	SHEAR #/BRK	SHEAR P/F	MI
1	04 / EX	IJ	PM	43	52	460	500		AM	85/55	P	125	P	4
													—	

PANEL PLACEMENT

TIME	TEMP	PANEL #	ROLL #	LOT # BATCH	REPAIRS: Y/N	#	REPAIRED	TESTED	AREA: L / W	± SQ. F
THICKNESS									TOTAL	

SEAMING

SEAM #	TACK'D	SEAM'D	EQUIP #	TECH	TEMP: SHEET	AMB	WIND	TEST. TYPE*	REPAIRS: Y/N	#	REP'D/TEST'D	DESTRUCTIVE SAMPLE: #	REP'D/TEST	LENG FT.

* V-VACUUM, S-SPARK, AP-AIR PRESSURE, I-IMPACT, AL-AIRLANCE, VI-VISUAL

TOTAL

CHK'D BY: DD

SIGNATURE: [illegible] for S.D.

SHEET _____ OF _____

88103910

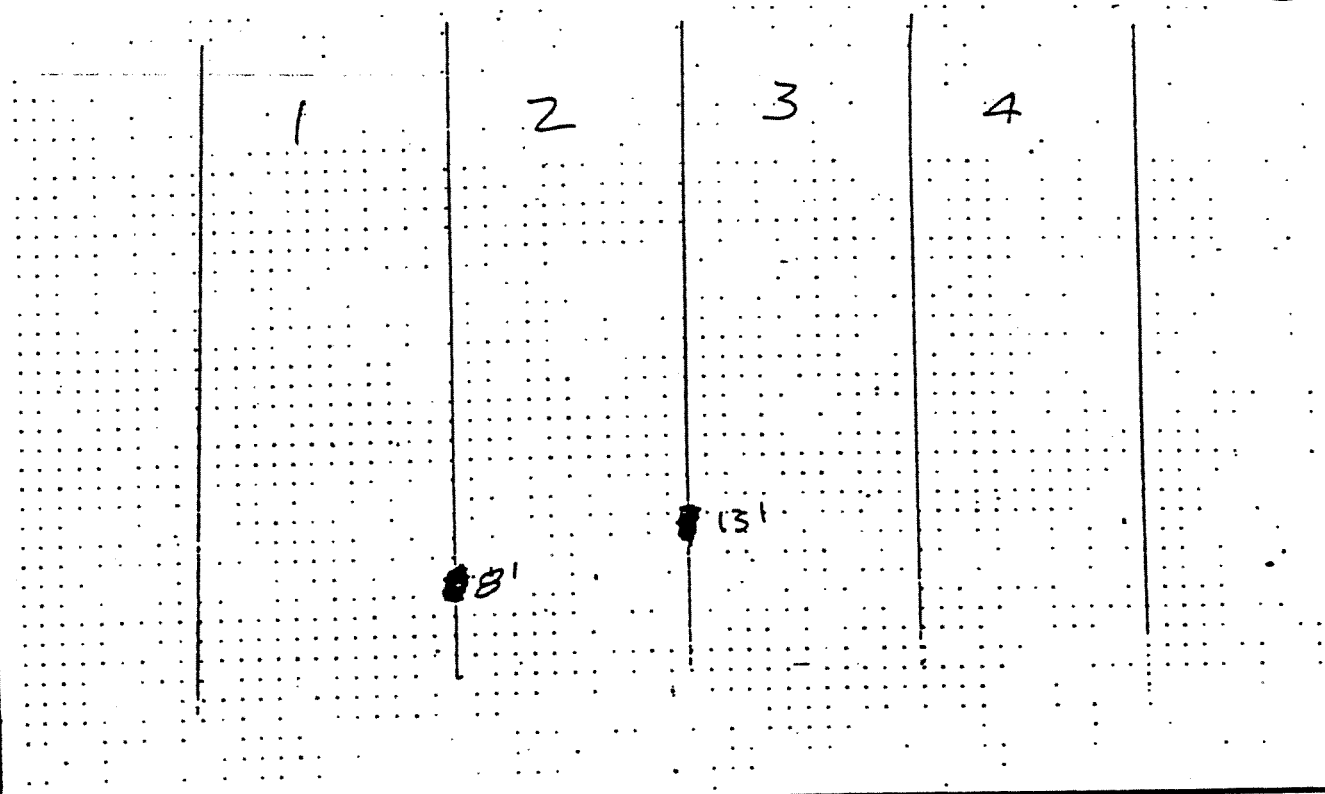
Woodward-Clyde Consultants

PANEL/SEAM DESCRIPTION

PROJECT NAME: U.S. Ecology-WASHPAD PROJECT NO.: 90H3121C

▭	CAP/SAMPLE	☒	REPAIRED	■	TESTED
○	PATCH	⊗	REPAIRED	●	TESTED

DATE: _____



PANEL PLACEMENT

TIME	PANEL #	ROLL #	LOT # BATCH	REPAIRS Y/N	REPAIRS #	REPAIRS REPAIRED	REPAIRS TESTED	AREA L / W	AREA ± SQ. FT.
								TOTAL	

SEAMING

SEAM #	TACH'D	SEAM'D	EQUIP. #	TECH.	TEMP. SHEET	TEMP. AMB	WIND	TEST TYPE*	REPAIRS Y/N	REPAIRS #	REPAIRS REP'D/TEST'D	DESTRUCTIVE SAMPLE #	DESTRUCTIVE SAMPLE REP'D/TEST	LENGTH FT.
													TOTAL	

* V-VACUUM, S-SPARK, AP-AIR PRESSURE, VI-VISUAL, I-IMPACT, AL-AIRLANCE

CHK'D BY: [signature] SIGNATURE: [signature] for S.D.

APPENDIX D

(REMOVED)

APPENDIX E

BATCH STABILIZATION UNITS INTEGRITY ASSESSMENT REPORT

UPGRADE OF EXISTING BATCH STABILIZATION UNIT

U.S. ECOLOGY, INC.
BEATTY, NEVADA
NDEP Permit HW0011
Revision 0

March 1998

PROFESSIONAL ENGINEER-STATE OF NEVADA
GRANT A. JACKSON
CIVIL
No. 10299

03-23-1998

Prepared By

NAISMITH ENGINEERING, INC.
ENGINEERING • ENVIRONMENTAL • SURVEYING
CORPUS CHRISTI, TEXAS

NEI PROJECT NO: 4856

TABLE OF CONTENTS

1. GENERAL: 1

2. FACILITY DESCRIPTION: 1

3. DESCRIPTION OF BATCH STABILIZATION UNIT MODIFICATION 1

- **3.1. Reason for Modification:** 1
- **3.2. Modification Procedure:** 1
- **3.3. Personnel Making Modification:** 2
- **3.4. Construction Quality Assurance for the Modification:** 2
- **3.5. CQA Personnel:** 2

4. REFERENCES 3

APPENDICES

Appendix A	As-Built Drawings and Revised Calculations
Appendix B	Construction Quality Assurance Documentation
Appendix C	Certification Letter

1. GENERAL:

Naismith Engineering, Inc., (NEI) was retained by U.S. Ecology, Inc., (USE) to perform the construction quality assurance (CQA) for the upgrade of the existing bulk stabilization unit (BSU), located at their Beatty, Nevada facility. Golder Construction Services, Inc. (GCS) was retained by NEI to perform third party certification for the BSU. Facility operations are governed by two (2) separate authorizations. The facility is authorized to manage hazardous wastes regulated by the Resource Conservation and Recovery Act (RCRA) under a permit (Permit No. NEV-HW0011) [Ref. 1] issued by the Nevada Department of Conservation and Natural Resources, Division of Environmental Protection (NDEP). The facility is also authorized to manage toxic substances regulated by the Toxic Substances Control Act (TSCA) under an approval issued by the U.S. Environmental Protection Agency, Region IX.

2. FACILITY DESCRIPTION:

The facility is located in Nye County, near Beatty, Nevada. It is authorized to treat, store and dispose of certain types of hazardous and toxic wastes. The bulk storage unit is designed for the mechanical solidification and/or stabilization of hazardous wastes and for debris treatment. The existing BSU was converted into secondary containment for the new primary containment unit. The converted secondary containment unit is approximately fifty (50) feet long and approximately thirteen (13) feet wide. The new primary containment unit is a welded steel tank fabricated from one (1) inch thick steel plates and standard structural steel members. The primary containment unit is approximately forty-nine (49) feet long and approximately twelve (12) feet wide. A sump is provided on the east end of the secondary containment unit. There are two (2) four (4) inch diameter steel pipes in the sump for liquid removal from the secondary containment unit. The bottom of the secondary containment unit was sloped to drain to the sumps. A (1/4) inch thick steel pan surrounds the BSU on the north and east sides to provide containment for loading/unloading and support activities. The steel pan is sloped to drain liquids to the sump in the northeast corner. Gravel and sand separated by a geotextile was placed above the containment pan and graded to prevent the runoff of liquids. The as-built drawings and revised calculations are in Appendix A.

3. DESCRIPTION OF BATCH STABILIZATION UNIT MODIFICATION

3.1. Reason for Modification:

The previous batch stabilization tank was modified as per requirements of Permit No. NEV-HW0011, Section V.B.3.a.

3.2. Modification Procedure:

The existing unit was initially cleaned out, walls straightened, and "touch-up" welding was performed. The unit was visually inspected after the welding was complete and then hydrostatically tested. The hydrostatic testing results of the secondary containment unit on January 21, 1998 are presented in Appendix B.

The north and south walls of the existing BSU were squared up with new (1/2) inch steel plating supported by (¼) inch steel plating. The gap between the existing steel walls and the new (1/2) inch steel plating was filled with a cement mixture. Two (4) inch steel pipes were placed on the east side of the secondary containment unit for liquid removal.

The primary containment unit was prefabricated in sections and then constructed inside the modified secondary containment unit. Below the floor and on the east 9.3 feet of the 1 inch thick steel primary tank is 3" x 3" x 1/2" steel angles on 5 inch centers for reinforcement. The rest of the new 1 inch thick primary tank was reinforced with 3" x 3" x 1/2" steel angles on 8 inch centers. The unit was visually inspected and hydrostatically tested. The hydrostatic testing results of the primary containment unit on January 27, 1998 is in Appendix B.

3.3. Personnel Making Modification:

The modification to the Batch Stabilization Unit was completed by U.S. Ecology, Inc., site maintenance personnel.

3.4. Construction Quality Assurance for the Modification*:*

CQA personnel inspected and tested the modifications to the secondary containment system following fabrication. Inspections were made to ensure that the fabrication was performed properly. In addition, a hydrostatic test was performed on the completed installation of the primary and secondary system. An inspection report and the results of the hydrostatic test are included in Appendix B. All inspections and test indicated that the lining system was functioning properly and was acceptable. Ms. Laurie Sanders of the Nevada Division of Environmental Protection (NDEP) was on site January 26, 1998 to observe the construction of the modified batch stabilization unit.

A letter certifying the proper construction of the Batch Stabilization Unit has been included in Appendix C.

3.5. CQA Personnel:

On-site CQA activities and CQA oversight were provided by Mr. Richard E. Kiel, P.E. of Golder Construction Services. Mr. Kiel is a registered professional engineer in the state of Nevada and is experienced in CQA activities for hazardous waste management facilities.

4. REFERENCES

1. "Nevada Division of Environmental Protection Permit for Hazardous Waste Treatment, Storage and Disposal", Nevada Division of Environmental Protection, Carson City, Nevada, July, 1988.

2. "Part B Renewal for Hazardous Waste Management Facility - U.S. Ecology, Inc., Beatty, Nevada", Volumes I through VI, U.S. Ecology, Inc., Houston, Texas, April, 1997, Revision 0.

D:\4856\BSUREPORT.DOC

APPENDIX A

AS-BUILT DRAWINGS
AND
REVISED CALCULATIONS

REVISED CALCULATIONS

OBJECTIVE: To determine, through established and structural steel design procedures, the required structural steel dimensions/member sizes of the several proposed batch stabilization unit (BSU) system components.

APPROACH:

1. Perform analysis and design according to established structural and foundation engineering standards, ACI 318-89.

2. Where applicable, static and dynamic loads have been combined to develop "worst case scenerio" loading conditions.

GIVEN:

1. The site is located in a seismic zone 3, according to the 1994 Uniform Building Code.

2. The proposed BSU as shown in the design drawings given in Appendix A of this report.

ASSUMPTIONS:

1. All structural steel will have a minimum yield strength, f_y, of 36,000 psi [A36 carbon steel].

CALCULATIONS:

Step 1. Structural steel mixing tank

The tank will rest inside a containment tank constructed with 1/2 inch steel plate which rests on grade.

A. Size Wall Stiffeners - The governing loading condition is created by earth pressure on the walls.

3 Pages of Calculations

PROFESSIONAL ENGINEER-STATE OF NEVADA
GRANT A. JACKSON
CIVIL
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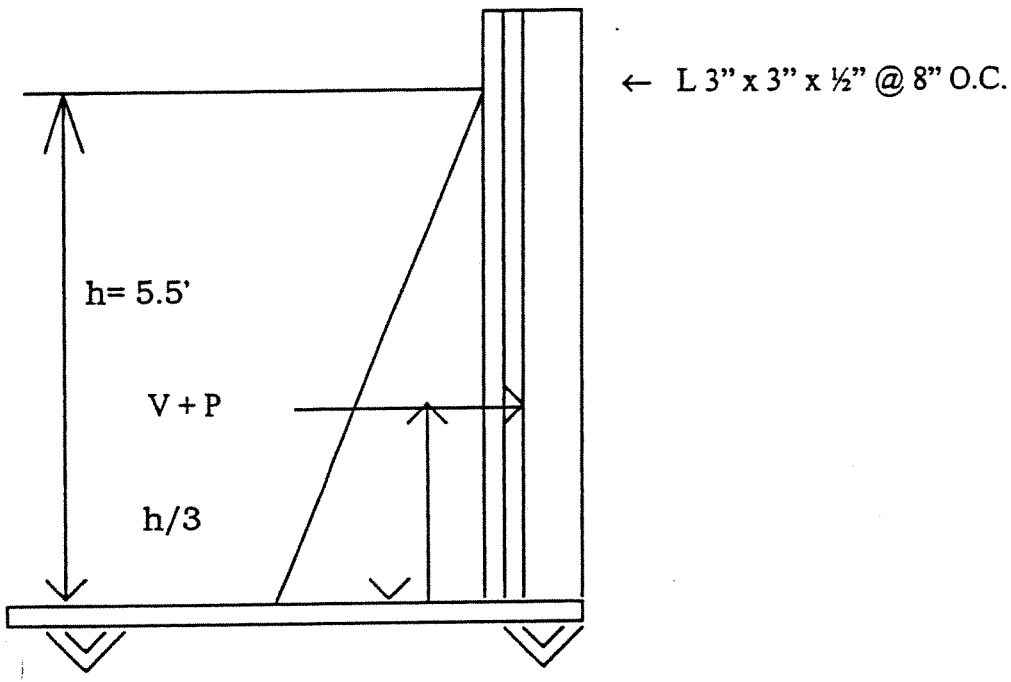


WALL DESIGN (Assume $\varnothing = 45°$ for Substrate)

P = FORCE DUE TO DEAD LOAD OF SUBSTRATE

$P = \frac{1}{2} \gamma h^2 \tan^2(45 - \varnothing/2) = 1/2\ (100\ pcf)\ 5.5 \tan^2(45-45/2) = 259\ ^{lb}/_{ft}$.

INFLUENCE FROM ZONE III SEISMIC (PER UBC 1994)

$$V = \frac{(ZIC)}{RW} P = \frac{[(0.30)(1.25)(8.2)]}{6} 259 = 133\ ^{lb}/_{ft} < P$$

- Z = 0.30 (Table 16 - I UBC 94)
- I = 1.25 (Table 16-K UBC 94)
- $C = 1.25\ S/T^{2/3} = 1.25\ (1.0)/(0.06)^{2/3} = 8.2$
  - S = 1.0 (Table 15-J, UBC 94)
  - $T = C + (hn)^{3/4} = 0.035\ (5.5/3)^{3/4} = 0.06$
- Rw = 6 (Table 16-N UBC 1994)

MOMENT AT BASE

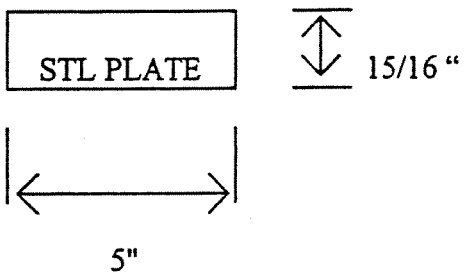
$$M_1 = (259 + 133\ ^{lb}/_{ft}) \frac{5.5}{3} = 719\ lb.ft\ (0.719\ k.ft)$$

$M_{allow.} = fb5x = (24ksi)(4.87\ in^3)\ 1/12 = 9.74\ k.ft > M_1$ ok

- fb = 24 ksi (AISC 9th)
- $Sx = I/y = 18.9\ in^4/(5.0 - 1.12) = 4.87\ in^3$

BASE (FLAT PLATE) DESIGN

1" STEEL PLATE WITH A 1/16" LOSS ON INTERIOR (ONE SIDE) DUE TO CORROSION

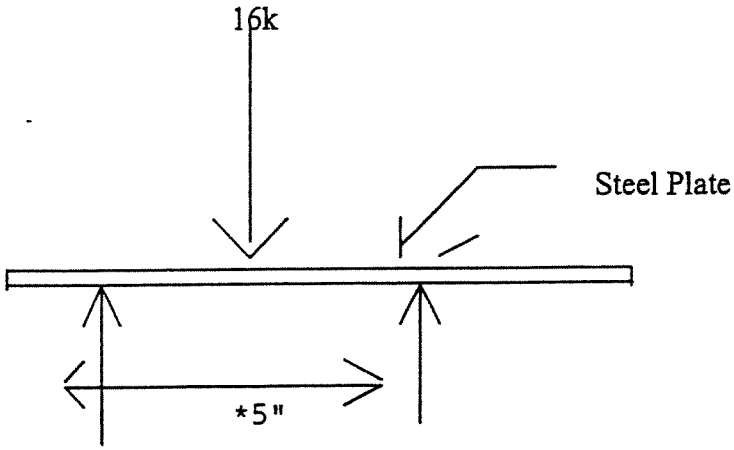


- $Sx = 1/6\ bh^2 = 1/6(5")(15/16")^2 = 0.73\ in^3$

$M_{allow} = (24\ ksi)(.73\ in^3)\ 1/12 = 1.46\ k.ft > M_1$ OK

MOMENT IN STEEL PLATE DUE TO HS20 TRUCK LOADING

HS 20 WHEEL LOAD = 16 klps



Continuity Factor

$M = PL/4 = (16k)(5/12*0.80)/4 = 1.33k.ft < M_{allow}$ OK

*This analysis is extremely conservative since a typical tire will bear on at least three 3"x3"x1/2" steel angles.

JOB NO. 4856
DESCRIPTION:

NAISMITH ENGINEERING, INC.
CALCULATIONS - STABILIZATION UNIT
SECONDARY CONTAINMENT VOLUME

SHEET NO. 1
DATE: JANUARY 1998

OBJECTIVE: To show that the containment volume within the confines of the secondary containment tank will meet the requirements from 40 CFR §264.193.

APPROACH: Determine the required volume of containment according to 40 CFR §264.193, which requires that the secondary containment be able to contain one hundred percent (100%) of the capacity of the largest tank within its boundary, plus the precipitation resulting from a 25-year, 24-hour rainfall event.

ASSUMPTION: The secondary containment will be sealed to prevent the collection of precipitation. Therefore, the secondary containment needs only to be sized to contain the volume of the primary tank.

CALCULATIONS:

Step 1 Calculate the maximum capacity of each steel mixing tank.

The maximum capacity of each tank, V_{tank}, is the sum of the volume above the flat bottomed area, V_{fb}, and the volume above the ramped area, V_r.

$$V_{tank} = V_{fb} + V_r = 29.3 \text{ ft } (12.1 \text{ ft})(1.8\text{ft}) + .5(20 \text{ ft})(12.1\text{ft})(1.8\text{ft})$$

$$= \underline{856 \text{ ft}^3}$$

Step 2 Calculate the volume of the secondary containment unit. It is approximately 2-1/2" deeper and 7" wider than the primary containment unit.

$$V_{tank} = V_{fb} + V_r = (29.5\text{ft})(12.7\text{ft})(1.8\text{ft}) + .5(20\text{ft})(12.7\text{ft})(1.8\text{ft})$$

$$= \underline{903 \text{ ft}^3}$$

Therefore, the secondary containment is adequate for containing 100% of the primary containment unit. Since the sides of the units are at the same elevation, this intuitively checks.

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PROFESSIONAL ENGINEER-STATE OF NEVADA
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03-23-1998

APPENDIX B

CONSTRUCTION QUALITY ASSURANCE DOCUMENTATION

NAISMITH ENGINEERING, INC.
PROJECT INSPECTION REPORT

Project Title: Upgrade of Existing BSU	
Owner: U.S. Ecology, Inc. - Beatty, NV (American Ecology)	
Owner's Project No.:	NEI Project No.: 4856

Date: 1-21-98	Time: 0700	Page 1 of __
Contractor: N/A	Type of inspection: ☐ daily ☒ periodic	
Inspector(s): David C. McCormick	Persons contacted on-site: Lori Taguchi (Technical Reviewer)	
Weather: Low 50's, clear, calm	Testing in progress: Inspection - Hydrostatic test	
Contractor: ☐ working ☐ delayed (weather) ☐ delayed due to N/A		

Work in progress:
Preparation for hydro test of the existing mixing tank.
Hydro test
- inspected welding - no visible gaps or holes.
- did not notice any bubbling or loss of water.

Work completed since last inspection:
N/A - First inspection

Equipment/materials received on-site since last inspection:
Received steel pleting

Summary:
0700 Arrived on site
0730 Health and Safety orientation
0800 Monitoring repair work to existing mixing tank and preparations for BSU upgrades.
1200 Inspected mixing tank with Ms. Taguchi (USE)
1230 Began Hydrotest
1505 Departed site

(Attach additional sheets as required)

Signature of inspector(s): David McCormick

Distribution:

Test Parameters

The Batch Stabilization Secondary Containment Unit is filled with water in a hydrostatic test. A plastic pan is also filled with water, to allow the test to account for water loss due to evaporation. Water level measurements are made in both units throughout the test period. Dimensions of the secondary containment unit are 49'-4" long, by 13'-7" wide, by approximately 5'-8" deep. The diameter of the plastic control pan is 11". All times are Pacific Standard Time. An initial mark was made on both units and all level measurements were made from this mark. This test was performed on January 21, 1998.

WATER LEVEL MEASUREMENTS OVER TIME			
Time	Pan Level (In.)	Wash Pad Level (In.)	Comments
12:20	1.0	1.0	Initial
12:35	1.0	1.0	No Loss
12:50	1.0	1.0	"
1:20	1.0	1.0	"
1:50	1.0	1.0	"
2:50	1.0	1.0	"

Pan Calculations

Area: $(\pi/4) \times (11\ in)^2 = 95.0\ in^2 \times (1\ ft^2/144\ in^2) = 0.65\ ft^2$

Volume lost: $0.0\ in \times 95.0\ in^2 = 0.0\ in^3 \times (1\ ft^3/1{,}728\ in^3) = 0.00\ ft^3$

Evaporation Rate: $0.00\ ft^3/0.65\ ft^2 = 0.00\ ft^3/ft^2$

Secondary Batch Stabilization Unit Calculations

Area: (filled to middle of ramp) $39.3\ ft \times 13.6\ ft = 534.5\ ft^2$

Actual Loss: $534.5\ ft^2 \times 0.0\ in \times (1\ ft/12\ in) = 0.0\ ft^3$

CONCLUSION: Since there was no recordable loss in the existing batch stabilization unit, the system did not leak and passed hydrostatic test

NAISMITH ENGINEERING, INC.
PROJECT INSPECTION REPORT

Project Title: Upgrade of Existing BSU	
Owner: U.S. Ecology, Inc. - Beatty, NV (American Ecology)	
Owner's Project No.:	NEI Project No.: 4856

Date: 1-26-98	Time: 0800	Page 1 of __
Contractor: N/A	Type of inspection: ☐ daily ☐ periodic	
Inspector(s): David McCormick (NEI) Rick Kiel, P.E.	Persons contacted on-site: Lori Taguchi - Technical Reviewer	
Weather: Low 50's, clear, calm	Testing in progress:	
Contractor: ☐ working ☐ delayed (weather) ☐ delayed due to N/A	Inspection - Hydrostatic Test	

Work in progress:
Preparation for hydrotest of the primary mixing tank.

Work completed since last inspection:
Modified existing tank, sealed previous secondary system, constructed exterior pan.

Equipment/materials received on-site since last inspection:
N/A

Summary:
0800 Arrived on site with Rick Kiel, P.E.
0830 Rick Kiel went through Health and Safety orientation.
0900 Performed inspection of BSU and extior pan while US. Ecology was performing modifications.
0945 Laurie Sanders (DNCR) - Env. Management Specialist II
1500 Departed site, US Ecology expects to complete BSU by late afternoon or early next morning.
(Attach additional sheets as required)

Signature of inspector(s): David McCormick

Distribution:

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NAISMITH ENGINEERING, INC.
PROJECT INSPECTION REPORT

Project Title: Upgrade of Existing BSU	
Owner: U.S. Ecology, Inc. - Beatty, NV (American Ecology)	
Owner's Project No.:	NEI Project No.: 4856

Date: 1-27-98	Time: 0800	Page 1 of 2
Contractor: N/A	Type of inspection: ☐ daily ☐ periodic	
Inspector(s): David McCormick (NEI) Rick Kiel, P.E. (GCS)	Persons contacted on-site: Lori Taguchi - Technical Reviewer	
Weather: Low 50's, clear, calm	Testing in progress:	
Contractor: ☐ working ☐ delayed (weather) ☐ delayed due to N/A	Inspection - Hydrostatic Test	

Work in progress:

Preparation for hydrotest of the primary mixing tank.

Work completed since last inspection:

Continue construction of Primary unit and exterior pan

Equipment/materials received on-site since last inspection:

N/A

Summary:

0800 Arrived on site with Rick Kiel, P.E.
(informed U.S. Ecology ran out of welding rod last night and drove to Las Vegas to purchase more).

2:30 pm Completed primary unit, began visual insp. and then performed the hydrotest. (Loss of 1/4"/15 min. in Secondary Sump).

3:30 pm Began pumping water out of primary tank in order to perform repairs on leaks.

(Attach additional sheets as required)

Signature of inspector(s): David McCormick

Distribution:

NAISMITH ENGINEERING, INC.
PROJECT INSPECTION REPORT

Project Title: Upgrade of Existing BSU	
Owner: U.S. Ecology, Inc. - Beatty, NV (American Ecology)	
Owner's Project No.:	NEI Project No.: 4856

Date: 1-27-98	Time: 0800	Page 2 of 2
Contractor: N/A	Type of inspection: ☐ daily ☐ periodic	
Inspector(s): David McCormick, P.E (NEI) Rick Kiel, P.E. (GCS)	Persons contacted on-site: Lori Taguchi - Technical Reviewer	
Weather: Low 50's, clear, calm	Testing in progress:	
Contractor: ☐ working ☐ delayed (weather) ☐ delayed due to N/A	Inspection - Hydrostatic Test	

Work in progress:

Preparation for hydrotest of the primary mixing tank.

Work completed since last inspection:

Continue construction of Primary unit and exterior pan.

Equipment/materials received on-site since last inspection:

N/A

Summary: (Continue from P. 1)

9:45pm finished repairs and began hydrotest (filled secondary)
10:00 pm Found 3 pinhole leaks (drained, dried, repaired leaks).
10:20 pm began hydrotest (filled secondary)
No leaks found in Primary
11:50 pm No loss in secondary.

(Attach additional sheets as required)

Signature of inspector(s): David McCormick

Distribution:

Test Parameters

The Batch Stabilization Primary Containment Unit is filled with water in a hydrostatic test. Water level measurements were made in the secondary sump throughout the test period. All times are Pacific Standard Time. A rod was used to measure the depth of water in the secondary sump pipe located in the northeast corner. This test was performed on January 27, 1998.

WATER LEVEL MEASUREMENTS OVER TIME		
Time	Secondary Sump (In.)	Comments
2:30 pm	0	Initial
2:45 pm	.25	Gain in Secondary
3:00 pm	.25	"Gain in Secondary
		Drained, Dried, Locating Leaks
		"
10:00 pm	19-7/8	Filled Secondary Sump
		Found 3 pinhole leaks on West Side
10:20 pm	19-7/8	Filled Secondary Sump after repairs
10:40 pm	19-7/8	No Loss
11:00 pm	19-7/8	No Loss
11:50 pm	19-7/8	No Loss

CONCLUSION: Since there was no recordable loss in the secondary sump and no visible losses in the batch stabilization primary unit, the system did not leak after final repairs to the primary and passed hydrostatic test

APPENDIX C

CERTIFICATION LETTER

GCS
Golder Construction Services, Inc.
Quality Assurance and Construction Management

February 6, 1998

Our Reference: 987-5124

Mr. Jeffrey C. Denison, P.E.
RCRA Facilities Branch Supervisor
Nevada Division of Environmental Protection
333 W. Nye Lane
Carson City, NV 89706

Re: **CERTIFICATION OF THE MODIFICATION TO THE BATCH STABILIZATION UNIT AT THE US ECOLOGY FACILITY NEAR BEATTY, NEVADA, UNDER NEVADA DIVISION OF ENVIRONMENTAL PROTECTION PERMIT NO. NEV-HW0011**

Dear Mr. Denison:

This letter is submitted to certify that the construction of the Batch Stabilization Tank has been completed and conforms with the tank system standards of 40 CFR Subpart J, including 40 CFR 264.192, as required by Section V.B.3.a of the Facility Permit (Nevada Division of Environmental Protection Permit No. NEV-HW0011). This certification applies to the facility only at the time of completion of the construction.

Mr. Rick Kiel, with Golder Construction Services, Inc. (GCS) and Mr. Dave McCormick, with Naismith Engineering, Inc. (Naismith) performed a site inspection on January 26 and 27, 1998, to provide an assessment of the integrity of the Batch Stabilization Unit (BSU) or Batch Stabilization Tank. In addition, a leak test was performed on January 27, 1998, to aid in this assessment in accordance with 40 CFR Subpart J - Tank Systems; Section 264.191 (b) (5).

The BSU was modified according to the "Revised Design for Double Walled Steel Batch Stabilization Unit," Revision 2, dated January 1998, by Naismith Engineering, Inc. and in accordance with additional field modifications deemed necessary. The modifications consisted of constructing a new primary containment unit inside the existing BSU, and converting the existing BSU to provide secondary containment. These modifications make the system capable of handling the hazardous wastes for which it was designed, without release for the intended life of the system.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

This certification will be followed by a report from Naismith (the Design Engineer) outlining the details of the work, and will include a complete set of as-built drawings.

If you should have any questions or need additional information, please feel free to contact us.

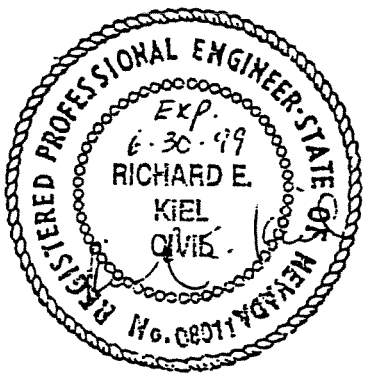
Sincerely,

GOLDER CONSTRUCTION SERVICES, INC.

Rick Kiel

Rick Kiel, P.E.
Senior Engineer

cc: Mr. Grant Jackson, P.E., Naismith Engineering, Inc., Corpus Christi, Texas
Mr. Zaki Naser, General Manager, US Ecology, Inc., Beatty, Nevada
Ms. Lori Taguchi, Engineering Manager, US Ecology, Inc., Beatty, Nevada



DOUBLE-WALLED STEEL BATCH STABILIZATION UNIT AND REAGENT SILOS

US Ecology, Inc.

Hazardous Waste Management Facility

Beatty, Nevada

Prepared by

AquAeTer, Inc.

Englewood, CO

October 9, 2001

Each oft the two bays of the BSU ("pans") will be constructed in a similar fashion. Pan construction will have a primary and secondary containment system, constructed of one-inch thick welded steel plate with standard structural steel members. The slope of the floor of the primary containment of the pans will be toward the mixing unit; this will facilitate the mixing process, and prevent waste materials and precipitation that falls on the pans from migrating beyond the limits of the pans.

Separate sumps will be located inside the secondary containment structure of each pan, near the mixing unit. The slope of each secondary containment structure will be toward the respective sump. The sumps will be inspected daily for the presence of liquid within the secondary containment structure. A steel pipe will extend into the sump to allow the inspection and extraction of any liquid that accumulates within the secondary containment sump. The primary and secondary containment structures will be sealed (welded) to prevent the migration of surface liquid from outside of the primary or secondary containment structures into the sump. Both containment structures are constructed of one-inch thick welded steel plate.

The areas beneath the truck load out and mixing area surrounding the pans will be underlain with 1/4-inch thick steel plate covered with six inches of sacrificial soil and 12 inches of gravel. For a distance extending outwards 12 feet from the edge of the pans, a concrete layer will be placed over the soil to facilitate operations near the pan. For an additional 12 feet beyond that, the sacrificial soil will form the top layer. The entire 24-feet wide concrete and sacrificial soil areas will be underlain by ¼-inch thick steel plates sloped to drain to separate collection sumps.

The load out area is where the stabilized waste will be transferred from the pan to the transport truck that will transfer the stabilized waste to the landfill. The steel plate of the load-out pans will be sloped to two separate sumps for the removal of any liquid that may accumulate within the gravel above the steel plate. A surface

berm of soil will be placed around the area to prevent the run-on of precipitation from entering the truck load out area. A drawing of the BSU is included in Appendix A.

4.0 BSU CONSTRUCTION

4.1 Construction Standards

The BSU will be used for the mixing of hazardous waste and debris with reagents and stabilizing material to allow the disposal of the mixed material in the landfill. The BSU is planned for use under atmosphereic pressure conditions to accommodate the mixing activities, including both the distributed load of the waste and reagents and the small impact loads anticipated from the mixing head. Experience gathered from the single pan BSU already located on site was incorporated into the design.

The secondary containment structures are designed to collect and drain liquids that pass through the primary walls of the pans into two separate sumps. Additionally, the steel pan underlying the surrounding load-out area includes two sumps installed to capture precipitation and surface water that may penetrate the sacrificial soil layer.

4.2 Tank Integrity Assessment

The integrity of the secondary containment structure was tested by filling each side of the BSU secondary containment structure with water and observing the pan interior for the presence of leaks. Water level in the two secondary containment structures was observed for level declines that could be caused by leaks that were not visible. The tank integrity test was performed before backfill was placed around the tank. As a result of the initial test, minor leaks were detected. These leaks were re-welded and re-

tested to demonstrate integrity. Notes documenting the integrity of the secondary containment structure is included in Appendix B.

The secondary containment structures for the BSU consists of a redundant one-inch thick welded-steel plate tank surrounding the primary (interior) tanks. The secondary containment structure tank is attached to the primary tank, with separation provided by structural steel angles. The secondary containment structure is completely sealed to prevent the influx of surface water or precipitation. Therefore, the secondary containment structure only has to hold 100 percent of the contents of the primary (interior) tank. The spacing between the two tanks is about 4 inches on all sides, along the dividing wall, and beneath the tanks. Since the two tanks are joined at the top (same elevation), the space formed by the structural steel angles ensures the containment is sufficient, and no additional calculations are required to demonstrate containment volume.

4.3 Structural Strength

The steel BSU tanks and the concrete reagent silo foundation will be designed to withstand the governing loads imposed by the design seismic loading criteria for a seismic zone 3. The BSU tanks are buried in level ground, and are not subject to sliding or overturning by seismic activity.

A mixing head will be used to perform the stabilization process. If used carelessly or improperly, the mixing head may be capable of damaging the floor or walls of the tanks. However, routine inspection and prompt repair of damage should prevent failure of the unit from punctures. Additionally, the BSU has been reinforced, as compared to the existing on-site BSU by the use of thicker steel plate, which should also contribute to the durability of the unit.

4.4 Corrosion Protection

The steel components of the BSU are cathodically protected against corrosion by the use of one pound aluminum sacrificial anodes installed on the tank walls. One aluminum anode will be bolted to each wall of the exterior of the secondary containment structure. The primary containment unit is welded to the secondary containment unit, and is therefore, also protected. The aluminum anodes will be monitored for corrosion and replaxed as necessary.

4.5 Compatibility with Waste

The BSU could potentially be exposed to any of the waste streams handled at the facility, including inorganic aquaeous liquids, organic liquids, water-based sludges, organic sludges, inorganic and organic solids. The primary wastes received for stabilzation at the facility will be organic and inorganic solids and sludges.

Highly reactive materials, and materials with a high pH or low pH represent the greatest potential for incompatibility with the steel tanks. The likelihood of chemical incompatibility between reactive, acidic, or alkaline wastes and the steel tanks is considered small due to the treatment reagents' tendance to quickly combine with the most reactive constituents in the waste, limiting their ability to further react with the tank material.

To further prevent the failure of the unit from incompatibility with the wastes, the BSU will be inspected routinely for signs of corrosion and structural failure. Any problems detected will be corrected prior to continuing stabilization operations. Routine cleaning operations between different waste types will remove waste residues remaining in the unit.

APPENDIX A

Batch Stabilization Diagram

APPENDIX B

Leak Integrity Assessment Notes

12-18-00

Hydro Test New Pan's

Start water in 7:40 Am

Water Started in West Side

7:55 West Side Full Visual

Check Found Leak in Cap

Mark for Repair - Found

Leak's in Center Wall Tie in

Check in Side Small seep on

Top Cap - Started Pumping

Out for Repair

Start water in East Side

8:40 East Sid Full 09:00

Checking for Leak's Small Seep

on Second panel Cap out Side

Mark for repair One Small Seep

South west Corner mark for

Repair Start Pumping out

10:20Am water out 10:45 -

Start grinding out Repair

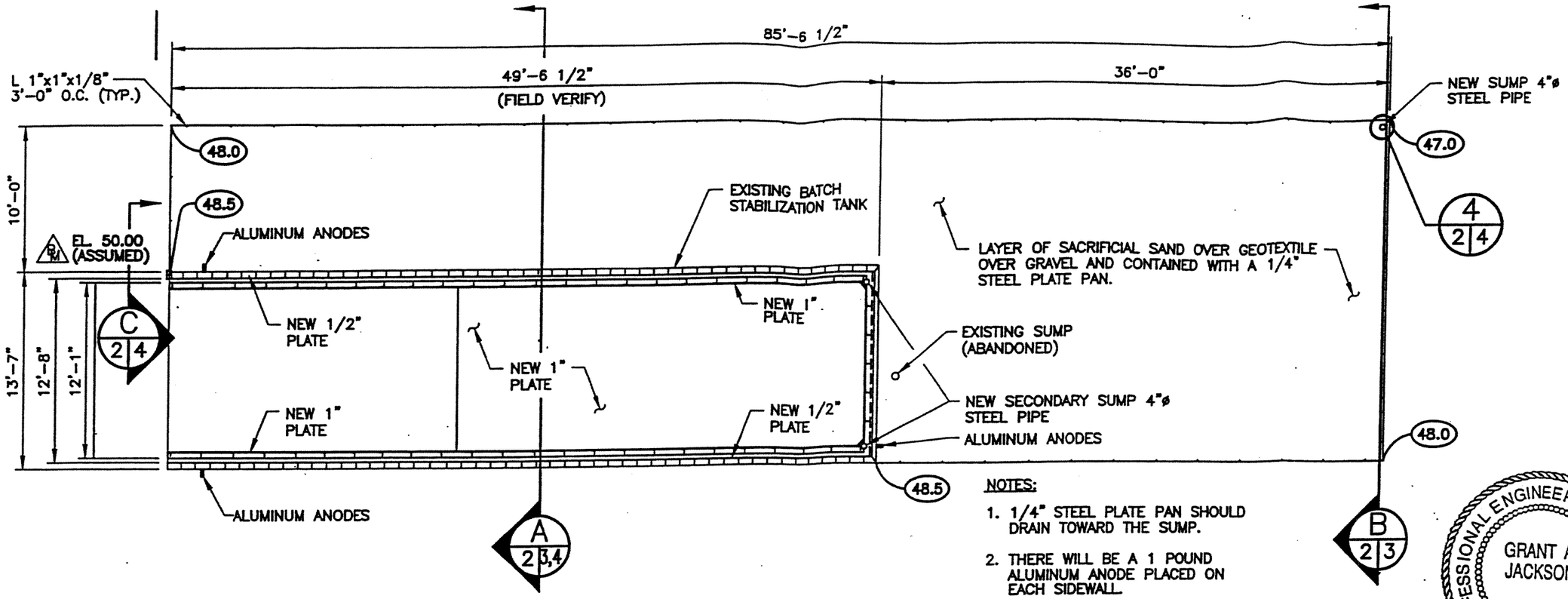
Area's Go to Lunch

Welding Repair

Continue welding Repair areas
Complete welding 10:20 Am
Start Water in 11:00 Am West
Side Full 11:25 Spilled water
on Floor inside and out Clean
out + dry Start Water on
on East Side 11:45 Am Full
12:10 Am No Spill, Go to Lunch
Back 1:00pm No Visiable Leak's
Water Standing Full

12-20-00

7:00Am Still No Leak's
Check out Side Grade for
Any moisture Check Floor
Weld's Start pumping out
10:45 Still Full Pump Both
West and East Side out
Still Reside water in Sump's



NOTES:

1. 1/4" STEEL PLATE PAN SHOULD DRAIN TOWARD THE SUMP.
2. THERE WILL BE A 1 POUND ALUMINUM ANODE PLACED ON EACH SIDEWALL.
3. TEMPORARY BENCHMARK ON TOP OF EXISTING TANK SIDEWALL ASSUMED ELEVATION = 50.00 FEET
4. 6" BERM AROUND THE PERIMETER OF THE 1/4" STEEL PLATE PAN, TO BE CONSTRUCTED USING THE EXCAVATED SOIL MATERIAL.

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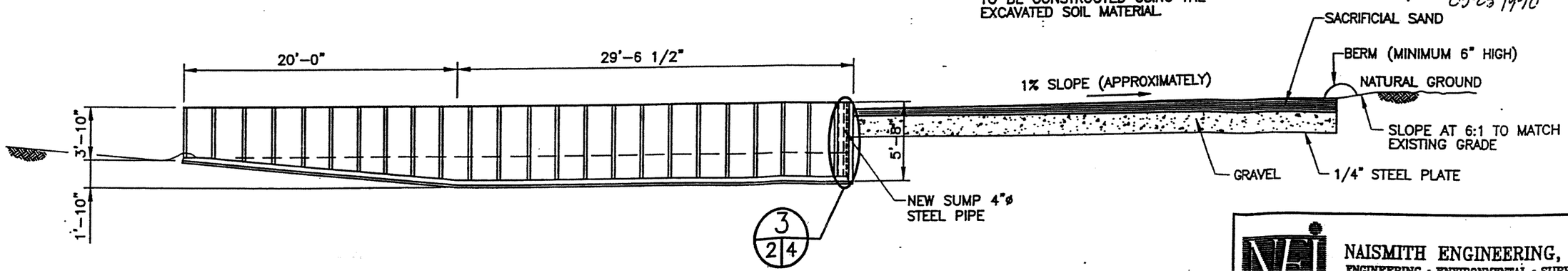


PLAN AND ELEVATION

SCALE: 1/8"=1'-0"

LEGEND

(48.5) BOTTOM OF 1/4" STEEL PLATE PAN ELEVATION

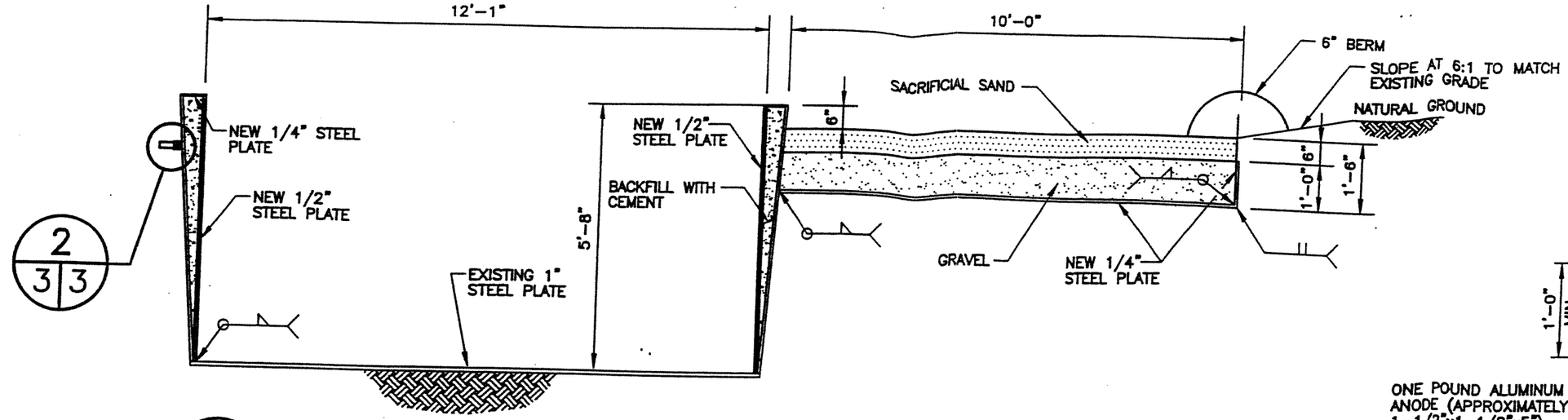
BM TEMPORARY BENCHMARK

REV.	REVISIONS	APPR.	DATE
1	EXISTING SUMP-ABANDONED	G.A.J	12/97
2	AS-BUILT		

NAISMITH ENGINEERING, INC.
ENGINEERING • ENVIRONMENTAL • SURVEYING
CORPUS CHRISTI, TEXAS

PLAN AND ELEVATION
MODIFIED BATCH STABILIZATION UNIT
PERMIT No. NEV-HW0011
U.S. ECOLOGY, INC.
BEATTY, NEVADA

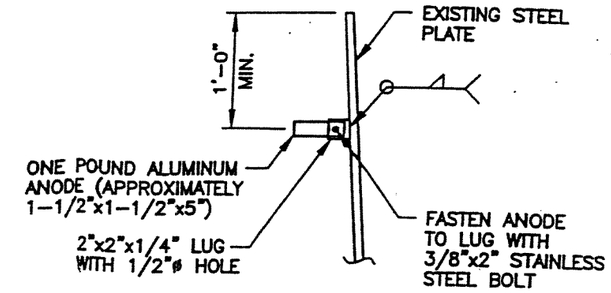
Drawn by T.C.A	Approv. by G.A.J	Scale AS NOTED	Dwg. title 4856-S02	Sheet 2
Checked by G.A.J	Project No. 4856	Date 12/97	Rev. 2	of 4



A 2 3 SECTION

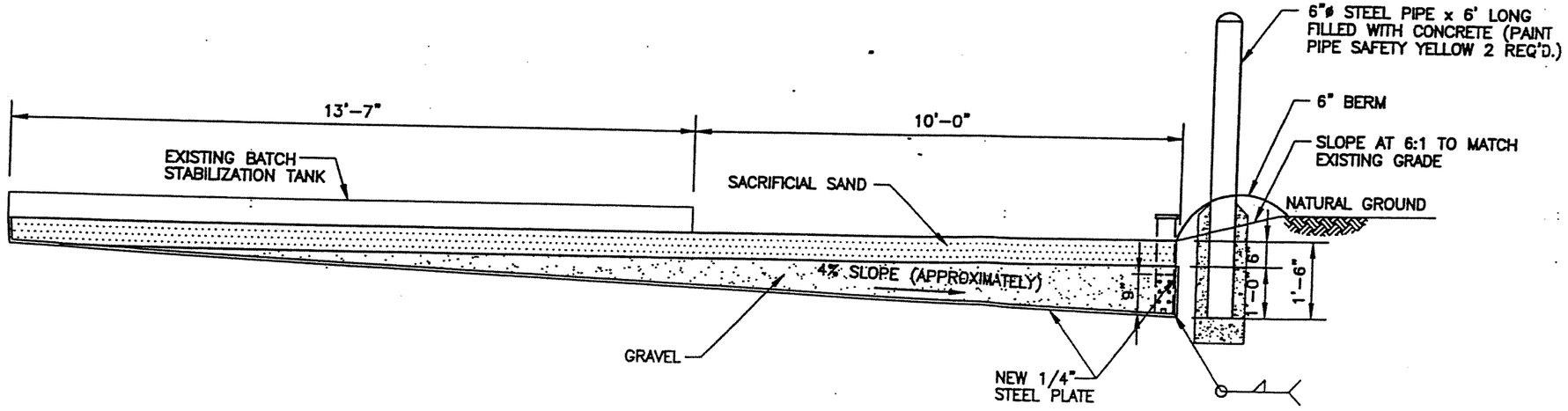
MODIFICATION TO EXISTING BATCH STABILIZATION TANK

SCALE: 3/8"=1'-0"



2 3 3 DETAIL

SCALE: 3/4"=1'-0"



NOTES:

NEW 1/4" STEEL PLATE SECONDARY CONTAINMENT TO DRAIN TOWARD THE SUMP.

B 2 3 SECTION

MODIFICATION TO EXISTING BATCH STABILIZATION TANK

SCALE: 3/8"=1'-0"

PROFESSIONAL ENGINEER-STATE OF NEVADA
GRANT A. JACKSON
CIVIL
No. 10299

03-23-1998

NOTES:

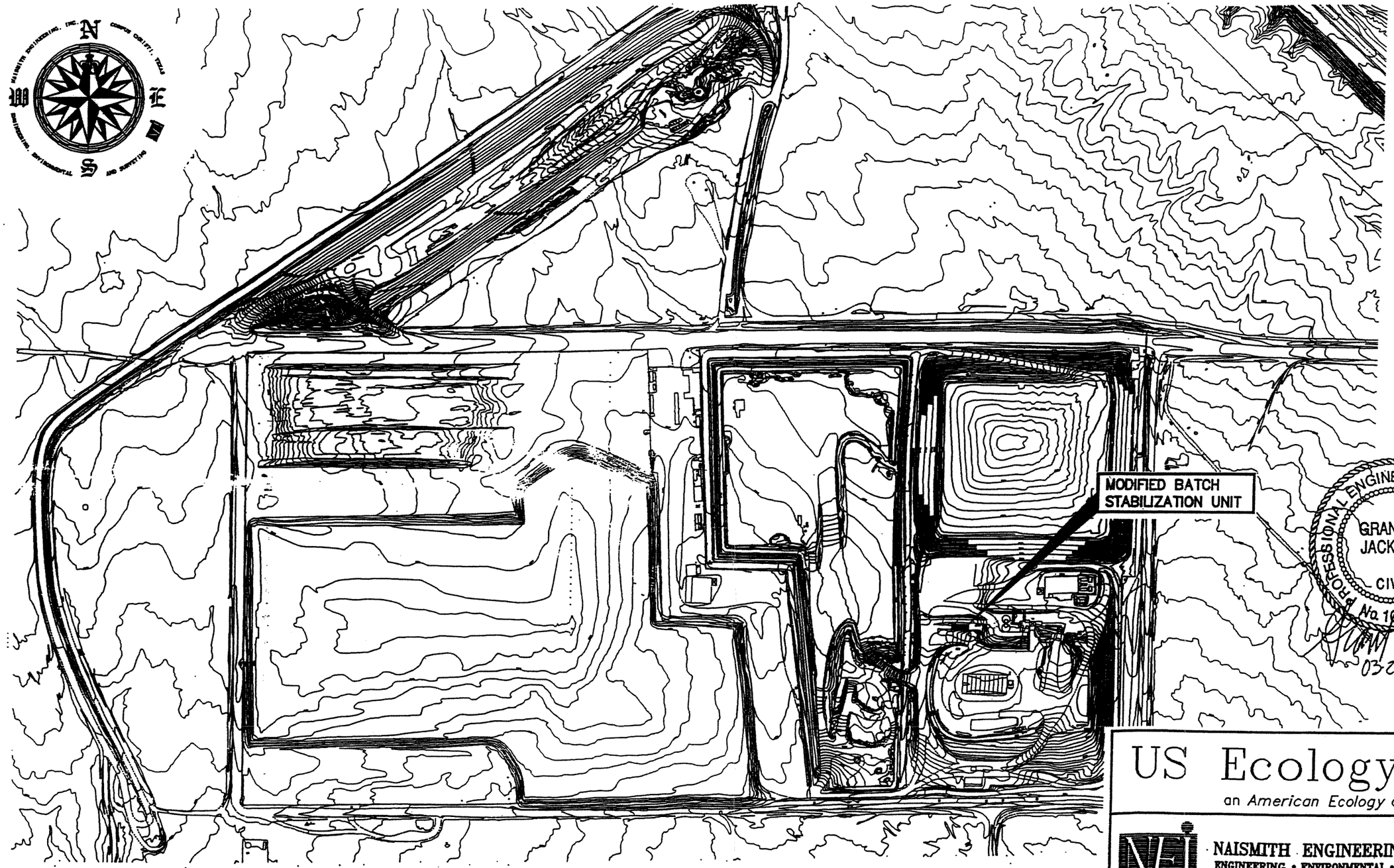
1. ALL STRUCTURAL MEMBERS AND PLATES TO BE ASTM A36 STEEL.
2. ALL WELDING SHALL BE DONE IN ACCORDANCE WITH THE A.W.S. USING E70XX ELECTRODES.
3. ALL JOINTS SHALL BE CONTINUOUSLY WELDED WITH FILLET WELDS.
4. REMOVE ALL BURRS (GRINDING).

REV.	REVISIONS	APP'R.	DATE
1	FOR CONSTRUCTION	G.A.J	12/97
2	AS-BUILT		

NAISMITH ENGINEERING, INC.
ENGINEERING • ENVIRONMENTAL • SURVEYING
CORPUS CHRISTI, TEXAS

SECTIONS
MODIFIED BATCH STABILIZATION UNIT
PERMIT No. NEV-HW0011
U.S. ECOLOGY, INC.
BEATTY, NEVADA

Drawn By T.C.A	Appr. By G.A.J	Scale AS SHOWN	Dwg. No. 4856-S03	Sheet 3
Checked By G.A.J	Project No. 4856	Date 12/97	Rev. 2	of 4



PROFESSIONAL ENGINEER-STATE OF NEVADA
GRANT A. JACKSON
CIVIL
No. 10299
03-23-1998

US Ecology

an *American Ecology* company

NAISMITH ENGINEERING, INC.
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CORPUS CHRISTI, TEXAS

300 0 300 600
GRAPHIC SCALE IN FEET

REV.	REVISIONS	APPR.	DATE
1	FOR CONSTRUCTION	G.A.J	12/97
2	AS-BUILT		

SITE PLAN
MODIFIED BATCH STABILIZATION UNIT
PERMIT No. NEV-HW0011
U.S. ECOLOGY, INC.
BEATTY, NEVADA

Drawn By: T.C.A	Appr. By: G.A.J	Scale: AS NOTED	Dwg. No.: 4856-S01
Checked By: G.A.J	Project No.: 4856	Date: 12/97	Rev.: 2

Sheet 1 of 2

DOUBLE-WALLED STEEL BATCH STABILIZATION UNIT

TANK INTEGRITY ASSESSMENT

US Ecology, Inc.

Hazardous Waste Management Facility

Beatty, Nevada

Prepared by

AquAeTer, Inc.

Englewood, CO

January 15, 2002

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1. INTRODUCTION

US Ecology, Inc. has requested that **AquAeTer** assist with the tank integrity assessment for the new Batch Stabilization Unit (BSU) constructed at the Hazardous Waste Management Facility (HWMF) near Beatty, Nevada. This tank integrity assessment conforms to the requirements of 40 CFR Part 264, Subpart J, Tank Systems.

2. FACILITY INFORMATION

The BSU will be used to stabilize and/or solidify hazardous wastes at the HWMF and treat hazardous debris prior to landfilling. Waste stabilization will be conducted in the BSUs, where waste and stabilization reagents (e.g., cement, kiln dust, lime, etc.) will be thoroughly mixed until a relatively homogeneous mixture is achieved. Water will be added to promote mixing and control air emissions, as necessary.

3. BSU OPERATIONS

The design of the double bay BSU (BSU 2) allows two separate wastes to be treated sequentially. The addition of a second mixing head would allow simultaneous stabilization and mixing activities to be performed on different wastes in each BSU bay. The BSU is constructed with truck load-out aprons on the north side of each BSU bay. Reagent silos are located near the BSU. The mixing unit is located at the center point on the south side of the two bays, allowing it to reach into each mixing bay.

4. BSU CONSTRUCTION

4.1 Construction Standards

The BSU is used for the mixing of hazardous waste and debris with reagents and stabilizing material to prepare the mixed material for disposal in the landfill. The BSU is used under atmospheric pressure conditions to accommodate the mixing activities, including both the distributed load of the waste and reagents and the small impact loads

anticipated from the mixing head. Experience gathered from the single pan BSU, already located on site, was incorporated into the design of the new units.

A secondary containment structure is an integral part of the design to collect and drain liquids that pass through the primary walls of the two separate mixing bays. The secondary containment structures are accessed by two separate sumps. Additionally, the steel pan underlying the surrounding truck load-out apron area includes two sumps installed to capture precipitation and surface water that may penetrate the sacrificial soil layer.

4.2 Construction

Each of the two bays ("pans") of the new double-bay BSU is constructed in a similar fashion. Pan construction incorporates a primary and secondary containment system; each constructed of one-inch thick welded steel plate with standard structural steel members. The slope of the floor of the primary containment of the pans is toward the mixing unit; this facilitates the mixing process.

Separate sumps are located inside the secondary containment structure of each pan, near the mixing unit. The slope of each secondary containment structure is towards the respective sump. A steel pipe extends into the sump to allow the inspection and extraction of any liquid that accumulates within the secondary containment sump. The primary and secondary containment structures are sealed (welded) to prevent the migration of surface liquid from outside of the primary or secondary containment structures into the sump.

The load-out apron area is where the stabilized waste is transferred from haul trucks to the pan or from the pan to transport vehicles that transfers the stabilized waste to the landfill. The areas beneath the truck-load out apron area surrounding the pans are underlain with 1/4-inch thick steel plate sloped to drain to separate collection sumps, and covered with gravel and sacrificial soil.

4.3 Description of Secondary Containment Structure

In each double-walled tank system, the primary tank holds the waste materials and the secondary tank serves as secondary containment. Each secondary tank slopes to a collection sump. Each secondary containment structure is completely sealed to prevent the influx of surface water or precipitation. The secondary containment structure holds slightly more than 100 percent of the contents of the primary (interior) tank. The spacing between the two tanks is about four inches on all sides, along the dividing wall, and beneath the tanks. Since the two tanks are joined at the top (same elevation), the space formed by the structural steel angles ensures the containment is sufficient, and no additional calculations are required to demonstrate containment volume.

The integrity of the secondary containment structure was tested by filling each side of the BSU secondary containment structure with water and observing for the presence of leaks to the interior (i.e., into the pan) or to the exterior (i.e., outside the outer secondary containment wall). The tank integrity test was performed before backfill was placed around the tank. As a result of the initial test, minor leaks in the tanks were detected. These leaks were re-welded. The integrity of the secondary containment structure was re-tested by filling each side of the BSU secondary containment structure with water, and observing the fluid level for six hours for declines that could be caused by leaks that were not visible. A control test tank open to the atmosphere also was observed for evaporation losses. No leaks were detected in the integrity test of the secondary containment tanks. Notes documenting the results of the hydrostatic tests are included in facility records. The integrity of the welded steel aprons also was tested prior to the placement of the gravel and sacrificial soil.

4.4 Structural Strength

The BSU tanks are buried in level ground, and are not subject to sliding or overturning by seismic activity.

A mixing head will be used to perform the stabilization process. If used carelessly or improperly, the mixing head may be capable of damaging the floor or walls of the tanks. However, routine inspection and prompt repair of damage should prevent failure of the unit from such damage. Additionally, the BSU has been strengthened, as compared to the existing on-site BSU, by the use of thicker steel plate, which should also contribute to the durability of the unit.

4.5 Corrosion Protection

The steel components of the BSU are cathodically protected against corrosion by the use of one pound aluminum sacrificial anodes installed on the tank walls. One aluminum anode will be bolted to each side of the exterior of the secondary containment structure. The primary containment unit is welded to the secondary containment unit, and is therefore, also protected. The aluminum anodes will be monitored for corrosion and replaced as necessary.

4.6 Compatibility with Waste

The BSU could potentially be exposed to any of the waste streams handled at the facility, including inorganic aqueous liquids, organic liquids, water-based sludges, organic sludges, inorganic and organic solids. The primary wastes received for stabilization at the facility will be organic and inorganic solids and sludges.

Highly reactive materials, and materials with a high pH or low pH represent the greatest potential for incompatibility with the steel tanks. The likelihood of chemical incompatibility between reactive, acidic, or alkaline wastes and the steel tanks is considered small because of the treatment reagents' tendency to quickly combine with the most reactive constituents in the waste, limiting their ability to further react with the tank material. Routine cleaning operations between different waste types will remove waste residues remaining in the unit.

5. CERTIFICATION

AquAeTer, Inc. services relating to certification of Batch Stabilization Unit 2 at the Beatty, Nevada facility were provided in a manner that is consistent with current standards of practice and the degree of care and skill ordinarily exercised under similar conditions by reputable members of the same profession in similar localities. The conclusions presented in this certification are based upon observations made by **AquAeTer** representatives at selected locations and times during construction and testing of Batch Stabilization Unit 2.

The signature and seal provided below is a declaration by the Professional Engineer that, in his professional judgment, the subject project was designed, constructed, and tested in manner consistent with the referenced design document and applicable State and Federal regulations.

This certification was prepared under the Professional Engineer's direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. The information submitted is, to the best of the Professional Engineer's knowledge and belief, true, accurate, and complete.

AquAeTer, Inc.

By:

Stephen L. Wampler, P.E.

PROFESSIONAL ENGINEER-STATE OF NEVADA
STEPHEN L WAMPLER
CIVIL
No. 13641

15 JANUARY 2002

-updated July 2015

APPENDIX F

PCB TANKS ULTRASONIC THICKNESS TEST RESULTS

Western Technologies Inc.
The Quality People
Since 1955

6633 West Post Road
Las Vegas, Nevada 89118
(702) 798-8050 • fax 798-7664

January 14, 2015

US Ecology
PO Box 578
Beatty, NV 89003

Attn: Ms. Rebecca Hogaboam

Re: Ultrasonic Testing
Four Aboveground Storage Tanks
US Ecology Landfill
Beatty, NV 89003

Ref. No. 4165XW001

Western Technologies (WT) arrived on-site on January 11, 2015 to perform ultrasonic testing (UT) thickness of four aboveground storage tanks (AST). The AST are oriented horizontal to the ground and a longitudinal east-west direction. The AST are eight feet in diameter. Two of the AST are 14 feet long (approximately 5,000-gallon capacity) and two AST are 22 feet long (approximately 7,500-gallon capacity). The equipment used for testing the thickness was an Olympus 45MG serial # 140313702. The instrument was calibrated on a 303 stainless steel gauge block #2218E.

The results of the tests are in the following tables:

Tank T-4 (7,500-gallon)

Location	Thickness*	Thickness	Thickness	Thickness	Thickness
East End (T, B, N, S, C)	0.245	0.246	0.252	0.251	0.252
West End (T, B, N, S, C)	0.252	0.246	0.257	0.253	0.256
Top (East to West)	0.280	0.238	0.255	0.258	0.275
Bottom (East to West)	0.253	0.246	0.256	0.248	0.246
North (East to West)	0.278	0.254	0.276	0.250	0.261
South (East to West)	0.263	0.267	0.258	0.251	0.245

*- Thickness in inches

Tank T-7 (7,500-gallon)

Location	Thickness*	Thickness	Thickness	Thickness	Thickness
East End (T, B, N, S, C)	0.258	0.261	0.248	0.255	0.263
West End (T, B, N, S, C)	0.265	0.269	0.266	0.262	0.264
Top (East to West)	0.270	0.263	0.246	0.241	0.233
Bottom (East to West)	0.268	0.269	0.235	0.242	0.253
North (East to West)	0.256	0.237	0.236	0.254	0.246
South (East to West)	0.262	0.272	0.242	0.259	0.253

Tank T-5 (5,000-gallon)

Location	Thickness*	Thickness	Thickness	Thickness	Thickness
East End (T, B, N, S, C)	0.261	0.253	0.251	0.253	0.262
West End (T, B, N, S, C)	0.228	0.235	0.227	0.231	0.234
Top (East to West)	0.253	0.254	0.261	0.231	0.236
Bottom (East to West)	0.249	0.259	0.246	0.228	0.234
North (East to West)	0.256	0.259	0.233	0.233	0.227
South (East to West)	0.254	0.265	0.253	0.239	0.233

Tank T-6 (5,000-gallon)

Location	Thickness*	Thickness	Thickness	Thickness	Thickness
East End (T, B, N, S, C)	0.228	0.228	0.228	0.227	0.229
West End (T, B, N, S, C)	0.226	0.221	0.228	0.228	0.230
Top (East to West)	0.234	0.242	0.216	0.256	0.243
Bottom (East to West)	0.239	0.235	0.247	0.256	0.249
North (East to West)	0.239	0.244	0.251	0.258	0.244
South (East to West)	0.242	0.238	0.246	0.253	0.259

LIMITATIONS: WT has performed our services in accordance with our contract with our Client, utilizing the ordinary degree of skill and care practiced by other firms providing similar services in the locality of the site. No other warranty or representation, either expressed or implied is made.

Conditions can exist within structures and below the ground surface that are not apparent visually or disclosed by sampling data. This study is limited to the conditions expressly disclosed in this report, and it does not represent the assessment or absence of any other conditions on or affecting the Site.

WT's findings are based on the assumption that the sampling locations, and the resulting data, are representative of assessed conditions. WT's interpretation, discussion and opinions of the results obtained from the referenced methods, observed conditions, and sample areas are applicable only to the specifically tested locations at the times stated herein.

If there are any questions, or if we can be of further assistance please call us.

Respectfully submitted,
WESTERN TECHNOLOGIES INC.

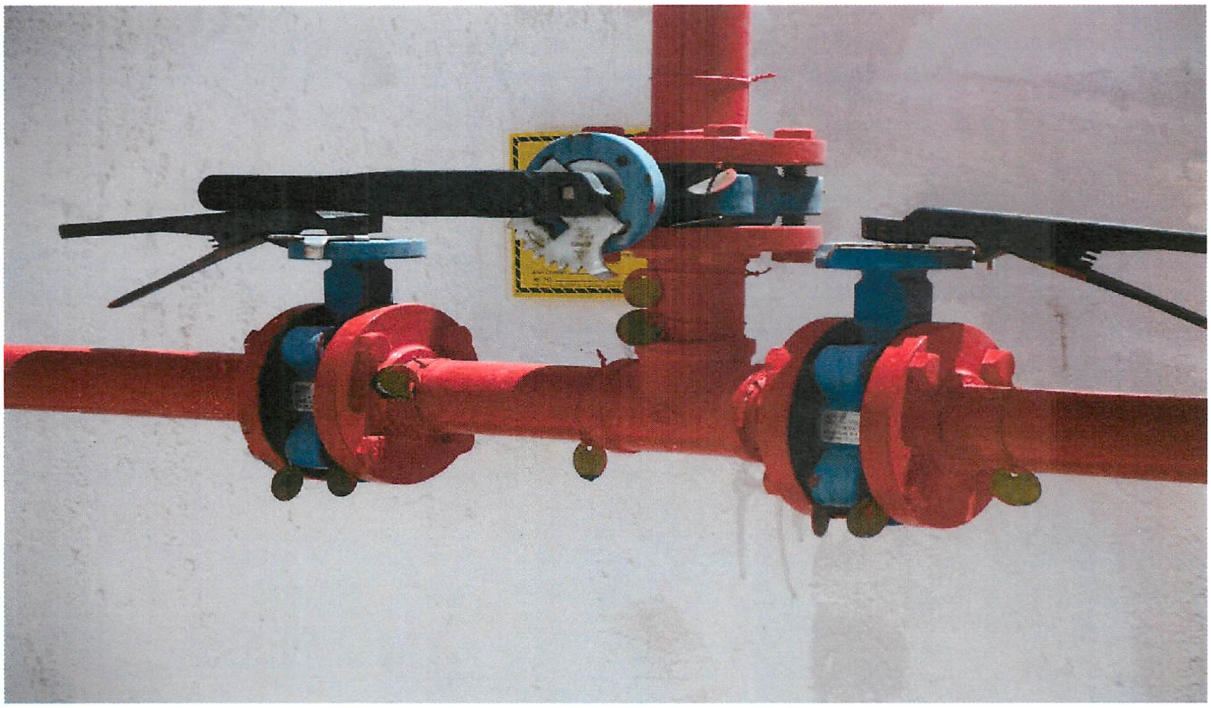
for

Michael Kelty
Director of Non Destructive Services

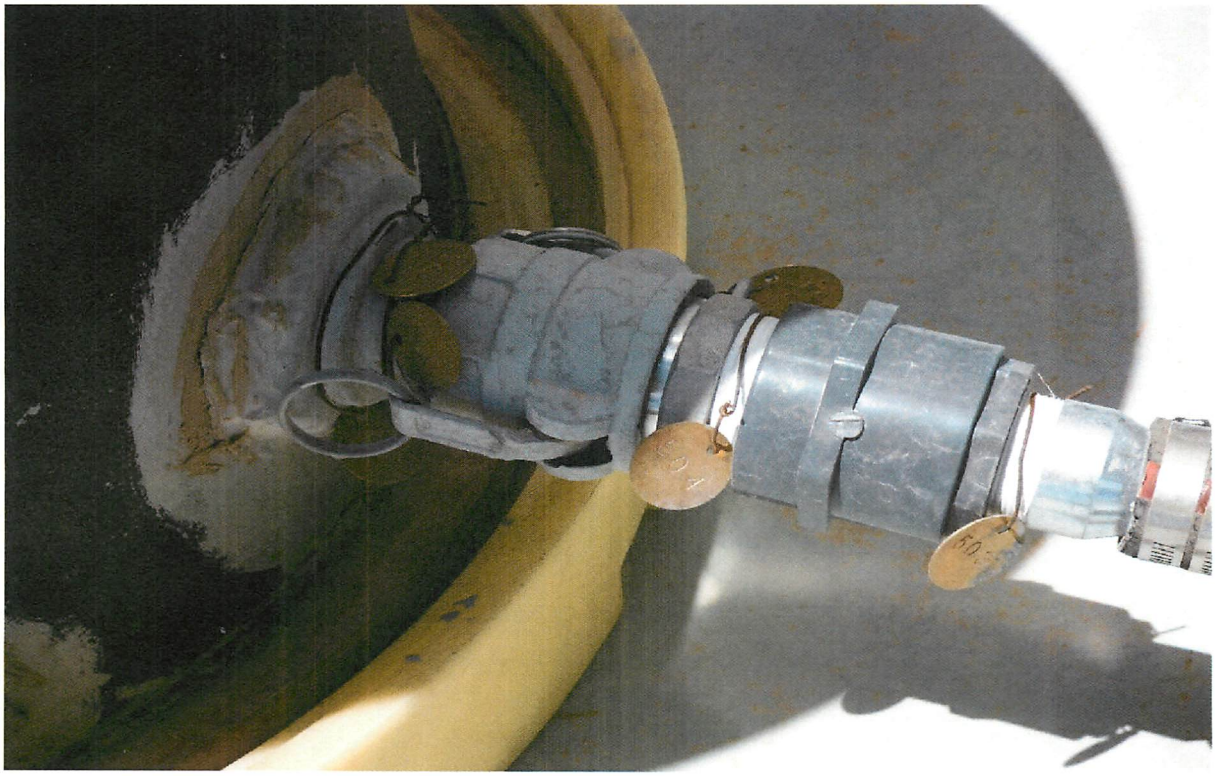
-updated July 2015

APPENDIX G

PCB PROCESSING SYSTEM P & I D

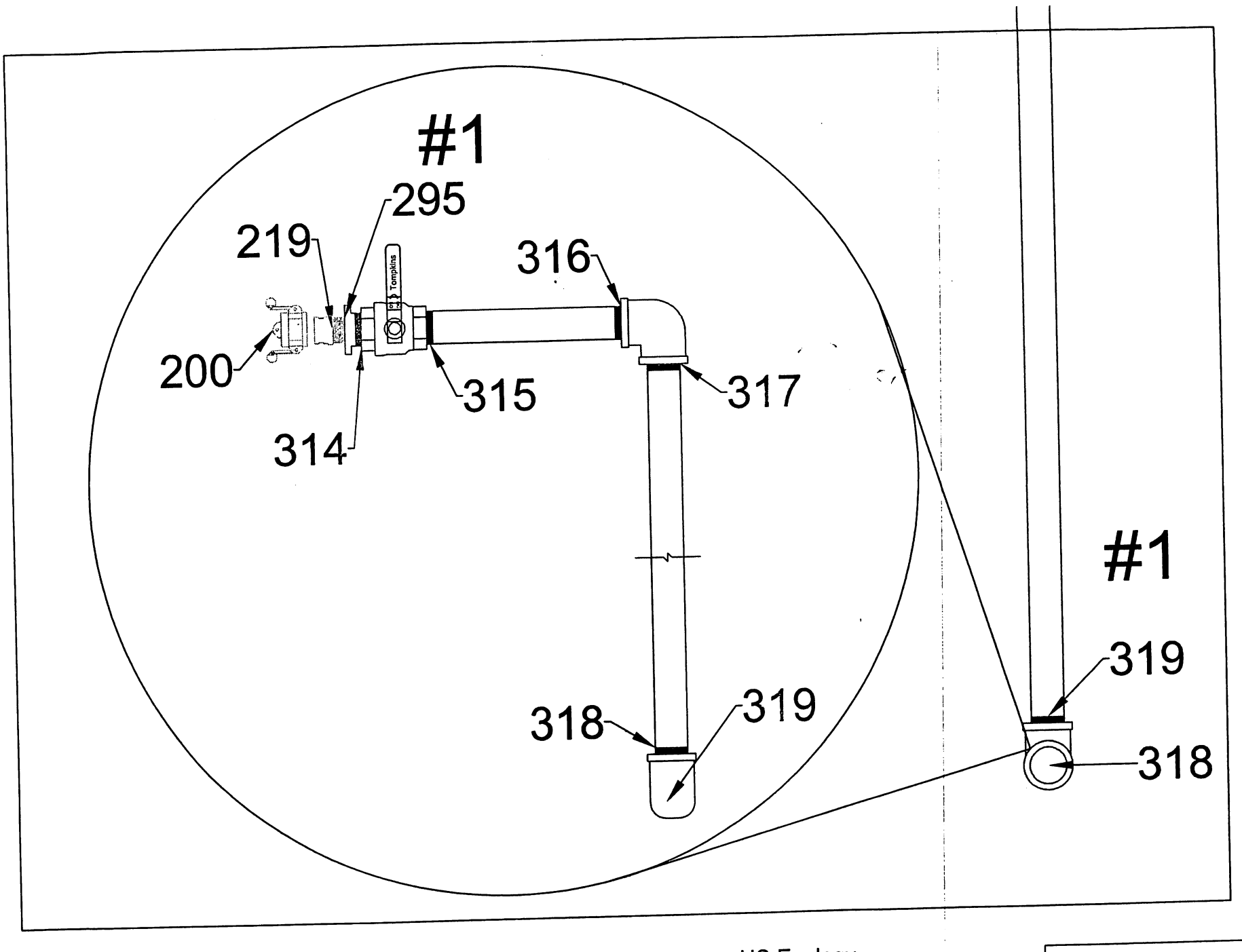


Above and below: View of piping with tagged emission test locations (Test Method 21)at the PCB storage tanks.



Above: View of double carbon vessels at the PCB storage tanks.

Below: View of the tank level monitoring alarm system.



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Beatty,Nv
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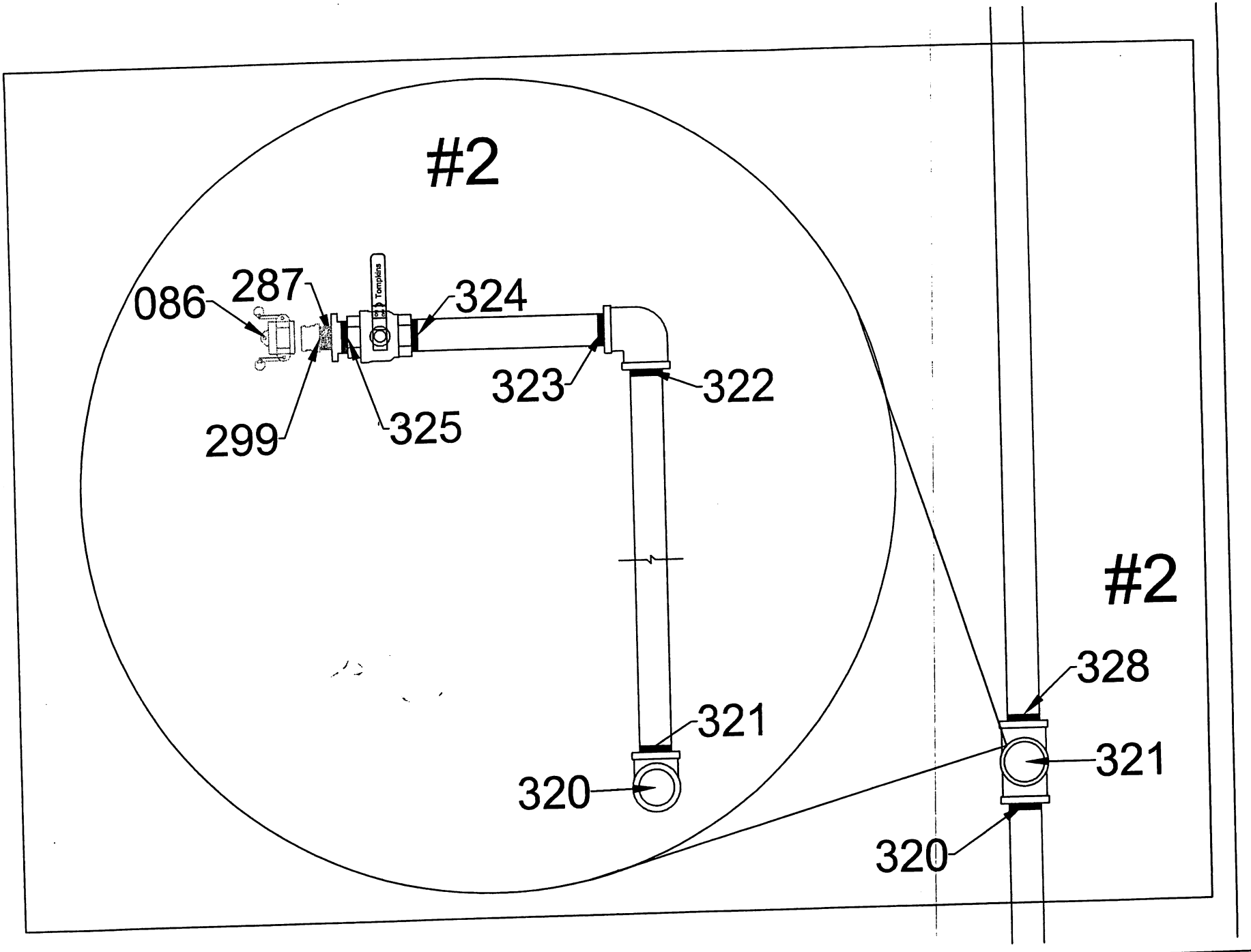
Revised 2-26-14



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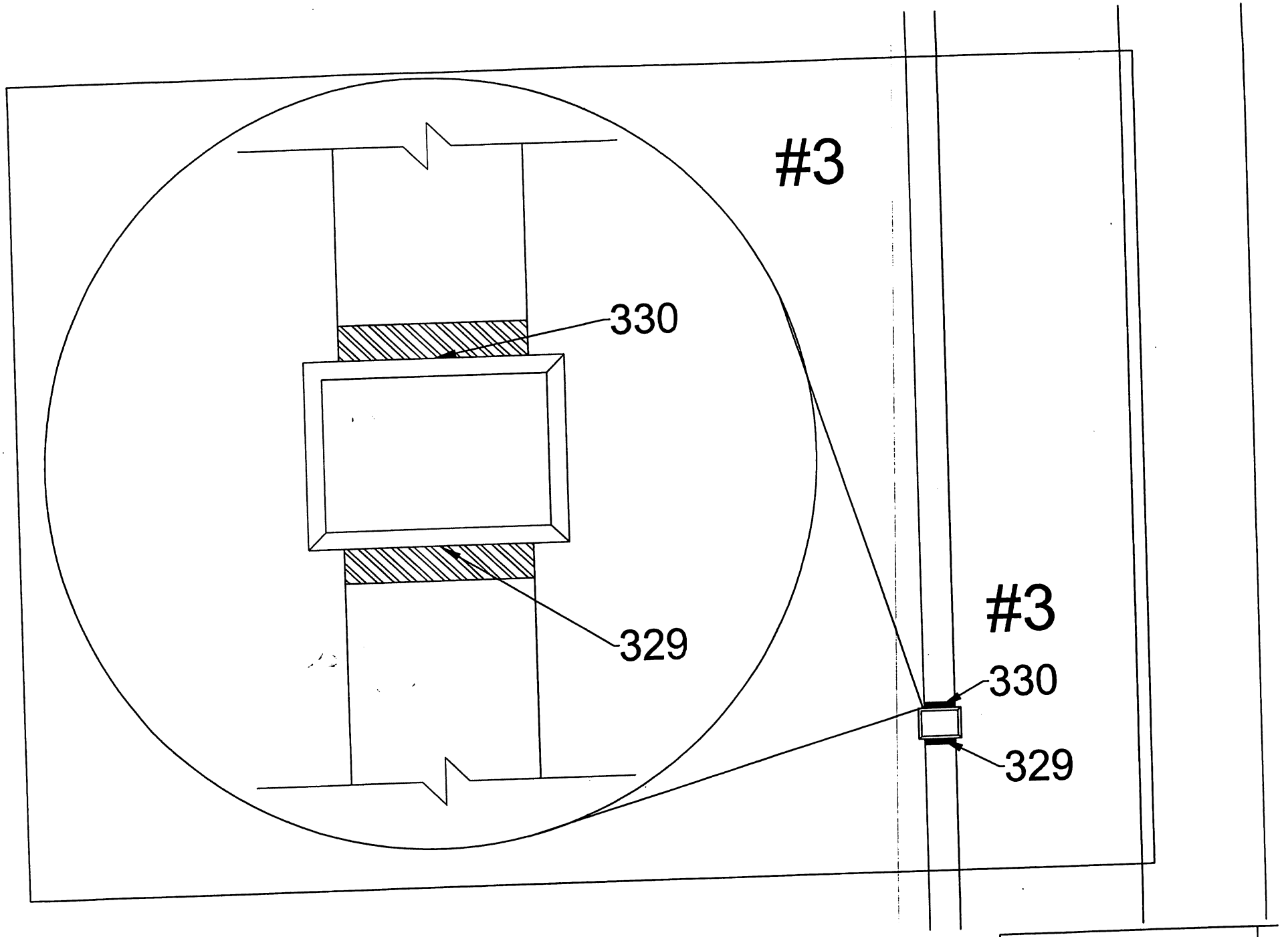

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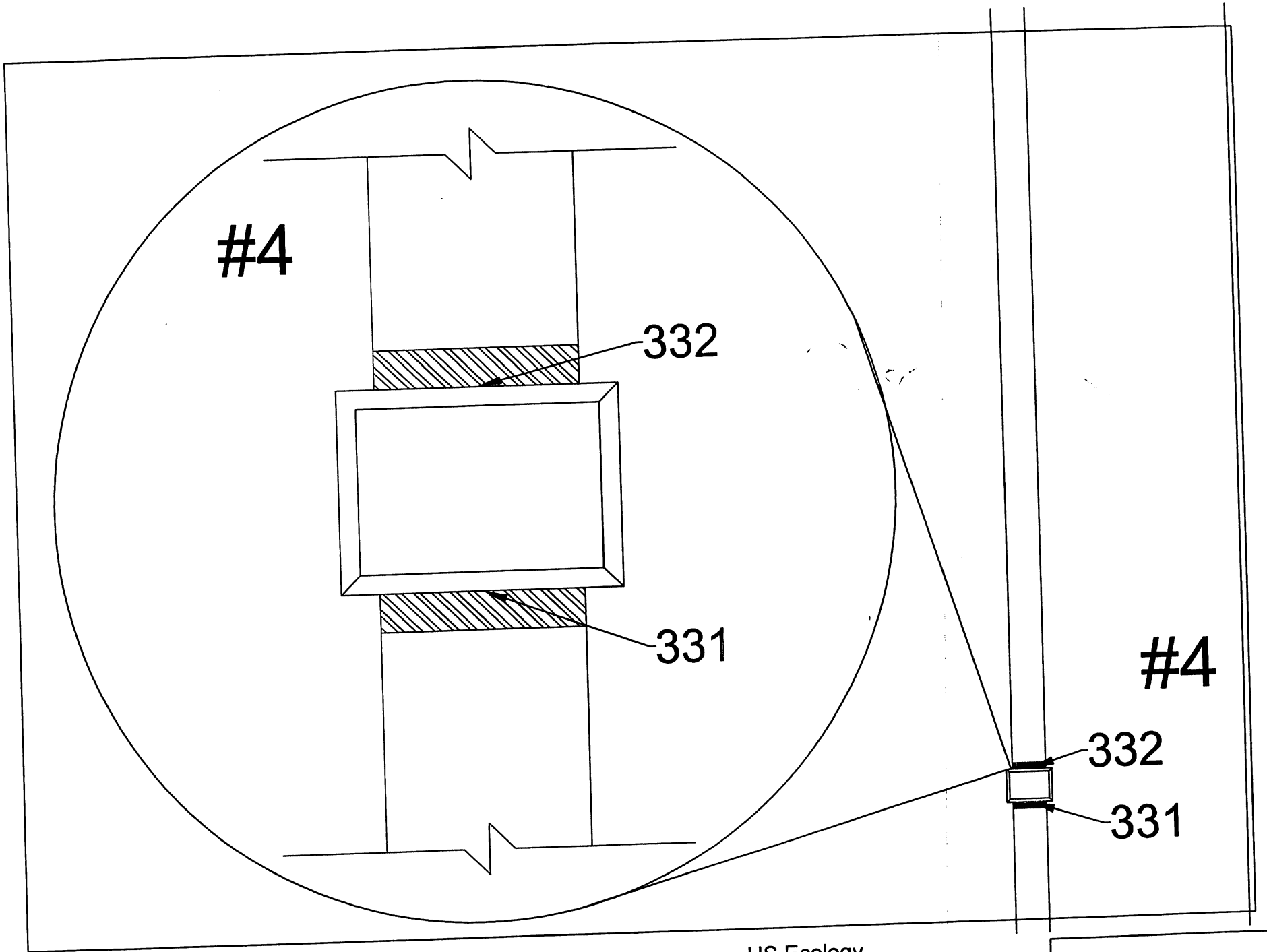

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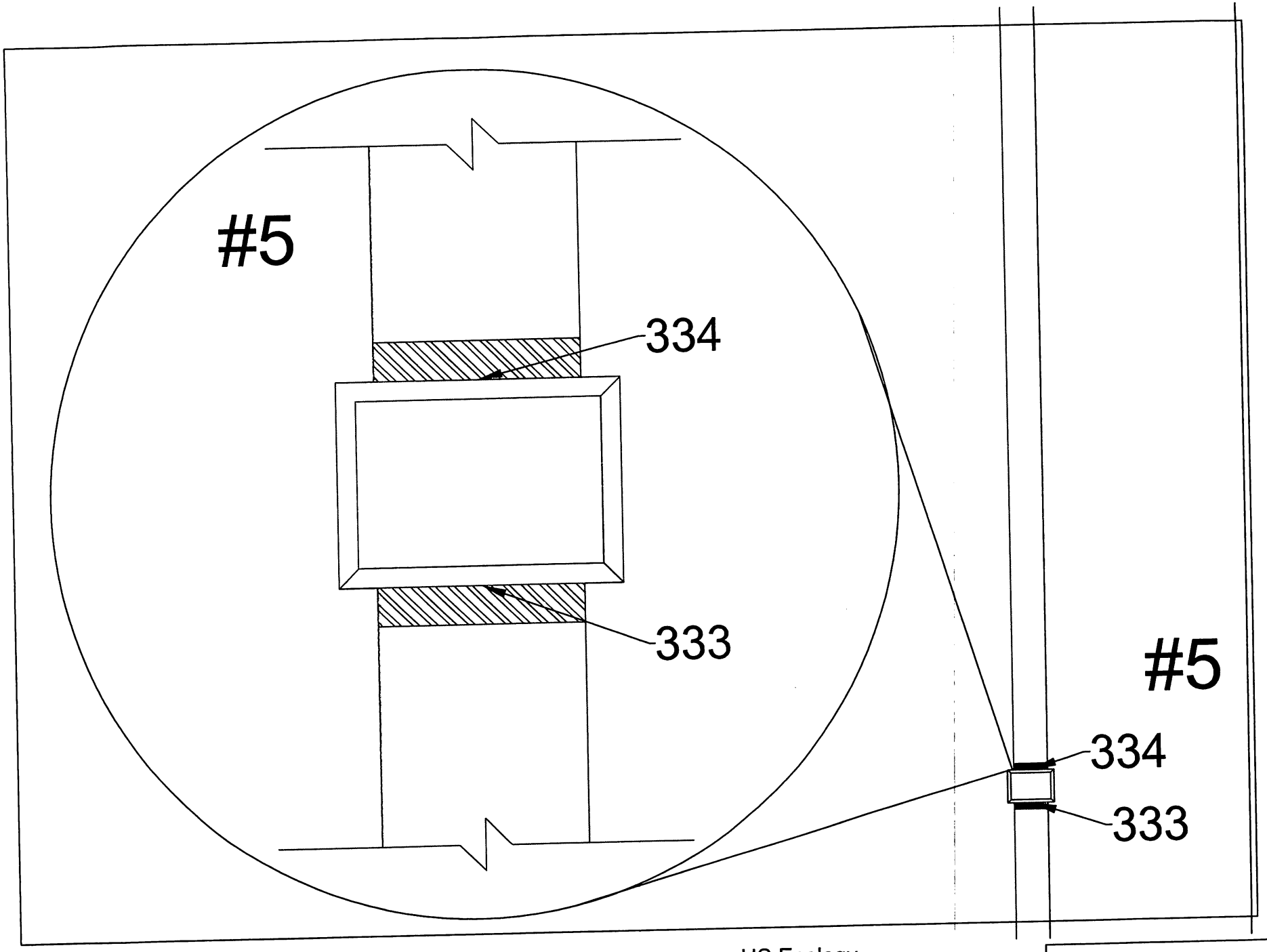

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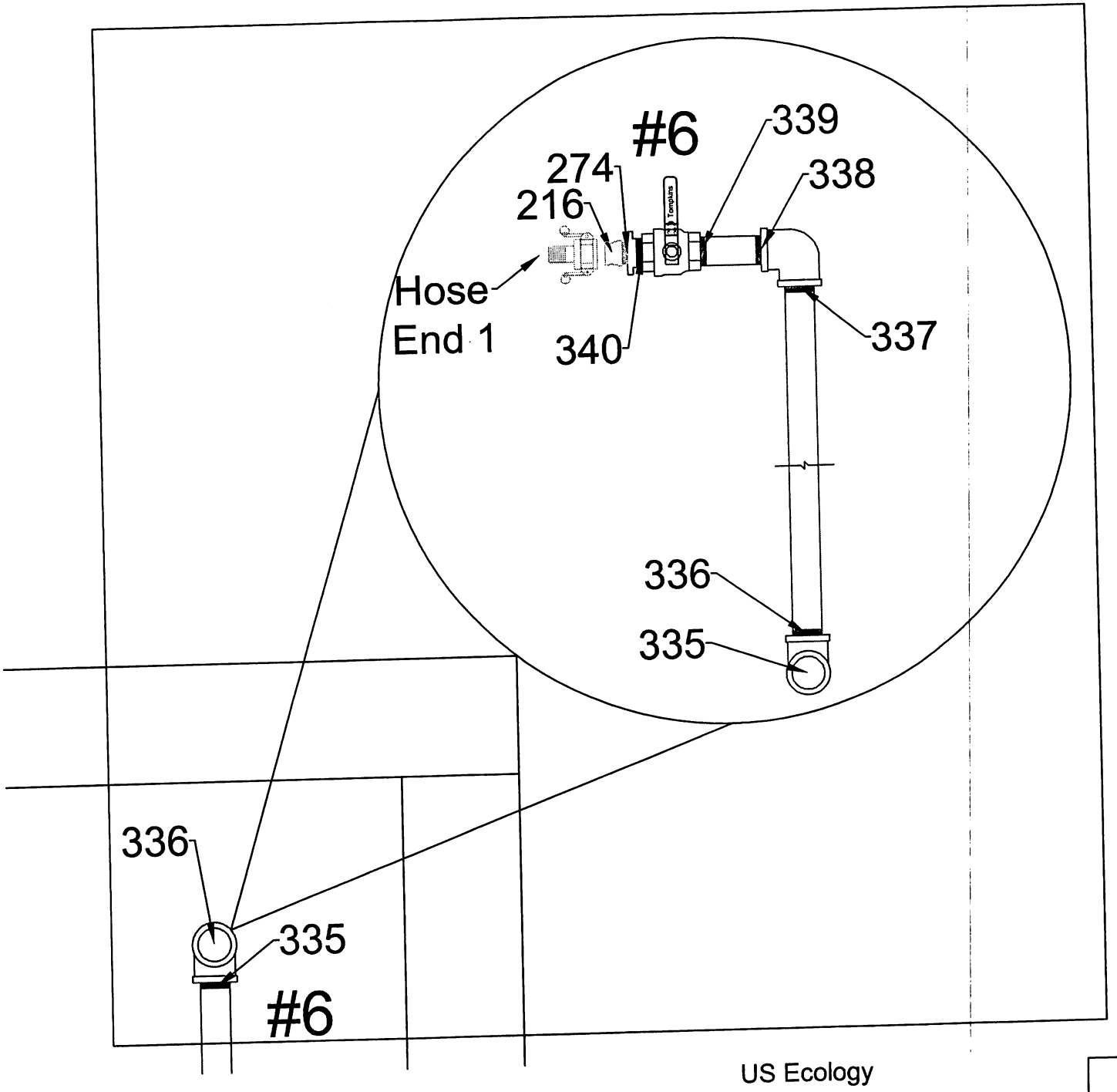

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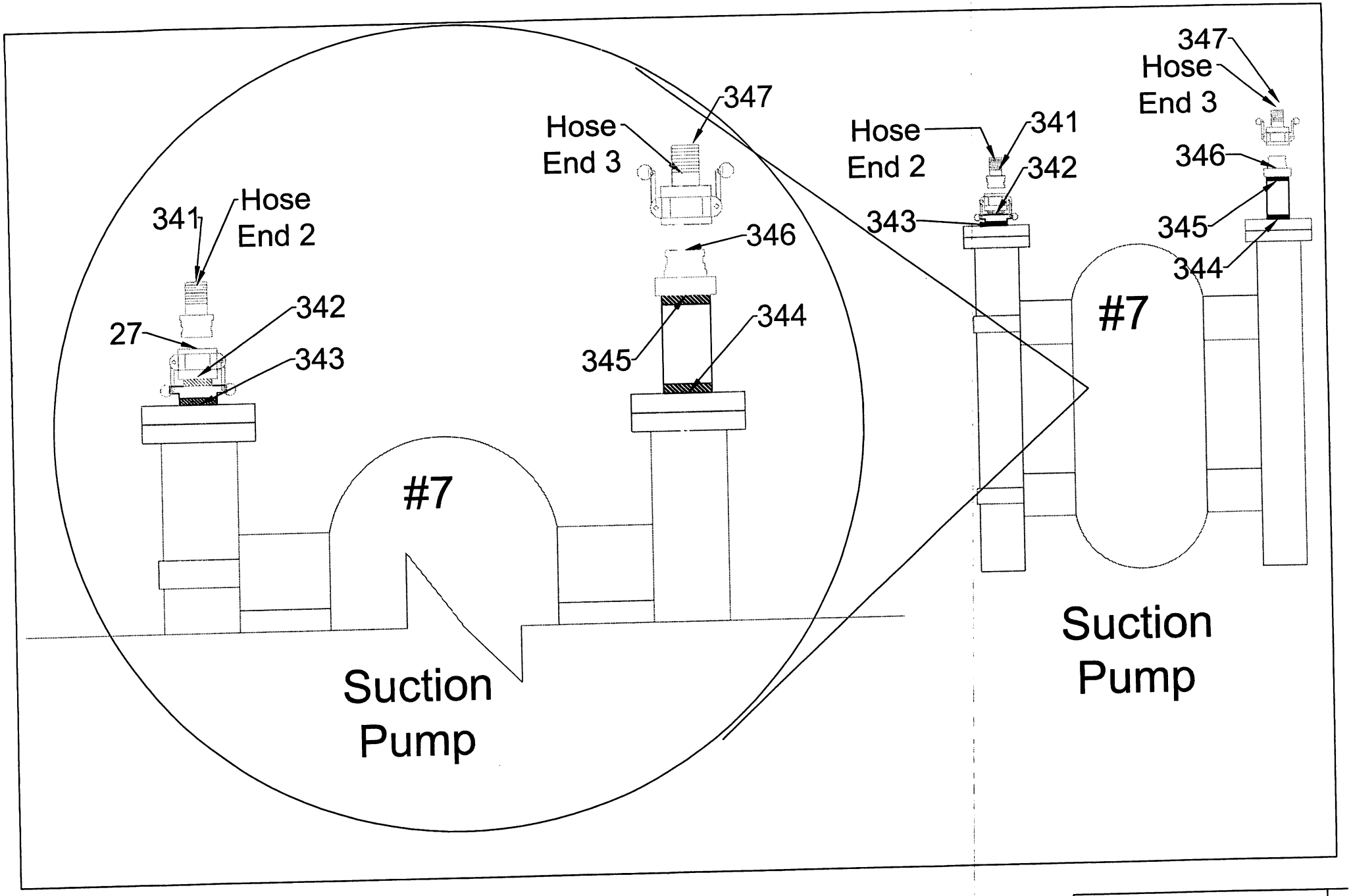

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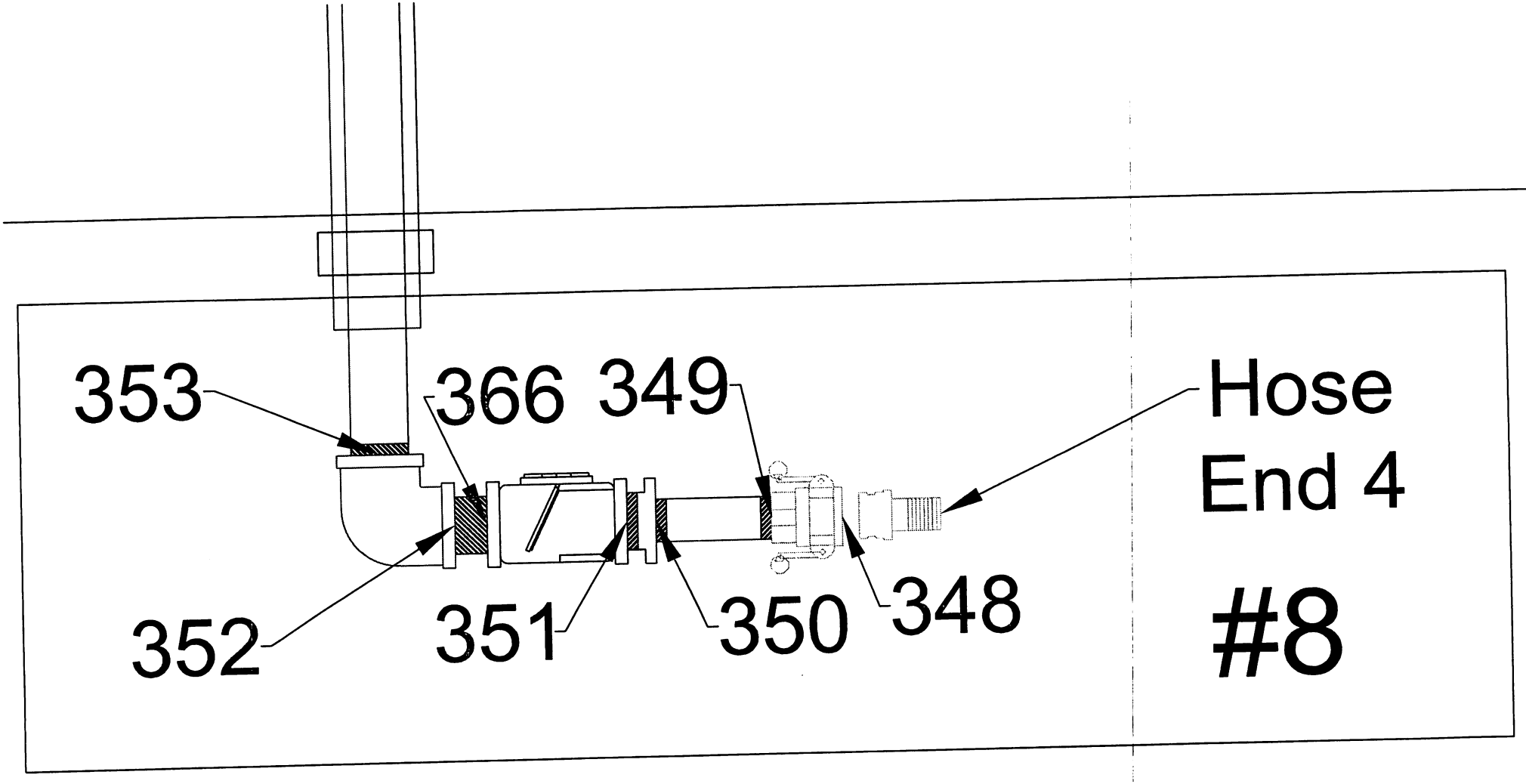

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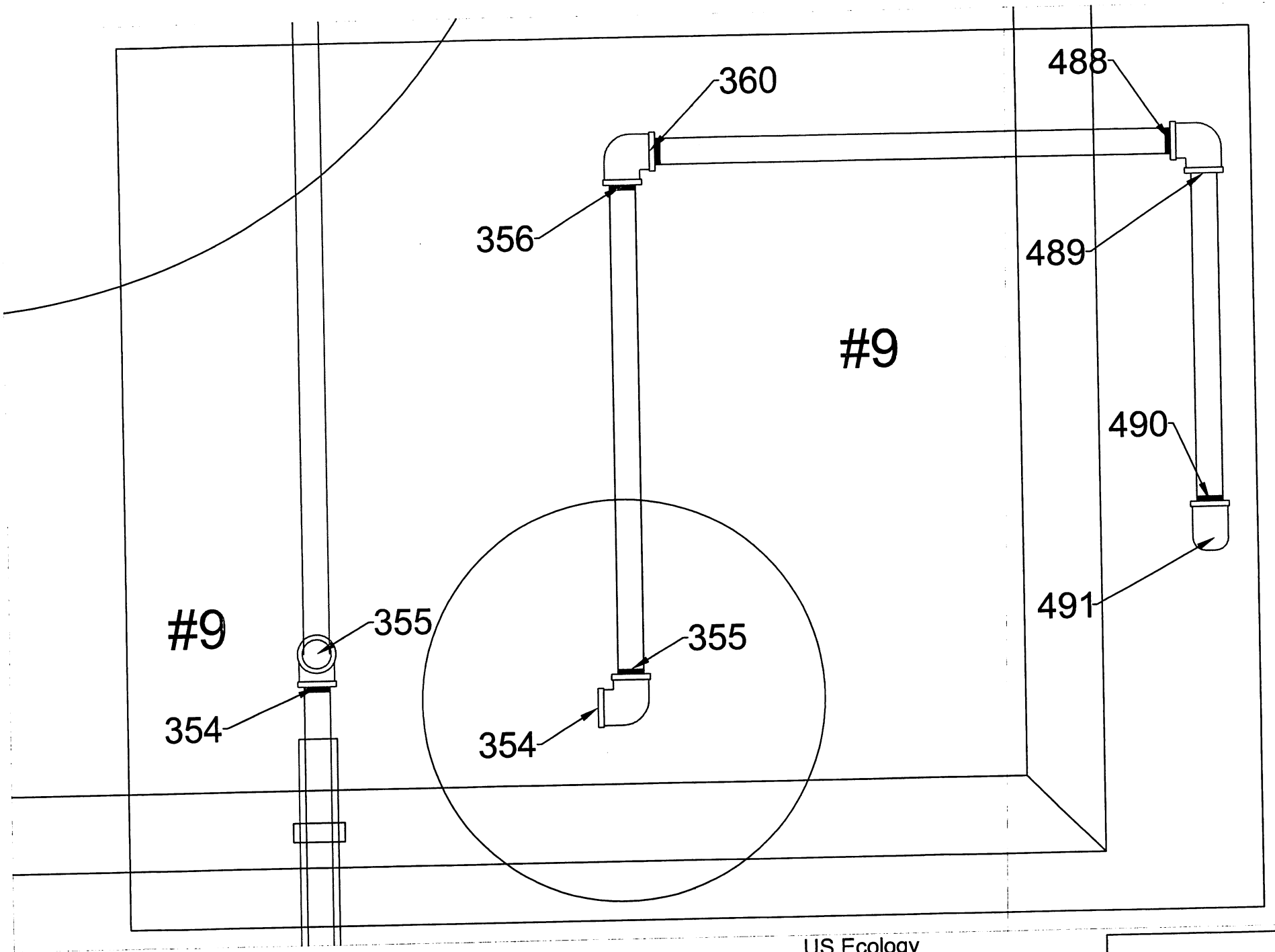

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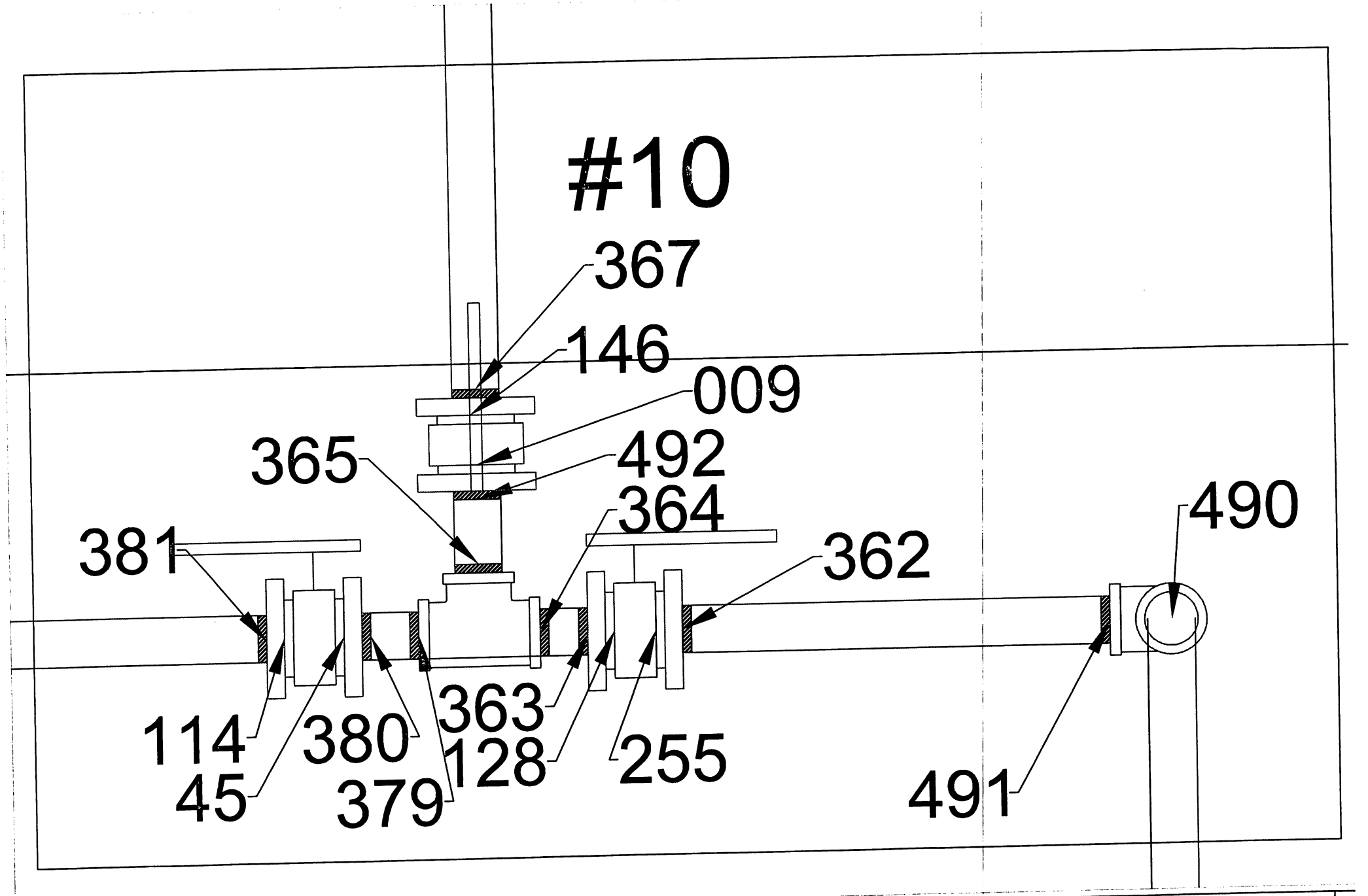

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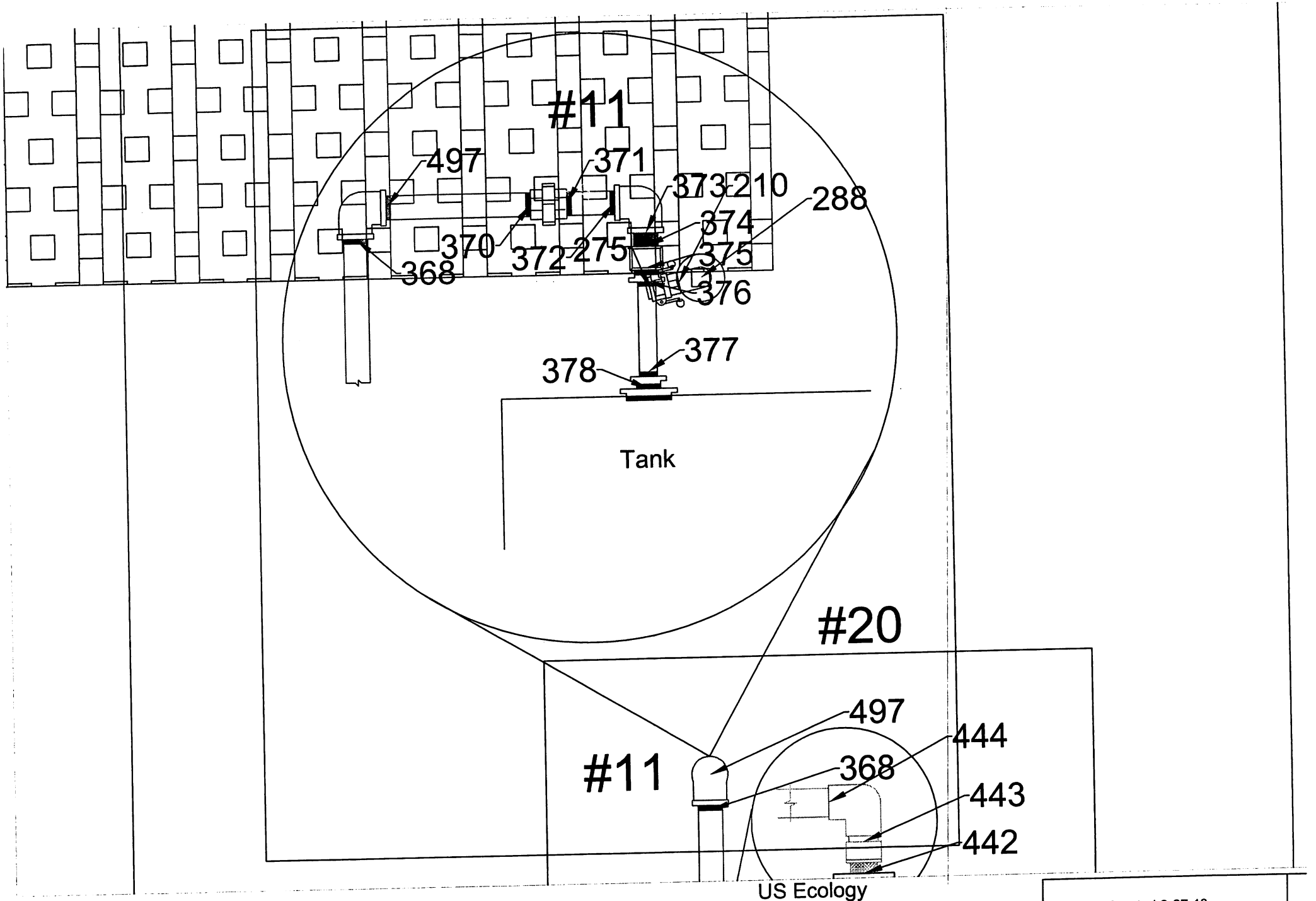

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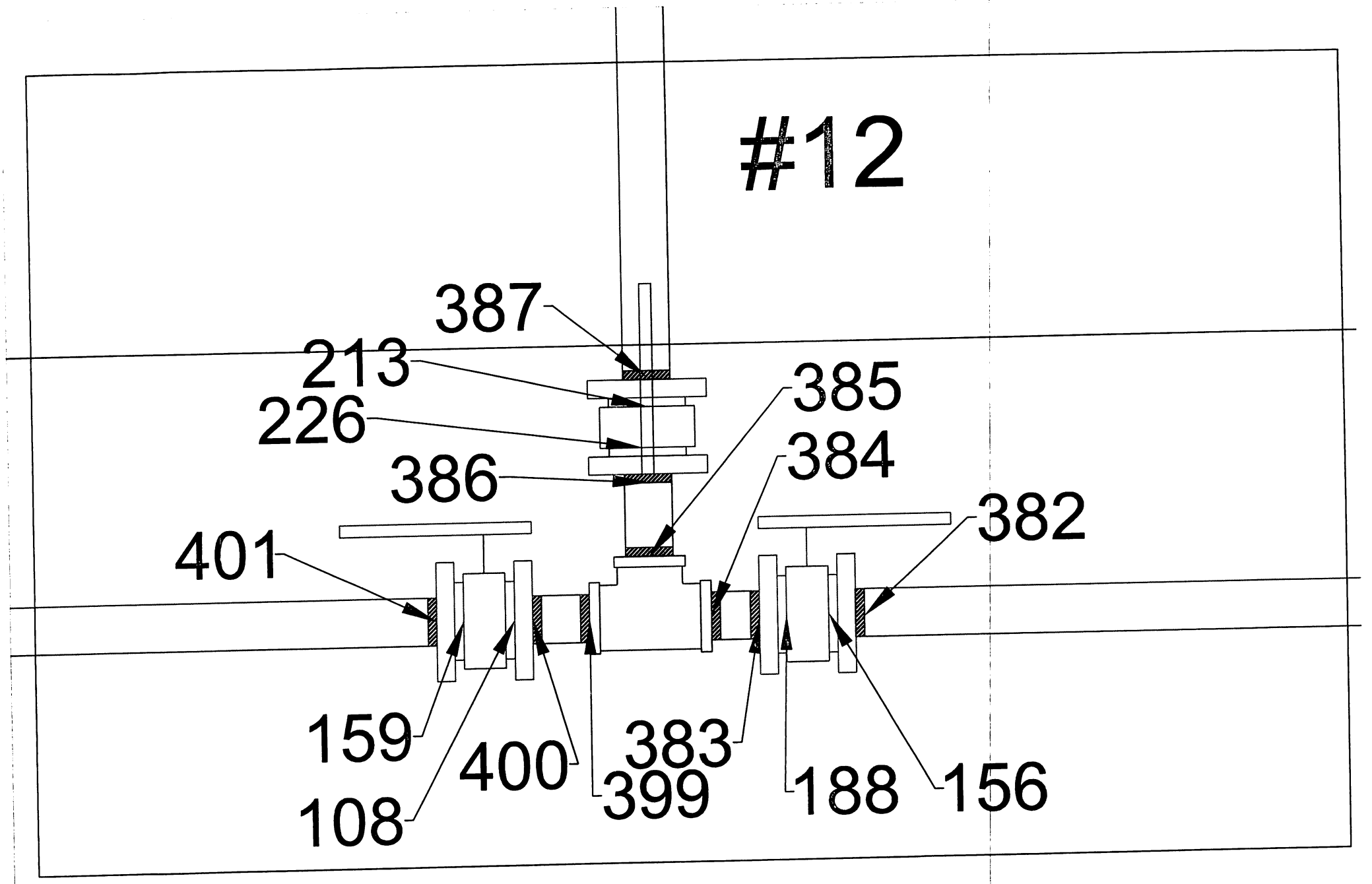

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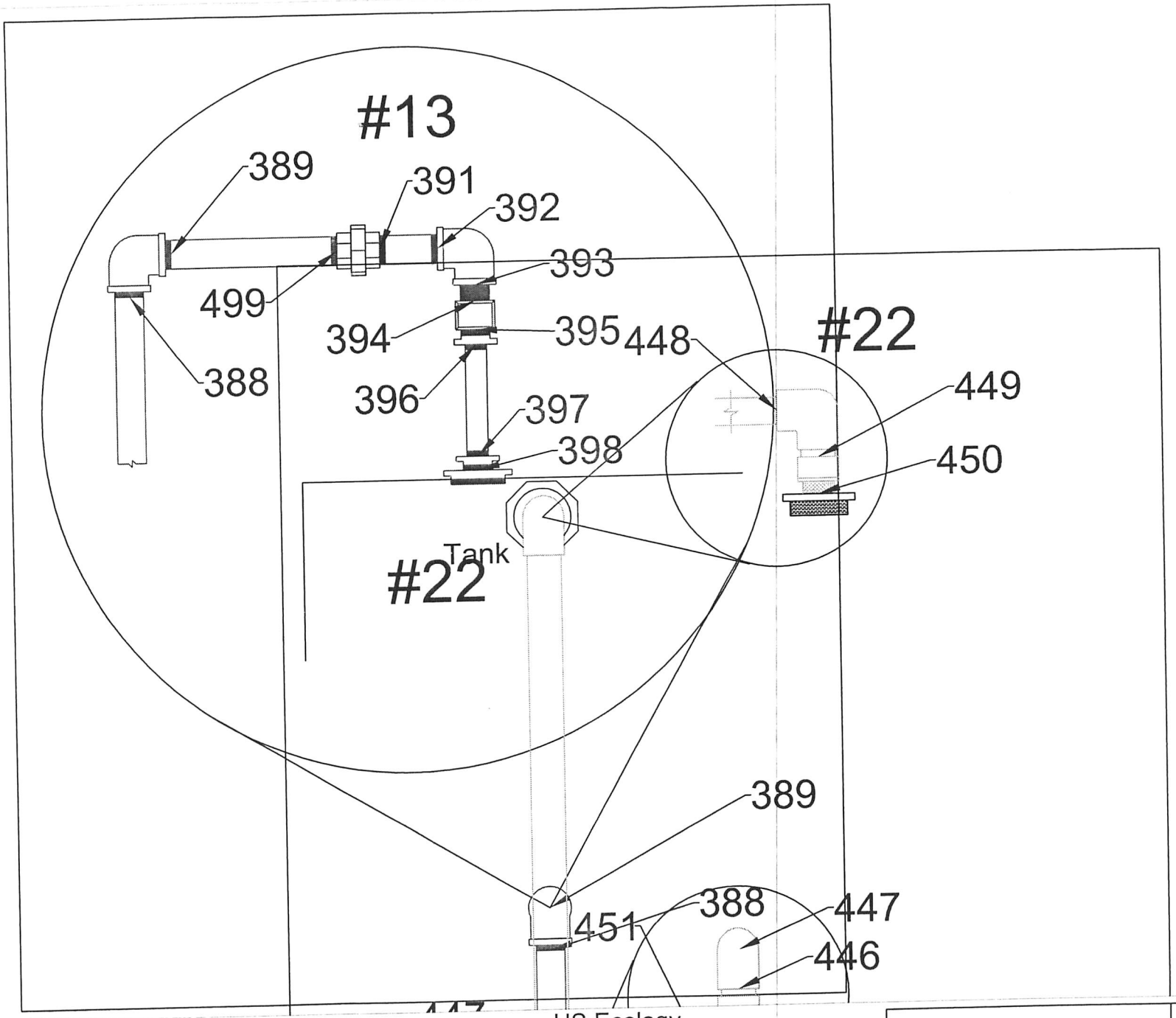

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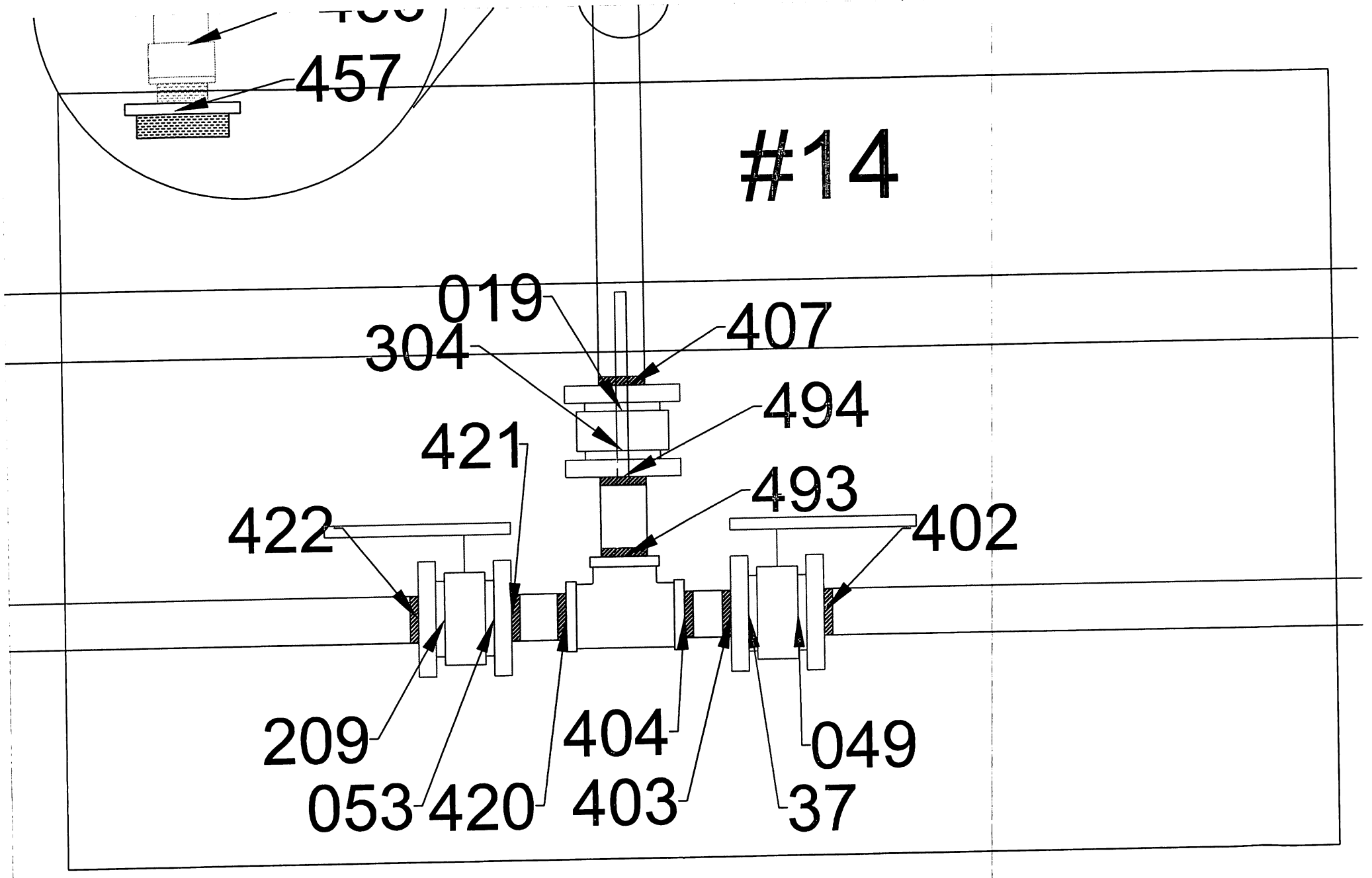

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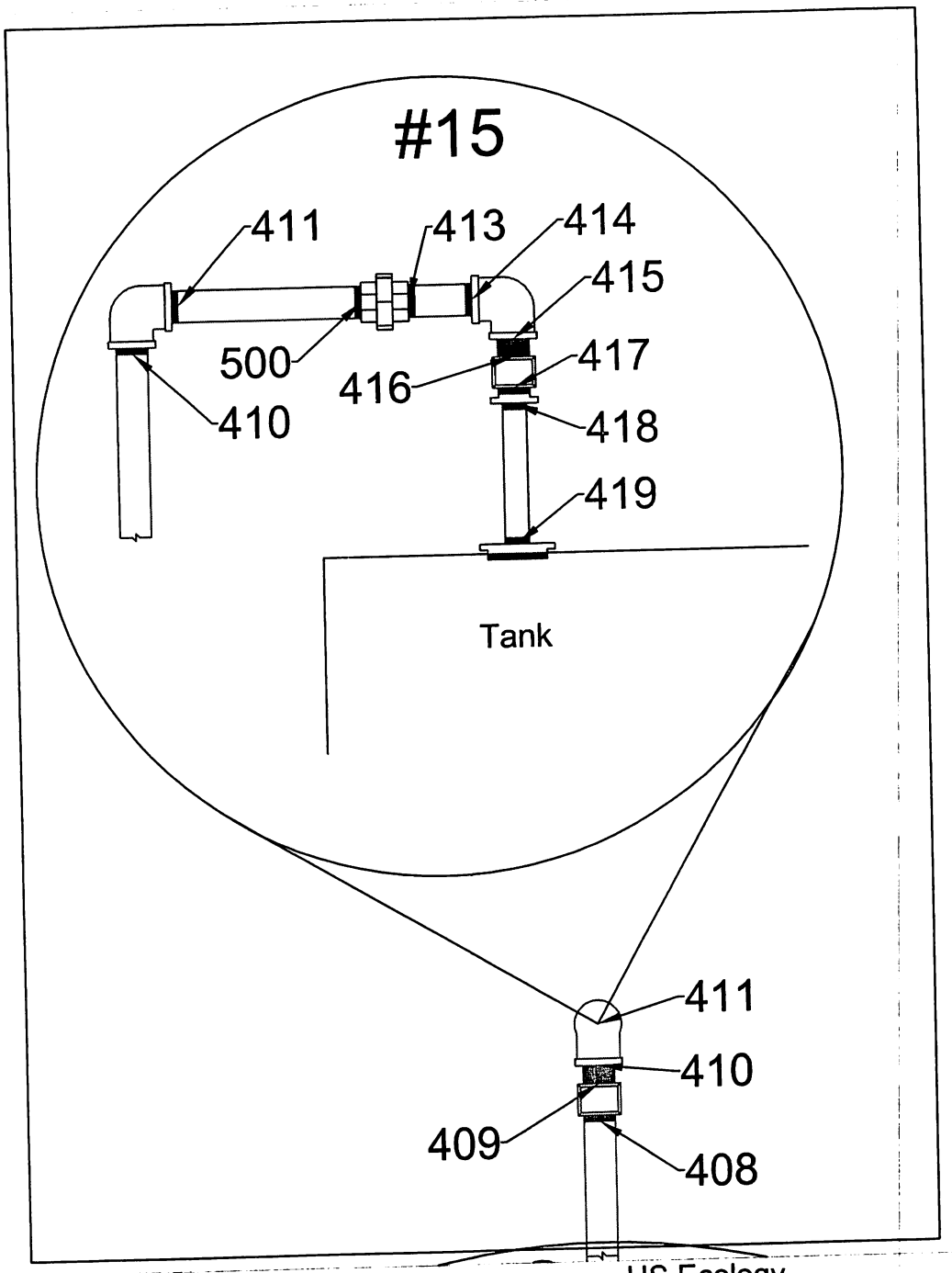

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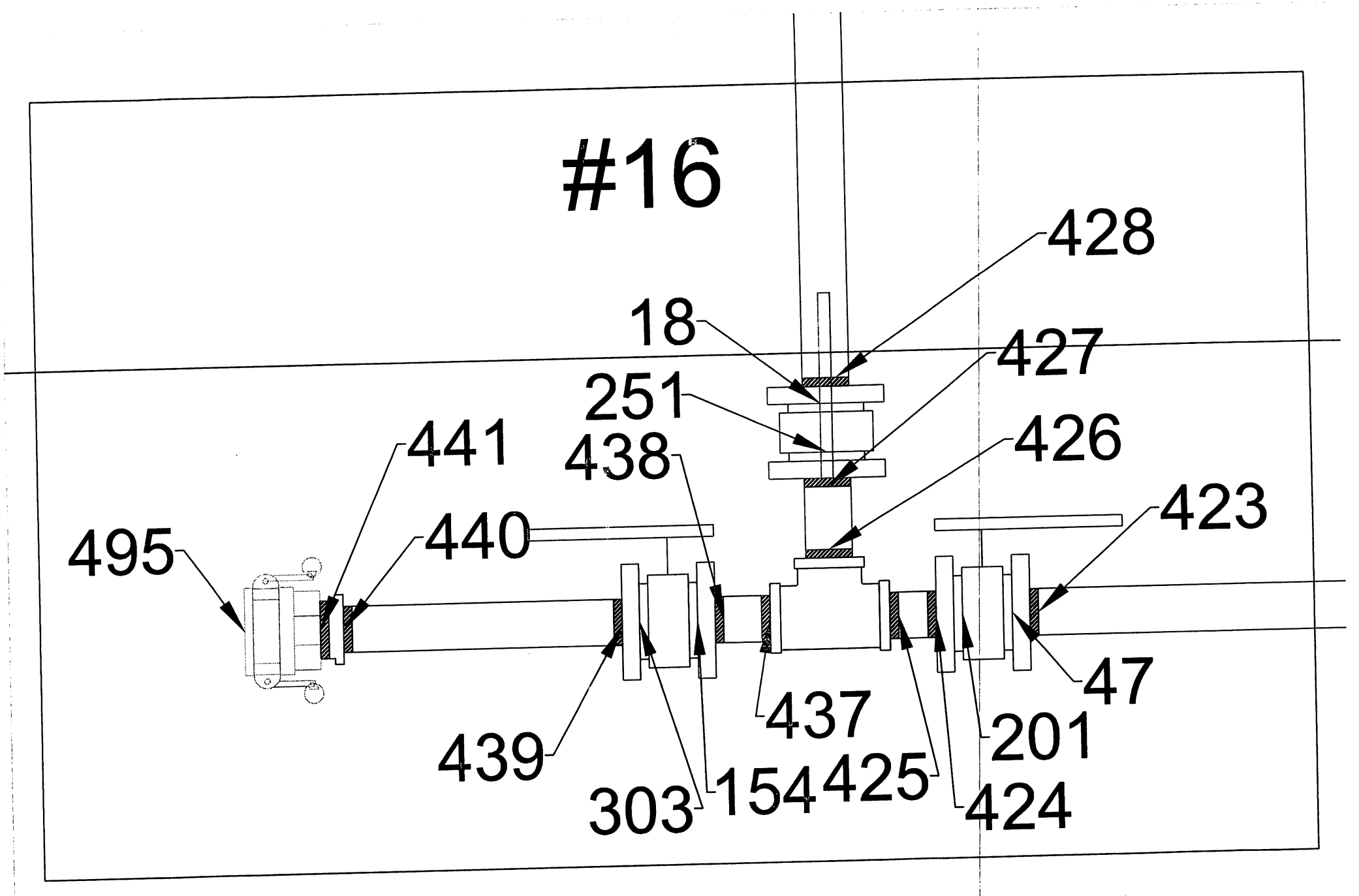

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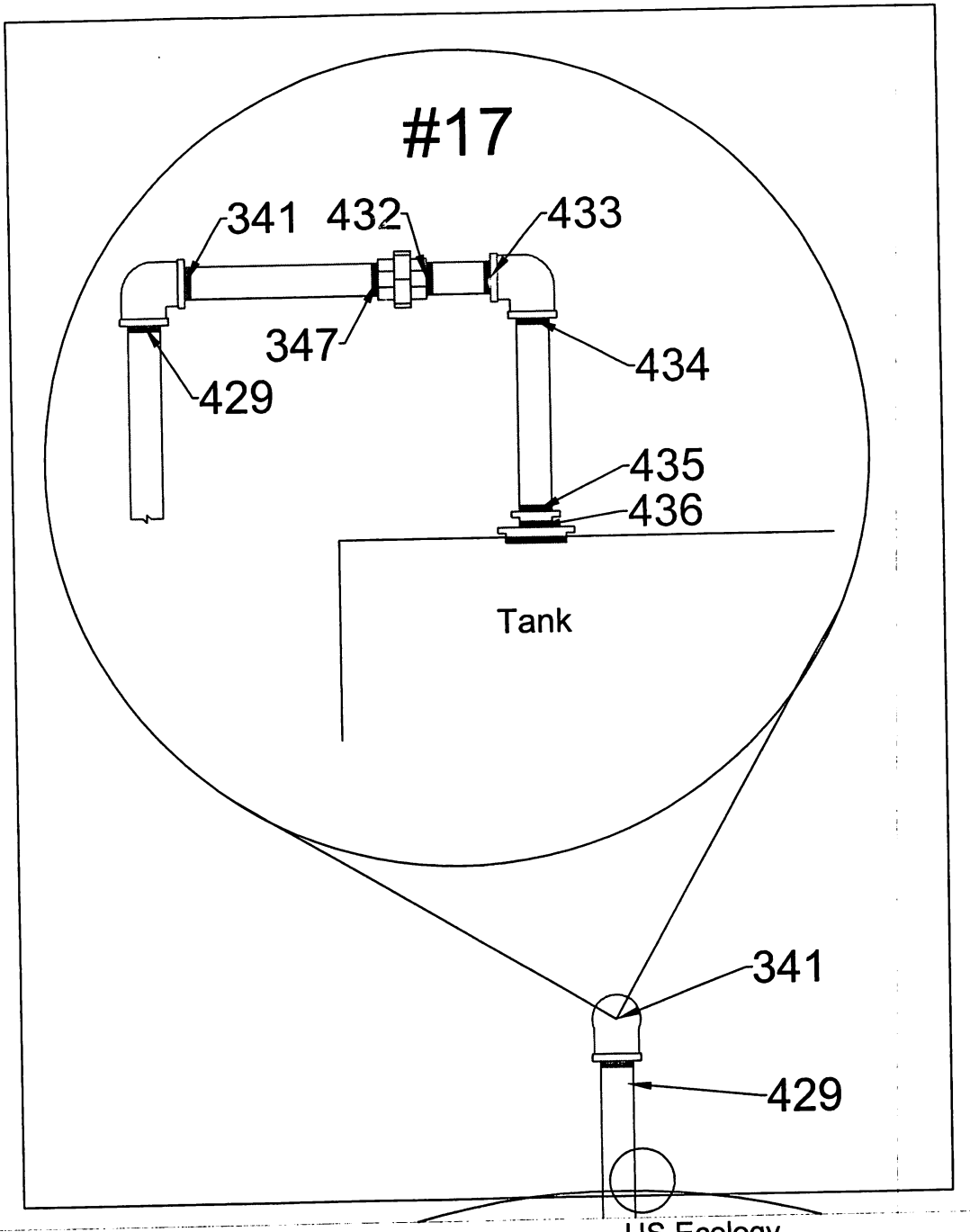

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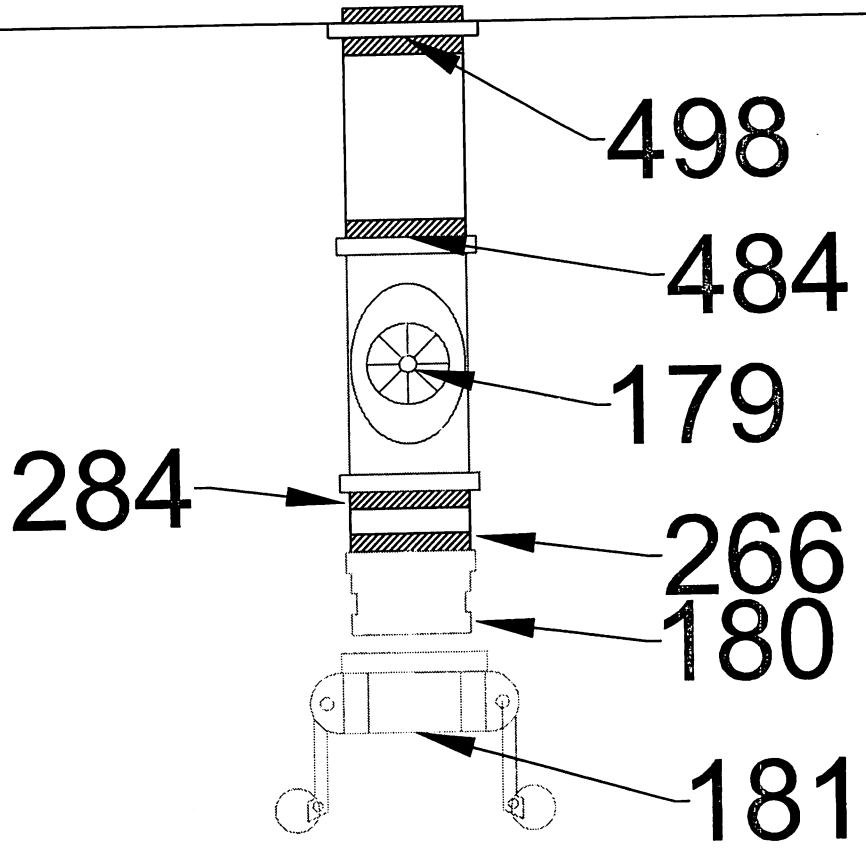

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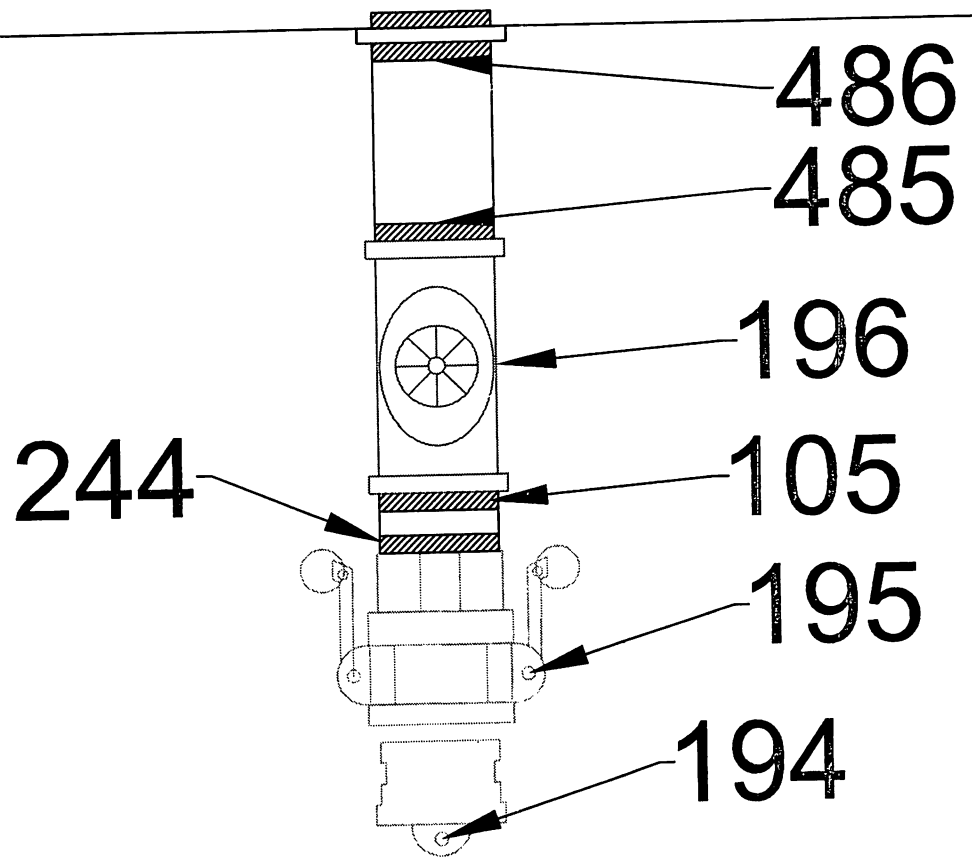

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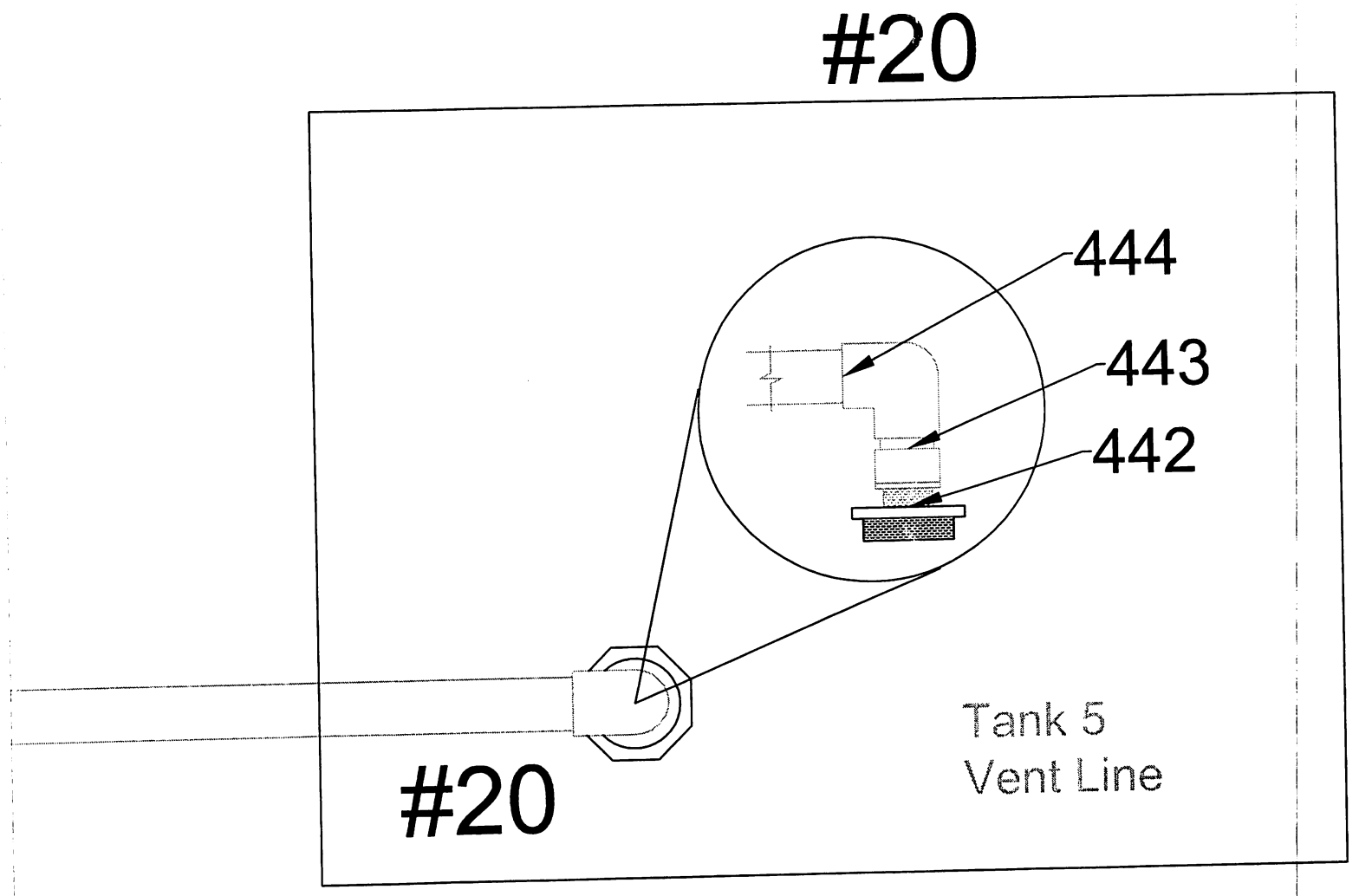

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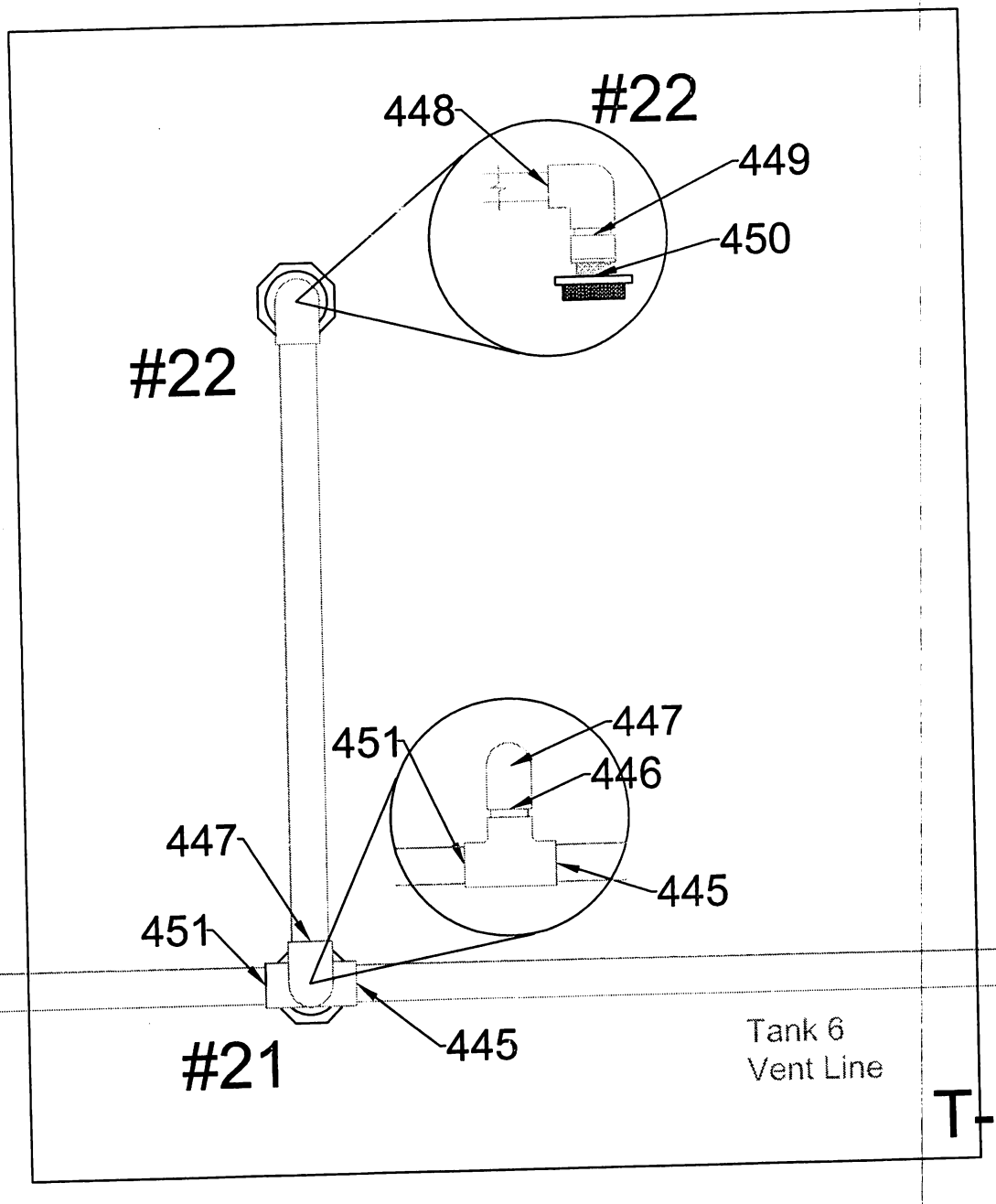

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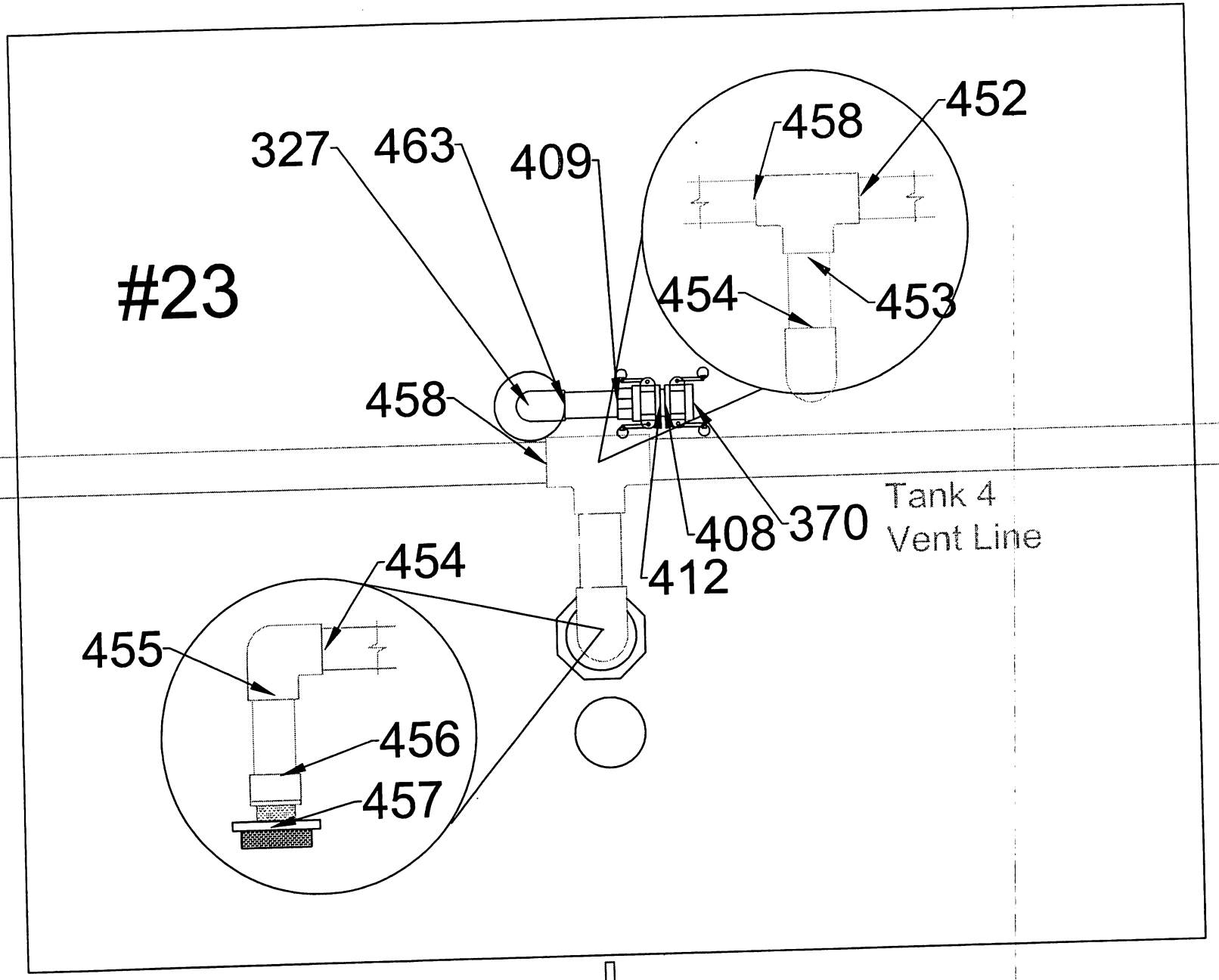

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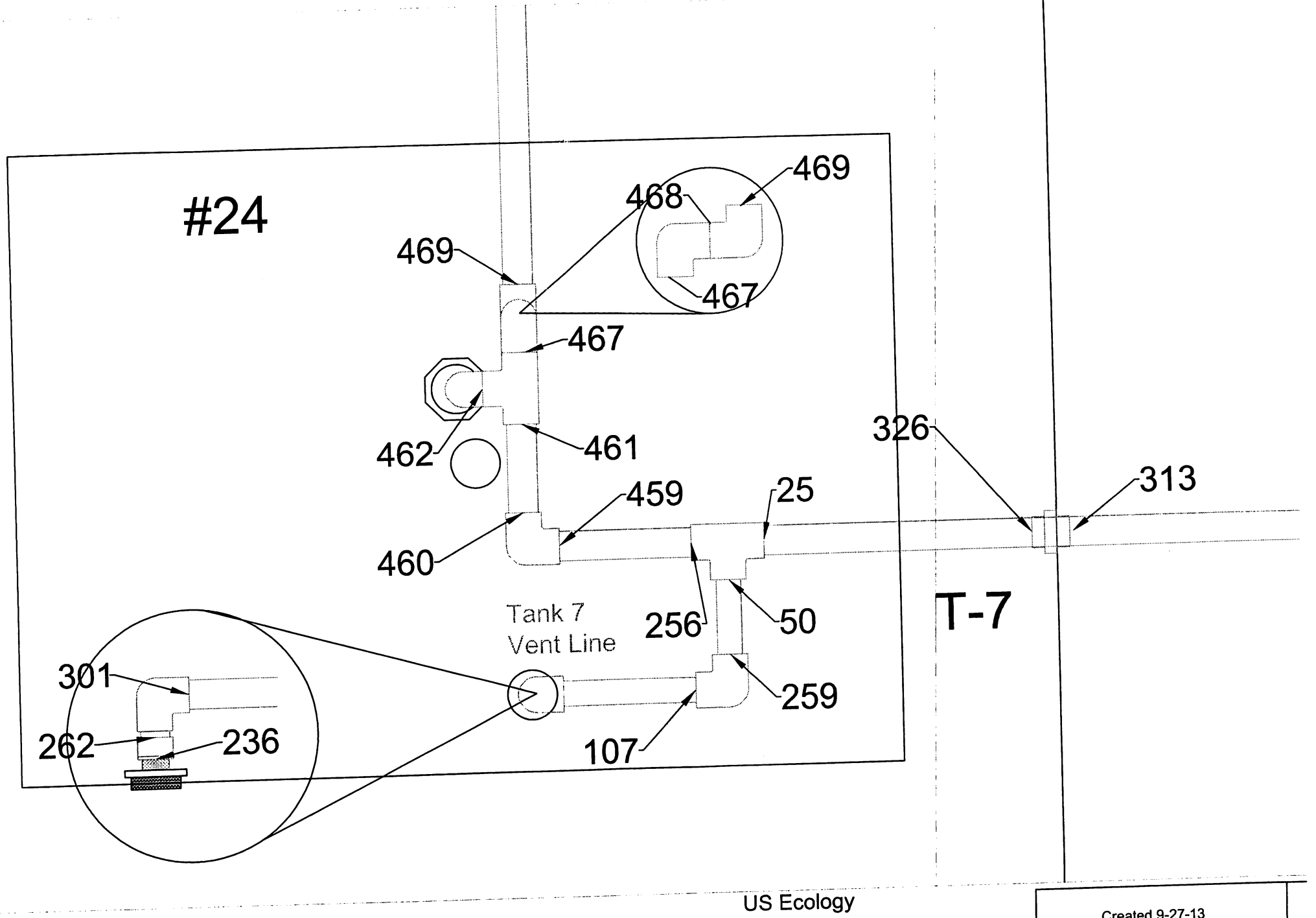
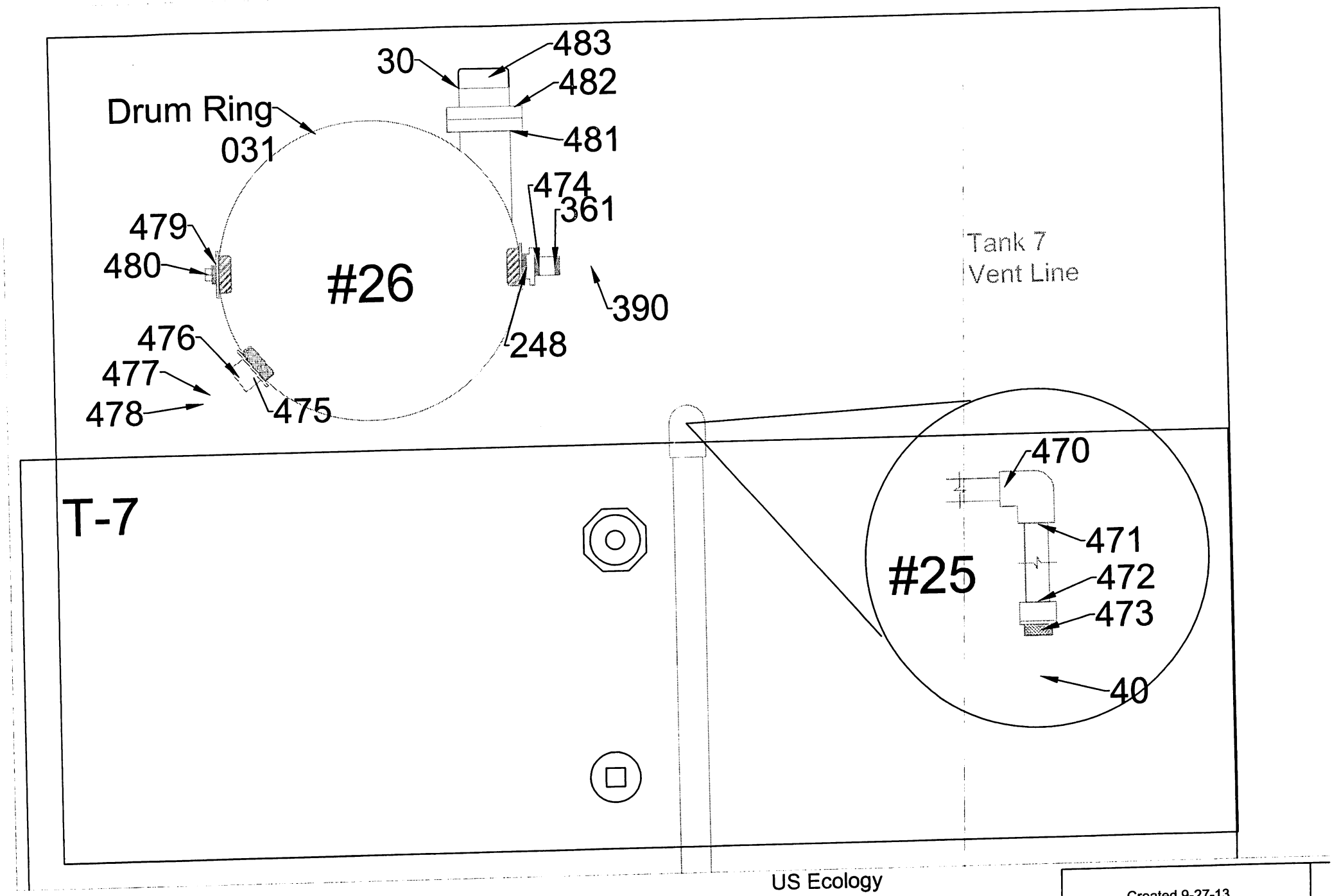
Created 9-27-13
Revised 2-26-14



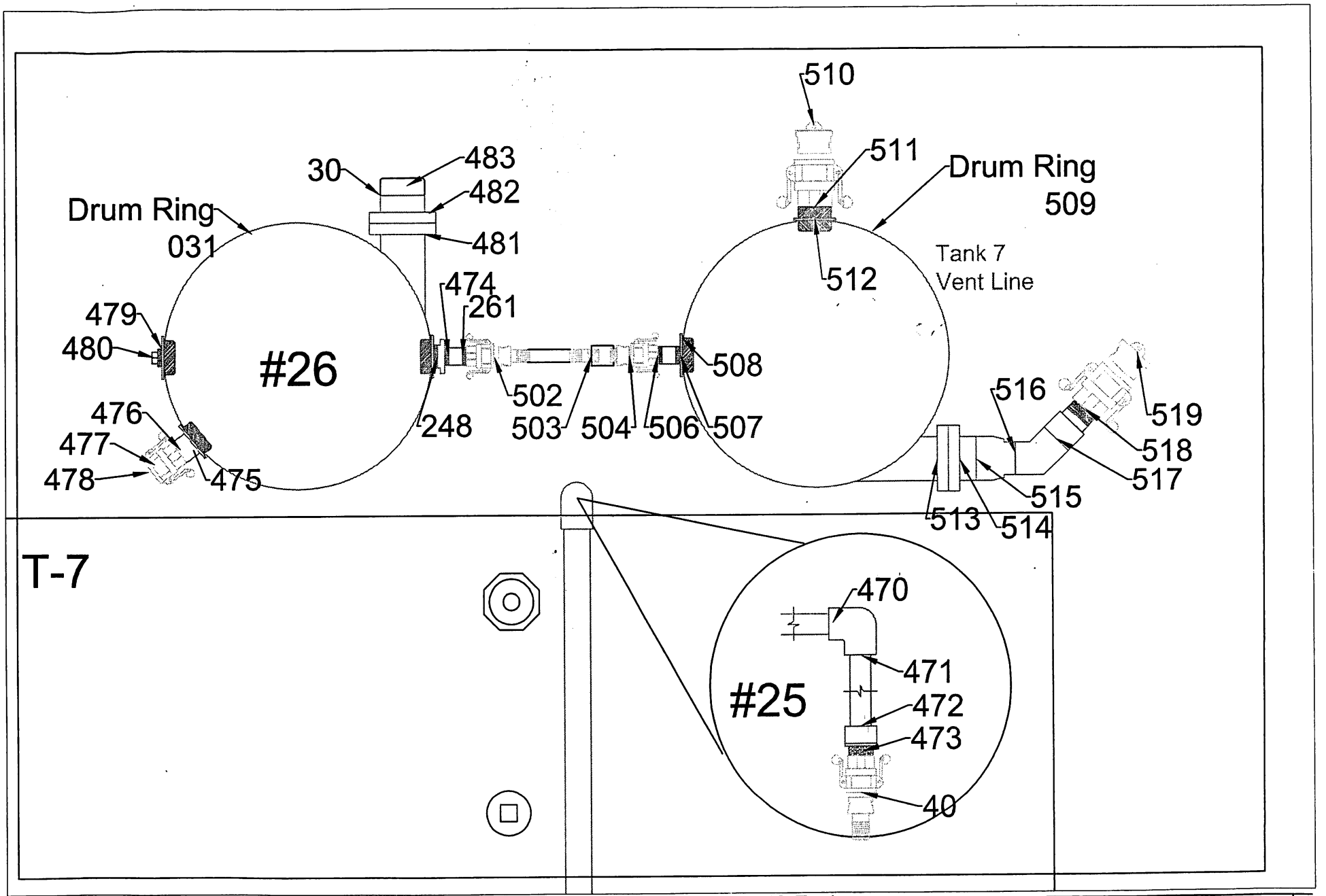
US Ecology
Beatty,Nv
Tank Farm Tag I.D.

Created 9-27-13
Revised 2-26-14



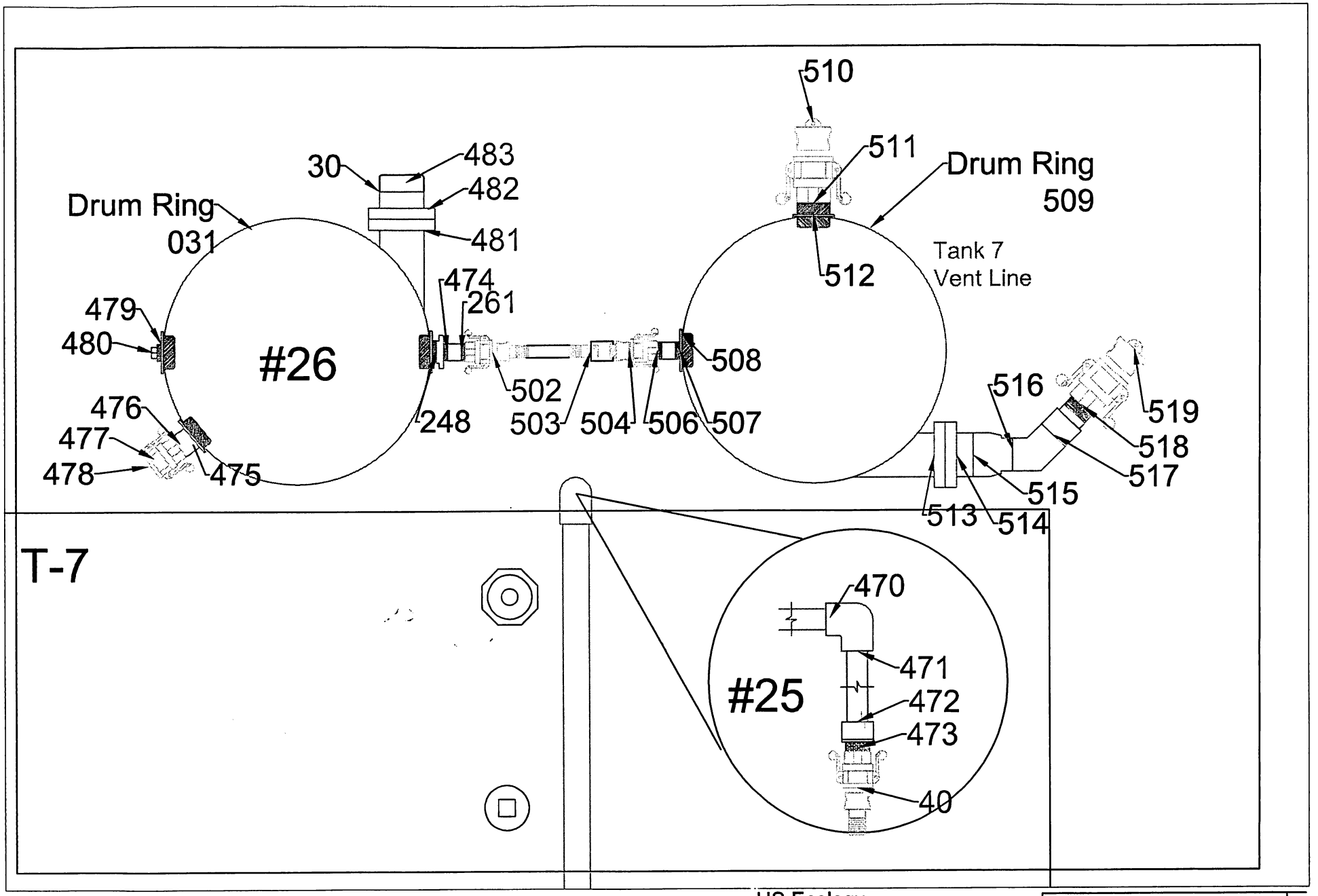
US Ecology
Beatty,Nv
Tank Farm Tag I.D.

Created 9-27-13
Revised 2-26-14



US Ecology
Beatty,Nv
Tank Farm Tag I.D.

Created 9-27-13
Revised 2-26-14



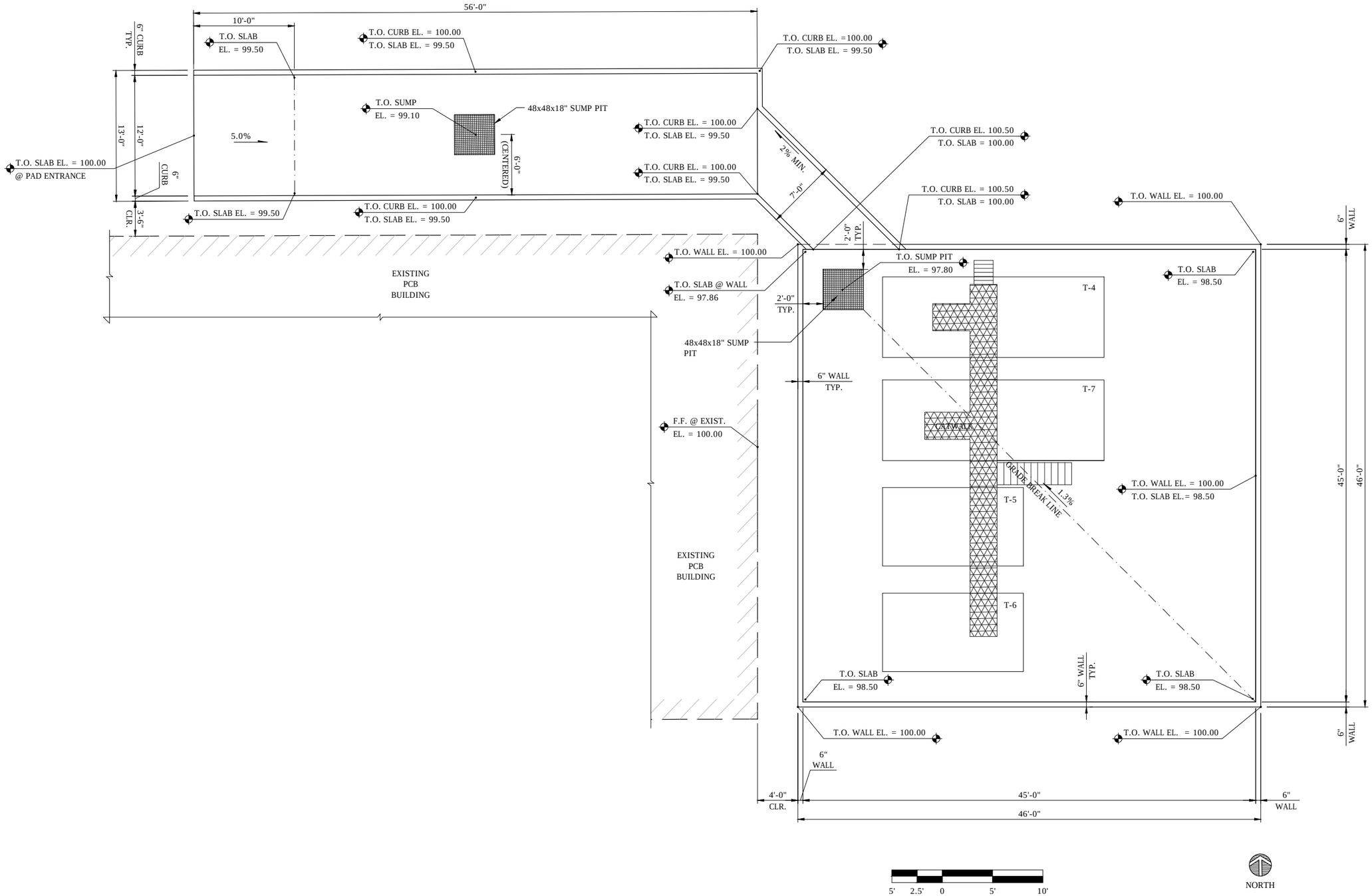
US Ecology
Beatty,Nv
Tank Farm Tag I.D.

Created 9-27-13
Revised 2-26-14

RECEIVED
DEC 29 2014
NDEP BWM

APPENDIX H

TANK FARM SECONDARY CONTAINMENT DRAWINGS



PCB TANK FARM AND
TRUCKING STAGING PAD
US Ecology Nevada, Inc.
HAZARDOUS WASTE MANAGEMENT FACILITY
BEATTY, NEVADA 89003

REVISED AUGUST 2015

-updated July 2015

APPENDIX I

PCB TANK FARM SECONDARY CONTAINMENT CALCULATIONS

The precipitation event considered in the design of the PCB Tank Farm is the 25-year, 24-hour storm. At the facility location, the 25-year, 24-hour storm event is a 2-inch rainfall. This rainfall amount was considered in the design of the PCB Tank Farm containment structure should the design storm occur during a tank failure.

Containment Capacity (as required by 40 CFR 761.65(b)(1)(ii)

Capacities of tanks within the PCB Tank Area:	2 tanks (5,000 gal. each)
	2 tanks (7,500 gal. each)
Total volume =	25,000 gallons

Containment capacity required is the larger of:

25% of total liquid storage capacity = 25% of 25,000 gallons = 6,250 gallons

200% of liquid storage capacity of largest tank = 2 x 7,500 gallons = 15,000 gallons

Containment capacity required by 40 CFR 761.65(b)(1)(ii) = 15,000 gallons

USEN conservative determination of PCB Tank Farm containment holding capacity

= 15,000 gallons + design storm precipitation

Design Storm precipitation volume = [2 in / 12 in/ft] x 45 ft x 45 ft x 7.48 gal/cu ft = 2,524.5 gals

Minimum containment capacity required = 17,524.5 gallons

Supports

2 Concrete Cradles – 2*(2 ft wide by 10 ft long by 1.67 ft high) = 66.67 cu ft

6 Metal Supports – 6*(1 ft by 1 ft by 2 ft high) = 12 cu ft

2 Concrete Pipe Supports – 2*(1 ft diameter by 1.04 ft high) = 0.14 cu ft

8 Concrete Supports –8*(2.083 ft by 2.083 ft by 0.67 ft high) = 23.3 cu ft

Total Support Volume = 66.67+12+0.14+23.3 = 102.11 cu ft

= 102.11 x7.48 gal/cu ft

= 763.8 gal

Containment capacity available	=	45 ft wide by 45 ft long by 1.5 ft deep – Supports
	=	3,037.5 cu ft x 7.48 gal/cu ft – Supports
	=	22,720.5 gallons – 763.8 gallons
	=	21,986.7gallons*

* Actual total capacity is somewhat greater since containment depth at low point (sump pit) actually is 23 inches.

<u>21,986.7 gallons > 17,525 gallons, liquid holding capacity satisfies 40 CFR 761.65(b)(1)(ii)</u>

Excess capacity is 21,986 – 17,525 gallons = 4,461 gallons

4,461 gallons is equivalent to 3.5 inches of freeboard above the design liquid height

APPENDIX J

REMOVED

APPENDIX K

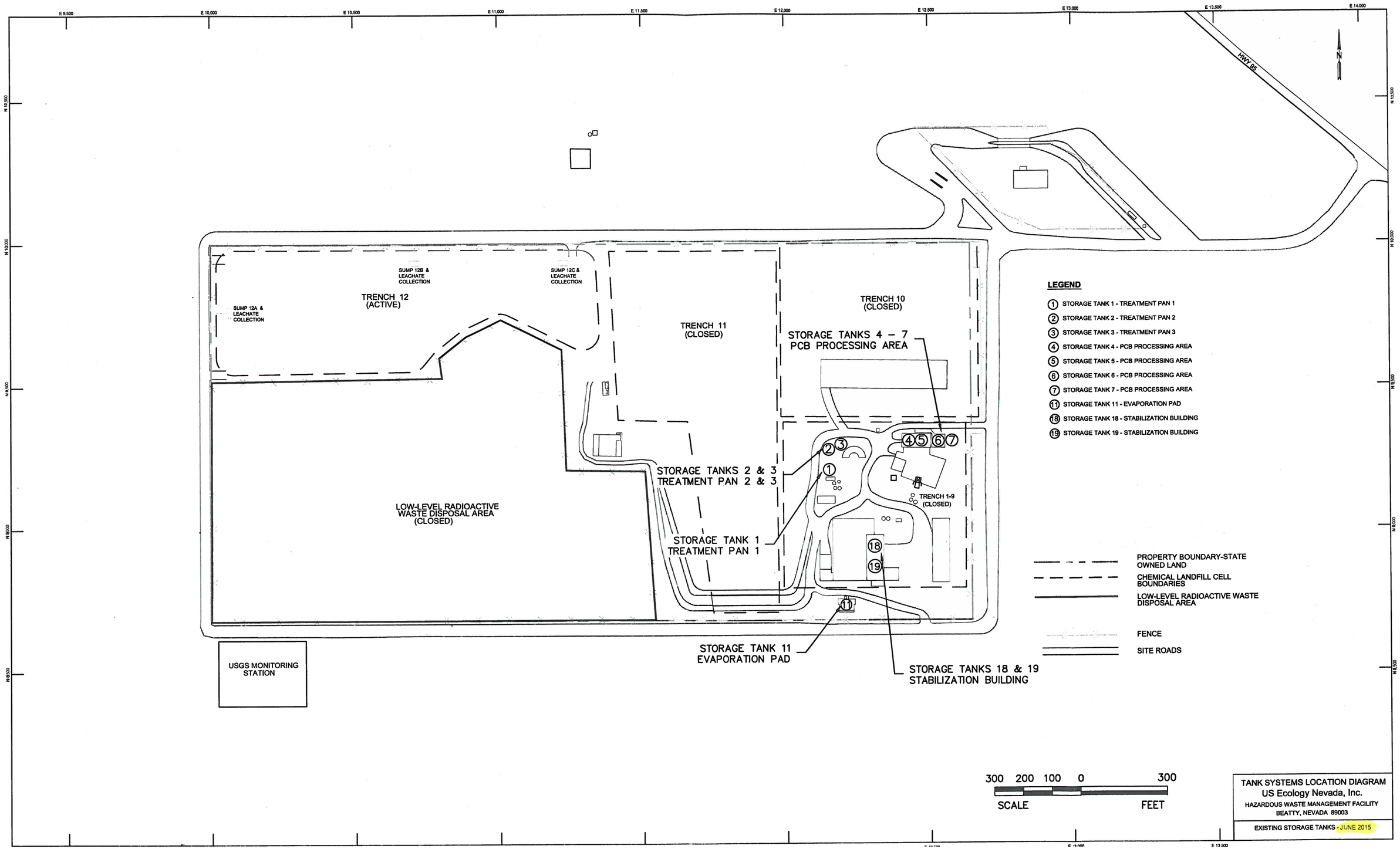
REMOVED

-updated July 2015

APPENDIX L

TANK SYSTEMS LOCATION DIAGRAM

RECEIVED
JUL 15 2015
NDEP BWM



APPENDIX M

CONTAINER MANAGEMENT BUILDING

TANK SYSTEMS 18 AND 19
(STABILIZATION PANS 4 AND 5)

INSTALLATION CERTIFICATION REPORT

Stabilization Facility - Mixing Tanks
Beatty, Nevada

Project No. 06B-G1263.1

Prepared for

US Ecology Nevada

May 4, 2007

AMERICAN GEO TECHNICS

Prepared for

US Ecology Nevada
PO Box 578
Beatty, NV 89003

Attention: Bob Marchand, Facilities Manager

INSTALLATION CERTIFICATION REPORT

Stabilization Facility - Mixing Tanks
Beatty, Nevada

American Geotechnics
Project No. 06B-G1263.1

Prepared by

American Geotechnics

Exp 6-30-10

PROFESSIONAL ENGINEER - STATE OF NEVADA
VAUGHN J. THURGOOD
5/4/07
CIVIL
No. 18380

Vaughn Thurgood, PE
CQA Manager

Rex W. Hansen, PE Idaho
Principal Engineer

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- 1.1 Purpose and Scope of Work 1
- 1.2 Description of Operations 1
- 1.3 Description of Tanks 2
- 1.4 Compatibility with Waste 3
- 1.5 Corrosion 3

2.0 CONSTRUCTION **4**
- 2.1 Construction Sequence 4

3.0 CONTAINMENT TESTS **5**
- 3.1 Secondary Containment Test 5
- 3.2 Primary Containment Test 5

4.0 CERTIFICATION **6**

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A Tank Construction Drawings
- Sheet M101
- Sheet S101
- Sheet S102
- Sheet C204
- Sheet C207
- Sheet C211

B Tank Construction Photos

C Hydrostatic Test Reports

1.0 INTRODUCTION

1.1 Purpose and Scope of Work

American Geotechnics was retained to provide construction quality assurance (CQA) services during the erection of the Stabilization Facility at the US Ecology Nevada (USEN) site. This report has been prepared for the purpose of certifying the installation of two mixing tanks in conformance with Title 40 CFR Part 264 Subpart J. The tanks were constructed as part of a new stabilization facility. The site is located in Nye County approximately 11 miles south of Beatty, Nevada along Highway 95.

1.2 Description of Operations

The subject tanks will serve as mixing pans, used to facilitate the solidification or stabilization of waste materials. Waste materials will typically be transferred into the mixing tanks from either end-dump trucks or tankers. The waste materials may consist of liquid, sludge, or solid waste debris with hazardous characteristics. Waste stabilization will be accomplished by mixing hazardous waste materials with reagents (cement, lime, kiln dust, etc.). A hydraulic excavator will be used to provide the necessary mixing forces and to remove the stabilized waste materials from the tank upon completion. The stabilized materials will then transported and placed in a permanent landfill repository at the site.

We understand the permitted operational procedures at the facility require daily inspection of the secondary containment of the mixing tanks to check for leakage through the primary containment. We also understand that as a matter of practice, USEN will not allow waste materials to be stored in the mixing tanks for extended periods of time (i.e. the materials are treated and removed within a shift period).

1.3 Description of Tanks

The subject mixing tanks are similar in design to the existing mixing pans currently used at the USEN facility. The mixing tanks consist of a steel plate primary containment vessel and an epoxy coated concrete structure that provides secondary containment. The tanks were designed to withstand the static weight of the waste materials in addition to the anticipated dynamic loads from the loading, mixing and unloading activities.

1.3.1 Primary Containment

Structural design of the steel vessel was performed by Samuel Engineering of Greenwood Village, Colorado. The steel vessel consists of the following components, as illustrated on Sheets S101 and S102:

- An external ¾-inch steel wear plate;
- a ½-inch steel structural plate; and
- wide flange (W6x15) structural framing members.

1.3.2 Secondary Containment

Structural design of the secondary containment concrete structure was provided by SECOR of Tualatin, Oregon. The mixing tank secondary containment consists of an epoxy coated, reinforced concrete structure, as illustrated on sheet C204. The concrete mat foundation is 24 inches thick and reinforced with two sets of #6 rebar spaced at 6 inches on-center in both directions, located near the top and bottom of the mat. The 12-inch thick walls are reinforced with a set of #6 vertical rebar at 6 inches on-center and a set of #5 horizontal rebar at 12 inches on-center.

The concrete mixing tank floors include a system of longitudinal drain channels that slope toward a collection box, as illustrated on Sheets C207 and C211. Inspection of the collection box is provided with a 4-inch diameter steel pipe that allows access through the primary steel vessel.

1.4 Compatibility with Waste

The mixing tanks could potentially be exposed to any of the waste streams handled by the USEN facility. Reactive materials and materials with high pH or low pH values represent the greatest potential for incompatibility with the steel tanks. We understand that routine maintenance inspections will be performed to evaluate the condition of the ¾-inch wear plate, and that replacement wear plates will be installed as needed.

The epoxy coating on the concrete structure will inhibit the effects of hazardous materials that may come into contact with the secondary containment.

1.5 Corrosion

The mixing tanks have no external metal components in contact with the soil or water. All reinforcement steel within the concrete secondary containment structures was constructed with the specified 3 inches of cover.

2.0 CONSTRUCTION

2.1 Construction Sequence

Record Steel Construction Inc. (RSCI) of Meridian, Idaho performed construction of the new Stabilization Facility and the subject mixing tanks. Tank construction began with excavation of the subgrade materials. The subgrade materials at the site were prepared and inspected prior to placement of tank foundations, which were observed to consist of Poorly Graded Sand with Silt and Gravel (SP-SM). The subgrade materials were moisture conditioned and compacted to 95 percent of standard proctor (ASTM D 698), in accordance with the construction specifications. Steel reinforcement bars for the tank mat foundations and walls were erected and cast, as shown in the enclosed photos (Appendix B). Structural fill, consisting of the native SP-SM materials, was placed around the exterior of the concrete structure in controlled lifts, moisture conditioned, and compacted to 95% of standard proctor. Multiple epoxy coatings were applied to the interior surfaces of the concrete tanks.

The primary containment steel vessels were fabricated by Rule Steel in Middleton, Idaho. Each tank vessel was fabricated and transported to the site in two halves. The vessels were lowered into position at the site using a 30-ton crane and then joined together along a common seam weld. The integrity of the primary and secondary containment was tested, as described in the following section.

3.0 CONTAINMENT TESTS

3.1 Secondary Containment Test

The integrity of the secondary containment structures for mixing tank #1 and #2 were tested as described in this section. Each concrete structure was filled with 12 inches of water and inspected after a minimum of 24 hours to record any loss of liquid. The water was exposed to the atmosphere during the test and thus was subject to evaporation. An open-ended control barrel was located on the floor of the concrete tank and monitored to account for the effects of evaporation during the testing periods. The hydrostatic tests performed on the concrete secondary containment structures indicated no net loss of liquid during the test periods.

3.2 Primary Containment Test

The integrity of the steel primary containment vessels for mixing tank #1 and #2 were tested as described in this section. Each steel vessel was filled to capacity with water and monitored for leakage over a 24-hour period. No water was observed to leak into the secondary containment during the test periods.

4.0 CERTIFICATION

"I hereby certify under penalty of law that this document and attached test results were prepared and conducted under my direct supervision. The information submitted, to the best of my knowledge and belief is true, accurate, and complete. The signature and seal provided below is a declaration by the Professional Engineer that, in his professional judgment, the subject mixing tanks were designed, constructed and tested in a manner consistent with the referenced design document and applicable state and federal regulations."

American Geotechnics

Vaughn Thurgood

Vaughn Thurgood, PE

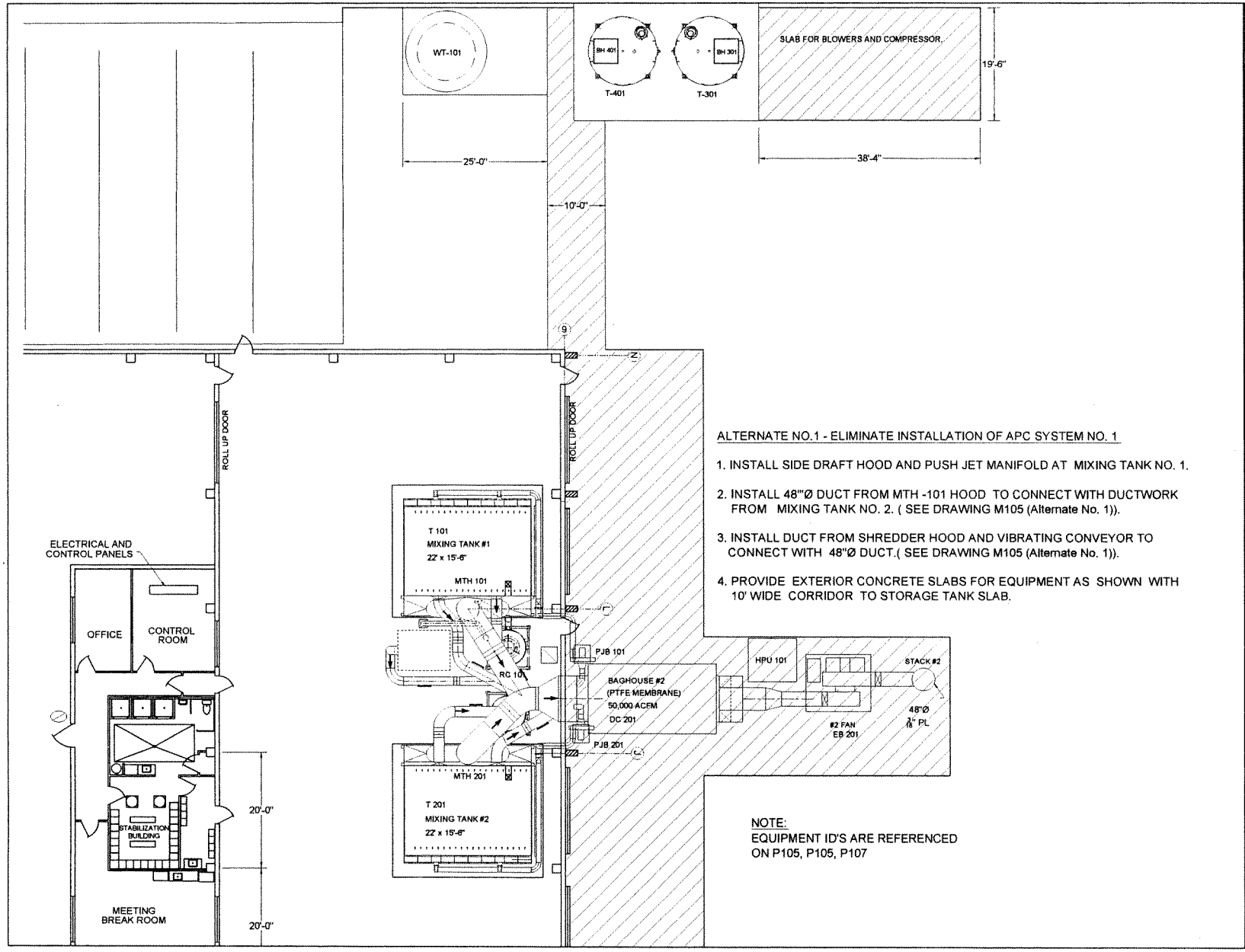
PROFESSIONAL ENGINEER - STATE OF NEVADA
VAUGHN J. THURGOOD
5/4/07
CIVIL
No. 18360

Exp 6-30-10

APPENDIX A

TANK CONSTRUCTION DRAWINGS

M101
S101
S102
C204
C207
C211



ALTERNATE NO.1 - ELIMINATE INSTALLATION OF APC SYSTEM NO. 1

1. INSTALL SIDE DRAFT HOOD AND PUSH JET MANIFOLD AT MIXING TANK NO. 1.
2. INSTALL 48"Ø DUCT FROM MTH -101 HOOD TO CONNECT WITH DUCTWORK FROM MIXING TANK NO. 2. (SEE DRAWING M105 (Alternate No. 1)).
3. INSTALL DUCT FROM SHREDDER HOOD AND VIBRATING CONVEYOR TO CONNECT WITH 48"Ø DUCT.(SEE DRAWING M105 (Alternate No. 1)).
4. PROVIDE EXTERIOR CONCRETE SLABS FOR EQUIPMENT AS SHOWN WITH 10' WIDE CORRIDOR TO STORAGE TANK SLAB.

NOTE:
EQUIPMENT ID'S ARE REFERENCED ON P105, P105, P107

N

0 16 32
APPROXIMATE SCALE (FEET)

REV	DATE	DESCRIPTION	DSN	CHK	AP
A	9/26/06	ISSUED FOR REVIEW	WBP	JPS	
B	9/29/06	ISSUED FOR REVIEW	WBP	JPS	
0		ISSUED FOR CONSTRUCTION			
1		ISSUED FOR CONSTRUCTION			

PREPARED BY:

SECOR
7730 SW MOHAWK STREET
TUALATIN, OREGON 97062
PHONE: (503) 691-2030 FAX 692-7074

FOR:

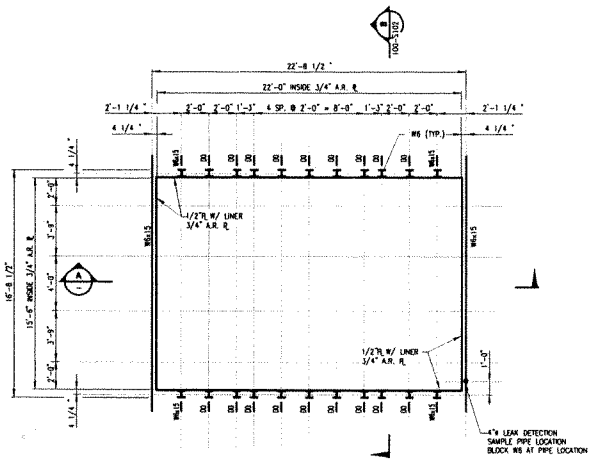
US ECOLOGY
BEATTY, NEVADA

TITLE:

PLAN VIEW - APC SYSTEMS
CONTAINER MANAGEMENT/
STABILIZATION BUILDING

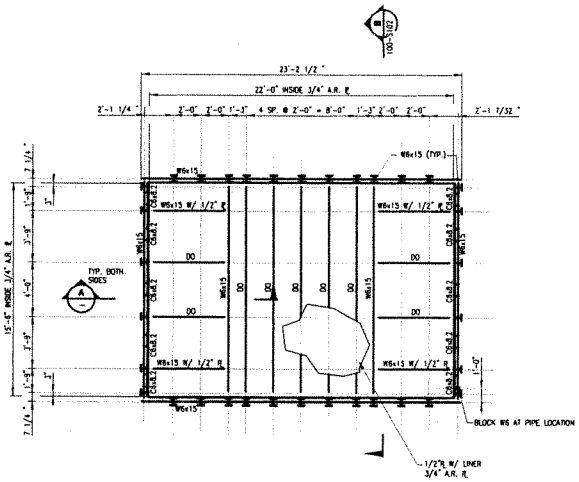
DRAWN BY: S. S., B.F., W.P.	DESIGNED BY: WI
CHECKED BY: JPS	APPROVED BY:
PROJECT NUMBER: 930T.05341.00.0007	SCALE: AS SHOWN
DATE: 09/26/2006	FILE PATH:

FIGURE:
M101(Alternate No. 1)



FRAMING PLAN @ TOP

SCALE: 1/4"=1'-0"



FRAMING PLAN @ BOTTOM

SCALE: 1/4"=1'-0"

STRUCTURAL STEEL GENERAL NOTES:

1.0 CODES AND STANDARDS

1.1 STRUCTURAL STEEL SHALL BE DESIGNED, FABRICATED, AND ERECTED IN ACCORDANCE WITH THE 9TH EDITION OF THE AISC SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS (ALLOWABLE STRESS DESIGN AND PLASTIC DESIGN), THE AISC CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES.

1.2 MATERIALS SHALL CONFORM TO ASTM STANDARD SPECIFICATIONS

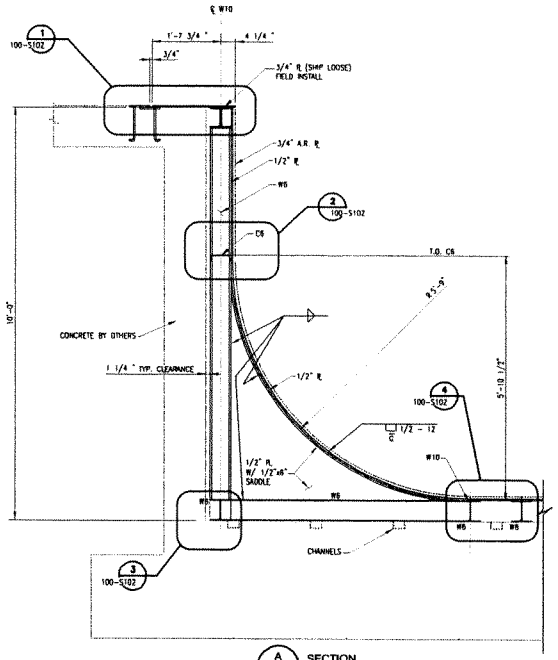
WIDE FLANGE AND STRUCTURAL TEE
SHAPES, BARS, AND PLATE ——— A992, 50kw
OTHER STRUCTURAL SHAPES ——— A36
HIGH STRENGTH BOLTS ——— A325 TYPE 1
HEAVY HEX NUTS ——— A563 GRADE DH
HARDENED STEEL WASHERS ——— F436
DTI WASHERS ——— F959
COMMON BOLTS ——— A307 GRADE B
STRUCTURAL TUBING ——— A 500 GRADE B
PIPE ——— A53 GRADE B
STEEL GRATING ——— A1011

1.3 STEEL WORK SHALL BE INSPECTED BY A SPECIAL INSPECTOR IN ACCORDANCE WITH CHAPTER 17 OF THE UNIFORM BUILDING CODE. INSPECTION SHALL INCLUDE STRUCTURAL WELDING, WELDING OF REINFORCEMENT, HIGH STRENGTH BOLTING, AND WORK PERFORMED BY NON-APPROVED FABRICATORS.

2.0 WELDED CONNECTIONS

2.1 WELDED FIELD CONNECTIONS SHALL BE USED ONLY WHERE SPECIFIED ON DESIGN DRAWINGS. ALL WELDING SHALL CONFORM TO AWS D1.1

2.2 WELDING ELECTRODES SHALL HAVE A 70 KSI MINIMUM TENSILE STRENGTH.



NOTE: TANK TO BE SHIPPED IN TWO SECTIONS. JOINT LOCATION TO BE DETERMINED BY THE FABRICATOR. FIELD WELD USING MINIMUM FILLET WELD PER THE PLATE THICKNESS.

A SECTION

3/4"=1'-0"

DWG NO.	DESCRIPTION
100-S102	MIXING TANKS FRAMING PLANS SECTIONS AND DETAILS SHEET 2 OF 2

REFERENCE DRAWINGS

NO.	DESCRIPTION	DATE	BY
2	CHANGED TITLE	8/14/08	BF
1	ADDED NOTE	7/19/08	BF
0	ISSUED FOR CONSTRUCTION	7/11/08	BF

REVISIONS

DISCIPLINE: STRUCTURAL STEEL
SCALE: AS NOTED
DESIGNED: D. BACON 3/18/08
DRAWN: B. FITZGERALD 3/18/08
CHECKED: D. BACON 7/11/08
APPROVED: D. BACON 7/11/08

CLIENT: US ECOLOGY HWY 95 12 MI SOUTH BEATTY, NEVADA

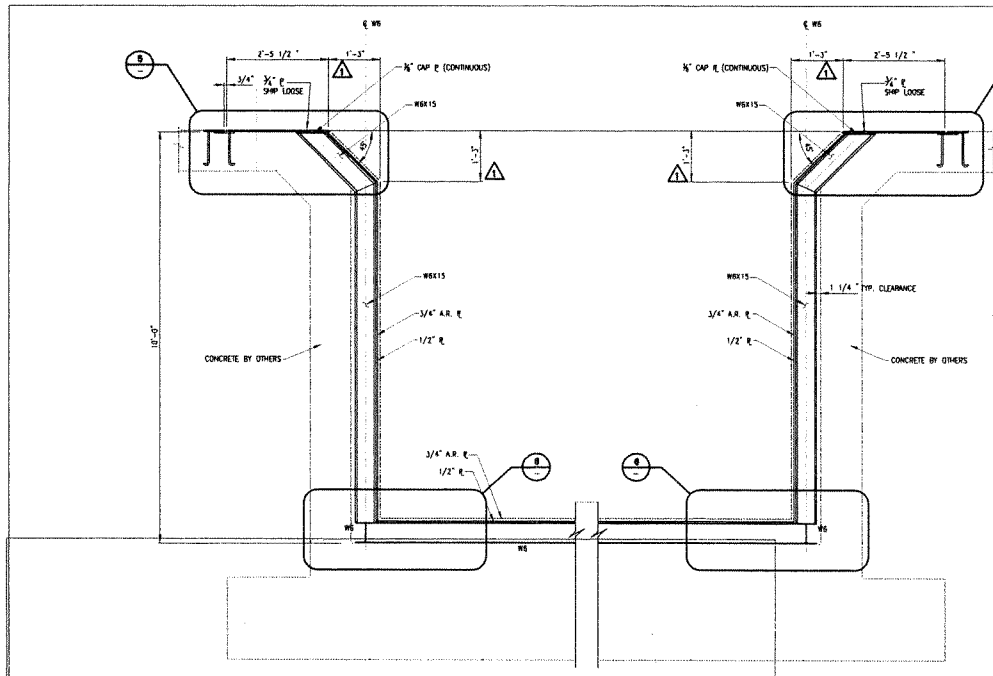
Samuel Engineering, Inc. The Process Solutions
8450 E. CRESCENT PARKWAY GREENWOOD VILLAGE, CO 80111
Phone: 303.714.6840 Fax: 303.714.4800

TITLE
CONTAINER MANAGEMENT/ STABILIZATION BUILDING
MIXING TANKS
FRAMING PLANS SECTIONS AND DETAILS
SHEET 1 OF 2

PROJECT NO. 6010-01

DRAWING NUMBER S101

REV. 2



B SECTION
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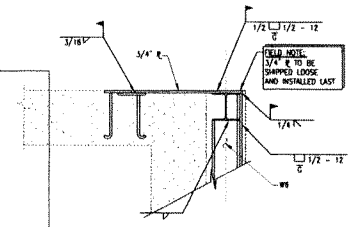

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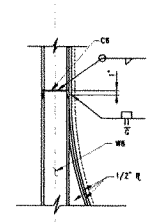

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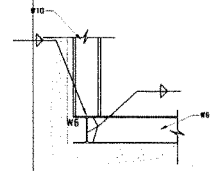

3 DETAIL
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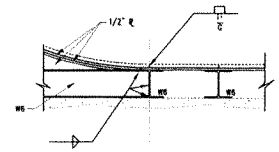
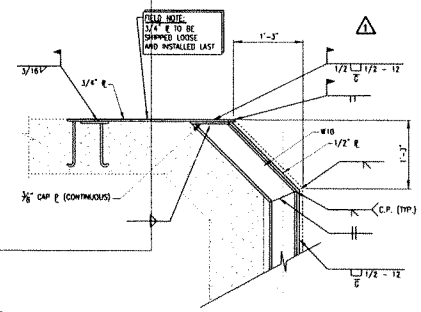
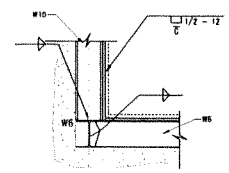


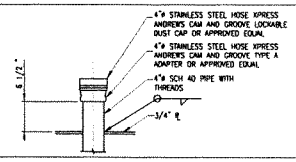
4 DETAIL
100-S101 1"=1'-0"



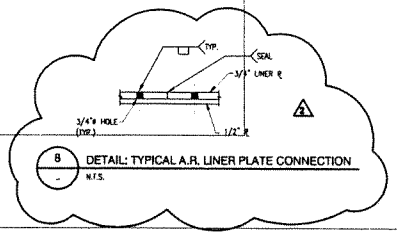
5 DETAIL
100-S101 1"=1'-0"



6 DETAIL
1"=1'-0"



7 TOP OF LEAK DETECTION PIPE
1"=1'-0"



8 DETAIL: TYPICAL A.R. LINER PLATE CONNECTION
N.T.S.

WELDING NOTE:
ALL WELDS FOR 1/2" ℄ AND 3/4" A.R. ℄ TO BE CONTINUOUS OR SEAL WELDED BETWEEN STITCHING

NOTES

1. WORK THIS DRAWING WITH DWG 100-S101

DWG NO.	DESCRIPTION
100-S101	MIXING TANKS FRAMING PLANS SECTIONS AND DETAILS SHEET 1 OF 2

REFERENCE DRAWINGS

NO.	DESCRIPTION	DATE	BY
2	ADDED NOTE CHANGED TITLE AND DETAIL	8/14/06	BF
1	REVISED DIMENSION	7/19/06	BF
0	ISSUED FOR CONSTRUCTION	7/11/06	BF

REVISIONS

DEPARTMENT:	STRUCTURAL STEEL
SCALE:	AS NOTED
DESIGNED:	D. BACON
DRAWN:	B. FITZGERALD
CHECKED:	D. BACON
APPROVED:	D. BACON

CLIENT: US ECOLOGY
HWY 95 12 MI SOUTH
BEATTY, NEVADA

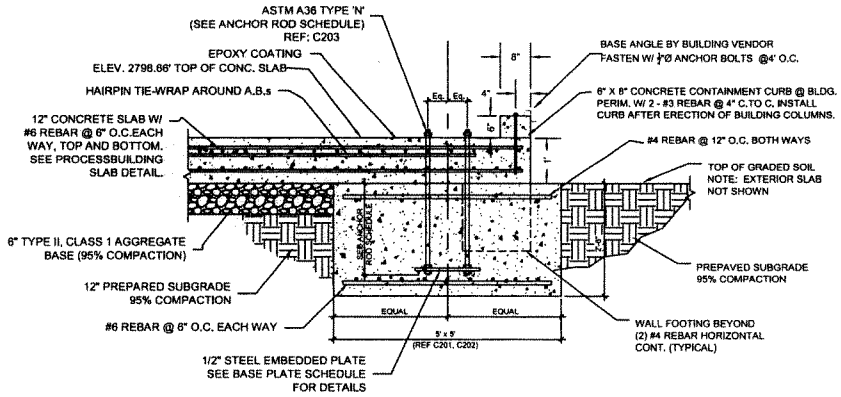
Samuel Engineering, Inc.
We Provide Solutions
8400 E. CRESCENT PARKWAY
GREENWOOD VILLAGE, CO 80111
Phone: 303.714.4640
Fax: 303.714.4800

TITLE
CONTAINER MANAGEMENT/ STABILIZATION BUILDING
MIXING TANKS
FRAMING PLANS SECTIONS AND DETAILS
SHEET 2

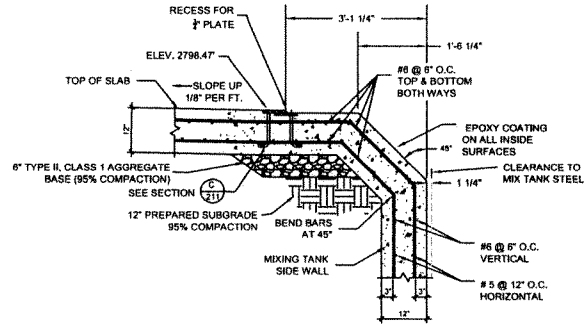
PROJECT NO. 6010-01

DRAWING NUMBER S102

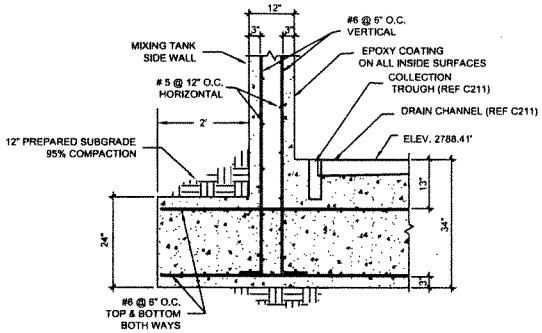
REV. 2



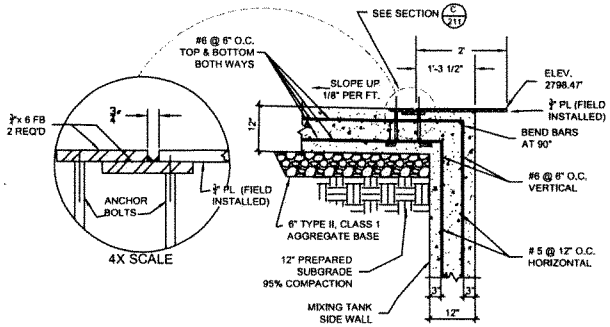
A / C204 TYPICAL COLUMN FOOTING
N.T.S.



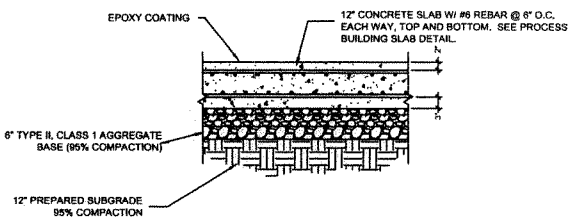
1 / C204 MIXING TANK TOP CORNER
REINFORCING STEEL DETAIL
N.T.S.



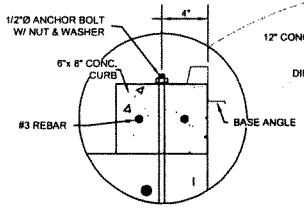
2 / C204 MIXING TANK BOTTOM DETAIL
N.T.S.

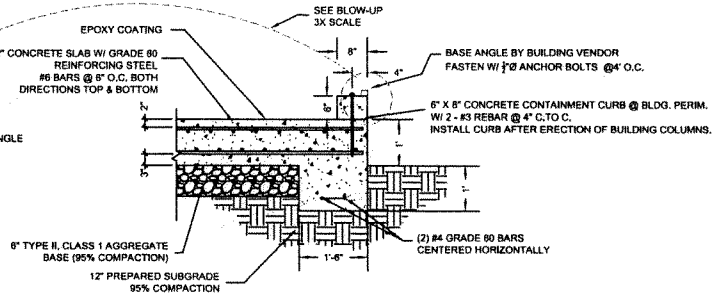


3 / C204 MIXING TANK TOP CORNER
REINFORCING STEEL DETAIL
N.T.S.



4 / C204 PROCESS BUILDING SLAB DETAIL
N.T.S.





5 / C204 TYPICAL PERIMETER FOOTING
N.T.S.

NOTES:
1. All reinforcing steel on this project will be grade 60.
2. All concrete on the project will have a 28-day compressive strength of 4,000 psi.
3. Compact subgrade to 95% of ASTM D698

SCALE : 3/4" = 1' ON 24x36 D SIZE
SCALE : 3/8" = 1' ON 11x17 B SIZE

REV	DATE	DESCRIPTION	DSN	CHK	APP
A	07/21/06	ISSUED FOR REVIEW	WBP	JPS	
B	8/16/06	ISSUED FOR REVIEW	WBP	JPS	
0	9/11/06	ISSUED FOR BID	WBP	JPS	
1		ISSUED FOR CONSTRUCTION			

PREPARED BY:

SECOR
7730 SW MOHAWK STREET
TUALATIN, OREGON 97062
PHONE: (503) 691-2030 FAX: 692-7074

FOR:

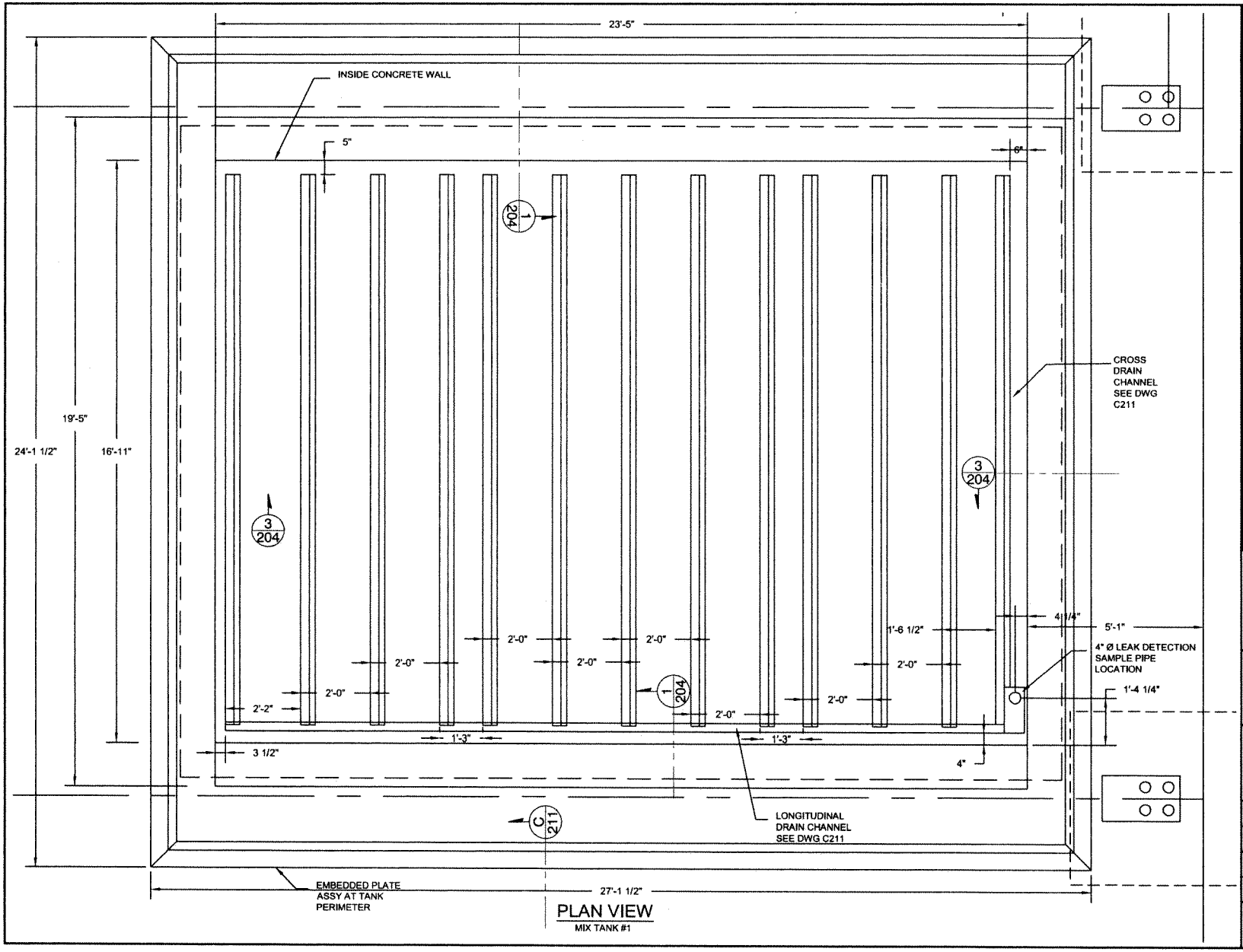
US ECOLOGY
BEATTY, NEVADA

TITLE:

SLAB, COLUMN FOOTING AND
MIXING TANK DETAILS
CONTAINER MANAGEMENT/
STABILIZATION BUILDING

DRAWN BY: S. S., B.F., W.P., KAM	DESIGNED BY: WP
CHECKED BY: JPS	APPROVED BY:
PROJECT NUMBER: 930T.05341.00.0007	SCALE: AS SHOWN
DATE: 09/11/2006	FILE PATH:

FIGURE: C204



PLAN VIEW
MIX TANK #1

1.) DRAIN CHANNELS TO BE WELDED TOGETHER IN THE FIELD (AND ATTACHED TO REBAR) TO FORM LEVEL AND TRUE SCREED SURFACE FOR CEMENT FINISHING.

2.) PRIOR TO PLACING CONCRETE FILL CHANNELS WITH FOAM OR OTHER TEMPORARY MATERIAL TO PREVENT FILLING CHANNELS WITH CONCRETE.

SCALE : 3/4" = 1' ON 24X36 D SIZE
SCALE : 3/8" = 1' ON 11X17 B SIZE.

REV	DATE	DESCRIPTION	DSN	CHK	APP
A	07/21/06	ISSUED FOR REVIEW	WBP	JPS	
B	8/16/06	ISSUED FOR REVIEW	WBP	JPS	
0	9/11/06	ISSUED FOR BID	WBP	JPS	
1		ISSUED FOR CONSTRUCTION			

PREPARED BY:

SECOR
7730 SW MOHAWK STREET
TUALATIN, OREGON
PHONE: (503) 691-2030/692-7074 (FAX)

FOR:

US ECOLOGY
BEATTY, NEVADA

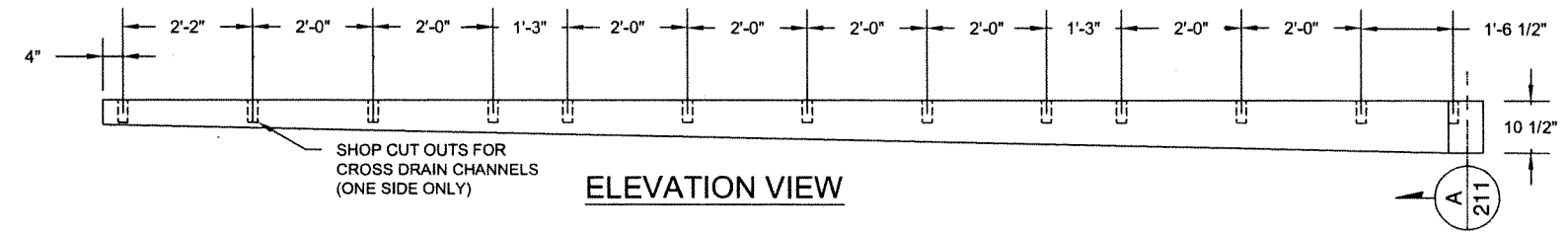
TITLE:

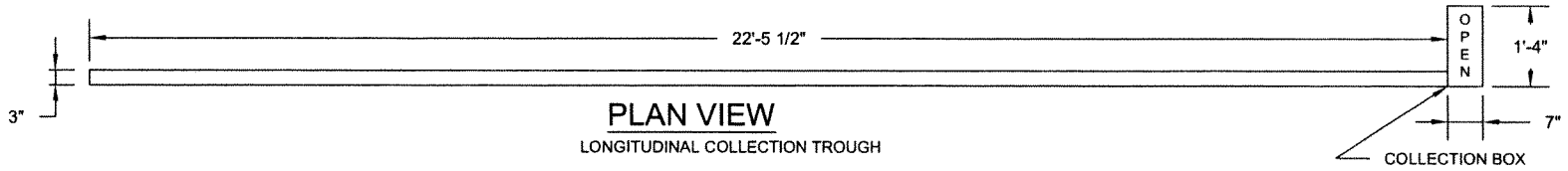
MIXING TANK SLAB
STABILIZATION/CONTAINER
MANAGEMENT BUILDING

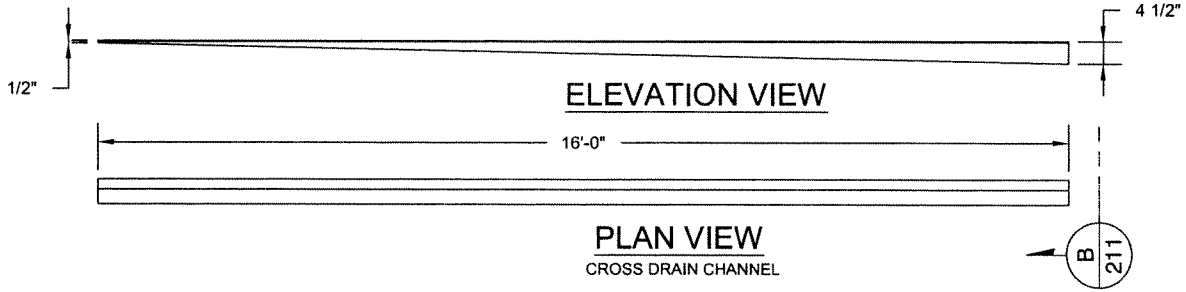
DRAWN BY: S. S., B.F., W.P., KAM	DESIGNED BY: WP
CHECKED BY: JPS	APPROVED BY:
PROJECT NUMBER: 930T.05341.00.0007	SCALE: AS SHOWN
DATE: 09/11/2006	FILE PATH:

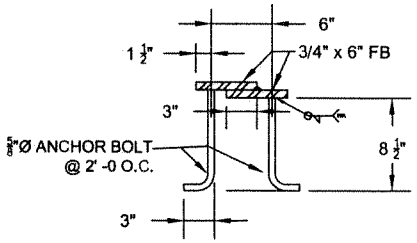
FIGURE:

C207

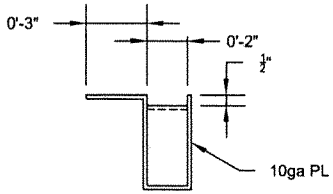




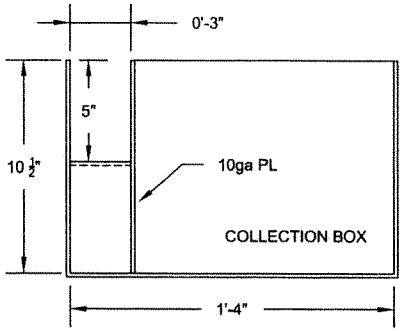




SECTION C 207 EMBEDDED PLATE ASSEMBLY
2X SCALE



SECTION B 211 DRAIN CHANNEL
4X SCALE



SECTION A 211 DRAIN CHANNEL
4X SCALE

SCALE : 3/16" = 1' ON 24X36 D SIZE
SCALE: 3/32" = 1' ON 11X17 B SIZE.

REV	DATE	DESCRIPTION	DSN	CHK	APP
A	07/21/06	ISSUED FOR REVIEW	WBP	JPS	
B	8/16/06	ISSUED FOR REVIEW	WBP	JPS	
0	9/11/06	ISSUED FOR BID	WBP	JPS	
1		ISSUED FOR CONSTRUCTION			

PREPARED BY:

SECOR
7730 SW MOHAWK STREET
TUALATIN, OREGON
PHONE: (503) 691-2030/692-7074 (FAX)

FOR:
US ECOLOGY
BEATTY, NEVADA

TITLE:
MIXING TANK SLAB
DRAIN CHANNELS
MANAGEMENT BUILDING

DRAWN BY: S. S., B.F., W.P., KAM	DESIGNED BY: WP
CHECKED BY: JPS	APPROVED BY:
PROJECT NUMBER: 930T.05341.00.0007	SCALE: AS SHOWN
DATE: 09/11/2006	FILE PATH:

FIGURE:
C211

APPENDIX B

TANK CONSTRUCTION PHOTOS

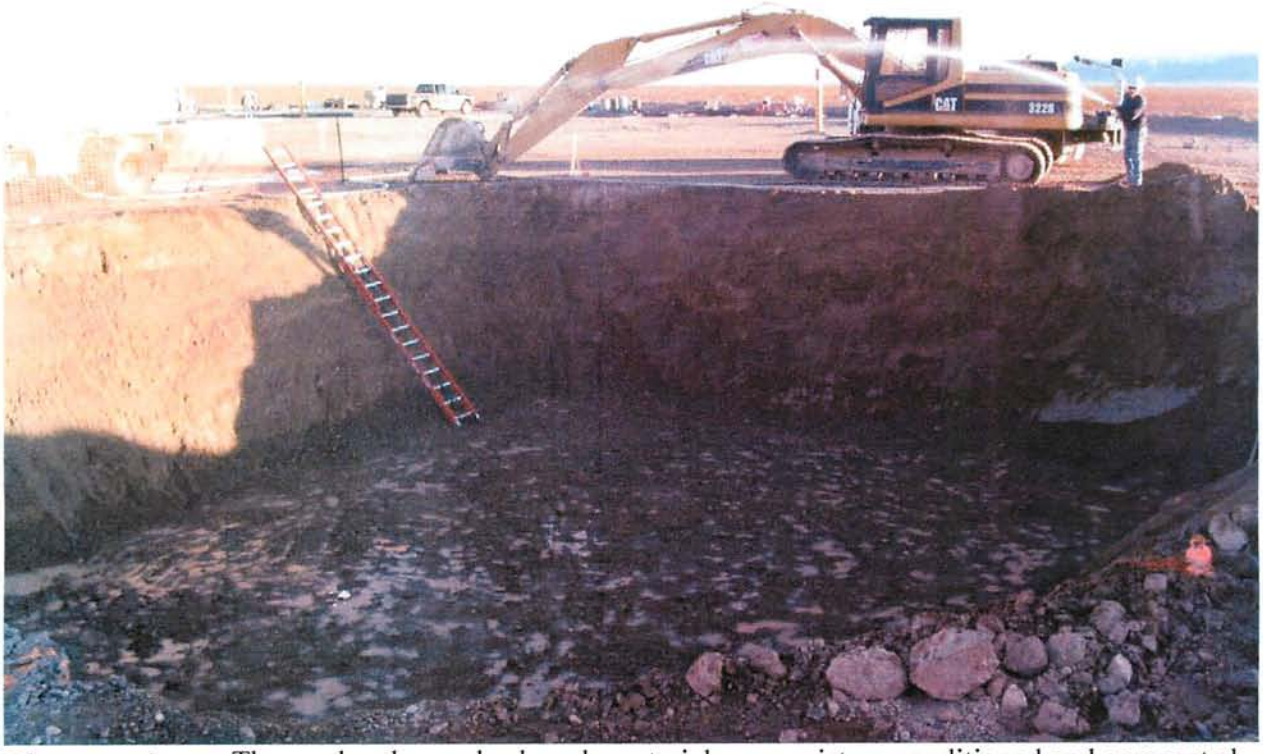


Photo – 1 The sand and gravel subgrade materials are moisture conditioned and compacted following excavation.

Photo – 2 Survey control for the foundation of mixing tank #1 is established while excavation continues for mixing tank #2.

Photo – 3 View of the #6 rebar installation prior to pouring the tank mat foundations.

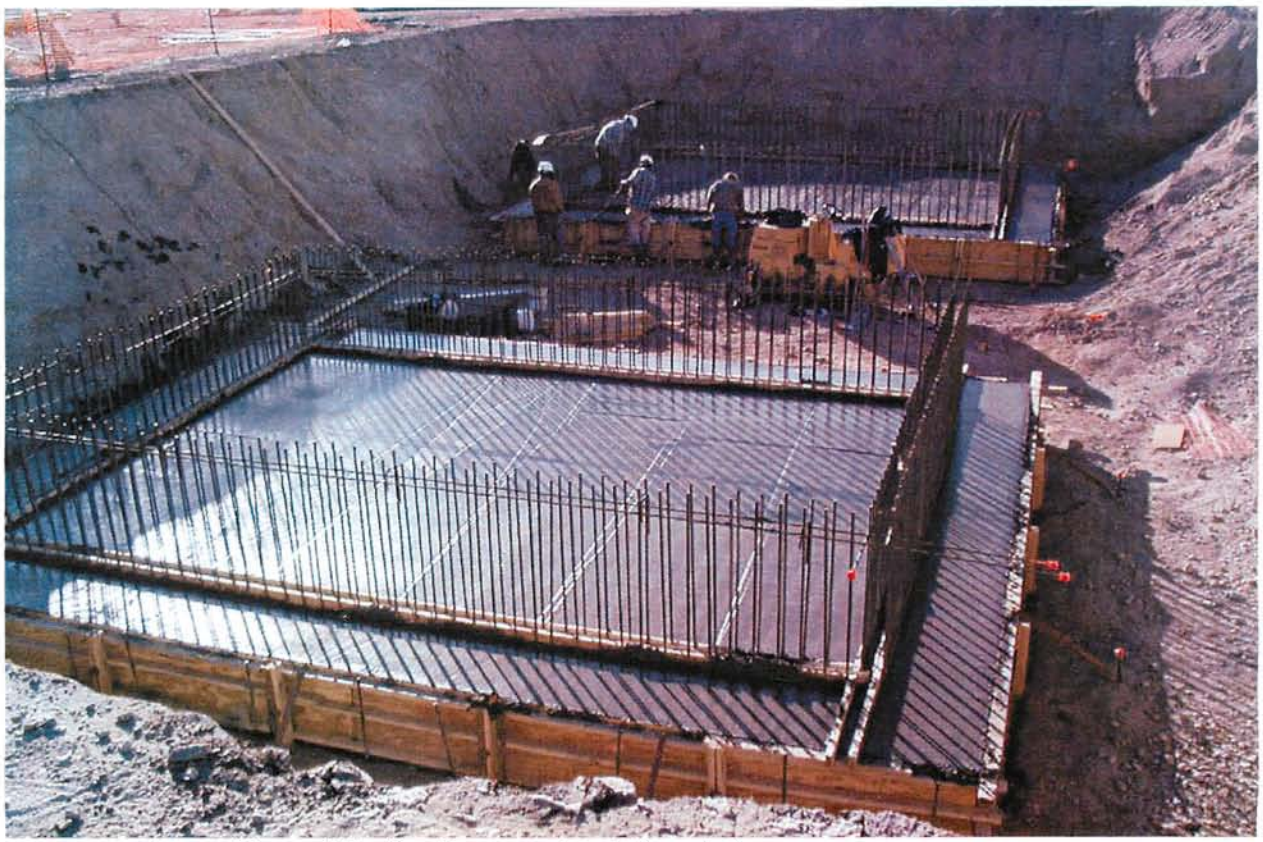


Photo – 4 View of the freshly poured tank foundations.

Photo – 5 View of a water stop installed along the construction joint located between the walls and the foundation of the tanks.

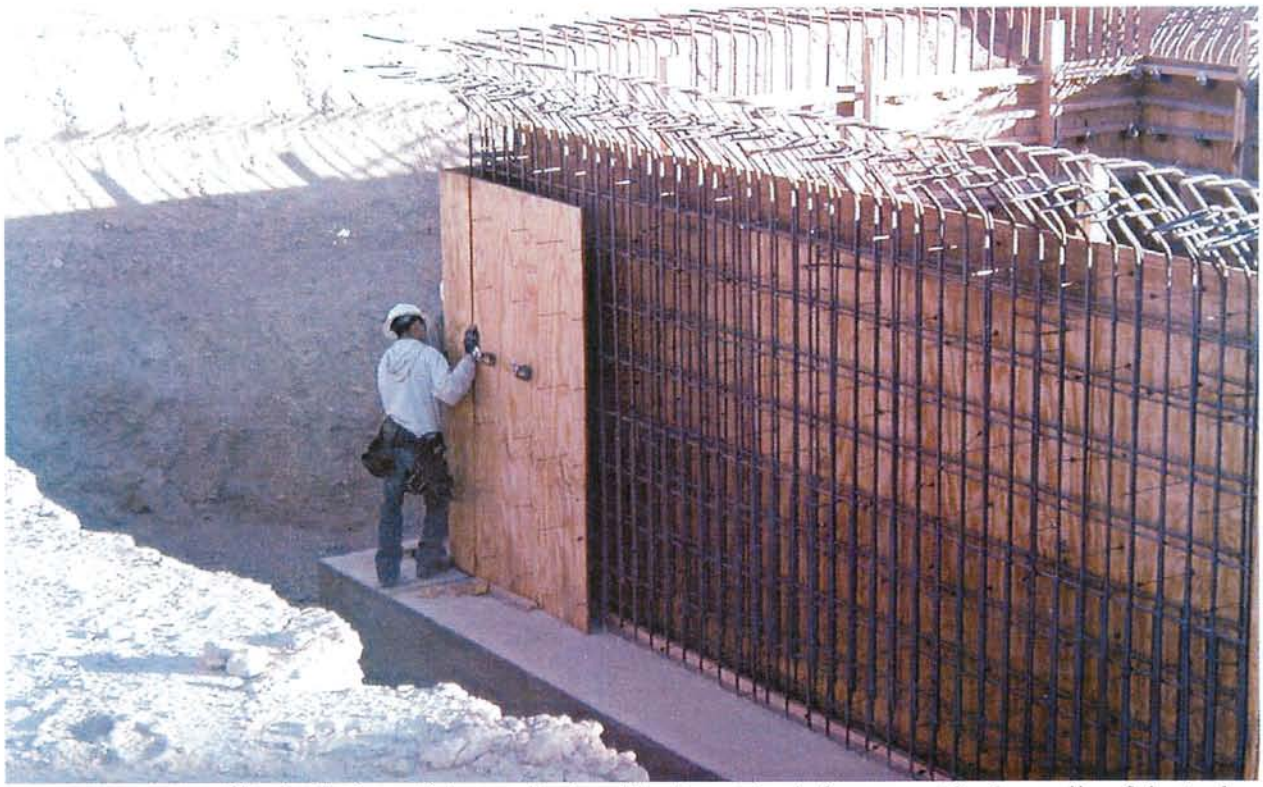


Photo – 6 Typical view of the vertical and horizontal reinforcement in the walls of the tanks.

Photo – 7 View of the completed formwork and concrete placement.

Photo – 8 Structural fill is place around the exterior perimeter of the concrete tanks in uniform lifts and compacted.

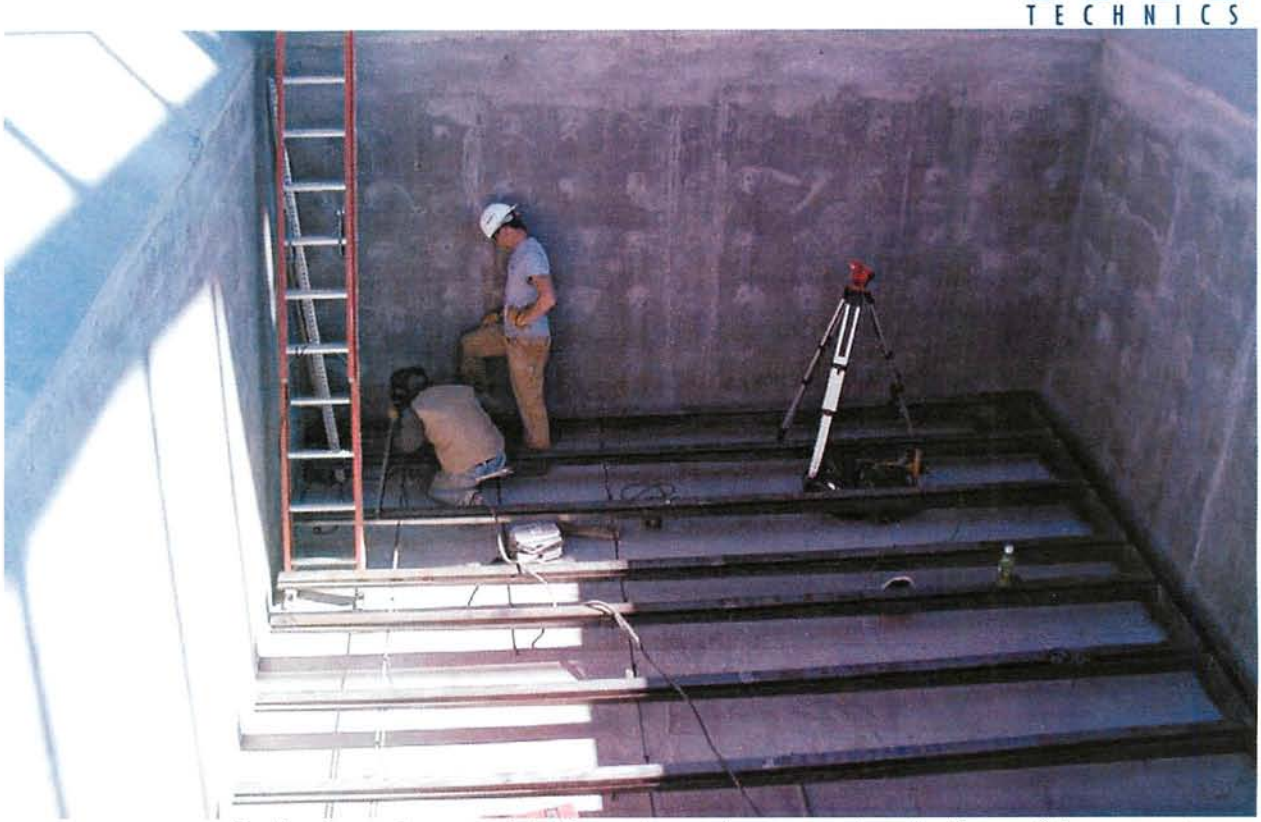


Photo – 9 Drain channels are welded into place prior to pouring the floor of the concrete tank.

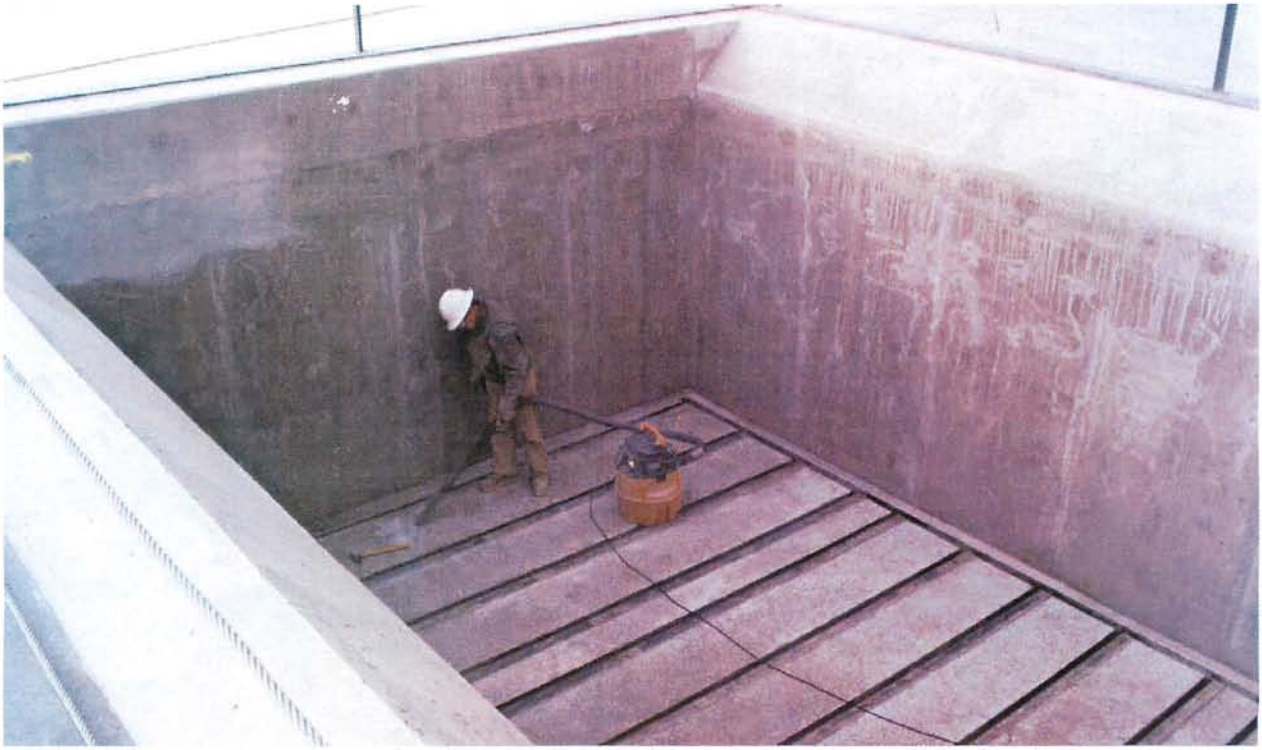


Photo – 10 Concrete surfaces were sand blasted and cleaned in preparation for the epoxy coating.

Photo – 11 Primer coat of epoxy is applied to the prepared concrete floor and walls.

Photo – 12 Hydrostatic test is performed on the secondary containment; the control barrel is visible near the base of the ladder.

Photo – 13 The steel vessels were constructed off-site in two halves and then transported to the site and lowered into position.

Photo – 14 View of the steel vessel after placement of both halves into the mixing tank.

Photo – 15 View of the 4-inch diameter access port that allows inspection of the secondary containment. Note the perimeter plates are not yet installed.

Photo – 16 The two halves of the steel vessel are joined along a common seam with multiple passes of welding rod.

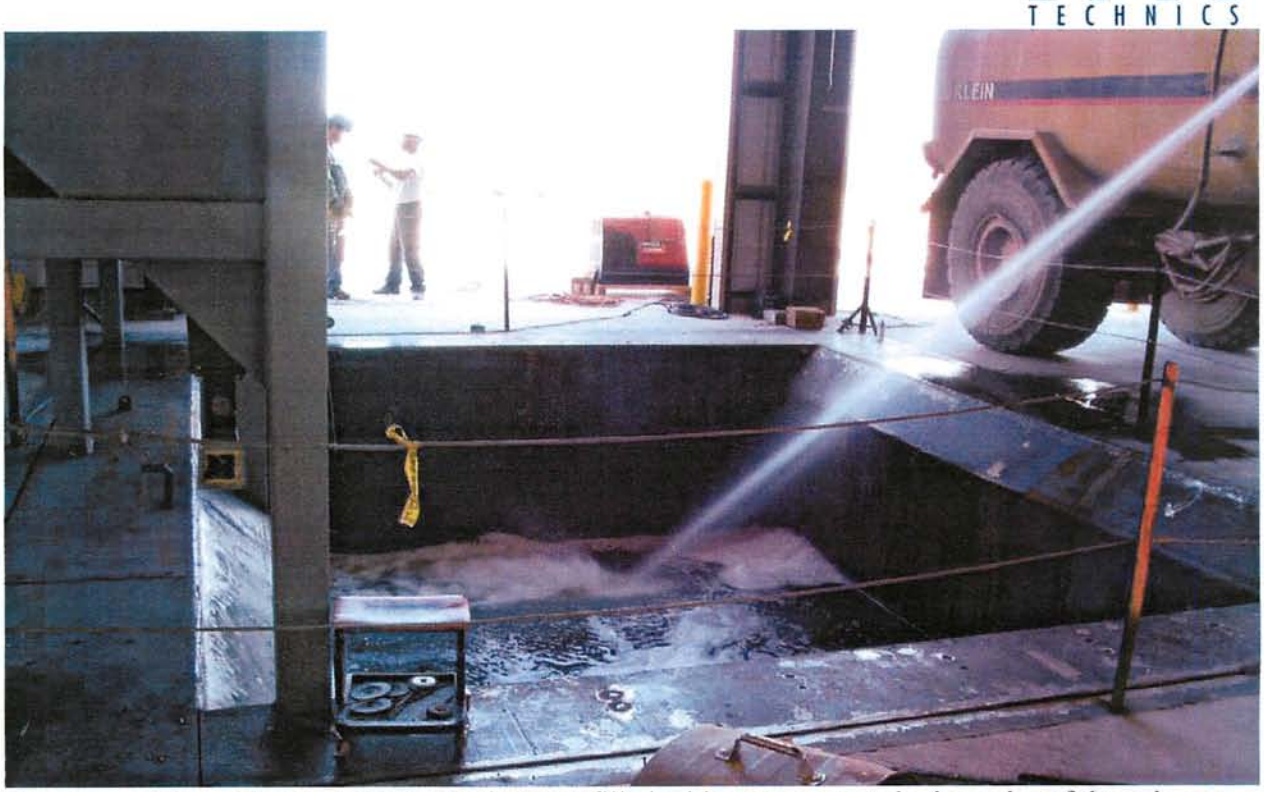


Photo – 17 The steel mixing tanks were filled with water to test the integrity of the primary containment.

Photo – 18 No leakage was observed into the secondary containment during the test period. A push jet manifold is visible on the far edge of the mixing tank.

APPENDIX C

HYDROSTATIC TEST REPORTS

US Ecology
P.O. Box 578
Beatty, Nevada 89003

800/239-3943
775/553-2203
Fax: 775/553-2742
www.americanecology.com

USEcology
an American Ecology company

March 23, 2007

Mr. Vaughn Thurgood, P.E.
American Geotechnics
5260 Chinden Blvd.
Boise, ID 83714

RE: US Ecology Nevada, Inc. - **Stabilization Building Treatment Tank Containment Leak Testing**

Mr. Thurgood;

This letter presents the results of the hydrostatic leak tests performed on the Stabilization Treatment Pan Secondary Containment Vaults located within the new Stabilization Building. The following test procedure was followed, as directed in your previous communications.

- The containment structures were cleaned and dried and allowed to stand for 24 hours.
- A second application of epoxy was installed and a 24 hour cure time was allowed.
- About 12 inches of water was placed in each of the containment structures.
- A thirteen inch tall drum (control drum) of known integrity was placed on the floor of the containment and filled to a level slightly above that of the water in the containment.
- Upon initialization of each test the water depth measurements were recorded from specific locations in the containment and control drum (See tables).
- Water levels were also measured after a 24 hour period or, in the case of the North Pan on March 21, when weather conditions permitted.

Date/Time	North Pan	Control Drum
3/19/07 16:30	12.0"	11 3/16"
3/20/07 16:30	-- *	11"
3/21/07 07:30	11 11/16"	10 7/8"
Delta @ 36 hours	5/16"	5/16"

Date/Time	South Pan	Control Drum
3/22/07 16:30	11 3/4"	11 5/8"
3/23/07 16:30	11 5/8"	11 1/2"
Delta @ 24 hours	1/8"	1/8"

* Windy conditions inhibited accurate measurement.

Should you have questions regarding this information, please contact either myself (extension 104) or Mr. Mark John (extension 103) at 800-239-3943.

Sincerely,

R L Marchand

Robert Marchand
General Manager

Enclosure
cc: Mr. Mark John, Operations Manager - US Ecology Nevada

07-008

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US Ecology
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Beatty, Nevada 89003

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USEcology
an American Ecology company

May 4, 2007

Mr. Vaughn Thurgood, P.E.
American Geotechnics
5260 Chinden Blvd.
Boise, ID 83714

RE: **Stabilization Building Treatment Tank**
Steel Vessel Primary Containment Leak Testing
US Ecology Nevada, Inc.

Mr. Thurgood;

This letter presents the results of the hydrostatic leak tests performed on the primary containment steel vessels associated with the treatment tanks located within the new Stabilization Building. The following test procedure was followed, as directed in your previous communications.

- Each treatment tank was filled to capacity with clean water.
- While the steel tanks were being filled with water, we noted that water spilled on the building floor was running into the void space between the top of the primary tank liner and the secondary containment. This gap will be closed when the epoxy coatings are applied to the building floor, fully isolating the building floor surface and the primary tank liner from the secondary containment. Upon initialization of each test, the depth of water within the secondary containment sump was observed and recorded.
- Water levels in each secondary containment sump were measured after a 24 hour period as follows.

Date/Time	North Pan Secondary Containment
4/30/07 14:00	5 1/8 "
5/1/07 14:00	5 1/8 "
Delta @ 24 hours	0"

Date/Time	South Pan Secondary Containment
5/3/07 08:00	2 7/8"
5/4/07 08:00	2 7/8"
Delta @ 24 hours	0"

Should you have questions regarding this information, please contact either myself (extension 104) or Mr. Mark John (extension 103) at 800-239-3943.

Sincerely,

R L Marchand

Robert Marchand
General Manager

Enclosure
cc: Mr. Mark John, Operations Manager - US Ecology Nevada

07-008

Recycled Paper

LANDFILL REPORT

US ECOLOGY NEVADA

OCTOBER 2009

Revised October 2011

SECTION 11

LANDFILL REPORT

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SECTION 11

LANDFILL REPORT

11.1.0 Introduction

This report by US Ecology Nevada (USEN) complies with the requirements of 40 CFR Part 264, Subpart N (§§264.300 - 264.316) and 40 CFR §270.21, as adopted by the Nevada Division of Environmental Protection (NvDEP). The report describes the design features employed in the construction and operation of Trenches 11 and 12.

11.2.0 List of Hazardous Wastes

USEN accepts a wide variety of hazardous and non-hazardous wastes for disposal in its secure landfill trenches. The Part A Application identifies the U.S. Environmental Protection Agency (EPA) hazardous waste codes acceptable for disposal on-site.

Hazardous wastes[1] accepted for disposal on-site meet the applicable treatment standards of 40 CFR Part 268 Land Disposal Restrictions (LDR); or are amenable for treatment at the facility to achieve the required standards prior to disposal. The Waste Analysis Plan[2] describes the waste characterization procedures employed to ensure that waste streams accepted for landfill disposal comply with the requirements of 40 CFR Part 268.

11.3.0 Landfill Operating Procedures

11.3.1 Landfill Description

Both Trench 11 and Trench 12 are in active use at the USEN Facility. Landfill final covers are described in References 15.

Trench 11 has an approximate ground-surface footprint of 11.3 acres, and is located on the northeast side of the plant. It is about 26 feet from the north and south property boundaries and at least 10 feet west of closed Trench 10 and closed pre-Resource Conservation and Recovery Act hazardous waste disposal Trenches. Trench 11 was constructed to a maximum depth of ~75' below the original ground surface (bgs). The Trench 11 below-grade specification details were previously submitted in the Part B Application dated January 1993 (Reference 1). Placement of waste in the above-grade portion of Trench 11 began in 2000.

The above-grade portion of the Trench 11 has been developed in three (3) sequential phases, as indicated in the design plans included in the previously submitted document *Trench 11 Above-Grade*

---

1 Here-in-after "waste" or "wastes."

2 All analytical references or treatment methods referenced in this section are for informational purposes. Specific analytical references are found in the USEN Waste Analysis Plan. Specific treatment processes are described in the section where the treatment occurs (e.g.; Tank Report for Stabilization, Container Management Report for container management).

Disposal Facility Design and Construction Quality Assurance Plan, revised May 6, 1999 (Reference 2). Placement of waste in Trench 11 is nearly complete.

Trench 12 is designed with an approximate ground-surface footprint of about 8.4 acres, and is located about 150 feet north of the closed low-level radioactive waste disposal cells, about 20 feet from the north and west property boundaries, and about 50 feet west from Trench 11. The maximum depth of Trench 12 will be ~75 feet bgs. The above-grade portions of Trenches 11 and 12 will be joined across the narrow unexcavated ridge of natural ground that separates the subsurface portions of the trenches. The final covers of the two Trenches also will be joined together. Details for Trench 12 were previously submitted in various reports, including:

- *Trench 12 Design Report*, Volumes I and II, TRC Environmental, 03/96 (Reference 3), and
- *Response to Notice of Deficiency for the Trench 12 Design Report*, HMA Environmental, 12/96 (Reference 4).
- *Supplement – Landfill Report for Trench 12, October 2007 (Reference 14)*
- *Design Basis and Construction Specifications for Trenches 11 and 12 Final Covers, April 2008 (Reference 15)*

Joining the above-grade portions of Trench 11 and 12 will make efficient use of land area available for waste disposal, improve the performance of engineered environmental protection measures (i.e.; subsurface liners, final covers, and leachate and surface-water management features), and allow efficient waste disposal operations as those operations move from the Trench 11 area into Trench 12. USEN also will be able to progressively close the filled portions of the two trenches as the above-grade areas are filled. Closure procedures are described in detail in the Closure Plan.

11.3.2 Management of Containerized Waste

Waste containers intended for disposal are inspected to ensure they are > 90% full or crushed, shredded, or similarly reduced in volume to the maximum practical extent before burial in the landfill. Typically, empty containers are placed in the landfill and crushed by landfill equipment (e.g.; dozer, compactor). Also, poly containers may be physically cut or crushed and buried to reduce their volumes.

11.3.3 Procedures to Prevent Disposal of Bulk or Containerized Liquids

Incoming waste shipments are subject to inspection and verification sampling and analysis to ensure the absence of free liquids. The presence of free liquids in a waste shipment is evaluated by visual inspection for free standing liquids or by using the Paint Filter Liquids Test (PFLT), as described in the WAP. Free liquids present in containerized shipments may be absorbed with a non-biodegradable absorbent (e.g.;

cement kiln dust, clay). Absence of free liquids will be confirmed prior to disposal using visual inspections or the PFLT.

Absorbed bulk liquid hazardous waste is not accepted for direct disposal. Solidified liquid waste may be accepted if the generator provides data demonstrating the liquid portion of the waste was chemically transformed into a solid.

Bulk or containerized shipments arriving at the facility containing free-standing liquids may be stabilized using appropriate stabilization reagents as described in the WAP.

11.3.4 Exceptions to Containerized Liquid Disposal Prohibition

Provisions are made in the regulations (40 CFR §§264.314) to allow for the disposal of containerized liquids on specific situations. These situations are:

- The container is a lab pack;
- The container is very small, such as an ampule; or
- The container is a non-storage type container, designed to hold free liquids (e.g., capacitors, batteries).

11.3.4.1 Lab Packs

Lab packs may be accepted for disposal at USEN after evaluation of the lab pack inventory to ensure it complies with these guidelines as established in 40 CFR §264.316:

(a) Hazardous waste must be packaged in non-leaking inside containers. The inside containers must be of a design and constructed of material that will not react dangerously with, be decomposed by, or be ignited by the contained waste. Inside containers must be tightly and securely sealed. The inside containers must be of the size and type specified in the DOT hazardous materials regulations (49 CFR Parts 173, 178, & 179), if those regulations specify a particular inside container for the waste;

(b) The inside containers must be overpacked in an open head DOT-specification metal shipping container (49 CFR Parts 178 & 179) of no more than 416-liter (110 gallon) capacity and surrounded by, at a minimum, a sufficient quantity of sorbent material, determined to be nonbioderadable in accordance with 40 CFR §264.314(e), to completely sorb all of the liquid contents of the inside containers. The metal outer container must be full after it has been packed with inside containers and sorbent material;

(c) The sorbent material used must not be capable of reacting dangerously with, being decomposed by, or being ignited by the contents of the inside containers, in accordance with 40 CFR §264.17(b);

(d) Incompatible wastes, as defined in 40 CFR §260.10, must not be placed in the same outer container;

(e) Reactive wastes, other than cyanide- or sulfide-bearing waste as defined in 40 CFR §261.23(a)(5), must be treated or rendered non-reactive prior to packaging in accordance with paragraphs (a) through (d) of this section. Cyanide- and sulfide-bearing reactive waste may be packed in accordance with paragraphs (a) through (d) of this section without first being treated or rendered non-reactive; and

(f) Such disposal is in compliance with the requirements of 40 CFR Part 268.

11.3.4.2 Small Containers

USEN considers small ampules to be similar to lab waste, and requires that they be packaged in the same manner. If all the ampules contain the same waste (e.g., quality control samples) and all other guidelines are observed, a drum inventory sheet is not required.

11.3.4.3 Non-Storage Containers

Non-storage containers (e.g.; capacitors, batteries) may be accepted for disposal without meeting the over-pack criteria established for lab waste, provided that the containers are in good condition.

11.3.5 Special Requirements for Ignitable or Reactive Wastes

Ignitable or reactive wastes will not be placed in the landfill, unless the waste has been processed to remove the ignitability or reactivity characteristic (in accordance with 40 CFR §261.23), and the wastes meet all applicable requirements and treatment standards under 40 CFR Part 268. In accordance to 40 CFR §264.313 incompatible wastes and materials must not be placed in the same landfill cell unless 40 CFR §264.17(b) is complied with. When ignitable or reactive waste treatment is required, USEN takes precautions such as small batch treatment to prevent violent reactions and/or generation of extreme heat, toxic mists, fumes or gases.

11.3.6 Special Requirements for RCRA Debris

RCRA debris typically is treated by an alternate treatment method of encapsulation. Microencapsulation typically occurs in other permitted units (e.g.; tank systems), but it is often preferable to perform macroencapsulation in the landfill to maintain the integrity of the outer barrier. When performed in the landfill, the debris is staged on an acceptable outer encapsulant (e.g.; polyethylene, HDPE) and wrapped or the debris, especially large debris, may be staged and encapsulated in place (e.g.; liquid clay, pozzolonic materials) to reduce contaminant leachability.

11.3.7 Special Requirements for Management of F020, F021, F022, F023, F026, F027 Wastes

Regulated dioxin-containing wastes may be disposed of on-site when the LDR treatment standards are met. Compliance with LDR requirements ensures that disposal of such waste will be protective of human health and the environment. In addition, USEN provides geologic and climatic conditions that are exceptional for the safe disposal of these and other waste streams. The extremely low rainfall, high evaporation rates, facility location in a desert area (isolated from population sources), waste

characterization and handling procedures, and facility design and operation minimize the potential for migration of these wastes through the soil, or volatilization into the atmosphere.

11.3.8 Special Requirements for Interim Processing Loads

Interim processing loads are loads of treated waste awaiting results from post-treatment testing. These loads may be staged within the lined area of Trench 12, provided that the treated waste is not placed on or adjacent to final cover. Up to 10 batches of waste may be placed at any one time. Treated waste awaiting test results are contained and controlled in the following manner:

- Wastes shall be placed in segregated piles, physically separated and distinguishable from other waste placed into the landfill.
- Wastes shall be placed in bulk in individual piles above an impermeable membrane. The impermeable membrane shall be at least 6 mil PVC, PPE or High Density Polyethylene and shall be placed within a lined area of the Trench.
- No free liquids shall be present as determined through visual inspection or a paint filter test,
- Wastes shall be protected from wind erosion and dispersal by topping with an anchored impermeable membrane or covering with a spray-on asphaltic emulsion. The spray-on emulsion may be applied at the end of the working day. Other covers providing equal protection may also be used.
- Interim processing loads will be moved within ten days of placement, either by disposal following successful confirmation testing or by retrieval for additional treatment or containerized storage.

Each waste pile shall be accompanied by the following information:

- Date and time of placement
- Unique waste batch identification
- Compatibility Group
- Approximate weight
- Hazardous waste label

Information accompanying treated waste shall be placed within a weatherproof container directly placed within the interim processing load. (Weatherproof containers are customarily metal "rockets" holding information within an enclosed tube which is affixed to a long rod that is placed within the waste pile.)

Compliance with the conditions stated above shall be verified during weekly landfill inspections.

11.3.9 Surveying and Record Keeping Procedures

USEN maintains records of waste locations within the Trench using a grid coordinate system established in reference to elevation and horizontal benchmarks. Irregularly-shaped loads and bulk loads will be defined by the grid block that most completely captures the load, noting that waste is moved by non-precise equipment such as bulldozers and can cross several grids. Shipments containing more than one waste stream of compatible waste may be buried and located in the same area, but need to be identified. Waste location information will be recorded in the Operating Record.

11.3.10 Wind Dispersal Control

To control wind dispersal of particulates during landfilling operations, USEN evaluates candidate waste streams during the waste stream evaluation process (as described in the WAP) to determine the waste stream's potential to generate excessive fugitive off-site particulate emissions during unloading. Specified packaging and handling arrangements contain the dust during unloading and disposal. If the potential for off-site fugitive particulate emissions is excessive, USEN will use place the roll-off box near the active face, use a liquid spray or take other measures to reduce fugitive particulate emissions. Wind dispersal potential is routinely reduced by using liquids to suppress dust, by daily cover and by spray foam. Non-hazardous, Non-RCRA and Leachate generated from Trenches 11 and 12 maybe used for the purpose of dust suppression. Leachate generated within Trenches 11 or 12 can only be used for dust suppression in the landfill from which it was generated (i.e. leachate generated from Trench 12 must be used in Trench 12 only). An EPA memo dated 5/23/96 authorizing the use of landfill leachate for dust suppression is included in Attachment D.

11.3.11 Run-On/Run-Off Control

The facility is located on a rise in the desert terrain formed by an alluvial fan. This rise extends up-valley (north and west) from the facility about 4.1 miles, forming a drainage area of 1.7 mi^2. Drainage of the remainder of the desert and surrounding mountains flows into the normally dry Amargosa River channel and natural drainage swales in the desert, and would not impact the facility during a 100-year storm event.

Run-on control for the 1.7 mi^2 drainage area is provided by a trapezoidal ditch (identified in design drawings as Ditch #1), north of the facility, which diverts the major portion of the drainage area to natural swales west of the facility. Smaller triangular ditches, (identified in drawings as Ditches #2 & #3), along the northern and eastern boundaries of the facility, divert the remainder of the drainage area around the facility. These drawings were previously submitted in Reference 5.

The run-on control ditches were designed to handle precipitation resulting from a 25-year, 24-hour design storm. A description of the procedures and assumptions employed in the design of the diversion ditches was previously submitted and incorporated herein as Reference 5.

The run-on control ditches are inspected annually to ensure that the design capacity is maintained. Necessary maintenance activities will be conducted to ensure that the system's capacity is not reduced by accumulated debris or obstructions.

11.3.12 Run-off Control

With the run-on control measures in place at the facility, the only water expected to come in contact with the waste in the disposal unit is direct rainfall. No run-off is expected from the disposal unit since precipitation within the Trench is evaporated naturally or collected by the unit's leachate collection and removal system.

Precipitation that falls outside of the above-grade berms is captured by the run-on control system and prevented from contacting waste.

11.4.0 Liners and Leachate Collection System Description

11.4.1 Liner Components Description

Trenches 11 and 12 employ liner and leachate collection systems equivalent to the Hazardous and Solid Waste Amendments (HSWA) of 1984 as Minimum Technological Requirements (MTR) to prevent the migration of hazardous wastes from land disposal units to groundwater and the surrounding environment. The Trench 11 liner system design meets the MTR performance standards and incorporates several liner design features tailored to site-specific arid environment conditions, and offering a level of protection equal or superior to the MTR requirements. The demonstration of USEN's liner system equivalency to the MTR liner system design was previously submitted with the original permit application. The specifications described in Reference 1 present the Trench 11 liner system design, which met the MTR requirements.

The design features of the Trench 12 liner and leachate collection system are similar to those of Trench 11 and also exceed the performance standards required of the MTR liner systems. The design features for Trench 12 were previously submitted in References 3, 4 and 14 and are included herein by reference.

The flexible membrane liner (FML)/Composite double liner system for both Trenches 11 and 12 is depicted in the design drawings included in previously submitted references (References 1 and 3), and incorporated herein by reference. The liner system is comprised of the following elements (described from top to the bottom).

Trench 11:

- Soil to isolate other components of the liner system from waste deposited in the Trench. The soil consists of 12" of cover material in the bottom and 6" in the sidewalls;
- Primary leachate collection/removal system consisting of a geotextile ($\geq$4 oz/ft^2) over a drainage geonet layer that slopes to collection sumps;
- Top synthetic liner consisting of 80-mil high-density polyethylene (HDPE);

- Leak detection/collection/removal system comprised of HDPE geonet which slopes to collection sumps;
- 100-mil HDPE liner which constitutes the upper layer of the composite bottom liner;
- Compacted clay liner consisting of a 6" thick layer of compacted, low permeability clay (select soil mixed with bentonite) placed at the Trench bottom and sidewall benches (this component has a hydraulic conductivity of $\leq 1 \times 10^{-7}$ cm/sec);
- 40-mil-thick HDPE liner placed at the bottom of Trench 11; and
- 4- or 6-ounce geotextile filter layer for further protection to overlying liner components during system installation.

Trench 12:

- Clean soil and/or select waste to protect the underlying liner components from heavy equipment or operations that could damage the liner. No large or angular elements, debris or drums are to be placed in this layer;
- Small particle size (i.e., sand or gravel) clean soil and/or select waste to protect the underlying liner components from heavy equipment or operations that could damage the liner. No large or angular elements, debris or drums are to be placed in this layer. The soil consists of 12" of material in the bottom and 6" in the sidewalls;
- Primary leachate collection/removal system consisting of a drainage geocomposite layer that slopes to collection sumps over a geotextile ($\geq$7.5 ounces/ft^2);
- Top synthetic liner consisting of 100-mil HDPE, textured on both sides;
- Leak detection/collection/removal system comprised of a drainage geocomposite over an HDPE geonet which slopes to collection sumps;
- 80-mil HDPE liner, textured on both sides, which constitutes the upper layer of the composite bottom liner;
- Geosynthetic Clay Layer (GCL), consisting of granulated bentonite sandwiched between two (2) geotextiles placed at the Trench bottom and sidewall benches (this component has a hydraulic conductivity of $\leq 1 \times 10^{-8}$ cm/sec); and
- Prepared fine-grained soil subgrade, 9" thick on Trench floor (this component has a hydraulic conductivity of $\leq 1 \times 10^{-5}$ cm/sec), with up to 36" of prepared subgrade beneath sumps.

Synthetic Liners

The synthetic liners installed in Trench 11 and Trench 12 are made of HDPE materials manufactured specifically for liquid containment. Manufacturer's resistance and strength data, as well as EPA SW-846 Method 9090 laboratory data for leachate, indicate that HDPE materials are resistant to a wide range of chemicals likely to be disposed at the facility. Method 9090 data demonstrating that the properties of the HDPE liner are not impacted by exposure to the waste and waste leachate were previously submitted and are included in Reference 6. These data correspond to testing conducted at a company-owned facility in

Texas, but are representative of the conditions at the USEN Facility in that the type of wastes managed by both facilities is similar.

Soil Liners

The soil component of Trench 11 liner system consists of a 6" thick layer of compacted, low permeability clay mixed with bentonite. The soil material employed was select soil from site stockpiles or excavations, from which all unsuitable materials such as trash, organic material, large rocks and particles were removed to allow the soil to pass a ⅜" sieve. Bentonite was combined with the soil in proportions that allow the liner system to be self-healing without causing excessive swelling (generally a minimum 12% dry weight bentonite contents).

Trench 12 uses a combination of compacted soil and a GCL element on the Trench floor. On side slopes, only the GCL will be used. The compacted soil layer is fine-grained soil screened from native materials and has a hydraulic conductivity specification of $\leq 1 \times 10^{-5}$ cm/sec. This material is used on the Trench floor and beneath leachate collection sumps.

11.4.2 Leachate Collection System

Trench 11

The Trench 11 double liner system incorporates a primary and a secondary leachate collection and removal system (LCRS). The primary LCRS is located above the primary liner, and is designed to collect and allow removal of liquids within the Trench. The secondary system is located between the two (2) liners, and its main function is to provide detection and removal of any leakage through the top liner.

The system was designed so that the south part of the Trench is served by one pair of collection sumps (Sump C1 for the collection system and D1 for the detection system), while the north part of the Trench is served by another pair of sumps (Sumps C4 and D4). By dividing the collection areas, the capacity requirements of the drain, the distance to the sump, and the contact time for leachate were minimized. The Trench's benches were also provided with sumps: C2/D2 and C3/D3. Sump C2 was closed in 1991 while retrofitting the sump risers.

The primary collection and transport mechanism of the LCRS is a HDPE drainage geonet layer covered by a geotextile (to prevent clogging), draining at a 2% slope to gravel-filled sumps. The HDPE drainage net (typically Tensar DN-3 geonet) has a transmissivity of 2 gpm/minute/linear foot/unit gradient or 7×10^{-7} m^2/sec, which is greater than the required 3×10^{-5} m^2/sec provided by 1' of sand with a permeability of 1×10^{-2} cm/sec. US Ecology tested the performance of the geonet under imposed loads, and confirmed that the lower transmissivity expected to result from intrusion of the overlying geotextile under applied loadings was significantly greater than the minimum requirement. Testing results were presented in the previous Part B renewal, in Section 5.4.2 of the Landfill Report, and are not duplicated here.

The drainage net flows to a trapezoidal gravel-filled sump sloped at 1% to a low point where a pipe riser will facilitate leachate monitoring and/or removal. Concrete-grade gravel in the ½" to ⅜" size range was

employed. The drain was completely surrounded by a geotextile layer with a minimum thickness of 100 mils, folded in areas adjacent to the liner where the gravel was found to be extremely angular.

Ten-inch HDPE diameter pipes with a standard dimensional ratio (SDR) of 17 were initially installed as risers. This provided a wall thickness of 0.632", an appropriate thickness to withstand the forces applied during Trench operation. The riser pipe was extended in 5' to 10' increments as the level of waste in the Trench increased, using prefabricated sections that were flanged and bolted (or otherwise connected) together.

The design of the Trench's leachate collection and detection system is illustrated on the design plans that were previously submitted and are included herein by reference.

Obstruction of Trench 11 risers required rehabilitation during the fall of 1991. All risers, with the exception of C4 and D4, were retrofitted by placing a steel pipe inside the HDPE pipe. The risers are extended as necessary to accommodate the above-grade waste disposal of Trench 11.

The level of liquid in the LCRS sumps is monitored weekly, and the presence and level of liquids is recorded in a log (an example log is provided in Appendix B). Measurement of the liquid level is performed by lowering a water measurement tape down the riser until the presence of liquid is indicated, such as by a sound or light. The level is determined by subtracting the difference between the known depth to bottom of the sump riser, and the tape measurement.

As described in the Response Action Plan (RAP), Appendix B, pumping is initiated when 18" (vertical) of liquid is measured in the sump. This avoids backup of liquids into the drainage layer. If liquid is detected at $\geq$ 18", the sump will be pumped until the liquid level is < 18". The total amount of liquid removed is recorded on the log.

Every time the volume of leachate in the sumps reaches pumping levels, USEN evaluates the detection for potential exceedence of the Action Leakage Rates (ALRs) specified in the RAP. A detailed description of the procedures to be followed in the event of an ALR exceedence is contained in the RAP.

Trench 12

The Trench 12 LDS consists of a double-side geocomposite (GSE Fabrinet 300-mil geonet sandwiched between two 8 ounce/yd^2 geotextiles) and a 60-mil underlying HDPE flexible membrane liner atop a geosynthetic clay liner. Three (3) sumps are also installed in the LDS to collect liquids draining from discrete portions of the leak detection layer in the Trench 12 cell floor and sidewalls. 40 CFR §264.301(c)(4) requires the facility to collect and remove pumpable liquids found in the LDS sumps to minimize the head on the bottom liner. "Pumpable liquids" are defined in this plan as liquid that can be reasonably pumped out of the sump based on sump dimensions and pump operating levels for automated pump systems.

Pumps located within a perforated riser pipe in the LDS are used to remove pumpable liquids at each sump. USEN monitors LDS sumps weekly and removes pumpable liquids.

The selected LDS Pump type will not operate (i.e., cannot pump liquid) if there is less than 0.6 feet of fluid above the base of the pump. The operating controls for LDS Pumps will be set so that pumping will begin when the fluid level above the base of the pump is approximately 2.0 feet. At this fluid level, the fluid being pumped will be fully contained with the limits of the LDS/LCRS Sumps. The LDS Pump capacity as established in this RAP and fluid head levels equivalent to 1.0 feet of head above the Lowest Point of the Trench Bottom Liner should never be exceeded.

All leachate sumps (LCRS and LDS) in Trench 12 are monitored weekly. The results of this monitoring (depth of leachate in the sump, volume of leachate removed if pumping is required, and pumping time) are recorded in the sump monitoring log maintained for each sump.

If liquid is detected in an LDS sump above the pump operating level, the sump will be pumped within 24 hours to remove pumpable liquids. If liquid is detected in an LCRS sump with a depth of 1.75 feet or greater in the LCRS riser, the sump will be pumped within 24 hours to remove pumpable liquids.

11.4.3 Liner System Location Relative to High Water Table

As discussed in the Groundwater Monitoring Plan, included in this Renewal Permit Application, the water table in the vicinity of Trenches 11 and 12 is located approximately 285 feet to 310 feet bgs. Groundwater elevations recorded since 1988 do not indicate any significant variations over time. The distance between the water table and the liner system is expected to be over 200 feet at all times.

11.4.4 Liner System Exposure Protection

The primary synthetic liner in Trench 11 is protected from wind or sunlight exposure by a sacrificial 100-mil geotextile placed permanently on top of the primary liner. This geotextile is inspected periodically until it is completely covered, and repaired or replaced as necessary.

The Trench 12 design uses a sacrificial 40-mil HDPE layer as protection for the primary liner. This HDPE will be inspected periodically, and repaired or replaced as necessary until it is completely covered.

11.4.5 Loads on Liner System

The liner system is subjected to loads from both static and dynamic sources during construction, installation, and over the life of the facility. The following static loads are anticipated on-site:

- Self-weight during installation
- Anchor trench capacity
- Vertical load of fill and cap

The following dynamic loads also are expected:

- Uplift pressures from wind loads
- Thermal expansion and contraction of liner
- Equipment traffic
- Post-closure settlement of the cap

Analyses of each of these loads on the Trench 11 liners and the cover design were performed for the construction of Trench 11, and results have been previously presented. The analyses demonstrated that the construction design of the Trench was well within the material limits. These calculations are included herein by reference, and can be found in detail in the 1993 Part B Application Landfill Report, Appendix K "Design Calculation for Loads," included herein by reference (Reference 7).

Similar analyses were performed for the Trench 12 design. Although the design was approved, minor modification to the design and improvements in materials may slightly alter some of the calculations. However, as with Trench 11, the design employed conservatively estimated material properties, and the changes are not expected to affect the performance of the construction design.

11.4.6 Liner System Foundation

Since 1961, extensive investigations of the subsurface soils have been conducted at the USEN Facility. Detailed discussion of the foundation materials is provided in the following documents, most of which have been previously submitted to the NDEP.

- *Site Characterization Low-Level Radioactive Waste Disposal Facility*, Beatty, Nevada, US Ecology, Inc., 1987.
- *Environmental Pathways Analysis and DOSE Model for Low-Level Radioactive Waste Management Facility, Beatty, Nevada*, US Ecology, Inc., 1989.
- *Exploratory Boring and Monitoring Well Installation Program at the US Ecology RCRA Facility in Beatty, Nevada*, The Mark Group, Report No. 88-2107, 1989.
- *Drilling, Sampling and Installation of Two Monitoring Wells at the US Ecology, Inc., Beatty, Nevada Facility, Rad Site*, Geraghty and Miller, Inc., Report No. NV01201, 1990.
- *Drilling and Installation of Six Monitoring Wells at the US Ecology, Inc., Beatty, Nevada Facility Chemical Site*, Geraghty and Miller, Inc., Report No. NV01203, 1991.
- *Completion Report Vadose Zone Monitoring Well 500 and 501, Beatty, Nevada*, IT Corporation, Report No. 244266, 1991.
- *License Renewal Application for Low-Level Radioactive Waste Management Facility*, Beatty, Nevada, US Ecology, 1992.

- *Sediment Properties and Water Movement Through Shallow Unsaturated Alluvium at an Arid Site for Disposal of Low-Level Radioactive Waste near Beatty, Nye County, Nevada*, U.S. Geological Survey, Water Resources Investigations Report 92-4032, 1992.
- *Geotechnical Investigation for Trench 12 at the US Ecology Hazardous Waste Management Facility, Beatty, Nevada*, Grant Environmental, 1994.

The following sections provide a summary of the results of these subsurface investigations.

11.4.6.1 Geologic Setting

The USEN Facility is located in the Amargosa Desert basin. The basin was formed by normal block faulting, which displaced the surrounding rock strata upward relative to the crustal block underlying the valley. This tectonic process and subsequent erosion created the current topography, which is characteristic of the entire basin and range province. Subsequent erosion of the uplifted areas has filled the basin with sedimentary deposits, which reach a maximum depth of approximately 1,000' near the center of the basin.

11.4.6.2 Type of Bedrock

Sedimentary, metamorphic and igneous rocks make up the fault block mountain ranges to the north, east and west of the Amargosa basin. Similar rock formations also underlie the unconsolidated sediments found on the valley floor. The sedimentary and metamorphic strata contained in these formations are Precambrian and Paleozoic in age while the igneous rocks formed during the Tertiary period.

11.4.6.3 Type of Subsurface Soils

The subsurface soils are primarily alluvial in origin, having formed during the Tertiary and Quaternary periods from sediments deposited in alluvial fans, debris flows, streambeds, dunes, and lake or marsh beds. As a result of the varied depositional mechanisms, the subsurface soils exhibit a wide range or shapes, sizes and mineralogical origins.

The alluvial fan deposits extend into the basin from each side to form bajadas or broad fan-shaped plains. Near the center of the basin, intermittent prehistoric lakes or marshes are indicated by extensive deposits of subsurface clays and silts. These fine-grained deposits typically interfinger with the surrounding alluvial fan deposits. Playa or dry lake bed deposits are also found in the central basin area. Fluvial and aeolian depositional processes have typically dominated since the end of the Pleistocene and at other times between periods of lake bed or playa deposition.

11.4.6.4 Depth of Subsurface Soils

Recent subsurface soil investigations have extended to depths > 650' bgs. These borings were generally advanced specifically for the installation of monitoring wells within the unconsolidated

alluvial sediments. A rotary drill exploration boring in July 1962, completed at the site water well may have penetrated bedrock. The following table summarizes the visual observations of the drill cuttings made by Vincent P. Gianella.

Summary of Gianella Log		
Predominant Material	**Thickness (feet)**	**Depth to Bottom (feet)**
Silt	22	22
Fine to Coarse Gravel with Boulders	80	102
Boulders with Clay	15	117
Small Gravel with Clay	30	147
Boulders with Clay	14	161
Orange to Brown Clay	45	206
Clayey Gravel with Boulders	59	265
Brown, Yellow and White Clay with Gravel	61	326
Boulders with Clay	14	340
White and Brown Clay with Boulders	95	435
Boulders with Clay	132	567
Gray Metamorphic Rock	8	575

More recent investigations have encountered soil formations to depths of 650'.

11.4.6.5 Hydrogeologic Conditions

Extensive hydrogeologic investigations have been conducted at USEN since 1988 to better define the physical properties and the hydraulic and hydrologic characteristics of the soil deposits. Following is a summary of the results of these previous investigations. Detailed discussions of the site hydrogeology are contained in the following documents previously submitted to NvDEP.

- *Exploratory Boring and Monitoring Well Installation Program at the US Ecology RCRA Facility in Beatty, Nevada*, The Mark Group, Report No. 88-2107, April 1989.
- *Drilling, Sampling and Installation of Two Monitoring Wells at the US Ecology, Inc., Beatty, Nevada Facility Rad Site*, Geraghty and Miller, Inc., Report No. NV01201, 1990.
- *Drilling and Installation of Six Monitoring Wells at the US Ecology, Inc., Beatty, Nevada Facility Chemical Site*, Geraghty and Miller, Inc., Report No. NV 01203, 1991.
- *Beatty RCRA Facility Investigation Report*, US Ecology, April 1992.

Recent investigations have identified alluvial deposits to a depth of ~300 feet to 350 feet, composed primarily of gravelly sands with poorly-sorted gravel or sand deposits in discontinuous intervals. The alluvial deposits are generally underlain by 50 feet to 150 feet of silt, clay and indurated deposits that act as a barrier to the downward flow of water. An upper saturated zone occurs near the contact between the overlying alluvial deposits and the underlying silt, clay and indurated deposits. A second aquifer has been identified in the sandy gravel formation that underlies the silt and clay deposits. The sandy gravel deposits generally become coarser with depth.

The depth to top of the saturation, as measured from the ground surface, is approximately 285' on the north side of the site and greater than 360 feet at the southwest corner of the low-level radioactive waste (LLRW) site. The interbedded clays and silts encountered beneath the saturated zone effectively separate the upper saturated zone from the lower aquifer located in the sandy gravel formation. The lower confined aquifer is located at depths below 380'. Thickness of

the lower aquifer is estimated to be >250 feet on the southern side of the site. The piezometric level measured in the lower aquifer indicates a confined condition.

No significant changes in the piezometric level of the water table on-site have been observed since the monitoring program was initiated and has remained about 250 feet below the bottom of Trench 11 (75 feet bgs). The depth of Trench 12 is not affected by the water table elevation.

11.4.6.6 Description of Foundation Soils

Sampling of the foundation soils was conducted by Converse Consultants in 1984 (Reference 8, previously submitted). Further sampling and testing of the foundation soils was performed by Law Engineering (Law) in 1980 (Reference 9) and 1981 (Reference 10), Mark Group in 1989 (Reference 11), Geraghty and Miller in 1991 (Reference 12), and Grant Environmental in 1994 (Reference 13). The following sections are a summary of the information contained in the reports.

The foundation soils at the facility consist primarily of extensive deposits of sand, gravelly sand and sandy gravel. These alluvial deposits generally extend from the ground surface down to depths of about 300'. In accordance with the Unified Soil Classification System (USCS), the foundation soil has been classified primarily as SM (Silty Sand), SP (Poorly Graded Sand) and SW (Well-Graded Sand). In localized zones, SC (Clayey Sands), GC (Clayey Gravels), and GW (Well-Graded Gravels) have been identified. Thickness of the individual beds within the foundation soil range from a minimum of 1 foot or less than 20 feet.

A. **Index Properties of Foundation Soil**

The grain-size analyses (ASTM D-422) indicate the foundation soils contain between 0% and 19% soil fines (minus #200 sieve) with more than half of the samples generally displaying fines between 4% and 14%. The sand-sized particles (minus #4 sieve, plus #200 sieve) ranged between 10% and 84%. In general, the percentage of sand-sized particles displayed a gradual decrease with depth. The percentage of gravel-size particles (plus #4 sieve) ranged widely from 12% to 90% with three-fourth of the values in the range of 20% to 60%. In most instances the samples displayed a gradual increase in gravel content with depth.

Atterberg limits tests (ASTM D-4318) were not performed on samples obtained from the foundation soils. In general, these samples were granular and had < 20% fines (minus #200 sieve) with most samples exhibiting < 12% fines.

A mineralogic evaluation using petrographic microscopy and x-ray rate diffraction indicate the foundation soils consist primarily of volcanic rock fragments with various amounts of basalt, quartz and feldspar. Locally, the soil may also contain minor amounts of calcite and claystone fragments. Claystone and agglomerates of clay and calcite were also observed. The results of the x-ray diffraction techniques indicated the fine-grained portion of the foundation soils consist

primarily of montmorillonite (35% to 40%), quartz (20% to 25%), sanidine (20% to 30%), illite (trace to 15%), cristobalite (0% to 10%), and kaolinite (trace).

The foundation soil wet bulk density (ASTM D-2937), determined by the Mark Group, Inc., ranged from a minimum of 90.0 pounds per cubic foot (pcf) to a maximum of 124.2 pcf. The average wet bulk density was 108 pcf. The dry bulk density ranged from 83.7 pcf to 112.9 pcf, with an average value of 91 pcf. Consistently higher bulk density values were determined from the samples obtained by Geraghty and Miller. For this study, wet bulk density values ranged from 105.2 pcf to 128.9 pcf for an average value of 118.5 pcf. The dry bulk density for the same samples ranged from a minimum of 82.3 pcf to a maximum of 119.8 pcf, for an average value of 110.4 pcf.

The moisture content (ASTM D-2216) of the foundation soil was generally between the ranges of 6% to 10% by weight for the granular samples taken above the saturated zone. As expected, fine-grained samples from below the saturated zone generally exhibited moisture contents >30%.

B. **Engineering Properties of Foundation Soil**

Standard Penetration Tests (SPT) were performed by Law in 1980-81 during installation of Observation Wells #101 - 107. The "N-value" (blow-counts/ft) of sampler penetration for the samples of the foundation soil ranged from 16 for a sample obtained near the surface in the non-cemented material to sampler refusal at most other locations. N-values as high as 200 blows for 2" penetration were recorded at two (2) sample locations. N-values of this magnitude are indicative of very dense coarse-grained soils or large gravels.

Unconfined compression strength tests (ASTM D-2166) were performed on block samples from the sidewalls of Trenchs 10 and 22 with values ranged from 77 psi to 175 psi, with an average of 130 psi. Strengths in excess of 55 psi are generally considered indicative of hard fine-grained soils.

Field infiltration tests were performed on five (5) different type samples from USEN. The sample types included the undisturbed desert surface, the bottom of Trench 10, dry uncontrolled compacted fill, moistened controlled compacted fill and the well-cemented layer located at a depth of 6 to 8 feet below the surface. The field infiltration rates ranged from 3.5×10^{-5} cm/s corresponding to a sample from the well-compacted layer to 1.3×10^{-3} cm/s for a sample tested on the undisturbed desert surface. At the bottom of Trench 10, field infiltration rates of 6.1×10^{-4} cm/s were recorded.

Laboratory falling head permeability tests were performed on samples representing the undisturbed desert surface, the bottom of Trench 10, dry uncontrolled compacted fill, and moistened controlled compacted fill. The laboratory permeability values ranged from 3.1×10^{-5} cm/s for the samples of dry uncontrolled compacted fill to 3×10^{-3} cm/s for the undisturbed

sample obtained from the desert surface. Samples obtained from the bottom of Trench 10 yielded values of 1.3×10^{-5} cm/s and 5.2×10^{-4} cm/s.

Compressibility of the foundation soil was not determined directly, however, the compressibility of the foundation soil should be minimal because of the coarse texture, consistency and degree of cementation exhibited by the soil. The classification test results indicate the foundation soils are primarily comprised of coarse-grained soils, while the SPT results indicate the foundation soils are very dense. These two (2) factors tend to minimize the compressibility of foundation soils and any compression or settlement that does occur should occur readily upon application of the load.

11.4.6.7 Bearing Elevation of Waste Trench

The foundation of Trenches 11 and 12 consists of extensive deposits of alluvial soils comprised primarily of sand, gravelly sand and gravel. Results of previous investigations indicate the upper layer of the alluvial deposits extend to ~ 300' beneath the ground surface. The below ground depth of the waste Trenches is ~ 80', which indicates that the bearing elevation of the waste Trenches will be well within the extensive alluvial deposits, and well above the groundwater level.

11.4.6.8 Engineering Analysis

Settlement of the foundation system should be minimal because of the granular texture and very dense consistency of the foundation soil. Because of the granular consistency, any potential settlement should occur upon application of the load. Since the majority of the waste Trench will be located below-grade, the majority of the vertical load applied to the foundation soil should be compensated by the soil removed during construction of the Trench.

Similar to the previous discussion concerning settlement, the foundation soil will exhibit a relatively high bearing capacity. The granular texture of the soil, coupled with the very dense consistency, will greatly minimize the potential for a bearing capacity failure.

Law performed a stability analysis for proposed steep side slopes of disposal trenches in 1981. Law concluded that an adequate factor of safety ($FS \geq 1.5$) would be provided in 90' deep trenches with 60% side slopes. The analysis was performed using conservative values for cohesion (cementation). Using a more realistic evaluation of cementation, Law further concluded that a factor of safety of ≥ 2.0 could be achieved.

The Trench 11 slope configuration consists primarily of 25 foot high ½:1 (63.5°) slopes with 15 foot horizontal benches. The resultant average Trench 11 side slopes, considering the benches, is about 45%. A slope stability analysis, previously submitted, was performed utilizing the REAME (Rotational Equilibrium Analysis of Multi-Layered Embankment) program developed by Y.H. Huang at the University of Kentucky. The analysis employed the soil strength parameters recommended by Law in their August 13, 1981 report and indicated a safety factor of 2.45 could be achieved using the parameters recommended by Law.

The slope stability analysis (Reference 13, previously submitted) of the below-grade portion of Trench 12 examines the sidewalls as continuous slopes, without benches. The analysis, performed in a similar fashion to the analyses of Trench 11, used the PCSTABL program and indicated the safety factor for the different slope orientations (north, south, east and west) ranged from 1.74 to 2.51 using the soil parameters recommended by Grant Environmental.

Excess external hydrostatic pressure is not a concern because of the granular texture of the foundation soil and the significant depth to the zone of saturation. The granular alluvial deposits comprising the foundation soil are generally free-draining and should not allow the buildup of excess hydrostatic pressures. The zone of saturation exceeds 200' below the bottom of the waste Trenchs.

The build-up of gas pressure beneath the waste Trench is unlikely because of the granular consistency of the soil and the high permeability of the formation. U.S. Geological Survey (USGS) data indicate that soil gas pressure within the Beatty foundation soil fluctuates with changes in the barometric pressure at the surface. With increasing depth, the pressure fluctuations are dampened but still indicate an interconnection to the ground surface.

USEN is located in the Basin and Range Province in Zone 3, an area of active seismicity. Between September 4, 1868, and August 4, 1992, a total of 23,764 seismic events were recorded by the USGS National Earthquake Information Center, within a 200 kilometer radius of the site. An event with an estimated magnitude of 8.0 (Richter Scale) occurred in 1872 about 78 miles west of the site in the Owens Valley of California. Recent earthquakes of unrecorded magnitude occurred in 1964 and 1968 within 1.2 miles and 6.2 miles of the site, respectively.

Several seismic events occurred during a 2-week period in the summer of 1992. The largest event during that time period was a magnitude 5.5 seismic event (Richter Scale) that occurred 22 miles west of the site on June 29, 1992. Although damage was reported near the epicenter, no damage was observed on-site during this event or during the half dozen smaller events that occurred over the following days.

Although USEN is located in an active seismic region, the probability of a seismic event occurring with sufficient magnitude to cause damage to waste Trenches is remote. However, as required by applicable regulations, slope stability analyses consider possible seismic events.

Localized subsidence of the natural ground surface because of internal erosion or solution activity has not been observed within the vicinity of USEN. The lack of appreciable precipitation and near surface groundwater flow coupled with the granular texture of the soil has greatly reduced the potential for internal erosion or piping, which could lead to surface subsidence.

11.4.7 Constructions and Maintenance

Material and construction specifications for all components of Trench 11 liner system are provided in the "Specifications for Trench 11 report included as Reference 1. Trench 12 specifications are essentially identical to those for Trench 11, and are included in References 3 and 4. A listing of the specific information requirements addressed by the specifications is provided below.

- Preparation of the liner system foundation, including a description of the procedures to be followed in preparing the supporting areas for the liner system;
- Procedures for installation of the soil components of the liner system;
- Procedures for installation of synthetic liner, including:
  - The inspection of synthetic liner bed for material which could puncture the liner, and removal of such material; the synthetic liner placement, and procedures for protection of the liner system before and during placement of material on top.
  - Techniques to bond liner seams are described.
  - Procedures for protection of the liner before and during placement of material on top of the liner are described.
  - Protection of the liner during operations is accomplished by restricting the minimum traffic loads imposed on the synthetic liner and leachate collection system until sufficient cover has been placed. To prevent mechanical damage or displacement of the liner, at least 1 foot of cover is placed prior to loading by tracked vehicles, and 6 inches prior to loading by wheel vehicles.
- Installation of leachate collection and detection systems, including the drainage layer, piping, and filter layers;
- Quality Control program; and
- Liner Repair Methods.

11.5.0 Above-Grade Design

The configuration of the above-grade disposal structure was designed to accomplish the following:

- Allow waste within the above-grade structure to remain within the boundaries of Trench 11;
- Allow stable, maintenance-free slopes; and
- Allow construction using conventional earthwork equipment.

Lateral migration of potential contaminants to the surface is prevented by a compacted earth embankment constructed around the Trench perimeter. As indicated in design drawings, the berm is covered on the top and outer slope with a synthetic liner. The structure design incorporates a permanent outer slope of three horizontal to one vertical (3H:1V), and an inside slope of 1.25:1. The structure will have a crest width of 16' (the minimum width which can be constructed conveniently with normal earthwork equipment), and heights between about 18' and 30'. Temporary ramps will be constructed along the outside of the

northern and southern embankment sections to provide safe one-way traffic flow, and access to all facilities.

An engineering analysis (Reference 2) demonstrating stability of the above-grade embankment slope was previously submitted in the "Trench 11 Above-Grade Disposal Facility Design and Construction Quality Assurance Plan", prepared by AquAeTer, Inc, and revised May 6, 1999.

Above-grade berms are constructed of on-site sand and gravels compacted to at least 95% Standard Proctor Density. Laboratory and field studies conducted by Converse and Associates (Reference 8, previously submitted) demonstrated that this minimum specification will be easily achieved with site soils. Converse studies determined maximum dry density of site compacted fill within the range of 122 to 128.5 pcf, and in-place dry densities of natural materials below loose surficial layers in the 122 to 129 pcf range.

The above-grade design for Trench 12 (References 3 & 4, previously submitted) incorporates the slope stability analyses.

Both Trench 11 and Trench 12 above grade designs incorporate alternative covers approved by the NvDEP in 2009.

11.5.1 Foundation Design

The northern and southern compacted fill berms of Trench 11 are constructed over below-grade wastes, and the remaining compacted fill berms (e.g., the eastern and western berms) are constructed over natural ground. Where the berm foundation consists of buried waste materials, these materials typically consist of about 50% to 60% buried waste and 40% to 50% sand and gravel backfill. Post-construction settlement or subsidence is not expected to be a significant problem for the berms founded on waste for the following reasons:

1. Waste materials beneath the above-grade facility are predominantly solid wastes;
2. The sand and gravel backfill is dry and tends to flow between containers, thus decreasing void space in the fill;
3. Most settlement will occur before the above-grade berms are constructed; and
4. Unlike clay soils, sands and gravels do not settle appreciably after initial placement and loading.

Settlement also is not expected to be a concern for berms founded on natural ground (e.g.; west & east berms). However, slope stability analyses indicate the loose sand layer that forms the natural surface material might affect the berm & final cover outer slope stability on the west side. In this area, the loose sand was removed, except where the trench liner already is present, and replaced with a compacted soil fill. The loose sand layer is not a concern for the east side berm and final cover that overlap the existing covers of Trench 10 and the Trenches 1 to 9 area. Differential settlement is not a concern since no berms founded partially on waste and partially on natural ground are included in the design.

The design for Trench 12 incorporates the foundation design for the above-grade berms. Above-grade berms founded on waste on the north and west sides of Trench 12 will be low (typically, <10' high) and, as such, subject to relatively little settlement. The higher berms intended for use on the south side of the Trench will be founded on native materials, and, as for similar Trench 11 above-grade berms founded on native soil, subject to minimal settlement. No above-grade berms are planned for the east side of Trench 12 where above-grade waste disposal will be continuous with above-grade waste disposal in Trench 11.

11.6.0 References

1. *Part B Application*, 01/93, Section IV.D, Landfill Report, with Appendices A through Q.
2. *Trench 11 Above-Grade Disposal Facility Design and Construction Quality Assurance Plan*, revised 05/06/99.
3. *Trench 12 Design Report*, Volumes I and II, TRC Environmental, 03/96.
4. *Response to Notice of Deficiency for the Trench 12 Design Report*, HMA Environmental, 12/96.
5. *Part B Application*, 01/93, Section IV.D, Landfill Report, Appendices C and D.
6. *Part B Application*, 01/93, Section IV.D, Landfill Report, Appendix F, "Method 9090 Compatibility Data."
7. *Part B Application*, 01/93, Section IV.D, Landfill Report, Appendix K "Design Calculations for Loads."
8. Converse Consultants, Inc., 1984, *Field and Laboratory Testing of Soils at the Beatty Site, 84-3163-01, Beatty Disposal Site, Nevada*, prepared for US Ecology.
9. Law Engineering Testing Company, 1980, *Trench Stability Analyses*, NECO, Inc. Beatty, Nevada Facility.
10. Law Engineering Testing Company, 1981, *Geotechnical Studies, Deep Trench Stability Analyses*, US Ecology, Inc. Beatty, Nevada Facility.
11. Mark Group, 1989, *Exploratory Boring and Monitoring Well Installation Program, US Ecology RCRA Facility, Beatty, Nevada,* 2 volumes, prepared for US Ecology.
12. Geraghty and Miller, Inc., 1991, *Drilling and Installation of Six Monitoring Wells at the US Ecology, Inc., Beatty, Nevada Facility Chemical Site.*
13. Grant Environmental, 1994, *Geotechnical Investigation for Trench 12 at the US Ecology Hazardous Waste Management Facility, Beatty, Nevada.*
14. AquAeTer, October 2007 Supplement – Landfill Report for Trench 12
15. AquAeTer, April 2008, Design Basis and Construction Specifications for Trenches 11 and 12 Final Covers,

Appendix 11-A

Leachate Monitoring and Recording Log

Trench 12 C1 Leachate Sump Monitoring Log

Date	Depth to Bottom	Depth to Water	Gallons Pumped	Pumping Time	Initials	Review initials	Comments
	85.6						
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Notes:

Trench 12 D1 Leachate Sump Monitoring Log

	Depth to Bottom	Depth to Water	Gallons Pumped	Pumping Time	Initials	Review Initials	Comments
	86.7						
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Appendix 11-B

Response Action Plan Trench 11

RESPONSE ACTION PLAN

LEAK DETECTION SYSTEM

TRENCH 11

US ECOLOGY NEVADA

OCTOBER 2009

SECTION 11-A

RESPONSE ACTION PLAN
TRENCH 11

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RESPONSE ACTION PLAN

11.1.0 Introduction

The U.S. Environmental Protection Agency (EPA) promulgated rules on January 29, 1992, mandating the preparation of Response Action Plans (RAP) for new hazardous waste landfill units which commence construction after January 29, 1992, or expansion of existing units after July 29, 1992 (57 FR 3462). At the US Ecology Nevada (USEN) Facility, Trench 11 is a regulated unit under this rule.

This RAP was developed to meet the requirements of 40 CFR §264.304 and to provide predetermined, site-specific actions that will detect leaks at the earliest practical time complemented by early follow-up actions that effectively minimize migration of hazardous substances from Trench 11.

11.2.0 Action Leakage Rate

The Action Leakage Rate (ALR) is the leakage rate that requires implementation of a response action to prevent hazardous constituent migration out of the unit. The regulations specify that a leakage rate be established for each leak detection sump in a regulated unit. The ALR for an individual sump may be based on an approach similar to the EPA proposed definition for rapid and extremely large leakage rate as provided in the January 29, 1992 rule. The calculation of the ALR is based on the maximum design leakage rate that the unit's leak detection system can remove without the fluid head on the bottom liner exceeding one foot. The EPA did not propose a standard ALR for regulated units. Regulated facilities may use the formula proposed by the EPA in the January 29, 1992 Final Rule to determine ALRs or justify higher ALRs through the use of different models, formulas, or demonstrating the exceedence of minimum technology standards.

In this submission, the ALR has been calculated for each individual detection sump located in Trench 11 based on the maximum flow that the leak detection system can deliver and remove (see Table 1).

Table 1 - ALR Determination

Sump No.	Total Flow (gal/day)	Pump Capacity (gal/day)	ALR* (gal/acre/day)
1D	211	12,960	70
2D	211	12,960	104
3D	211	12,960	84
4D	211	12,960	44

*The total flow is limited by the capacity of the sump collection trench to 211 gal/day. The ALRs were all calculated based on that flow. See Attachment A for ALR calculations.

11.2.1 Trench 11 ALRs

The leak detection system in Trench 11 consists of a geonet drainage layer on the cell floor and sidewalls. The geonet drains to a gravel-filled collection sump. A pump located within a perforated riser pipe is used for liquid removal.

11.2.2 Function of ALR

The ALRs established in this document will serve as a trigger for response actions for Trench 11. US Ecology will contact the Nevada Division of Environmental Protection (NvDEP) within seven days after confirmation of an exceedence of the ALR. Measured rates of leakage less than the ALR will be addressed by the collection and removal of pumpable liquids from the detection sump to minimize head on the bottom liner. Pumping will follow the facility pumping schedule outlined below. All amounts of leachate pumped from the leak detection system will be documented in the facility operating record.

11.2.3 Trench 11 Collection Sump Action Levels

The collection system in Trench 11 consists of three (3) sumps draining the primary liner on the cell floor and sidewalls. The trench is constructed so that the liner drains to a gravel-filled collection sump. A pump located within a perforated riser pipe is used for liquid removal. The sumps are constructed such that water levels of at least 1.75 feet are required to actuate the pumps. The following levels are an indication of 1 foot of hydraulic head exists on the collection liner (see Table 2).

Table 2 - Collection Sump Levels

Sump No.	Total Water Level (feet)
1C	1.75
2C	Closed
3C	3.9
4C	4.0

11.2.4 Function of the Collection Sump Action Levels

The collection sump action levels established in this document will serve as response actions for Trench 11. Should water levels in the collection sumps reach the listed values, actions will be undertaken by the facility to remove water from the sumps.

11.3.0 Leachate Removal

The purpose of the leachate collection and removal system (LCRS) is to remove pumpable liquids from the primary liner system, thereby minimizing the possibility of leachate escaping the primary liner into the leak detection system. To assure pumpable liquids are removed from this primary system, USEN will monitor the LCRS sumps and ensure that liquids are removed such the head on the primary liner does not exceed 1 foot.

40 CFR §264.301 (c)(4) requires the facility to collect and remove pumpable liquids found in the leak detection system sumps to minimize the head on the bottom liner. "Pumpable liquids" are defined as any amount of liquid that can be reasonably pumped out of the sump based on sump dimensions, pump operating levels for automated pump systems, and the goal of minimizing the head in the sump and backup of liquids (from the sump and drainage tile or pipes) into the drainage layer. The distance from the bottom of the leak detection sump in Trench 11 to the top of the primary liner is approximately 3.25 feet. The leak detection sump pumps require approximately 1.75 feet of head to operate properly. The pump operating level for the leak detection sumps in Trench 11 has therefore been established at

1.75 feet. This will avoid backup of liquids into the drainage layer, minimize the head on the bottom liner, and allow the pump to function properly.

11.4.0 Sump Monitoring

1. All leachate sumps (LCRS and detection) in Trench 11 will be monitored at least weekly during the active life of the trench. The results of this monitoring (depth of leachate in the sump and volume of leachate removed if pumping is required) will be recorded in the sump monitoring log maintained for each sump.

   a. If liquid is detected in a leak detection sump with a depth of 1.75 feet (pump operating level) or greater, the sump will be pumped, within 24 hours, until evacuated or liquid removal is no longer possible or is below the 1.75 feet pump operating level. The volume of leachate pumped will be recorded on the sump monitoring log for that sump.

   b. If liquid is detected in a LCRS sump with a depth of 1.75 feet or greater, the sump will be pumped, within 24 hours, until evacuated or liquid removal is no longer possible. The volume of leachate pumped will be recorded in the sump monitoring log for that sump.

2. If liquid is pumped from a LCRS or leak detection sump, the frequency of monitoring that sump will be increased to daily (daily is defined for this RAP as each day that the facility is open for operation – normally Monday through Friday, excluding weekends and holidays), until the liquid level in the sump is maintained below 1.75 feet in depth for two (2) consecutive days. If the leachate measurement in a sump is 2.5 feet or greater, the sump monitoring frequency will be increased to daily including Saturday, Sunday and holidays, until the liquid level in that sump is maintained below 2.5 feet for two (2) consecutive days. At that time, monitoring will be reduced to operational days only (Monday through Friday).

3. During the post-closure period (which begins after the final cover is installed), the leachate sumps will be routinely monitored on a monthly basis (see NOTE). If the leachate level in a LCRS or leak detection sump stays below the pump operating level (1.75 feet) for two (2) consecutive months, the leachate in that sump will be monitored on at least a quarterly basis. If the leachate level in a LCRS or leak detection sump stays below the pump operating level (1.75 feet) for two (2) consecutive quarters, the leachate level in that sump will be monitored on at least a semi-annual basis.

   If at any time during the post-closure period the pump operating level is exceeded in a leak detection sump monitored on a quarterly or semi-annual basis, that sump will return to monitoring on a monthly basis until the liquid level in the sump again stays below the pump operating level for two (2) consecutive months/quarters before relaxing the frequency of monitoring.

   Note: If at any time during the post-closure period, if the leachate levels noted above are exceeded in a sump that is being monitored on a monthly basis, that sump will return to

monitoring as outlined for monitoring during the active life of the trench (as outlined above). This monitoring frequency will continue until the liquid level in the sump again stays below the 1.75 feet level for two (2) consecutive days/weeks before relaxing the frequency of monitoring.

11.5.0 Determination of LCRS or Leak Detection Issues

ALR Exceedence

An ALR exceedence is suspected to have occurred when the volume of liquid pumped from any leak detection pump exceeds 211 gal/day over a 7-day period. Facility personnel will report to the Facility Manager[1] should this volume be pumped from any leak detection monitoring well in one 24 hour period. The volume of leachate pumped from each detection sump in the leak detection system will be recorded in the facility operating record.

The average leakage rate, in gallons per acre per day (GAPD), based on site operations that pump leachate each day of the week, is calculated as follows.

$$GPAD = \frac{[\text{Sum of pumped volumes for the last 7 days}]}{[\text{acreage served by sump}]}$$

11.6.0 Repairs to Liner System During Operation

If during routine operations the liner is damaged and requires repairs, the facility will initiate repairs according to recommended procedures by the High Density Polyethylene (HDPE) liner manufacturers. All inspection reports showing damage and subsequent repairs shall be documented in the facility operating record. All repairs will be made in accordance with the Trench 11 specifications and construction quality assurance program to ensure that repairs meet design criteria. Repairs shall be completed to the extent practicable within 20 working days after their discovery.

11.7.0 RESPONSE EVALUATION

If the 211 gal/day limit is exceeded in the detection sumps, facility personnel will notify the Facility Manager immediately. The Facility Manager will review the sump monitoring log and determine through calculation if the ALR has been exceeded. Should it be determined an ALR exceedence has occurred, the facility will follow the procedure listed below.

11.8.0 Response Action Plan for Leakage Greater Than ALR

Upon confirmation of ALR exceedence, the following actions will be initiated.

1. Notify NDEP in writing within seven (7) days of determining that the ALR has been exceeded.

---

1 All references to the Facility Manager will include his/her designee and are herein-after referred to collectively as the "Facility Manager."

2. Submit a preliminary written assessment to NDEP within 14 days of the determination. This report will document the amount of liquids removed from the leak detection sump; likely sources of the liquids; possible location, size and cause of any leaks; and short-term actions taken and planned.

3. Assess the source or liquids and amounts of the liquids by source.

4. Conduct a fingerprint, hazardous constituent or other analysis to identify the sources of liquids and possible locations of any leaks, and the hazard and mobility of the liquid.

5. Assess the seriousness of the leak in terms of potential for escaping into the environment.

6. Determine, to the extent practicable, the location, size, and cause of any leak.

7. Determine whether waste receipt should cease or be curtailed; whether any waste should be removed from the unit for inspection, repairs, or controls; and whether or not the unit should be closed.

8. Determine if any other short-term and long-term actions need to be taken to mitigate or stop any leaks.

9. Within 30 days after the initial notification to NDEP that the action leakage rate has been exceeded, submit a report to NDEP containing the information and determinations specified in items 3 through 8 above.

10. Thereafter, submit monthly reports to NDEP as long as the flow rate in the leak detection systems exceeds the action leakage rate summarizing the results of any remedial actions taken and actions planned.

Appendix 11- A

ALR Calculations

AMERICAN ECOLOGY
PROJECT: BEATTY ORDER RESPONSE
ALR CALCULATIONS

COVER SHEET PAGE 1
CALCULATION NO. NV161002
BY: [illegible]
CHECKED: LB
DATE: OCTOBER 10, 1995
Rev. December 5, 1995

I. SCOPE

The Order for the facility dated August 7, 1995, requires that the leak detection system (LDS) for Cell 11 be reevaluated and the action leakage rates (ALRs) adjusted, if necessary. The Order also required that the test performed on the geonet at 8,000 lb/ft^2 overburden pressure, and referenced in the current Response Action Plan (RAP) for the facility, be repeated at an overburden of 10,000 lb/ft^2.

II. ALR DETERMINATION

The following calculations, Calculation No. NV161002, Sheet Nos. 1-9, evaluate the ability of the LDS to transmit flow. The calculations, not including this cover sheet, will be included as an attachment to the RAP.

Preferential flow for the majority of the cell floor is to the LDS sump trench because of cell geometry. A small area of the floor flows directly to the sump. The sump trench was determined to be a limiting factor in transmitting flow to the sump. Once the geonet at the sump is flowing full, additional flow will be transmitted across the cell floor, although at a lower gradient. Because flow is transmitted across the entire cell floor, the sump perimeter becomes the limiting factor in the system. The maximum flow that the system can remove is determined by the maximum flow that can be transmitted at the sump perimeter and removed through the riser pipe and pump. At the maximum flow rate that the system can deliver, converted to an ALR, the geonet in the cell will flow full, or partially full, and fluid head will not increase with time (mound).

The riser pipe perforations were evaluated and determined to be adequate for transmitting the system flow. In addition, the smallest pump used in the LDS system is a two inch pump. The current pump being used has a maximum flow rate of nine gallons per minute, which is greater than the maximum flow that the system can deliver. A specification sheet for the current pump is included in Attachment 1.

Based on the above evaluation, the ALRs for Cell 11 are:

DESIGNATION	ALR (GAL/AC/DAY)
Sump D1	70
Sump D2	104
Sump D3	187
Sump D4	98

III. JUSTIFICATION OF ASSUMPTIONS

A. GEONET TRANSMISSIVITY

The test performed on the geonet and referenced in the RAP was not repeated. The specific material that was tested in 1989 is no longer manufactured. A replacement product is available; however, the manufacturing technique is different and the new product might yield greater flow characteristics than the old material according to the manufacturer. For this reason, historical data on geonet products, general transmissivity data, construction specifications and cell construction quality assurance (CQA) reports were used to quantify a transmissivity value.

The transmissivity value used in the LDS evaluation calculations is the 4 x 10^{-4} m^2/sec. This is the transmissivity required in the Specifications for Cell 11 Construction included in the Permit Application on file with the Nevada Department of Environmental Protection. The original specifications did not specify a corresponding overburden value for the transmissivity requirement. In the CQA Report for Cell 11, Phase I, Second Half, a revised specification sheet was included with the manufacturer's certification statements requiring a transmissivity of $4x10^{-4}$ cm/sec under a loading of 12,000 lb/ft^2 (see Attachment 2). An Engineering Revision Authorization was probably prepared to add this requirement, however, the original document has not been located.

The CQA reports for Cell 11 were reviewed and information concerning the geonet products used in each stage of construction were reviewed. The reports contained the following data.

<u>Cell 11, Phase I, First Half (See Attachment 3)</u>
Report Title: Geosynthetic and Natural Component Materials Quality Assurance Services, First Half of Trench 11, Phase I, Beatty Facility
Prepared By: Golder Associates, Inc.,
Product: Tensar NS1410(DN4-HD)
Transmissivity Certified by Manufacturer: $1x10^{-3}$ ft^2/sec at 10,000 lb/ft^2
Gradient of 1

<u>Cell 11, Phase I, Second Half (See Attachment 4)</u>
Report Title: Final Report to US Ecology, Inc. Construction Quality Assurance Observation and Testing Report, Trench 11, Phase I, Second Half, Beatty, Nevada, Quality Control Documents
Prepared By: Golder Associates, Inc.
Product: Tensar NS130590 (DN3)
Transmissivity Certified by Manufacturer: 2.82 gal/min/lf ($5.8x10^{-4}$ m^2/sec) at 12,000 lb/ft^2 normal pressure
Gradient of 1

<u>Cell 11, Phase II (See Attachment 5)</u>
Report Title: US Ecology, Inc. Trench 11, Phase II, Quality Assurance Construction Report
Prepared By: Woodward-Clyde Consultants
Product: Tensar NS130592
Transmissivity Certified by Manufacturer: $0.3x10^{-3}$ ft^2/sec ($2.7x10^{-5}$ m^2/sec) at 20,000 lb/ft^2
Gradient of 1

<u>Cell 11, Phase III (See Attachment 6)</u>
Report Title: Construction Quality Assurance Final Report , Trench 11, Phase 3 Construction
Prepared By: Vector Engineering, Inc.
Product: Gundle Gundnet
Transmissivity Certified by Manufacturer: 2 gal/min/ft (minimum) ($4x10^{-4}$ m^2/sec)
11.41 gal/min/ft ($2.4x10^{-3}$ m^2/sec) at 10,000 lb/ft^2
Gradient of 0.25

The transmissivity values stated above are for varying values of normal pressure (10,000 lb/ft^2 to 20,000 lb/ft^2) and for varying test conditions. The test conditions, or boundary conditions, when stated on manufacturer specification sheets are two aluminum plates. A comparison of current transmissivity test results for Tensar products with a boundary condition of two plates, and a boundary condition of two HDPE sheets, shows the values to be almost identical. The graphed test results are included in Attachment 7. These graphs also show a trend of increasing transmissivity with decreasing gradient. The geonet manufacturer stated that the referenced trend can be extrapolated to continue to increase with continued decreasing gradients.

Historical graphs of transmissivity data were found in the reference material for the Liner Waiver Request contained in Volume IV(A), Section 3-13 of the current permit application on file with the NDEP. These

graphs are included in Attachment 8. Graph A shows that at high pressures (20,000 lb/ft^2), the transmissivity of the geonet material decreased with decreasing gradient. Graph B shows the transmissivity to increase with reduced gradients at pressures between 1000 lb/ft^2 and 5000 lb/ft^2, remain unchanged at a pressure of 15,000 lb/ft^2 and decrease at a pressure of 20,000 lb/ft^2. The transmissivity values reported at 10,000 lb/ft^2 to 15,000 lb/ft^2 and a gradient of 0.25 to one were assumed to be valid for lower gradients.

Values for transmissivity, for ALR determination, were not taken directly from the historical graphs in Attachment 7 because the tests were conducted under the conditions of soil, geotextile, geonet, geomembrane. This scenario will yield a lower transmissivity value than a test condition of geonet between HDPE materials. Graphs included in Attachment 9 of the same products tested under the two different boundary conditions show the referenced decrease in transmissivity.

The graph of transmissivity performed by the Geosynthetic Research Institute (GRI) and included in the current RAP was discounted. This graph depicts a linear relationship of transmissivity versus gradient. No other data, either current or historical, documents this type of relationship. In addition, no test procedures were included with the data. Manufacturer's specification sheets, dated about the same time as the GRI test, reference the use of a draft test method from ASTM for transmissivity determination. These specification sheets are included in the CQA documents referenced previously. In addition, the test was performed with a geotextile and sand as one boundary, which is not the working condition of the geonet in the LDS. In general, the data from the test procedure included in the current RAP did not correlate with any other located documentation and was discounted.

B. GRAVEL TRANSMISSIVITY

The gravel for Cell 11 construction was required to have a size range of between 1-1/2 inch to 3/8 inch. The specification is included in Attachment 10. For calculation purposes, the gravel was assumed to have a hydraulic conductivity of 4.5 cm/sec. This is a reasonable assumption based on generalized published data. In addition, similar gravel was used in construction at another American Ecology facility. The gradation curves and hydraulic conductivity test results for this gravel are included in Attachment 10 to substantiate the referenced assumption.

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SHEET NO. 1 OF 9
CALC. NO. NV161002
DATE 10/7/95
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CHECKED BY LR LR Rv. 1
REV 1 REV 2 REV 3

PROJECT Beatty Order Response
SUBJECT ALR Calculation

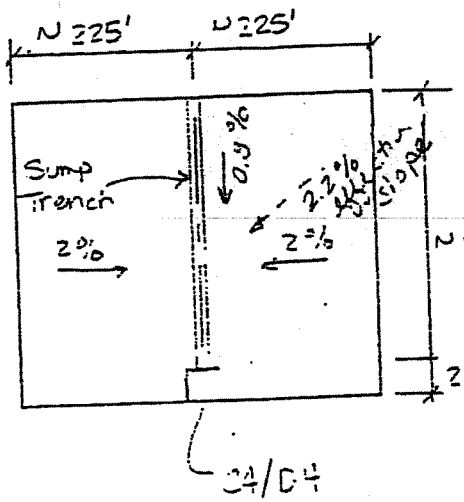
- Calculate ALR for Cell 11 Detection Sumps
- Use maximum flow rate that the system can deliver. Consider all limiting factors/ System components

SUMP C4/D4

→ Consider Sump C4/D4 because they serve the largest flow area

Sump Trench Slope = 1%

Floor Slope (@ trench) = 0.8%



Area to D4 (by CADD) = 4.767 Ac = 207,651 ft²

A (by scaling drwgs) = (450')(440' + 23') = 208,350 ft²

→ Use CADD Area in calcs. requiring total area because more accurate

(S. side consists of sideslope + partial waste slope)
5' = side of sump only

- Geonet transmissivity = specified transmissivity = 4×10^{-4} m²/sec

- Area Contributing to side of sump trench

(440')(225') = 99,000 ft² × 2 = 198,000 ft²

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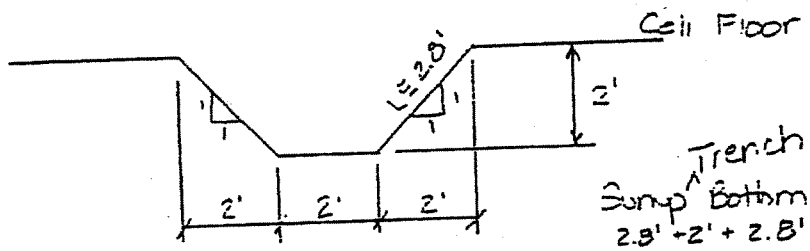
PROJECT Beatty Order Response
SUBJECT ALR Calculation

Sump Trench Dimensions (Ref Cell 11 Drawing NV8705 0024-6)



Sump Trench Bottom Length
2.8' + 2' + 2.8' = 7.6 ft.

Area of Flow in Trench: $2(1/2)(2')(2') + (2')(2') = 8\ ft^2$

Total area contributing to Sump D4: 4.762 Ac. = 207,433 ft^2
(Ref Cell 11 RAP Area Cal CADD)

Area Contributing at sides of sump
$(23')(225') = 5175\ ft^2$ (each side)

American Ecology

SHEET NO. 3 OF 9
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DATE 10/7/95
COMPUTED BY CAG
CHECKED BY LR
REV 1 REV 2 REV 3

PROJECT Beatty Order Response
SUBJECT ALR Calculation

- Because entire leak detection system is geonet, except for sump area, the limiting component will probably be the largest flow area served by a limited geonet section. This will be at the sump trench which serves the majority of the cell floor.

Q_g transmitted by geonet = K i A

$K = \frac{T}{t}$ $\quad t = 0.2 \left(\frac{1\ ft}{12''}\right) = 0.017\ ft.$

$T = 4 \times 10^{-4}\ m^2/sec \left(\frac{10.78\ ft^2}{m^2}\right) = 0.00431\ ft^2/sec$

$= 0.259\ ft^2/min.$

$K = \frac{0.259\ ft^2/min}{t = 0.017\ ft} = 15.2\ ft/min$

Q_{cell} into sump trench (Max)

$Q = (15.2\ ft/min)(0.02)[(2)(440')(0.017')]$

$Q = 4.55\ ft^3/min$

Q through sump trench (Max)

$Q_t = (15.2\ ft/min)(0.01)[(0.017')\overbrace{(7.6\ ft)}^{\text{Perimeter Length of Trench Sump (see pg. 2)}}]$

$Q_t = 0.02\ ft^3/min$

→ The sump trench is limiting as anticipated

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PROJECT BEATTY
SUBJECT AIR CALC

- Determine flow at sides of sump, "Q_1)
  (Sides of LDS geonet tie to gravel at top of gravel)

  Detection sump intercept length (See Sht. 9)

  $Q_{1\,max} = K i A$

  $= (15.2\ ft/min)(0.02)[(2)(5')(0.017')]$

  $= 0.052\ ft^3/min$

- Because the flow is restricted by the sump trench, flows will be transmitted over floor area also ("Q_2")

  Under this scenario, the geonet at the perimeter of the sump will govern. The flattest floor slope will also govern for the flow from area sloping to sump trench

  $Q = K i A$
  where A = area of geonet at sump perimeter that intercepts floor flow that slopes to sump trench. Intercepts sump at bottom and side slopes of LCS Gravel = 4.2' + 2.5' + 2.5' = 9.2 (See Sht 9/9)

  $Q_2 = (15.2\ ft/min)(0.003)[(9.2')(0.017')]$

  $= 0.009\ ft^3/min$

  Flow from sidewall + flow from cell floor that equalizes due to diurnal rise will contribute @ sidewall intercept w/ sump @ top of LCS gravel

  $Q = (15.2\ ft/min)(0.009)[(7.5')(0.017')] = 0.016\ ft^3/min$ (conservative: assumes floor will govern)

  $Q_{TOTAL} = Q_2(FRONT) + Q_1(SIDES) + Q_3(SIDEWALL)$

  $= 0.019\ ft^3/min + 0.052\ ft^3/min + 0.016\ ft^3/min$

  $= 0.087\ ft^3/min$

* See Attached Dwg NV-161-CON-001,002 for sump configuration
Also Ref. Dwg. NV 87050024 11 for sump configuration.

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PROJECT Beatty Order
SUBJECT ALR Calculation

- Check flow through gravel

Use $K = 4.5$ cm/sec

$4.5 \text{ cm/sec} \times \frac{\text{in}}{2.54 \text{ cm}} \times \frac{\text{ft}}{12 \text{ in}} = 0.148 \text{ ft/sec}$

$= 8.86 \text{ ft/min.}$

For the 1' of gravel in sump area, use gradient corresponding to flattest contributing slope to define flow through gravel (max)

$Q = KiA$

$Q = (8.86 \text{ ft/min})(0.003)[(1 \text{ ft})(\underbrace{(4.2'+25'+25')}_{\text{intercepts floor, flow from [illegible]}} + \underbrace{(2)(5')}_{\text{floor flow from slope}} + \underbrace{(7.5')}_{\text{sidewalk}}]$

$Q = 1.89 \text{ ft}^3/\text{min}$ > contributing flow ($0.087 \text{ ft}^3/\text{min}$) O.K.

- Check flow through riser perforations

1/2" holes / 4 holes per row (Ref. Drwg. NY87050024-6)

Use orifice equation

$Q = CA\sqrt{2gh}$

C = orifice coeff = 0.61 for sharp edges

A = area = $\pi(0.5''/2)^2$

$= 0.196 \text{ in}^2 = 1.36 \times 10^{-3} \text{ ft}^2$

h = head = 1 ft

$Q = (0.61)(1.36 \times 10^{-3} \text{ ft}^2)\sqrt{(2)(32.2 \text{ ft/sec})(1 \text{ ft})}$

$Q = 0.0067 \text{ ft}^3/\text{sec}$ per hole

$= 0.402 \text{ ft}^3/\text{min/hole}$ > total flow O.K.

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CALC. NO. NV161002
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PROJECT BEATTY
SUBJECT ALR Calc.

Because sumps have been determined to be the limiting factor in the LDS system, and C3/D3 have same design as C4/D4, the ALRs for these sumps should be calculated in the same manner.

The ALR shall not be greater than the flow that the system can deliver

Flow that system can deliver = 0.087 ft^3/min
$0.087\ ft^3/min \times 60 min/hr \times 24 hr/day \times 7.48 gal/ft^3 = 937\ gal/day$

$937\ gal/day \div 4.762\ Ac = 197\ gal/ac\ day$

Applying a S.F. of 2

$197\ gal/ac\ day \div 2 = 98\ gal/ac\ day$

An ALR of 98 gal/ac day for sump D4

based on the maximum that the system can deliver. Because the sump perimeter and sump trench are the limiting components of the system, some of these areas will be flooding till under these conditions, while some floor areas will have only partial or no flow.

For D3, Area = 2.502 Ac

ALR (with SF=2) = $937\ gal/day \div 2.502 Ac \div 2$
$= 187\ gal/ac\ day$

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PROJECT Beatty
SUBJECT ALR Calc.

Bench Sumps

The maximum flow in the LDS for the bench sumps will similar to the flows for the floor sumps. However, the bench slopes are less than the floor slopes.

Use minimum bench slope for evaluation

Min. Slope = 0.56 %

$Q = K i A$

Perimeter length = $\overbrace{(43' + 25' + 25' + 2(5') + 7.5')}^{\text{same as floor sump}}$

= 26.7 L.F.

$Q = (15.2\ ft/min)(0.0056)(0.017')(26.7')$

$= 0.039\ ft^3/min \left(\frac{7.48\ gal}{ft^3}\right)\left(\frac{60\ min}{hr}\right)\left(\frac{24\ hr}{day}\right)$

= 420 gal/day for bench sumps

Area served by D1 = 2.987 Ac
Area served by D2 = 2.025 Ac

Sump D1: ALR = 420 gal/day ÷ 2.987 Ac ÷ 2
= 70 gal/acr/day

Sump D2: ALR = 420 gal/day ÷ 2.025 Ac ÷ 2
= 104 gal/ac/day

Appendix 11-C

Response Action Plan Trench 12

RESPONSE ACTION PLAN

LEAK DETECTION SYSTEM

TRENCH 12

US ECOLOGY NEVADA

OCTOBER 2009

Revised May 2011

RESPONSE ACTION PLAN
TRENCH 12
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1. Introduction 1
2. Leachate Collection and Removal System 1
3. Leak Detection System 1
4. Action Leakage Rate 2
5. Sump Monitoring 3
6. Determining When the ALR Is Exceeded and Response Actions 3
7. Leachate Management 5

Table 1 ALR Determination
Figure 1 Typical Sump Layout

Appendix A ALR Calculations
Appendix B Pump Specification Sheet

RESPONSE ACTION PLAN

TRENCH 12

1. Introduction

The U.S. Environmental Protection Agency (USEPA) promulgated rules on January 29, 1992, requiring Response Action Plans (RAP) for new hazardous waste landfill units which commence construction after January 29, 1992, or which expand existing units after July 29, 1992 (57 FR 3462). At the US Ecology Nevada (USEN) Facility, Trench 12 is a new hazardous waste landfill unit that is regulated under this rule. This RAP meets the requirements of 40 CFR §264.304 and identifies actions to be taken if an action leakage rate has been exceeded.

2. Leachate Collection and Removal System

The primary leachate collection and removal system (LCRS) minimizes the possibility of leachate migrating through the primary liner into the underlying Leak Detection System (LDS). The primary LCRS in Trench 12 consists of a double-sided geocomposite (GSE Fabrinet 300-mil geonet sandwiched between two 8 ounce/yd^2 geotextiles) and an underlying 80-mil HDPE flexible membrane liner. (See Appendix A, Figure 1.)

Upon completion of all phases of construction, three (3) sumps will collect liquids draining from discrete portions of the Trench 12 cell floor and sidewalls. At the time of submittal, phase I construction is completed and one detection sump and one collection sump have been constructed in Trench 12. 40 CFR §264.301(c)(2) requires the facility to collect and remove leachate from the landfill during the active life and post-closure care period. Pumps located within a perforated riser pipe in the LCRS are used to remove liquids at each sump. USEN monitors LCRS sumps weekly and removes accumulating leachate to ensure that the head on the primary liner does not exceed 1.0 foot.

3. Leak Detection System (LDS)

The Trench 12 LDS consists of a double-side geocomposite (GSE Fabrinet 300-mil geonet sandwiched between two 8 ounce/yd^2 geotextiles) and a 60-mil underlying HDPE flexible membrane liner atop a geosynthetic clay liner. Upon completion of all phases of construction, three (3) sumps will be installed in the LDS to collect liquids draining from discrete portions of the leak detection layer in the Trench 12 cell floor and sidewalls. 40 CFR §264.301(c)(4) requires the facility to collect and remove pumpable liquids found in the LDS sumps to minimize the head on the bottom liner. "Pumpable liquids" are defined in this plan as liquid that can be reasonably pumped out of the sump based on sump dimensions and pump operating levels for automated pump systems.

Pumps located within a perforated riser pipe in the LDS are used to remove pumpable liquids at each sump. USEN monitors LDS sumps weekly and removes pumpable liquids.

Figure 1 shows the basic configuration of Trench 12 LDS/LCRS Sumps, and identifies the limits of the Sumps and the limits of the Trench Bottom Liner. The vertical distance from the bottom of the LDS Sumps to the lowest point of the trench bottom liner is approximately 2.25 feet. Figure 1 also shows a schematic of 1.0 foot of leachate on the Trench Bottom Liner. The LDS Pump will be positioned in each LDS Sump such that the base of the pump is approximately 2.25 feet below the lowest point of the trench bottom liner. The selected LDS pump type will not operate (i.e., cannot pump liquid) if there is less than 0.6 feet of fluid above the base of the pump. The operating controls for LDS Pumps will be set so that pumping will begin when the fluid level above the base of the pump is approximately 2.0 feet. At this fluid level, the fluid being pumped will be fully contained with the limits of the LDS/LCRS Sumps. The LDS Pump capacity as established in this RAP and fluid head levels equivalent to 1.0 feet of head above the lowest point of the trench bottom liner should never be exceeded.

4. Action Leakage Rate

The Action Leakage Rate (ALR) is the maximum design flow rate that the leak detection system (LDS) can remove without the fluid level on the bottom liner exceeding one (1) foot. This plan establishes an ALR for each of the three LDS sumps in Trench 12. (See Appendix A.)

The ALR for each sump is based on an approach similar to the USEPA-proposed definition for "rapid and extremely large leakage rate" as provided in the January 29, 1992 rule. In this plan, the ALR is based on the maximum flow that the LDS can deliver to the sumps as shown in Table 1.

Table 1. ALR Determination

Sump	Total Flow* (gal/day)	Pump Capacity** (gal/day)	Sump Area (acres)	ALR*** (gal/acre/day)
12A	910	2,160	4.45	204
12B	910	2,160	3.45	147
12C	910	2,160	3.26	279

Adjusted from 264 due to use of 220 geocomposite in LDS

* Inflow capacity of geocomposite component of LDS system.

** Maximum capacity of the IH125 pump at 80 feet is 1.5 gal/min.

*** The ALR is calculated based on the collection flow capacity of the LDS sump.

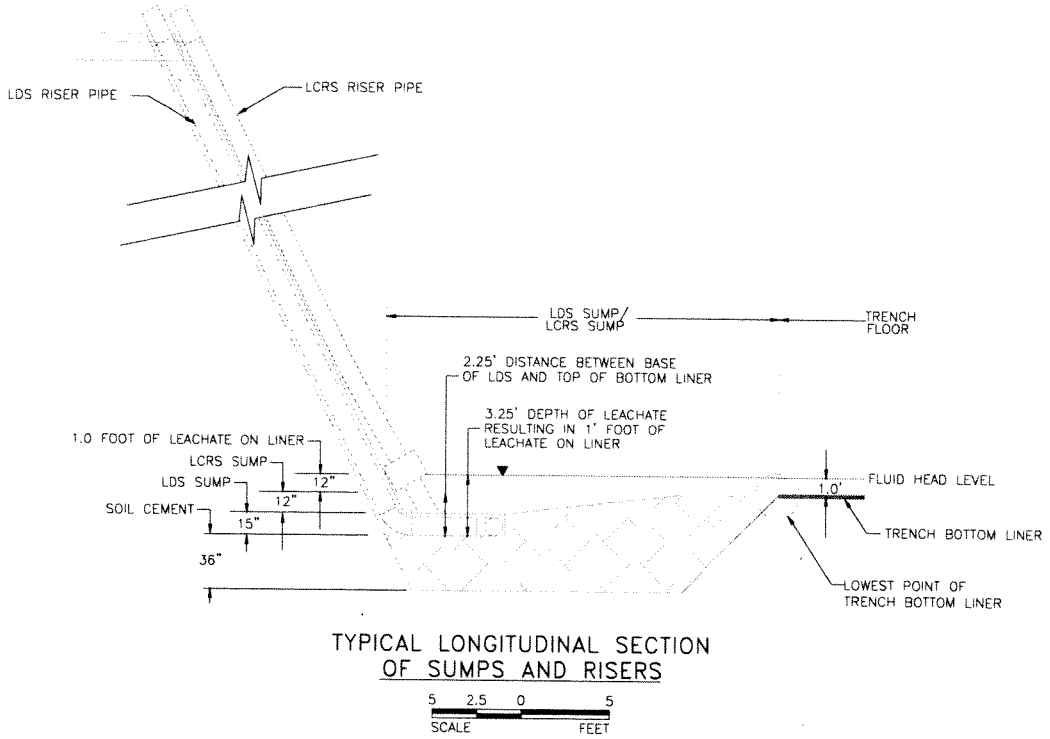
5. Sump Monitoring

All leachate sumps (LCRS and LDS) in Trench 12 are monitored weekly. The results of this monitoring (depth of leachate in the sump, volume of leachate removed if pumping is required, and pumping time) are recorded in the sump monitoring log maintained for each sump.

If liquid is detected in an LDS sump above the pump operating level, the sump will be pumped within 24 hours to remove pumpable liquids. If liquid is detected in an LCRS sump with a depth of 1.75 feet or greater in the LCRS riser, the sump will be pumped within 24 hours to remove pumpable liquids.

During the post-closure period, after the final cover is installed, leachate collection sumps and leak detection sumps will be monitored monthly.

Figure 1 Typical Sump Layout



6. Determining When the ALR Is Exceeded and Response Actions

If the volume of liquid pumped from any LDS sump exceeds 910 gal/day, facility personnel will report this information to the Facility Manager.[1]

[1] All references to the Facility Manager will include his/her designee and are herein-after referred to collectively as the "Facility Manager."

The Facility Manager will institute daily monitoring for five working days to determine whether average removal volumes indicate that practical daily total flow limits are being exceeded for an individual sump. Five-day average flow rates will then be used to calculate Action Leakage Rates to determine whether ALR values in Table 1 are being exceeded.

If the Facility Manager determines that the flow rate into the LDS exceeds the ALR for an individual sump, the Facility Manager will follow the steps outlined below:

1. Notify NDEP and EPA Region IX in writing within seven (7) days of determining that the ALR has been exceeded.

2. Submit a preliminary written assessment to NDEP within 14 days of the determination. This report will document the amount of liquids removed from the leak detection sump; likely sources of the liquids; possible location, size and cause of any leaks; and short-term actions taken and planned.

3. Assess the source or liquids and amounts of the liquids by source.

4. Conduct a fingerprint, hazardous constituent or other analysis to identify the sources of liquids and possible locations of any leaks, and the hazard and mobility of the liquid.

5. Assess the seriousness of the leak in terms of potential for escaping into the environment.

6. Determine, to the extent practicable, the location, size, and cause of any leak.

7. Determine whether waste receipt should cease or be curtailed; whether any waste should be removed from the unit for inspection, repairs, or controls; and whether or not the unit should be closed.

8. Determine if any other short-term and long-term actions need to be taken to mitigate or stop any leaks.

9. Within 30 days after the initial notification to NDEP that the action leakage rate has been exceeded, submit a report to NDEP containing the information and determinations specified in items 3 through 8 above.

10. Thereafter, submit monthly reports to NDEP as long as the flow rate in the leak detection systems exceeds the action leakage rate summarizing the results of any remedial actions taken and actions planned.

7. Leachate Management

Leachate generated from leachate collection systems (LDS and LCRS) in Trench 12 will be used for dust control within the lined cell (from which the leachate originated). During early operations in Trench 12, there will be less opportunity to use collected liquids from leachate collection systems for dust control when there is little waste disposed in Trench 12. Excess liquids, not used for dust control and removed from the active cell will require appropriate disposal as a hazardous liquid. The appropriate disposal of the hazardous liquid will need to be accomplished within appropriate time limitations.

Appendix A

ALR Calculations

AquAeTer *optimizing environmental resources - water; air; earth*

CALCULATION SUMMARY SHEET

PROJECT NUMBER: 073133.05

PROJECT NAME: USEN – Trench 12 Response Action Plan

DATE: May 20, 2008

CALCULATION NUMBER: _____ Revision: 0

CALCULATION TITLE: ALR Calculation

DESCRIPTION OF CALCULATION:

Calculation to determine Action Leakage Rate in the LDS

REFERENCES USED: Number of Reference Pages Attached: _____

1. GSE Geotextile Information
2. Designing with Geosynthetics, Koerner, 1998
3. Calculation in 10/8/2007 Supplement to Landfill Report for Trench 12 Attachment 3, "LDS Flow Capacity and Pump Sizing"

REVIEW COMMENTS:

CALCULATION MADE BY: CAB DATE: 5/20/2008

CALCULATION CHECKED BY: SLW DATE: 6/18/2008

CALCULATION REVISED BY: CAB DATE: 6/18/2008

CALCULATION REVIEWED BY: SLW DATE: 6/18/2008

Purpose of Calculation

Evaluation of the ability of the leak detection system (LDS) for Trench 12 to transmit flow and evaluation of the action leakage rate (ALR). The evaluation of ALR is required in the Response Action Plan (RAP). For this calculation the conservative assumption is made that the primary liner system leaks and pumping of the LDS is required.

Method

- The LDS flow to a typical Trench 12 sump was calculated.
- The ALR for Trench 12 LDS sumps was calculated

Analysis

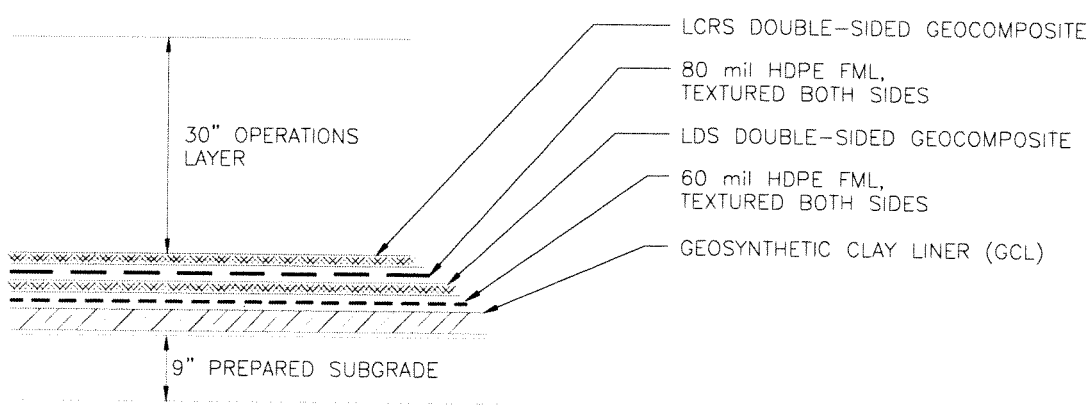
Applicable Regulations

The regulatory definition of the ALR is, "the maximum design flow rate the LDS can remove without the fluid head on the bottom liner exceeding one foot." The ALR must include an adequate safety margin to allow for uncertainties in the design (e.g., slope, hydraulic conductivity, thickness of drainage material), construction, operation, and location of the LDS, waste and leachate characteristics, likelihood and amounts of other sources of liquids in the LDS, and proposed response actions. The ALR must consider decreases in the flow capacity of the system over time resulting from siltation and clogging, rib layover and creep of synthetic components of the system, overburden pressures, etc.

Geometry

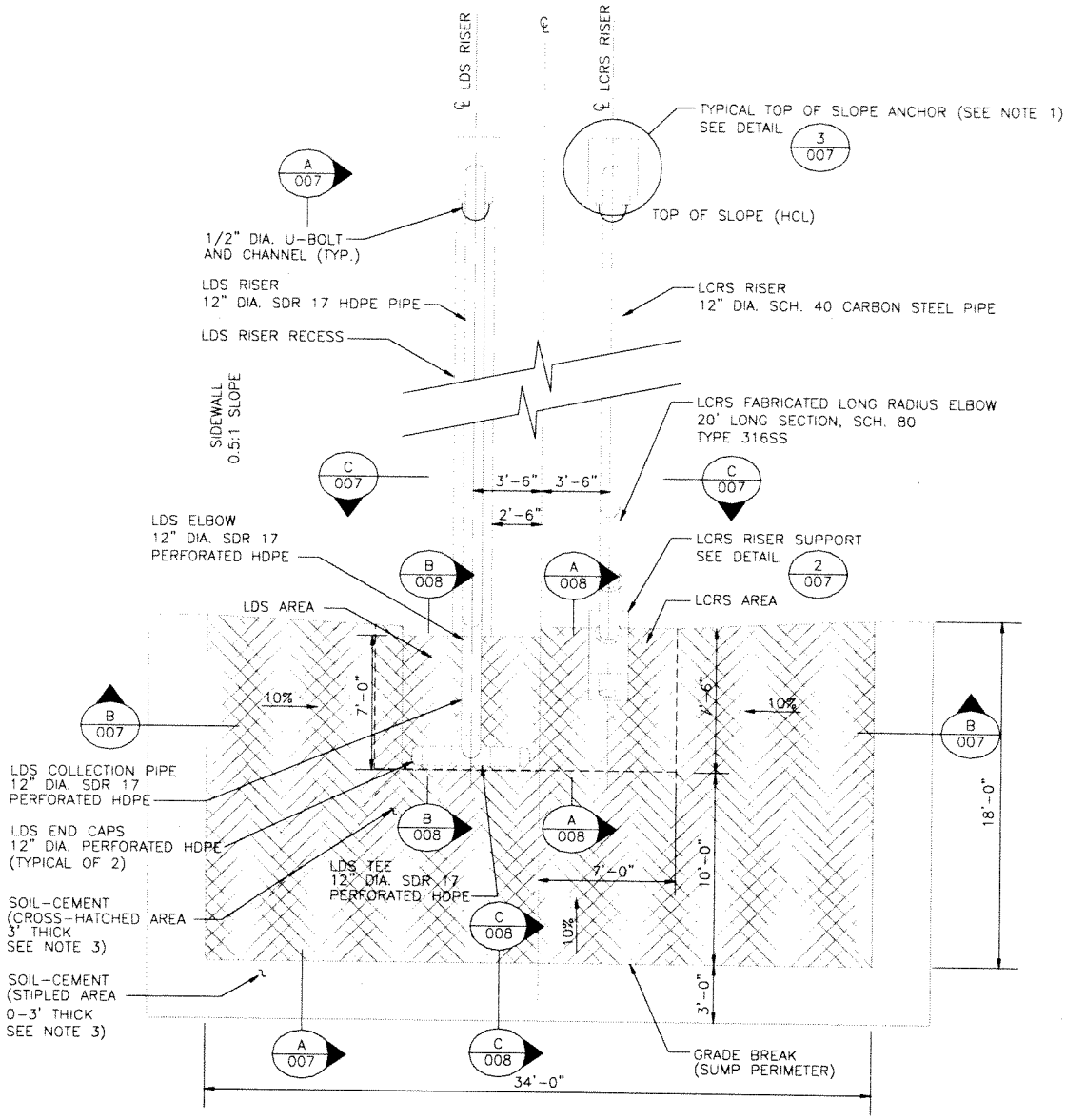
The typical bottom liner is shown below. Both the LCRS and LDS double-sided geocomposites are have a 300-mil geonet component.

Figure 1. Typical Trench Bottom Configuration



There are three sumps in the Trench 12 design. The typical geometry is shown below.

Figure 2. Typical Sump Layout



Flow Capacities

The following flow elements are used in the LDS.

- Double sided geocomposite (GSE Fabrinet 300-mil geonet sandwiched between two 8 ounce/yd^2 geotextiles).

- Gravel (screened site materials with at least 95% falling within the size range between 1.0 and 3.0 inches and not more than 5% passing the #4 sieve) used in the sump only.

The double sided geocomposite is used in the slope liner LDS as well as in the bottom liner as shown in Figure 1. Therefore, flow within in the LDS will be controlled by the minimum bottom slope.

Flow within the geocomposite is calculated using Darcy's Equation (which assumes laminar flow within the net).

$q = \Theta_{eff} * i$

Where

q = flow per unit width

Θ_{eff} = effective transmissivity

i = hydraulic gradient

Effective transmissivity for the geocomposite is calculated by applying several safety factors to the published transmissivity value. The following formula is used for that calculation.

$$\Theta_{eff} = \frac{\Theta}{(FS_{CR} \times FS_{IN} \times FS_{CC} \times FS_{BC})}$$ Where:

FS_{CR} = the factor of safety for creep deformation of the drainage core itself and/or intrusion of the adjacent geotextile into the drainage core space

FS_{IN} = the factor of safety for elastic deformation of the adjacent geotextile intruding into the drainage core space

FS_{CC} = the factor of safety for chemical clogging and/or precipitation of chemicals onto the geotextile or within the drainage core space

FS_{BC} = the factor of safety for biological clogging of the geotextile or within the drainage core space

The following table shows the unit flow capacity for the 300-mil trench bottom geocomposite based on the applicable transmissivity, or hydraulic conductivities, hydraulic gradients, and safety factors.

Flow Element	Θ	FS_{CR}	FS_{IN}	FS_{CC}	FS_{BC}	Θ_{eff}	i	q	q
Units	gal/min /ft	NA	NA	NA	NA	gal/min /ft	NA	gal/min/ft	gal/day/ft
GSE Fabrinet UF 8 ounce/yd^2	4.35	1.4	1.5	1.5	1.5	0.92	**0.01**	0.0092	13
GSE Fabrinet UF	4.35	1.4	1.5	1.5	1.5	0.92	**0.1**	0.0921	133

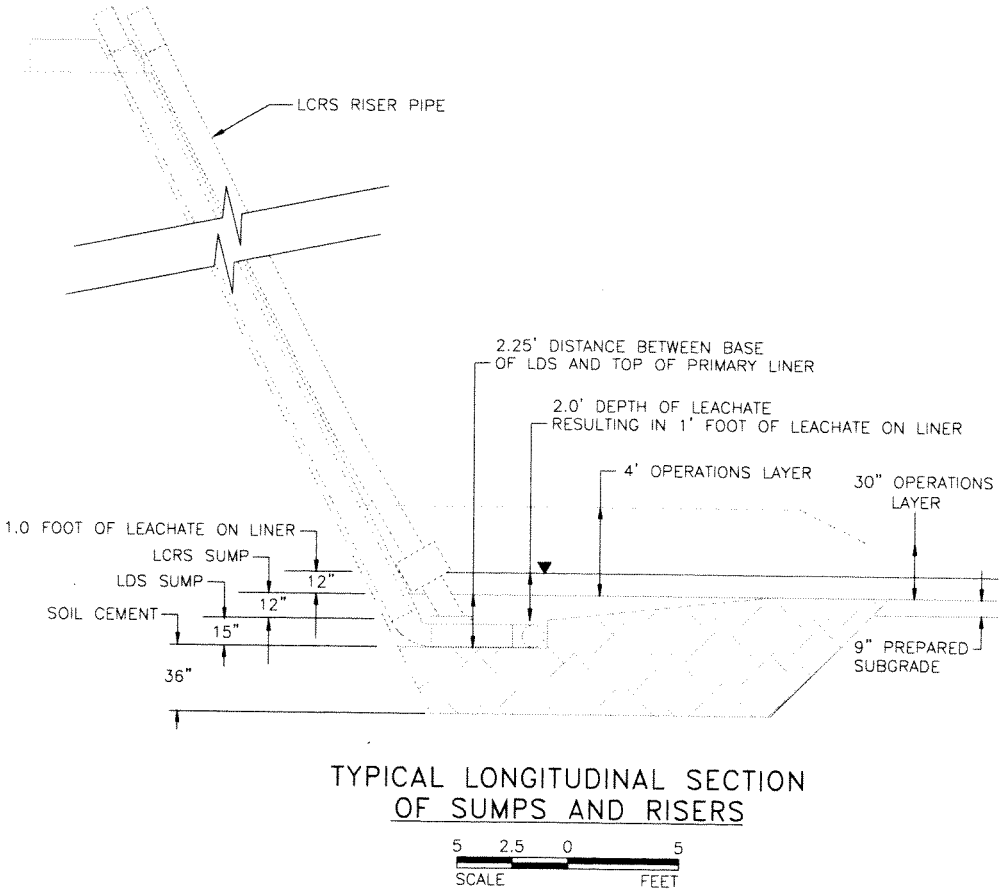
8 ounce/yd^2									

Transmissivity values are provided by the manufacturer as included in the references. Safety factors are taken from the literature (Koerner 1998). Flow capacities are shown at hydraulic gradients of 1 percent and 10 percent for the nominal cell bottom slope and the minimum sump slope, respectively. Since the gravel is used only within the sump boundaries around the riser pipes, flow capacities are calculated for the geocomposite only.

Controlling Section

Preferential flow for the cell floor is to the LDS sumps of each Phase (12A, 12B, and 12C). Because flow is transmitted tot the sump from across the entire cell floor, the sump perimeter was determined to be the limiting factor in transmitting flow to the sump for removal. The maximum flow that the system can remove is determined by the maximum flow that can be transmitted at the sump perimeter and removed through the riser pipe and pump. At the maximum flow rate that the system can deliver, converted to an ALR, the geocomposite will flow full, or partially full, and fluid head will not increase (mound) with time.

Figure 3. Typical Sump (Longitudinal Section)



As shown in the typical sump layout figures (Figures 2 and 3), there are two potentially controlling sections:

1) the 7'x 7' LDS perimeter at 15" thick; and

2) the perimeter at the grade break between the 1 and 10 percent slopes.

To determine the controlling section, the flow at each section was determined as:

Total Flow = Flow at section * Section Length (perimeter).

Total Flow at 7'x 7' LDS perimeter = 133 gal/day/ft * (7'+7'+7') = 2,793 gal/day

Total Flow at 1 to 10% grade break = 13 gal/day/ft * (18'+34'+18') = 910 gal/day

Therefore, the controlling section is located at the grade break from 1 percent to 10 percent surround each of the three sumps. The grade break has a 70 feet long perimeter Contribution to flow from the fourth side (against the trench sidewall) is ignored.

Total flow capacity for each cell contributing to each sump (including floor and sidewalls) and total area for each cell are shown in the table below and are used to calculate the ALR.

The smallest pump that has been used in the LDS system of Trench 11 is a two-inch pump. That pump has a maximum flow rate of nine gallons per minute, which is greater than the maximum flow that the Trench 12 system can deliver. The same pump or equivalent is anticipated for use in Trench 12 LDS sumps. A specification sheet for the pump is included.

Sump	Total Flow Capacity Through GSE Fabrinet UF (at i = 0.01) (gal/day)	Pump Capacity (gallons/day)	Trench Area Served by Sump (acres)	ALR (gal/acre/day)
12A	910	2,160	4.45	204
12B	910	2,160	3.45	264
12C	910	2,160	3.26	279

Result

Sumps 12A, 12B, and 12C of Trench 12 all have the same design. The only difference between the three sumps is the size of the area draining to the sumps. Sump 12A has the largest drainage area at 4.45 acres.

The Iron Horse IH125 Extended-Duty Piston Pump or equivalent is acceptable for use in Trench 12 LDS sumps.

Flow through the 300-mil GSE Fabrinet UF (or equivalent) at 1 percent up to the perimeter of the sump (at the grade break) is the controlling section for ALR determination. The total flow at each of the three sumps at this controlling section is 910 gallons per day. This results in the lowest ALR occurring in Cell 12A at 204 gallons per acre-day. Flow from any of the three sumps exceeding 910 gallons per day might result in fluid head rising on the bottom liner. Determination of exceedence of the 910 gallons per day flow will result in the implementation of a response action.

Flow through the 300-mil GSE Fabrinet UF at 10 percent gradient up to the perimeter of the 7' x 7' area around the LDS pipe and pump is sufficient, and does not result in accumulation of water on the LDS liner.

AquAeTer

optimizing environmental resources - water; air; earth

CALCULATION SUMMARY SHEET

PROJECT NUMBER: 103247

PROJECT NAME: USEN T12/PH2 Construction QC and Certification

DATE: March 28, 2011

CALCULATION NUMBER: (not assigned) Revision: Update 2008 ALR calculation

CALCULATION TITLE: Determine Sump 12B ALR for 220 mil Geocomposite

DESCRIPTION OF CALCULATION:

Revision of ALR determination for Trench 12, Phase 12B LDS geocomposite

REFERENCES USED: Number of Reference Pages Attached: 8

1. August 2008 Response Action Plan, LDS for Trench 12 (5/20/08 ALR Calculation)
2. Skaps TN220-2-6 delivered material specs.
4. Drawing NV12-11-021, As built topography of Phase 12B cell floor
3. Geosynthetics Research Institute Standard GC8

REVIEW COMMENTS:

CALCULATION MADE BY: SLW DATE: 28 March 2011

CALCULATION CHECKED BY: CAB DATE: 28 March 2011

CALCULATION REVISED BY: DATE:

CALCULATION REVIEWED BY: SLW DATE: 28 March 2011

Purpose of Calculation

Determine flow carrying capacity of a 220-mil double-sided geocomposite (TN220-2-6) in the LDS portion of the liner system on the floor of Trench 12- Phase 12B for the purpose of revising the Action Leakage Rate (ALR) for the Phase 12B sump. Revision of the ALR is required because TN220-2-6 geocomposite was used in the construction of Sump 12B instead of the 300-mil geocomposite that was intended (per approved design) to be used.

Method

Determine the flow carrying capacity of the 220 mil geocomposite by the same method used in the similar calculation made for the Trench 12 Response Action Plan (2008). The revised calculation uses the same safety factors (i.e., capacity reduction factors) that were used in the 2008 calculation rather than the less conservative capacity reduction factors that are recommended by GRI in GC8. These factors, though more conservative than recommended by GRI are used for consistency with previous Trench 12 LDS calculations.

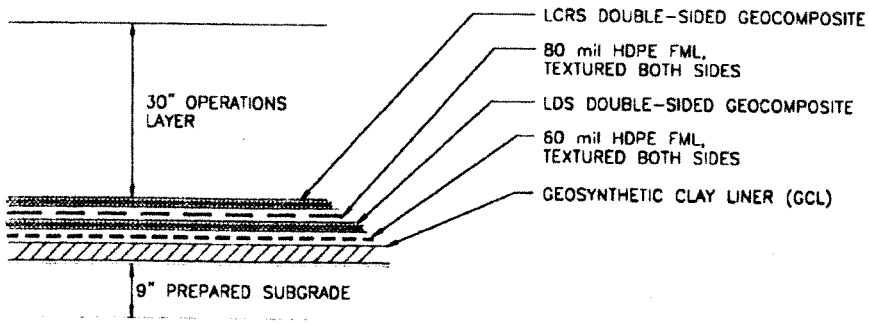
Analysis

USEPA guidance on Action Leakage Rates for Leak Detection Systems (EPA 530-R-92-004, 1992) defines the ALR as the "maximum design flow rate that the leak detection system can remove without the fluid head on the bottom liner exceeding one foot." As such, the ALR is the flow the drainage media (in this case, a 220-mil geocomposite) can convey as free flow under the influence of gravity at the actual slope (gradient) of the installed geocomposite. The calculation considers no head build-up, thus gradient is the only driving force causing the liquid flow. Flow constriction, such as narrowing of the flow pathway width near the sump entrance, becomes the controlling factor in ALR determination.

Flow Geometry

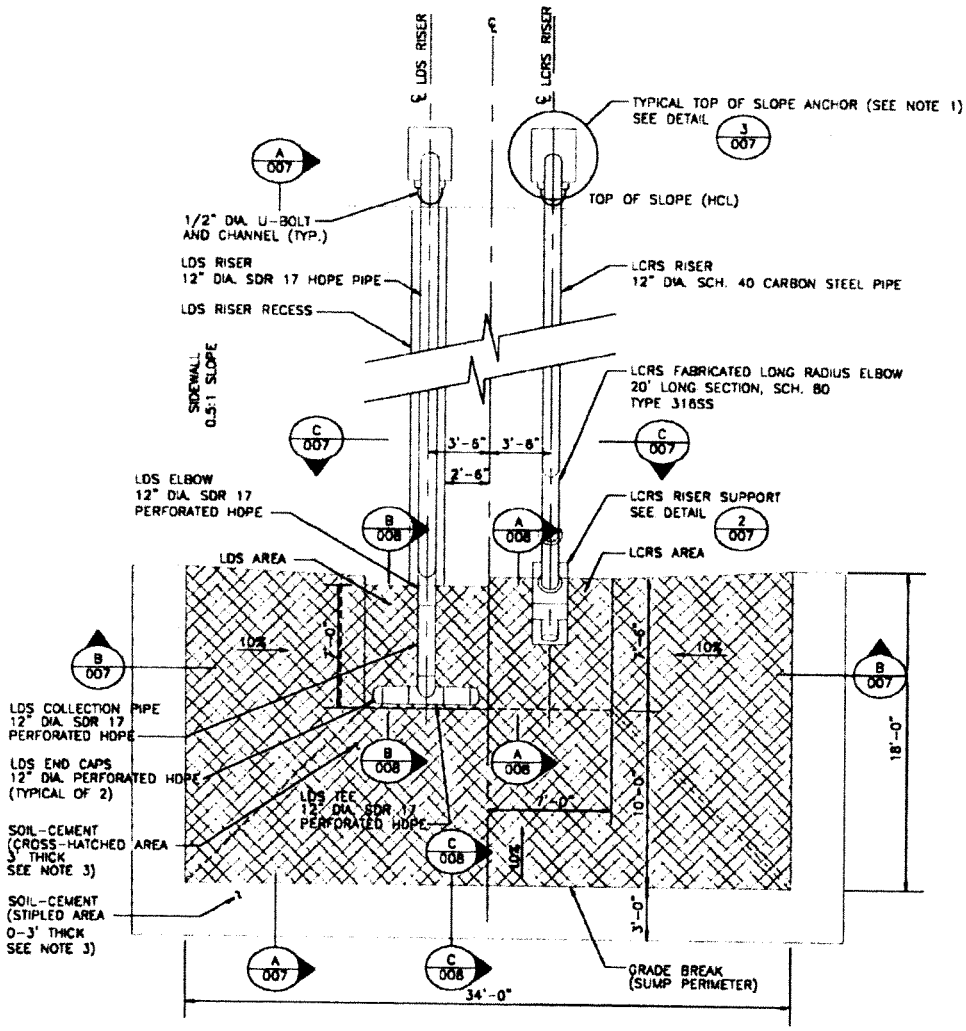
The typical bottom liner is shown below.

Figure 1. Typical Trench Bottom Configuration



For Phase 12B, the LDS double-sided geocomposite is the 220-mil thick Skaps TN220-2-6 geocomposite. This material type differs from the 300-mil geocomposite specified for the LDS liner NDEP-approved Trench 12 design and, as such, is intended to apply only to the Phase 12B area and Sump 12B.

Figure 2. Typical Sump Layout



Flow Capacities

The following flow determination apply to the geocomposite component LDS part of the Phase 12B liner system.

- Double sided geocomposite (Skaps Transnet TN220-2-6).

The 220-mil double sided geocomposite is used in the LDS sideslope liner as well as in the LDS bottom liner. A single, continuous layer of geocomposite is used. Therefore, flow within in the LDS is controlled by the slope of the landfill cell bottom and the geometry of the sump entry.

The flow carrying capacity of the geocomposite is assumed to be equal to test values for material used in Phase 12B construction, as reported by the manufacturer at the time of installation. The geometric mean of those actual values is:

$$\Theta_{manufacturer} = [2.85 \times 10^{-4} * 2.86 \times 10^{-4} * 2.98 \times 10^{-4}]^{-1/3} \text{ in } m^2/sec$$

$$= 2.90 \times 10^{-4} \ m^2/sec$$

In actual use as a landfill liner system component, the capacity of the material can decrease over time in response to textile intrusion (IN), creep (CR), chemical (CC), and biological (BC) factors. Although the most conservative application of these factors likely applies only at a point in time late in the life of the landfill, to make the calculation of flow carrying capacity appropriately conservative, these factors are considered (as shown below) to reduce the manufacturer's determination of material property from the outset of landfill operation.

$$\Theta_{eff} = [\Theta_{manufacturer}] \div [FS_{IN} * FS_{CR} * FS_{CC} * FS_{BC}]$$

The following table shows the determination of unit flow capacity for the geocomposite based on the mean transmissivity and safety factors.

Flow Element	$\Theta_{manufacturer}$	FS_{IN}	FS_{CR}	FS_{CC}	FS_{BC}	Θ_{eff}
Units	m^2/s	NA	NA	NA	NA	m^2/s
TransNet 220-2-6	2.90×10^{-4}	1.5	1.4	1.5	1.5	6.14×10^{-5}

Considering the reduced transmissivity of the material, flow within the geocomposite is calculated using Darcy's Law (which assumes laminar flow). GC8 is included as a reference for the formula that is used below.

$$q_{actual} = \Theta_{eff} * i$$

Where

q_{actual} = flow per unit width of material, based on effective material transmissivity

Θ_{eff} = effective transmissivity, based on actual transmissivity reported by manufacturer

i = hydraulic gradient

Flow within the material is controlled by effective transmissivity (Θ_{eff}) and the actual (as-built) slope of the LDS floor liner. In the Trench 12B floor area, the average slope of the trench floor subbasins that potentially direct leakage to Sump 12B, as taken from Drawing NV12-11-021, is 1.7% in the area outside (above) the Outer Sump entry. The average slope is 10% in the area between the Outer Sump entry and the Main Sump entry. The determination of flow potential (q_{actual}) per unit width of flow path in each area of the sump entry is determined below.

Flow Element	Θ_{eff}	i	q_{actual}	q_{actual}
	m^2/s	NA	$m^3/s/m$	gal/day/ft
TransNet 220-2-6	6.14×10^{-5}	0.017	1.04×10^{-6}	7.26
	6.14×10^{-5}	0.1	6.14×10^{-6}	42.72

Conversion: $1.0\ m^3/s/m = 1.0\ m^2/s = 6.9569 \times 10^6$ gpd/ft

These values of q_{actual} are applied to the length of the controlling geocomposite section at each of the Sump 12B entries (Outer Sump and Main LDS Sump) to determine the total daily flow and daily flow per contributing area (in acres). These values are considered to determine the ALR for Sump 12B.

The total sidewall and floor area of the Phase 12B landfill cell, 3.45 acres, is considered in these calculations.

Controlling Section at **Outer Sump entry**

This calculation focuses on the flow restriction (controlling cross-section) at the perimeter of the grade break between the main landfill cell floor (1.7% average slope) and the interior slope of the Outer Sump area (10%). The Outer Sump has a perimeter of 70 feet at the grade break between the cell floor and the sump. This dimension does not include the sump side that is against the sidewall because little flow is contributed from the sidewall, the sidewall slope is steep (increasing flow), and a double-thickness of geocomposite is installed at the sidewall/floor transition. The table below shows the value that would become the ALR if the TN220-2-6 geocomposite layer at the Inner Sump Entry is the controlling geocomposite section.

Sump	q_{actual}	Width of Controlling Section	ALR	ALR
12B	gal/day/ft	Feet	gallons/day	gpd/acre
	7.26	70	508.2	147.3

Controlling Section at **Main Sump Entry**

Within the 7'x7' Main LDS Sump area immediately surrounding the LDS riser pipe, the perimeter is 21 feet (not including the sump side that is against the sidewall) as shown in the typical sump layout figure. The table below shows the value that would become the ALR if the

TN220-2-6 geocomposite layer at the Main LDS Sump Entry is the controlling geocomposite section.

Sump	q_{actual}	Width of Controlling Section	ALR	ALR
12B	gal/day/ft	Feet	gallons/day	gpd/acre
	42.72	21	897.1	260.0

Verification Calculation Result

This calculation determines Sump 12B ALR value (as total daily flow to the sump and total daily flow in gallons per contributing acre (gpd/ac) for Trench 12, Phase 12B. The ALR at the Outer Sump Entry is 147.3 gpd/ac and the ALR at the Main Sump Entry is 260 gpd/ac. The lower value, 147.3 gpd/ac, becomes the ALR for the Phase 12B area. As indicated, this ALR is equivalent to a total daily flow to Sump 12B of approximately 508 gallons.

Actions that would be required in the event of LDS sump flows exceeding the 508 gallons per day ALR value are provided in the approved Trench 12 Response Action Plan. This modified ALR is applicable only to Sump 12B and replaces the Sump 12B value included in the 2008 RAP. ALRs for Sumps 12A and 12C are not changed by this calculation.

Appendix B

Pump Specification Sheet

IRON HORSE

Extended-Duty Piston Pumps

For Remediation and Landfill Pumping

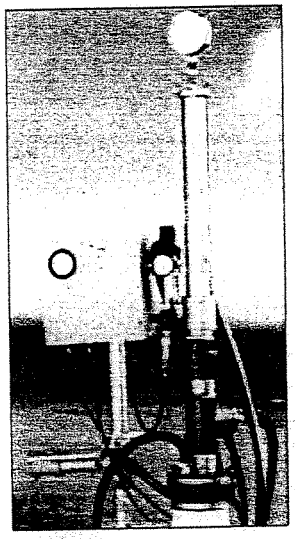
IRON HORSE™

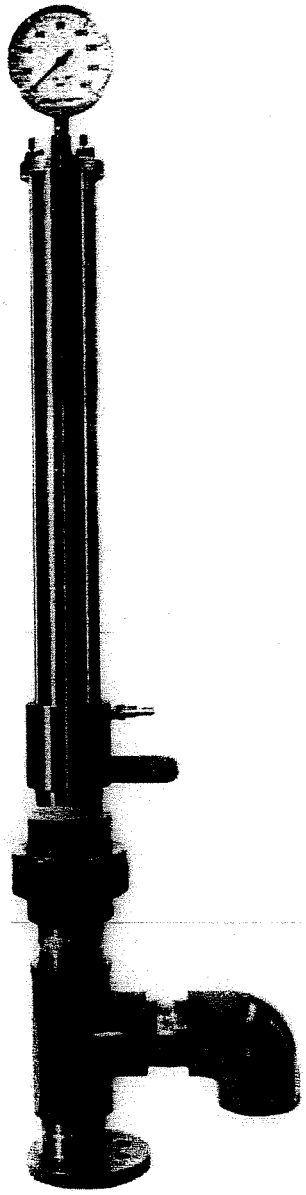
The first piston pump durable enough to carry the QED name

QED
Environmental Systems
A division of Severn Trent Laboratories, Inc.

IRON HORSE Extended-Duty Piston Pumps Built for

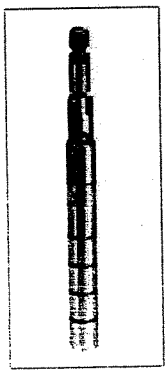
IRON HORSE Extended-Duty Piston Pumps are built for durability based on QED's 20 years of engineering experience in landfill pumping. IRON HORSE pumps are designed to provide dependable pumping in applications that benefit from the special capabilities of piston pumps, such as slant wells, sites requiring no drive air with the pumped fluids, deeper wells, and drawdown to extremely low levels.





IRON HORSE pumps are air-powered and use a reciprocating air cylinder at the wellhead to drive a piston down in the well, connected by a flexible fiberglass rod. Each piston stroke lifts a known amount of liquid and provides positive suction at the inlet. Piston pumps can be installed in wells and risers at any angle, including horizontal.

Unlike older piston pump designs used in landfills and remediation sites, IRON HORSE pumps are designed from the start for durability and serviceability to greatly reduce maintenance frequency and costs. In comparative testing, IRON HORSE has demonstrated critical component life many times that of older piston pump designs. IRON HORSE'S simplicity and strength advantages are visible even from first appearances. QED's extensive engineering experience and resources have delivered the first piston pump good enough to carry our name.



What makes IRON HORSE piston pumps more durable?
IRON HORSE pump's durability advantage is based on better engineering solutions to the challenges of landfill and remediation pumping. Examples of important IRON HORSE pump durability features include:

- Heavy-duty, stainless steel construction used for key components subject to wear, such as the piston and check valves.
- Rugged, oil well type, all-stainless steel piston
- Ultra-hard metal surfaces and special seal materials for longer service, as used in concrete pumps and industrial slurry equipment
- Serviceable driver air cylinder components to avoid having to replace the entire unit when it wears out.
- Serviceable stainless steel check valves downwell, instead of throwaway plastic type.
- Simpler, more reliable built-in air cylinder controls, similar to those used on jackhammers, rather than weather-exposed valves and tubing circuits.

Durability, Backed by the Leaders in Air-Powered Landfill Pumping

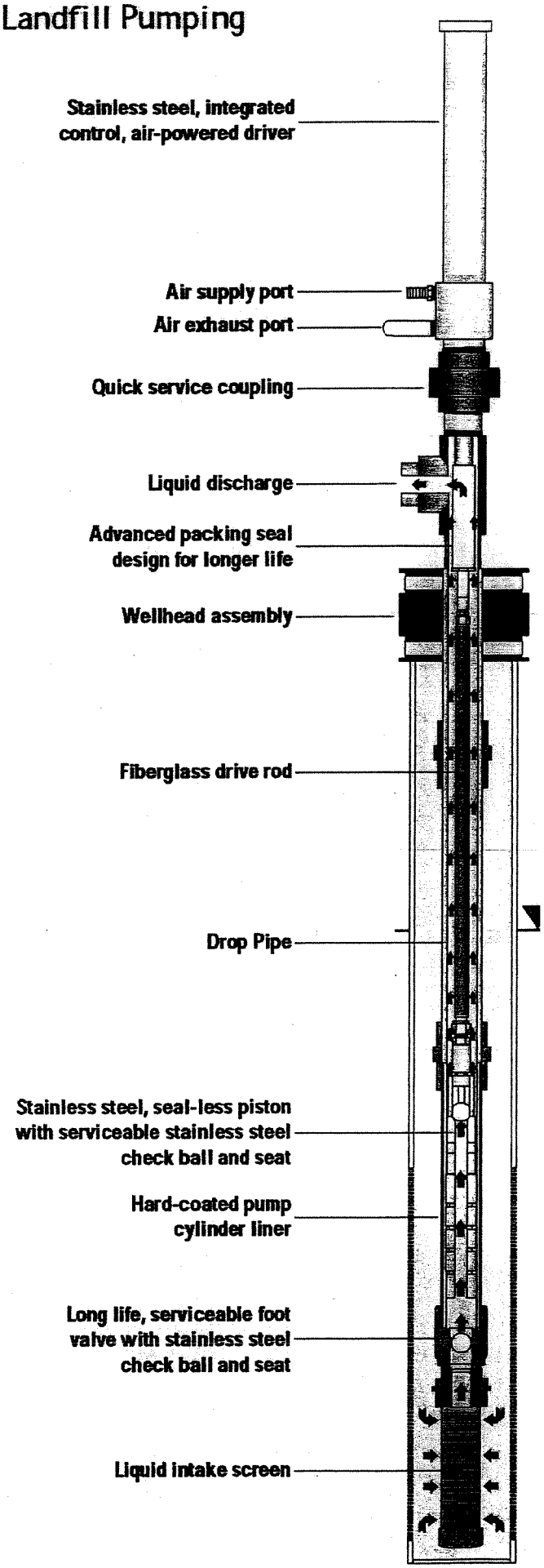
How it Works

The IRON HORSE pump has four major components:

- A reciprocating air cylinder at the wellhead.
- A liquid pumping piston and cylinder at the bottom of the well.
- A fiberglass rod connecting the air cylinder to the downwell piston.
- A downwell drop pipe which provides the flow conduit from the downhole pump to the wellhead.

The air cylinder is connected via a flexible, one-piece fiberglass rod to the liquid pump piston. The piston reciprocates within a specially designed stainless steel cylinder located at the bottom of the drop pipe.

Supplying compressed air to the air cylinder starts it reciprocating – automatically. The reciprocating action is controlled by heavy-duty, jackhammer type controls built into the cylinder itself. The recommended level control is referenced to pressure and vacuum in the well, and provides accurate and reliable pump shutoff when the desired level is reached.



Advantages

- Extended duty between service compared to other piston pump designs
- Simple driver with reliable, built-in reciprocation mechanism
- Seal-less, stainless steel pump piston
- Serviceable check valves and drive cylinder
- Extreme low drawn-down capability
- Isolates driver air from pumped liquid
- Slant-well and horizontal applications

IRON HORSE Extended-Duty Piston Pump Specifications

IH 125 System (1-1/4" Drop Pipe)

Max Flow Rate: 2 gpm (7.5 lpm)
Approximate Pump Volume/Cycle: 0.045 gal (.170 L)
Max. Cycle Rate: 40 cpm
Max. Depth: 400 ft. (121.9 m)
Consult factory for depths greater than 400 ft.
Min. Liquid Pumping Level Above Bottom:
Standard Screen 12 in. (30.5 cm)
Short Screen 6 in. (15.2 cm)
Max. Air Pressure: 120 psi (8.4 kg/cm2)
Air Usage: See chart below
Min. Well Casing Inside Diameter: 4" (10.2 cm)

Model IHD - Driver Assembly:
Weight: 22 lbs. (9.97 kg)
Length: 50 in. (1.27 m) without gauge
Max. Diameter: 4 in. (10.2 cm)
Drive Piston Diameter: 2 in. (5.08 cm)

Wellhead Assembly
QED offers 4", 5", 6" or 8" wellhead caps and flanges required to support and operate the system.

Model IH125 - Downwell Pump Assembly (Piston, Cylinder, Foot-Valve, Screen)

Piston:
Weight: 1.5 lbs. (.68 kg)
Length: 11 in. (27.9 cm)
Diameter: 1.06 in. (2.69 cm)

Pump Cylinder Assembly:
Weight: 5 lbs. (2.27 kg)
Length: 58 in. (1.47 m)
Outside: Diameter 2.25 in. (5.72 cm)

Model 39538 Drive Rod:
1/2 in. (1.27 cm) diameter, 3/8 in. (.952 cm) pultruded epoxy and glass fiber with protected anti-abrasion coating

Drop Pipe, not supplied by QED: 1 1/4 in. (3.175 cm) CPVC, Schedule 80, 10 ft. (3.04 m) sections, threaded connectors

Model 39573 Pneumatic Bubbler Level Control:
(References to well-head vacuum)
Weight: 14 lbs. (6.35 kg)
Size: 12 in. (30.4 cm) high x 15 in. (38.1 cm) wide x 6 in. (15.2 in.) deep, (Complete, with regulator, mounting brackets and connection fittings)

IH 200 System (2" Drop Pipe)

Max Flow Rate: 5 gpm (18.9 lpm)
Approximate Pump Volume/Cycle: 0.120 gal (.454 L)
Max. Cycle Rate: 40 cpm
Max. Depth: 180 ft. (54.8 m)
Consult factory for depths greater than 180 ft.
Min. Liquid Pumping Level Above Bottom:
Standard Screen 18 in. (45.7 cm)
Short Screen 6 in. (15.2 cm)
Max. Air Pressure: 120 psi (8.4 kg/cm2)
Air Usage: See chart below
Min. Well Casing Inside Diameter: 5" (12.7 cm)

Model IHD - Driver Assembly:
Weight: 22 lbs. (9.97 kg)
Length: 50 in. (1.27 m) without gauge
Max. Diameter: 4 in. (10.2 cm)
Drive Piston Diameter: 2 in. (5.08 cm)

Wellhead Assembly
QED offers 5", 6" or 8" wellhead caps and flanges required to support and operate the system.

Model IH200 - Downwell Pump Assembly (Piston, Cylinder, Foot-Valve, Screen)

Piston:
Weight: 6.5 lbs. (2.94 kg)
Length: 18 inches (45.7 cm)
Diameter: 1.75 in. (4.44 cm)

Pump Cylinder Assembly:
Weight: 8.5 lbs. (3.85 kg)
Length: 64 in. (1.62 m)
Outside Diameter: 3.35 in. (8.51 cm)

Model 39538 Drive Rod:
1/2 in. (1.27 cm) diameter, 3/8 in. (.952 cm) pultruded epoxy and glass fiber with protected anti-abrasion coating

Drop Pipe, not supplied by QED: 2 in. (5.08 cm) CPVC, Schedule 80, 10 ft. (3.04 m) sections, threaded connectors

Model 39573 Pneumatic Bubbler Level Control:
(References to well-head vacuum)
Weight: 14 lbs. (6.35 kg)
Size: 12 in. (30.4 cm) high x 15 in. (38.1 cm) wide x 6 in. (15.2 in.) deep, (Complete, with regulator, mounting brackets and connecton fittings).

Materials of Construction

Above-Ground Pump Driver Materials:
Driver Assembly: Stainless Steel / Aluminum
Stuffing Box: Stainless Steel
Wellhead Assembly: Nylon, CPVC, Stainless Steel

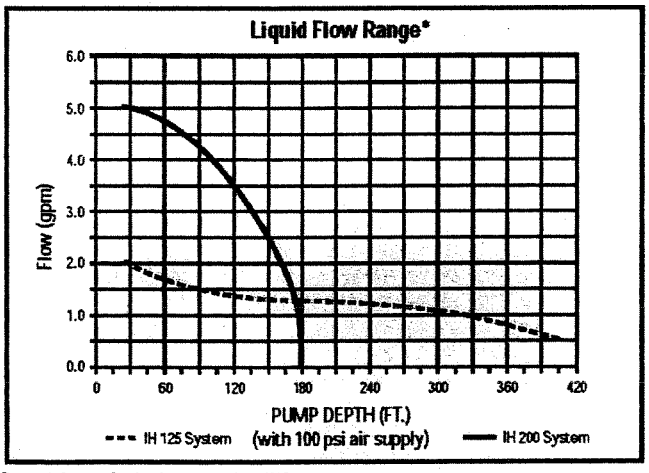
Down-Well Pump Materials:
Drive Rod: Fiberglass
Pump Piston: Stainless Steel
Pump Piston Seal: Labyrinth Seal (seal-less)
Pump Piston Check Ball & Seat: Stainless Steel
Pump Housing Assembly: Stainless Steel / CPVC
Foot-Valve (Check Ball & Seat): Stainless Steel
Intake Screen: CPVC or Stainless Steel

Hose & Tubing Options:
Pump Air Supply: 3/8 in. (.952 cm) ID Rubber Air Hose
Liquid Discharge:
1-in. (2.54 cm) ID Nylon Tube or Rubber Hose
Level Control Bubbler Tube:
1/4 in. (.635 cm) OD Black Nylon
Level Control Reference Tube:
5/16 in. (.793 cm) Black Nylon

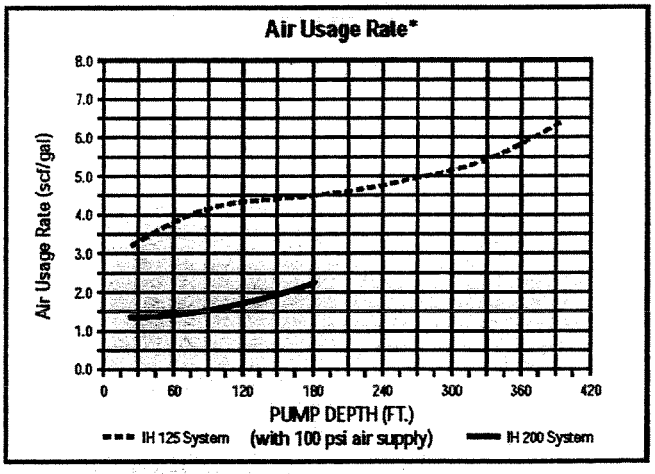
Application Temperature Range: Max: 180° F (82.2 C)
Downhole Min: -20° F (-28.9 C) Surface

Warranty:
Limited (1) one-year warranty for parts and labor on all system components. Warranty begins on delivery date.

IRON HORSE™
Patent Pending



*consult factory for depths greater than 400ft.



*consult factory for depths greater than 400ft.

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Appendix 11 – D

EPA Memo for Leachate as Dust Suppression

SEND TO:
CHAD & STEVE B.
JOE & DOUG
~~DOUG~~
SIMON & JIM

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

MAY 23 1996

OFFICE OF
SOLID WASTE AND EMERGENCY RESPONSE

MEMORANDUM

SUBJECT: The Proposal by USPCI to use Hazardous Waste Leachate for Dust Suppression at a Landfill

FROM: Matthew Hale, Director
Permits and State Programs Division (5303W)
Office of Solid Waste

TO: Steve Gilrein, Associate Director for RCRA
Hazardous Waste Management Division (6PD-O)

We have carefully considered the proposal by USPCI to use hazardous waste leachate for dust suppression at its Lone Mountain landfill in Oklahoma. We believe that the proposal, as USPCI and the Region VI staff have described it, is environmentally sound when properly managed under RCRA permitting conditions. To meet the permit requirements for dust suppression, USPCI currently purchases potable water and then disposes of the leachate off site through deep well injection. By using the leachate, a valuable resource would be saved and the relatively costly disposal of a low-level hazardous waste would not be necessary.

The proposal raises two legal issues. First, Section 3004(l) of RCRA forbids the use of hazardous waste for dust suppression or road treatment. Second, removing the leachate from the unit, storing the liquid in another unit, and then applying the leachate on the landfill could arguably make it subject to the Land Disposal Restrictions (LDRs).

As to the issue of the land disposal restrictions, USPCI could likely avoid possible liability by pumping the leachate from the sumps and keeping it within the landfill rather than first placing the waste in a separate unit. To accomplish this, the leachate might be pumped directly from the sumps to dedicated spray trucks or towed containers in the landfill. The leachate would not leave the unit and applying the leachate (i.e., moving the leachate within the unit) would not be considered placement into a land disposal unit. Furthermore, since placement in a land disposal unit would not be involved, the ban on placing hazardous liquids in landfills would not apply.

In addition, we believe it is reasonable to take the position that the use of leachate in this way would not constitute a violation of Section 3004(l) because the legislative

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history of Section 3004(l) only discusses the use of hazardous waste for road treatment. Clearly, Congress's concern was the uncontrolled release of hazardous liquids to the environment, not the reapplication of leachate into the lined landfill from which it was originally derived. As long as the leachate is being returned to the landfill where it originated, we do not believe it is being "used for dust suppression" in the sense prohibited by Section 3004(l).

Oklahoma, of course, is authorized for the relevant RCRA provisions under discussion. Therefore, the State would have the final say in interpreting the applicability of the RCRA land disposal restrictions and Section 3004(l) to USPCI's proposal, and could make a more stringent interpretation. We believe, however, that under a reasonable interpretation of the provisions, USPCI would be allowed to carry out its proposal.

Thank you for the opportunity to assist you. If you have any questions, please contact David Eberly of my staff on 703-308-8645.

cc: David Vogler, Region VI
Frank McAlister, PSPD, FB
David Eberly, PSPD, AB

REMOVED – No longer in service

LOW TEMPERATURE THERMAL DESORPTION (LTTD)

SYSTEM REPORT

US ECOLOGY NEVADA

March 2010

ENVIRONMENTAL MONITORING PLAN

US ECOLOGY NEVADA

March 2010

Revised May 2011

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ENVIRONMENTAL MONITORING PLAN
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SECTION 13

ENVIRONMENTAL MONITORING PLAN

13.1.0 OVERVIEW OF ENVIRONMENTAL MONITORING DATA

The US Ecology Nevada environmental monitoring system includes data from three sources:

- 18 groundwater monitoring wells,
- Four pairs of leachate sumps, and
- A soil gas extraction well

The groundwater monitoring system uses eighteen wells in the Upper Water-Bearing Zone to monitor semi-annually for releases from landfill Trenches 11, 12 and the pre-RCRA Solid Waste Management Units (SWMUs) including Trenches 1 through 10. Water levels are measured in all wells at the time of each monitoring event to determine groundwater gradients. Samples are collected and analyzed for constituents as specified in the facility permit and as delineated below.

Leachate from Trench 11 and Trench 12 is sampled semi-annually from at least one sump in each Trench and analyzed for specified constituents. Leachate monitoring establishes a baseline of constituents present in leachate for comparison with groundwater monitoring data in the unlikely event of a release. In addition, leachate levels and pumping volumes are recorded and analyzed for compliance with permit conditions, and to assess the overall effectiveness of the leachate collection and detection sumps. Leachate data will also be used to assess the performance of alternative covers permitted for construction on Trench 11 and Trench 12.

Organic vapors have been detected in the vadose zone located under the facility, and a Soil Vapor Extraction (SVE) system has been installed to remove organic vapors. Extracted vapors are pumped through a carbon filter and monitored daily with a calibrated Photo ionization Detector (PID) that tests for volatile organic compounds (VOCs) exiting the filter system. In addition, weekly PID readings are recorded from a point between the wellhead and the carbon filter, and a summa canister sample is collected annually to quantify all constituents in the vadose zone. The performance of the SVE system is evaluated through monitoring of groundwater for selected VOCs.

13.2.0 GENERAL HYDROGEOLOGY INFORMATION

Numerous reports (Appendices A through F, References 1 through 5) contain information on site stratigraphy, physical and chemical properties of the vadose and upper saturated zones, and relationships with the confined gravel aquifer. The following sections briefly review regional and site geology and hydrology.

13.2.1 Regional and Site Geology

The US Ecology Nevada (USEN) Facility is located in the Amargosa Desert basin which was formed by normal block faulting, which displaced the surrounding strata upward with respect to the crustal block underlying the valley. This widespread structural process formed the characteristic topography of the entire Basin and Range province. Erosion of the uplifted areas, during and after their displacement, has filled the basin with a variety of sedimentary deposits. These deposits have reached a depth of 1000 feet in the center of the basin near Lathrop Wells.

The sediments of the valley floor are unconsolidated to partly indurated and Tertiary to Quaternary in age. Deposited as alluvial fans, debris flows, streambeds, dunes, and lake or marsh beds, they exhibit a very, wide range of shapes and grain size distributions. The mineralogy of the sediments varies widely as well, reflecting the diversity of their source rocks.

Details on the nature of the unconsolidated strata beneath the facility have been determined from the various borings and well installations, which have been made since 1961. Extensive hydrogeologic investigations have been conducted at the site to determine the soil properties and hydrologic characteristics.

Stratigraphic information derived from the site characterization and monitoring well installation programs for the RCRA disposal facility describe a sequence of deposits consistent with alluvial fan and playa depositional processes. Deposits from the ground surface to a depth of approximately 300 feet beneath the RCRA facility are alluvial in nature. The alluvial sediments are predominantly gravelly sands with poorly sorted gravel or sand deposits which occur in discontinuous intervals. The gravelly sand extends deeper (approximately 350 feet below ground surface) at the southwestern area of the LLRW facility (Figure 3).

Generally, the next 50 to 150 feet of deposits beneath the RCRA facility consist of silt, clay and indurated deposits. The fine-grained sediments are typical of playa deposits and may change composition relatively quickly with depth.

The silt-clay deposits were also observed in borings 001 and 002. The upper surface of the silt-clay unit is relatively flat beneath the northern half of the RCRA facility and appears to deepen to the southwest beneath the LLRW facility.

Drilling investigations indicate that the upper saturated zone occurs near the contact of the silt-clay and indurated sediments with the overlying gravelly sands. The confined aquifer occurs in a sandy gravel formation underlying the silt-clay deposits.

This sandy gravel generally becomes coarser as it extends to depths exceeding 650 feet below ground level. The deeper gravels, cobbles, and boulders represent a higher energy, fluvial environment.

13.2.2 Regional Groundwater Flow Patterns

The surficial drainage area of the Amargosa Desert covers about 2600 square miles and is part of two regional groundwater systems (see Figure 13-3):

These two groundwater systems converge in the Amargosa Desert and probably continue to the south into Death Valley. Groundwater flow directions in the Amargosa Desert are generally to the southeast and southwest. Summaries of previous work on regional groundwater flow in this part of Nevada can be found in Elliott (1982) and Feeney, et al. (1987). Groundwater flow is controlled by alluvium, volcanic rock, and carbonate rocks. Thick volcanic sequences associated with calderas of the Nevada Test Site and areas to the west become less significant to the south, and thick carbonate rock sequences are assumed to be present beneath the Amargosa Desert (Feeney et al., 1987).

13.2.3 Site Hydrogeology

13.2.3.1 Saturated Zone

The degree of continuity of the hydrogeologic units beneath the site is illustrated in the cross-sections of Figures 13.5 and 13.6. At the 300-series well locations, saturation begins near the top of a 50-150 foot thick sequence of partially cemented to well-indurated clays, silts and sand. The depth to saturation from the ground surface ranges from near 285 feet on the north side of the site to > 360 feet at the southwest corner of the LLRW facility (see Appendix A). The interbedding of clays and cemented silts and sands at these depths serves to separate the upper saturated zone from the confined gravel aquifer beneath into discrete hydrogeologic units.

The gravel aquifer is encountered beneath the fine-grained deposits at a depth of 380 feet or more. It consists of sandy gravel with some cobbles and boulders, and is > 250 feet thick at the southern boundary of the site. The piezometric level measured in this aquifer occurs near 315 feet below ground surface, indicating a confined condition. The groundwater gradient in both the upper saturated zone and confined gravel aquifer is to the south and southwest, following the trend of the Amargosa Valley. This gradient is consistent with regional data, as reported by Nichols (1987) and Kilroy (1991).

Appendix A is a site plan showing water table contours in 2009. Groundwater gradients increase to the south beneath the RCRA facility and are generally uniform to the southwest beneath the LLRW facility. All wells and borings drilled to sufficient depth have encountered a confined gravel aquifer. A piezometric contour map of the confined aquifer is provided as Appendix B. Groundwater flow in the confined aquifer is generally to the south-southwest.

Numerous studies have been conducted which estimate hydraulic conductivities and transmissivities for this facility. Appendix C provides the calculations used to determine an average hydraulic conductivity for the upper aquifer of 6.63 $x10^{-4}$ feet/sec. Hydraulic gradients based on March 1995 groundwater elevations range from 0.028 ft/ft on the eastern side of the facility to 0.058

ft/ft in the central to western portion. Groundwater velocity estimates using March 1995 information ranges from 5.3×10^{-5} ft/sec to 1.1×10^{-4} ft/sec (using an average effective porosity of 0.35, as calculated in Appendix C). The measured hydraulic conductivities are consistent with samples lithologies and are considered representative of the upper saturated zone. Lithologies vary both laterally and vertically; however, groundwater velocities will be predominantly near the low end of the range given, as a result of the high clay and silt contents of the upper saturated zone.

Pumping test data from earlier studies (References 1 and 5) indicate the confined gravel aquifer has a transmissivity ranging from about 1,900 to 3,000 gpd/ft. Assuming these values are representative of the screened intervals of the 600-series wells, and using gradients derived from Appendix B, a groundwater flow velocity of about 30-50 ft/year is considered typical of the confined aquifer (calculations are presented in Appendix C). The heterogeneity of the sediments in the confined aquifer suggests somewhat smaller or larger velocities may be possible on a local scale.

13.2.3.2 Vadose Zone

As discussed earlier, the thickness of the vadose zone beneath the USEN Facility varies from 285 feet to > 360 feet. The moisture contents of sediments in the vadose zone are, in general, < 10% by weight, as determined from core samples (Reference 1) and in-situ neutron probe measurements (Fischer, 1992). Fisher (1992) also concluded that the potential for contaminant transport by water flow through the vadose zone is minimal under conditions observed at the facility. The extreme dryness of subsurface sediments is further characterized by water potentials from -10 to -60 bars, measured at the U.S. Geological Survey (USGS) study site near the southwest corner of the LLRW facility (Nichols, 1987; Fischer, 1990 and 1992).

An environmental pathways analysis performed for the Beatty LLRW facility used physical property data of site sediments and assumed a conservative recharge rate of 0.5 mm/year. Calculated travel times for vadose zone water from trenches to the upper saturated zone ranged from 13,000 to 24,000 years.

13.3.0 GENERAL GROUNDWATER MONITORING REQUIREMENTS

13.3.1 Groundwater Monitoring Wells

The USEN groundwater monitoring program yields representative samples from upgradient and downgradient wells. The groundwater monitoring system consists of detection monitoring (point of compliance) wells and background wells screened in the upper aquifer. Table 13-1 lists the wells, the well application, and current condition.

Table 13-1 - Monitoring Well Designations		
Well Identification	**Designation**	**Aquifer**
001	Point of Compliance	Upper
002	Point of Compliance	Upper
308	Point of Compliance	Upper
309	Point of Compliance	Upper
310	Point of Compliance	Upper
311	Point of Compliance	Upper
313	Background	Upper
315A	Point of Compliance	Upper
316	Point of Compliance	Upper
317	Point of Compliance	Upper
318	Background	Upper
319	Background	Upper
320	Point of Compliance	Upper
322	Point of Compliance	Upper
324	Point of Compliance	Upper
325	Point of Compliance	Upper
326	Point of Compliance	Upper
327	Point of Compliance	Upper
600	Supplemental	Lower
601	Supplemental	Lower
603	Supplemental	Lower
604	Supplemental	Lower
605	Supplemental	Lower

Three (3) monitoring wells (MW-320, MW-322, and MW-324) were installed in 2008 along the western perimeter of the site downgradient of Trench 12.

13.3.2 Sampling and Analysis Plan

A sampling and analysis plan is included as Appendix D. This document describes in detail the procedures and techniques employed for sample collection, preservation and shipment. The plan also describes the procedures utilized for sample analysis and chain of custody control.

13.3.3 Statistical Procedures

The purpose of the USEN groundwater monitoring program is to determine if the facility has had a significant effect on groundwater quality. To determine if a statistically significant increase has occurred, groundwater data is initially compared with the groundwater quality standards in Table 13-2. These standards are based on an analysis of groundwater quality data from 2003 to 2009 comparing up gradient and down gradient wells. The statistical analysis method used by AquAeTer is outlined in Appendix 13-E.

13.4.0 DESCRIPTION OF DETECTION MONITORING PROGRAM

13.4.1 Analytical Parameters

The analytical parameters in the USEN detection monitoring program are listed in Table 3-2.

13.4.2 Frequency of Sampling and Statistical Evaluation

The Background Wells and Point of Compliance Wells in the upper aquifer are monitored quarterly for the constituents in Table 13-2 Statistical evaluations are made on groundwater analytical data from Point of Compliance Wells for each sampling event. The supplement wells will be maintain but not sampled. Justification for elimination of sampling the supplemental wells every five quarters is included in Appendix 13-G.

Table 13-2 – Groundwater Protection Standards

Ground Water Constituents	Ground Water Protection Standard
Arsenic	0.0152 mg/L
Barium	0.240 mg/L
Cadmium	0.0053 mg/L
Chromium	0.185 mg/L
Lead	0.0297 mg/L
Mercury	0.002 mg/L
Selenium	0.0039 mg/L
Silver	0.0627 mg/L
Sodium	324 mg/L
Cyanide	0.010 mg/L
Chloride	106 mg/L
Fluoride	5.5 mg/L
Nitrate-Nitrite as N	2 mg/L
Sulfate	274 mg/L
pH (std. units)	7 to 8.7
Specific Conductance	1,398 umhos
Total Organic Halides (TOX)	0.007 mg/L
Total Organic Carbon (TOC)	7.46 mg/L
Gross Alpha	22 pCi/L
Gross Beta	25 pCi/L
Radium 226/228*	5 pCi/L (Combination of Radium 226 & 228)
Tritium*	250 pCi/L
Endrin**	0.0002 mg/L
Lindane**	0.004 mg/L
Methoxychlor**	0.10 mg/L
Toxhaphene**	0.005 mg/L
2,4 – D**	0.1 mg/L
2,4,5 – TP Silvex**	0.01 mg/L

* From 2005 permit ** Established in 40 CFR §264.94

In addition to the constituents outlined in Table 13-2 groundwater will be analyzed to meet the requirements of 40 CFR §761.75 (b)(6)(iii).

13.4.3 Background Values

The upper aquifer "background" values for the parameters presented in Tables 13-2 were developed from the statistical analysis of groundwater samples collected from 2003 to 2009.

13.4.4 Determination of Groundwater Flow and Direction

Groundwater flow rate and direction in the upper saturated zone and the confined aquifer are determined and reported annually.

13.4.5 Other Source Demonstration

Once groundwater analysis results have been collected and subjected to a data quality review, the data is compared to the facility background value. To determine if a statistically significant increase has occurred, groundwater data is initially compared with the groundwater quality standards in Table 13.2. These standards are based on an analysis of groundwater quality data from 2003 to 2009 comparing up gradient and down gradient wells.

USEN also uses additional lines of evidence to evaluate whether liquids have been released from the landfill to groundwater. Leachate generation rates, leachate data, and landfill gas data are evaluated and compared with groundwater data to determine whether a source other than a currently-operating regulated unit caused the increase or that the increase resulted from error in sampling, analysis, evaluation, or natural variation in the groundwater. For example, constituents detected in leachate provide an indication of constituents that could be expected to be observed in groundwater if liquids were released from the site. USEN provides the results of this analysis in semi-annual reports to the NvDEP.

13.4.6 Detection Verification Procedure

Point of Compliance wells are evaluated statistically each time the wells are sampled. If a potential statistically significant increase (SSI) is identified, the results are verified during the next scheduled sampling event. Each semi-annual report includes analytical results for all environmental samples, and a discussion of any significant statistical increases.

13.4.7 Corrective Action Program

The facility submitted a Corrective Action Plan (CAP) in September 1998 and implemented a Corrective Measures Study (CMS) in March 1999. Prior investigations had determined that trace organic constituents detected in upper aquifer groundwater were attributable to gas migration from regulated units and solid waste management units. The selected remedy was extraction of waste constituents from the soil vapor in the overlying vadose zone. This work has now been competed with installation of a pilot SVE system. A final CMS report was submitted in April 2003. The CAP is included as Appendix E To evaluate the effectiveness of corrective measures, upper aquifer monitoring wells are sampled and analyzed semi-annually for the constituents in Table 13-3

Table 13-3 – Corrective Measures Evaluation

Ground Water Constituents	Ground Water Protection Standard (mg/L)
Carbon tetrachloride	0.005
Chloroform	0.005
Tetrachloroethene	0.005
Toluene	0.005
Trichloroethene	0.005
Trichloroflouromethane	0.005

13.5.0 LEACHATE MONITORING

On a quarterly basis samples will be collected and analyze from the Leachate Collection and Removal System (LCRS) and Leachate Detection and Removal System (LDRS) in both Trench 11 and Trench 12 (any leachate sump generating liquids will be sampled). Samples are analyzed for the parameters found in Table 13-4. The results of these analyses are submitted with the semi-annual report. .

Table 13-4 Leachate Sample Analysis

Arsenic	Endrin
Barium	Lindane
Cadmium	Methoxychlor
Chromium	Toxaphene
Lead	2,4-D
Mercury	2,4,5-TP Silvex
Selenium	
Silver	Chloroform
Cyanide	Tetrachloroethene
Fluoride	1,1,1- Trichloroethane
Sodium	Toluene
Sulfate	Acetone
Chloride	All chlorinated organics from EPA Method 8260
TOX	Total PCBs
TOC	
pH	Gross Alpha
Specific Conductance	Gross Beta
Nitrate-Nitrite as N	Radium 226/228
	Tritium

13.6.0 SOIL GAS MONITORING

Extracted soil gas is pumped through a carbon filter and monitored daily with a calibrated Photo ionization Detector (PID) that tests for volatile organic compounds (VOCs) exiting the filter system. In addition, weekly PID readings are recorded from a point between the wellhead and the carbon filter, and a summa canister sample is collected annually to quantify all constituents in the vadose zone. (See table 3-5.)

13.7.0 REPORTING REQUIREMENTS

This section describes the general record keeping and reporting requirements for the Facility's environmental monitoring program.

13.7.1 Records

The facility maintains the following information on-site:

- Field records concerning environmental measurements, sampling events, and related information
- All lab analyses of samples collected from all sources.
- Copies of semi-annual reports

	Table 3-5 **Soil Vapor Extraction Annual Summa Canister Analysis** Compounds Analyzed	
Hexane	Chloroform	Chlorobenzene
o-Xylene	Dichloromethane (Methylene chloride)	Chloroethane (Ethyl chloride)
Trichlorofluoromethane	1,1,2,2-Tetrachloroethane	cis-1,2-Dichloroethene
Ethylbenzene	1,1,2-Trichloroethane	cis-1,3-Dichloropropene
1,2-Dichloropropane	1,2,4-Trichlorobenzene	Dichlorodifluoromethane
Benzene	1,2,4-Trimethylbenzene (Pseudocum)	Dichlorotetrafluoroethane
m&p-Xylene	1,2-Dibromoethane (EDB)	Hexachlorobutadiene
Chloromethane (Methyl chloride)	1,2-Dichlorobenzene	Styrene
1,1,1-Trichloroethane	1,2-Dichloroethane (EDC)	Tetrachloroethene (PCE)
Carbon tetrachloride	1,3,5-Trimethylbenzene/4-Ethyltoluene	trans-1,2-Dichloroethene
1,1-Dichloroethane	1,3-Dichlorobenzene	trans-1,3-Dichloropropene
Trichloroethene (TCE)	1,4-Dichlorobenzene	Vinyl chloride
1,1-Dichlorethene	Benzyl chloride	
Trichlorofluoroethane	Bromomethane (Methyl bromide)	

13.7.2 Environmental Report Content

USEN submits narrative reports for each sampling event 90 days after the analytical information is received and verified. Reports include descriptions of the groundwater flow conditions and groundwater quality conditions, as described below.

- Executive Summary – brief summary of the report, emphasizing key results and conclusions.
- Alternative Source Notification (if required)
- Groundwater Quality Conditions – groundwater sample data and data evaluation
    - Summary of Detection Monitoring Results, including identification of statistically significant increases.
    - Background data evaluation;
- Leachate data, including leachate removal rates, comparison with Action Leakage Rate, leachate levels, and leachate analytical data.
- Soil gas monitoring data
- Groundwater gradients
- Tables, Figures and Appendices, including field and analytical data for the sampling events and corrective measures.

13.8.0 REFERENCES

Currie L.A., 1968. Limits for qualitative detection and quantitative determination: application to radiochemistry. Analytical Chemistry, 40, 586-593.

Elliot, B. 1982. An investigation of selected quality parameters in the Amargosa drainage basin. Desert Research Inst. Publ. 45039, DOE/NV/10162-18, 20 pp.

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McKinley, P.W., Long, M.P., and Benson, L.V., 1991. Chemical analyses of water from selected wells and springs in the Yucca Mountain area, Nevada and southeastern California. U.S. Geological Survey. Open-File Report 90-355.

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Daniel B. Stephens and Associates, Jan. 1989, Laboratory Analyses of Soil Hydraulic Properties for the Beatty, Nevada Project.

USEPA, 1992. Draft Addendum to Interim Final Guidance – Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities.

13.8.1 Additional References

The following list of references corresponds to reports previously submitted to the Nevada Division of Environmental Management.

Reference 1 Exploratory Boring and Monitoring Well Installation Program, US Ecology, RCRA Facility, Beatty, Nevada; The MARK Group, 2 Volumes, April, 1989.

Reference 2 Drilling, Sampling and Installation of Two Monitoring Wells at the US Ecology, Inc., Beatty, Nevada Facility Rad Site; Geraghty & Miller, Inc., Dec., 1990. (This report was included in the RCRA Facility Investigation (RFI) report submitted on April, 1992)

Reference 3 Drilling and Installation of Six Monitoring Wells at the US Ecology, Inc., Beatty, Nevada Facility Chemical Site; Geraghty & Miller, Inc., May, 1991 (included in RFI report).

Reference 4 Completion Report Vadose Zone Monitoring Well 500 and 501 Beatty, Nevada, IT Corp., July, 1991 (included in RFI report).

Reference 5 Beatty, Nevada Aquifer Test Review; J.L. Grant & Associates, 1990

Reference 6 Statistical Analyses of Groundwater Data at Background Well 313, AquAeTer, 1999

FIGURE 13-1

REGIONAL GROUNDWATER FLOW PATTERNS IN THE AMARGOSA DESERT AND VICINITY

Fig 13-1

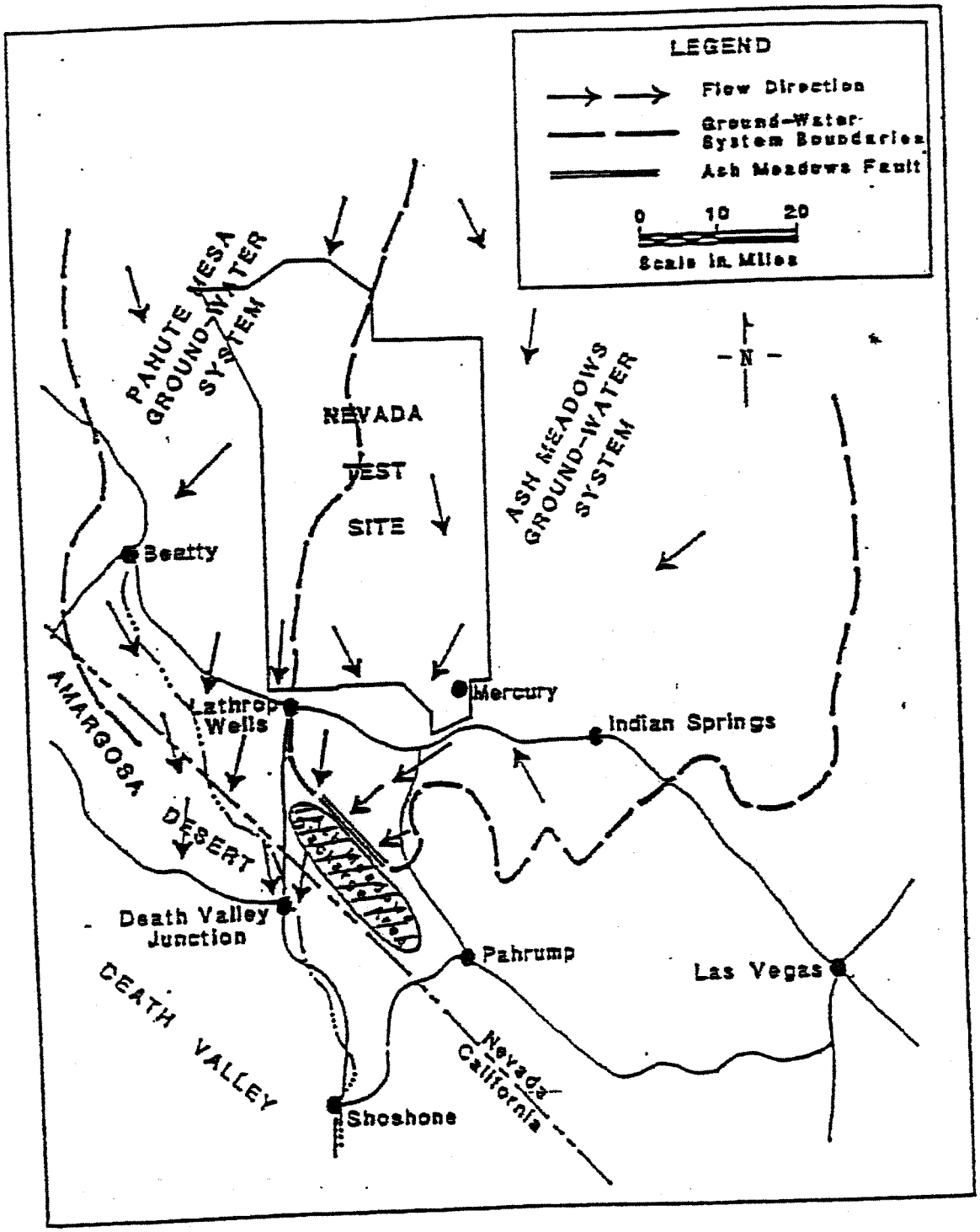
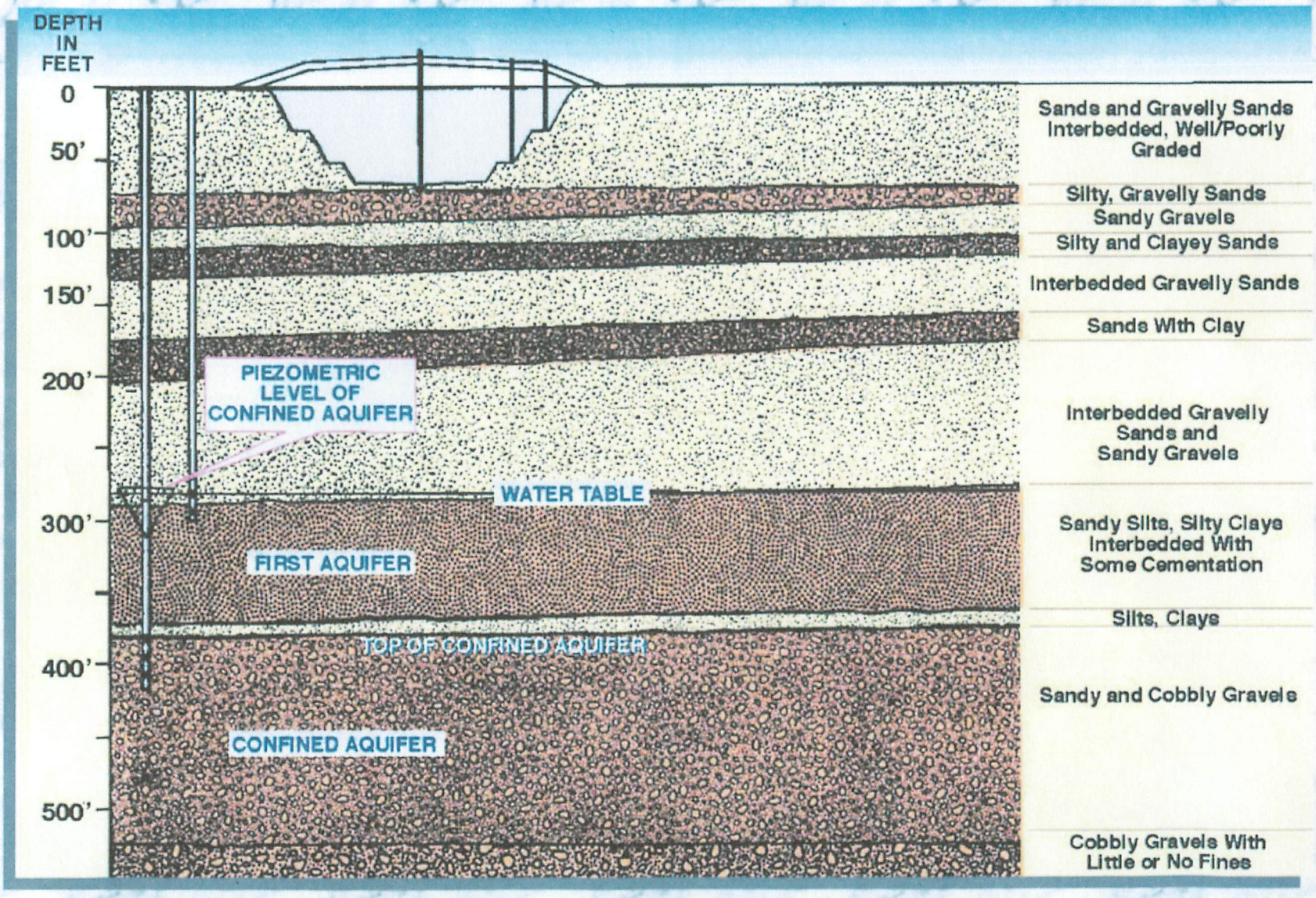


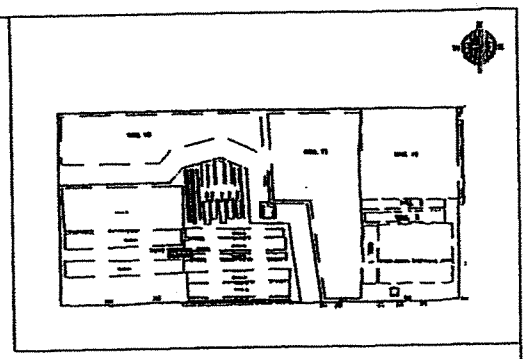
Figure 1. Regional groundwater flow patterns in the Amargosa Desert and vicinity (from Elliott, 1982).

FIGURE 13-2

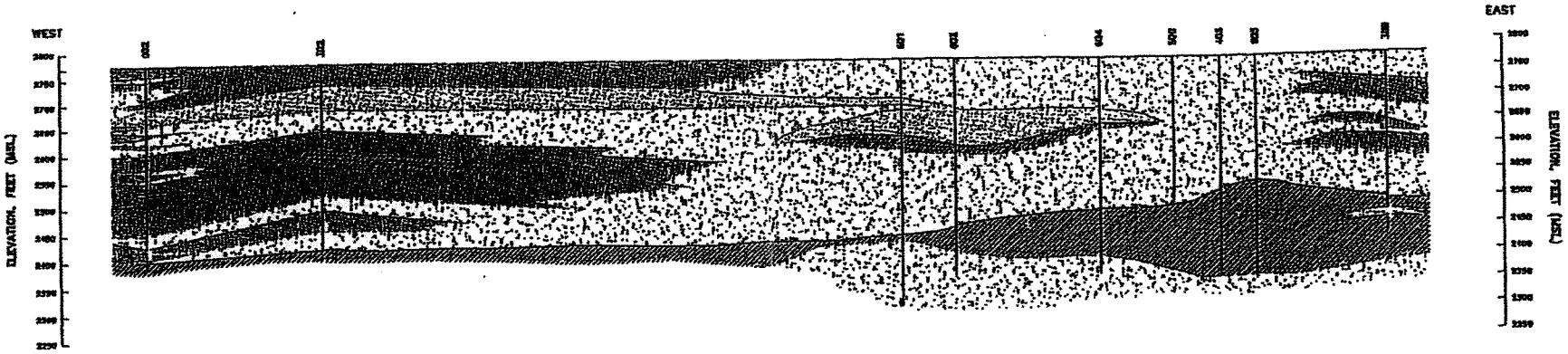
SITE STRATIGRAPHIC PROFILES

Conceptual Subsurface Profile





PROFILE LOCATION



EAST/WEST STRATIGRAPHIC PROFILE

EXPLAINATION

GRAVEL

GRAVELLY SAND

SAND

SILT/CLAY

LEGEND

WATER TABLE

SCREEN INTERVAL

REVISIONS

American

NY-153-GMS-004

SITE STRATIGRAPHIC PROFILE

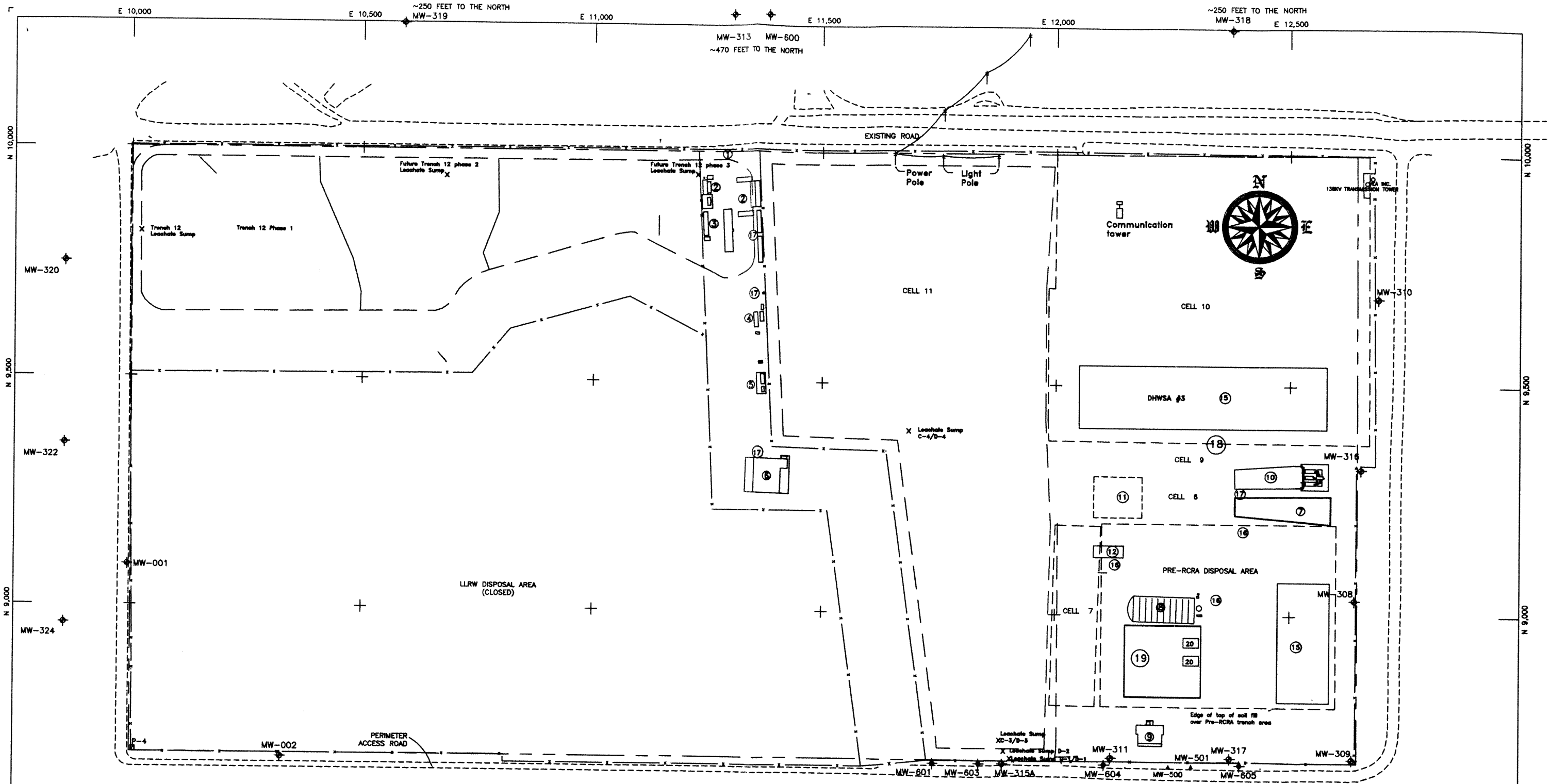
U.S. Ecology

NY-163-GMS-005

1-3

FIGURE 13-3

Groundwater Monitoring System/Point of Compliance



LEGEND

Monitoring Well Coordinates – WGS84
(September 21, 2006)
Sample since GPS well (Accuracy per well 13-16')

- PERMIT LINE
- FENCE LINE
- UNIMPROVED ROAD
- SITE COORDINATE SYSTEM MARKER LOCATION IN NORTHING AND EASTING
- X Landfill Leachate Management Sump
- MW-002 DETECTION MONITOR WELL LOCATION AND NUMBER
- MW-603 SUPPLEMENTAL MONITOR WELL LOCATION AND NUMBER
- MW-500 VADOSE ZONE MONITOR WELL LOCATION AND NUMBER
- B96-1 CORRECTIVE ACTION BORING LOCATION AND NUMBER
- TO BE ABANDONED OR REMOVED FROM SAMPLING
- TO BE ADDED

1. MAIN SITE ENTRANCE
2. ADMINISTRATION OFFICES
3. DRIVERS LOUNGE
4. LABORATORY AND LAB STORAGE
5. FUEL STORAGE
6. MAINTENANCE SHOP
7. LTTD – Removed & Closed
8. TRUCK PARKING PAD (CMU #7)
9. EVAPORATION TANK (T-11)
10. PCB BLDG (CMU #1)
11. STABILIZATION TANKS 2 & 3
12. STABILIZATION TANK 1
13. Removed
14. Removed
15. DRY HAZARDOUS WASTE STORAGE AREA
16. REAGENT STORAGE SILOS
17. FIRE CONTROL HYDRANT
18. SVE Well
19. CMS BLDG (CMU #16)
20. Treatment Tanks 4 & 5

Description 100 50 0 100 SCALE FEET

Rev Date	Description
12-05-08	Added Trench 12 leachate sumps. Labeled future leachate sumps (phase 2 and 3). Updated MW 320, 322, 324 label.
4-8-09	Added buffer zone details.
4-2-10	General updates for permit renewal / LTTD Removal.
5-18-10	General updates for permit renewal

REVISIONS

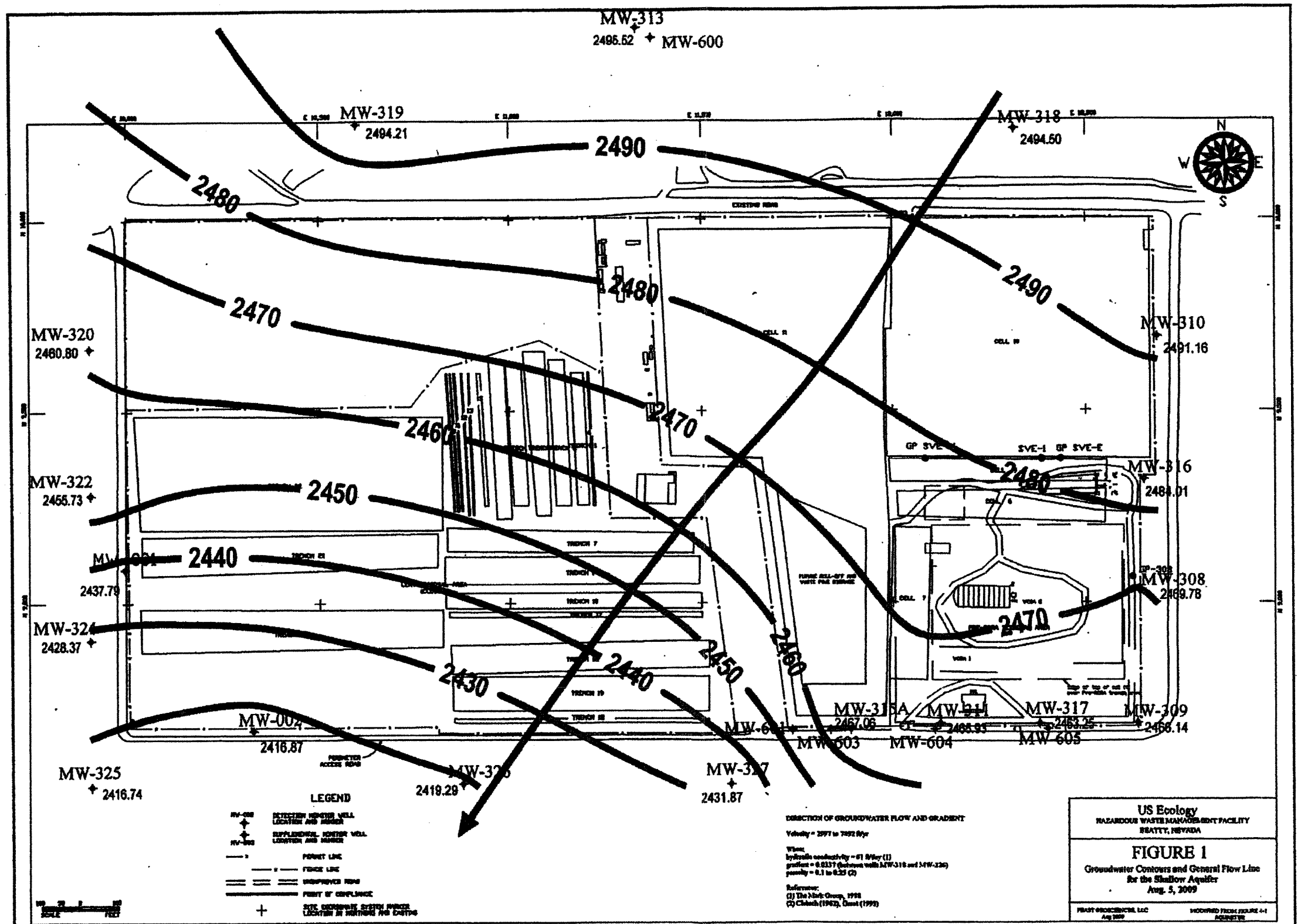
Drawn By: LAM
Checked By: CAB
Appr. By: PAZ
Date: 3/99
Scale: AS SHOWN
Project No.: 010917
UPDATED: 05/18/2010

US Ecology Nevada, Inc.
HAZARDOUS WASTE MANAGEMENT FACILITY
BEATTY, NEVADA 89003

Drawing NO. 1

Appendix 13 A

Upper Aquifer Contour Map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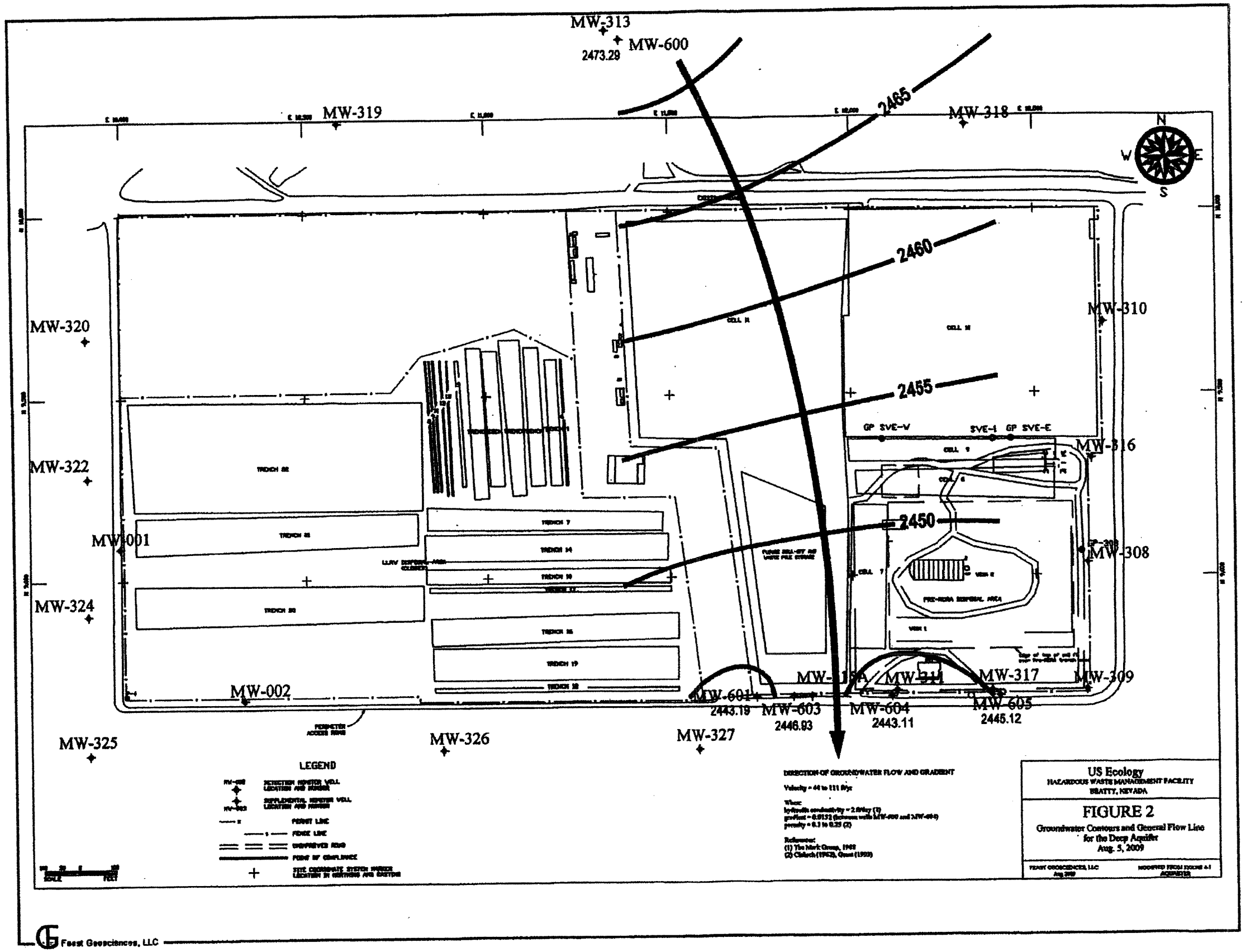
2494.21
MW-318
2494.50
2490
2480
2470
2460
2450
2440
2430
MW-320
2460.80
MW-322
2455.73
MW-324
2428.37
MW-325
2416.74
MW-002
2416.87
MW-310
2491.16
MW-316
2484.01
MW-308
2469.78
MW-315A
2467.06
MW-311
2468.93
MW-317
2463.25
MW-309
2466.14
MW-603
MW-604
MW-605
MW-327
2431.87
2419.29
LEGEND
DIRECTION OF GROUNDWATER FLOW AND GRADIENT
US Ecology
HAZARDOUS WASTE MANAGEMENT FACILITY
BEATTY, NEVADA
FIGURE 1
Groundwater Contours and General Flow Line
for the Shallow Aquifer
Aug. 5, 2009
Feast Geosciences, LLC

Appendix 13 B

Confined Aquifer Potentiometric Contour Map


MW-313
2473.29
MW-600
MW-319
MW-318
2465
2460
2455
2450
MW-320
MW-322
MW-001
MW-324
MW-002
MW-325
MW-326
MW-327
MW-310
MW-316
MW-308
MW-309
MW-317
MW-605
2445.12
MW-604
2443.11
MW-603
2446.93
MW-601
2443.19
N
S
E
W
LEGEND
DIRECTION OF GROUNDWATER FLOW AND GRADIENT
US Ecology
HAZARDOUS WASTE MANAGEMENT FACILITY
BEATTY, NEVADA
FIGURE 2
Groundwater Contours and General Flow Line
for the Deep Aquifer
Aug. 5, 2009
Feast Geosciences, LLC

Appendix 13 C

Hydraulic Conductivity and Porosity Calculations

Calculations of
Hydraulic Conductivities
Upper Aquifer

1. Reference : Law Engineering, 1981

   Transmissivity (T) = 7,000 gpd/ft
   Average Saturated Thickness (h) = 11 feet (Mark Group, 1989)
   Hydraulic Conductivity (K) = T/h
   K= 7,000/11 = 636 gallons per day (gpd)/ ft^2

   Converting to feet/ sec
   gpd/ ft^2 X 1.55 X 10^{-6} = ft/sec (Freeze & Cherry)
   636 gpd/ ft^2 X 1.55 X 10^{-6} = 9.86 X 10^{-4} ft/sec

2. Reference: Mark Group, 1989
   K= 184 gpd/ ft^2

   Converting to feet/ sec
   184 gpd/ ft^2 X 1.55 X 10^{-6} = 2.85 X 10^{-4} ft/sec

3. Reference: Mark Group, 1989
   K= 455 gpd/ ft^2

   Converting to feet/ sec
   455 gpd/ ft^2 X 1.55 X 10^{-6} = 7.05 X 10^{-4} ft/sec

4. Reference: Emcon, 1973
   K= 500 gpd/ ft^2

   Converting to feet/ sec
   500 gpd/ ft^2 X 1.55 X 10^{-6} = 7.75 X 10^{-4} ft/sec

5. Reference: Grant, 1990
   T= 4,000 gpd/ft
   Average Saturated Thickness (h) = 11 feet (Mark Group, 1989)
   Hydraulic Conductivity (K) = T/h
   K= 4,000/11 = 363.6 gallons per day (gpd)/ ft^2

   Converting to feet/ sec
   363.6 gpd/ ft^2 X 1.55 X 10^{-6} = 5.64 X 10^{-4} ft/sec

Average K = 9.86×10^{-4} ft/sec
2.85×10^{-4} ft/sec
7.05×10^{-4} ft/sec
7.75×10^{-4} ft/sec
5.64×10^{-4} ft/sec

32.15×10^{-4} ft/sec/ 5 = 6.63×10^{-4} ft/sec

Porosity Calculations

Reference: Freeze & Cherry

$N = 1 - Pb/Ps$

Using the samples taken from the 400, 402c and 403 borings

From boring 400 at a depth of 273 feet Pb = 1.45 Ps = 2.22 so
$N = 1 - (1.45/2.22) = 0.35$

From boring 402 c at a depth of 271 feet Pb = 1.62 Ps = 2.38 so
$N = 1 - (1.62/2.38) = 0.31$

From boring 403 at a depth of 279 feet Pb = 1.38 Ps = 2.31 so
$N = 1 - (1.38/2.31) = 0.4$

The average porosity is then computed to be 0.35

Appendix 13 D

Sampling and Analysis Plan

SAMPLING AND ANALYSIS PLAN

US ECOLOGY NEVADA

May 2010

Revised May 2011

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GROUNDWATER SAMPLING AND ANALYSIS PLAN

1.1 PURPOSE

This plan details the sampling, maintenance, and analytical methodologies and procedures which assure consistent groundwater quality data from a representative network of monitoring wells at the US Ecology Nevada Facility (USEN) located near Beatty, Nevada. This document complies with the requirements of 40 CFR Part 264, Subpart F and 270.14(c)(6)(iv), and is in accord with procedures described in the 1992 RCRA Groundwater Monitoring Technical Enforcement Guidance (TEGD) published by U.S. EPA Office of Solid Waste. This plan also describes the procedures used to collect leachate samples once the leachate has been pumped from the landfill.

1.2 APPLICABILITY

This plan applies to ground water sampling at US Ecology Nevada.

1.3 REQUIREMENTS

Groundwater sampling is conducted in a manner to ensure that representative samples have been collected.

1.4 SAFETY

Groundwater sampling is conducted in a safe manner based on procedures reviewed and discussed prior to beginning the work.

1.5 EQUIPMENT AND MATERIALS

Sampling equipment and materials are decontaminated as described in the decontamination section of this document.

The following equipment is required to conduct groundwater sampling:

- Clean sample containers with required labels and preservatives. (These containers may be supplied by an independent laboratory).
- Devices for measuring water level, well depth, and for detection of immiscible layers.
- Portable pH, conductivity, turbidity and temperature meters, and applicable standards and buffer solutions for calibration.
- Field Log Book (information must be recorded in ink).
- Non-phosphate detergent and deionized water from facility laboratory for decontamination of equipment (deionized water should be replaced daily when using for decontamination).
- Portable air compressor to drive sampling pumps.
- Dedicated sampling discharge hose (composed of inert material, e.g., Teflon).
- Coolers and ice packs for transport to the laboratory.
- Containers for purge water storage (where necessary due to potential contamination).

- Purge water discharge hose.
- Disposable gloves and paper towels.
- Chain-of-Custody forms and security seals.

1.6 PRECAUTIONS

- Smoking is prohibited during well sampling.
- All monitoring will typically begin at the upgradient well; downgradient wells will typically not be sampled prior to the upgradient well unless dedicated equipment is used in downgradient wells.
- All instruments used for in-situ or field measurements are calibrated each day prior to use in the field according to the manufacturer's specifications. Each calibration and calibration check must be noted in the field log book or other record. Recalibration is required only when the calibration check shows drift outside of the manufacturer's specifications.
- A new pair of gloves must be worn when sampling each well.
- Water levels (see Section 2.3, 2.4, and 2.5) at all wells will be measured before any of the wells are purged or sampled.
- Place the generator or air compressor as far away downwind from the well opening as possible to prevent the potential for detection of hydrocarbons from the exhaust fumes.
- Recalibrate equipment if erratic readings are encountered during sampling (i.e., are not within the expected range as compared to the previous sampling event).

2. SAMPLING PROCEDURE

Activities that occur during groundwater sampling are summarized as follows:

- pre-arrangement with testing laboratory for sample bottles and coolers,
- inventory and check integrity of sample bottles
- assembly and preparation of equipment and supplies,
- well head inspection
- water-level measurements
- visual inspection of water
- purging and sampling equipment to well
- on-site measurement of parameters
- groundwater sampling,
- secure and package samples
- sample labeling
- completion of sample records
- completion of Chain-of-Custody records, and
- sample shipment

Detailed sampling and analysis procedures are presented in the following sections.

2.1 ARRANGEMENTS WITH ANALYTICAL LABORATORY

Prior to sampling, arrangements are made with an analytical laboratory that conducts the sample analyses. The requirements for the laboratory are included in the analytical procedures and Quality Control (QC) procedures included in this document.

The laboratory provides a sufficient number of sample containers for the wells to be sampled and the blanks to be included. The laboratory selects the proper type and size for the containers, based upon the analyses to be conducted. For samples requiring chemical preservation, preservatives are added to containers. Shipping containers, ice chests with adequate container padding are sent to the facility with the containers.

2.2 OBSERVATION OF WELL CONDITION

During groundwater sampling events, the integrity and operation of monitoring wells is checked if possible. The items to be observed include:

- weather conditions for each sampling date
- ground-surface conditions, with typical notations to include, but not limited to flooding, ground subsidence, and presence of desiccation cracks, and
- the surface casing and/or locking mechanism inspection for deterioration of casing or tampering, and
- the locking mechanism, if present, will be lubricated periodically with a graphite lubricant.

These comments are recorded in the Field Log Book.

2.3 PREPARATION FOR SAMPLING FOR MONITORING WELLS

Prior to the sampling episode, equipment is assembled, checked-out, and calibrated in accordance with the procedures included in this document. Equipment (e.g. water level indicator and non-dedicated pumps and sampling equipment) is cleaned prior to and after obtaining a sample in accordance with the decontamination procedures included in this document.

2.4 DECONTAMINATION PROCEDURES

Water used for equipment cleaning will be the distilled or de-ionized water from the site laboratory and non-potable water obtained from the site well. As practical, equipment cleaning fluids will be collected, stored, and disposed of in a manner consistent with local, state, or federal rules or regulations.

Portions of sampling and test equipment that contact the sample will be thoroughly cleaned before use for sampling. Equipment must be cleaned before and after a sample is taken. This includes water-level tapes or probes, non-dedicated pumps, tubing, and test equipment for field parameters. The procedure for cleaning pH, specific conductance, temperature, and turbidity field measurement equipment is a

thorough de-ionized or distilled water rinse between wells. The procedures for equipment cleaning are as follows, unless otherwise specified by the manufacturer:

- rinse with distilled or de-ionized water,
- air dry, and
- use equipment immediately, or pack equipment in plastic wrap or bags, or in aluminum foil.

Any necessary deviation from these procedures will be documented in the Field Log Book.

2.5 SAMPLING PROCEDURES

Special care is exercised to prevent water-quality changes to the groundwater and extracted samples during the sampling activities. The three primary ways in which such impacts can occur are:

- contamination of a sample through contact with improperly cleaned equipment; or
- cross-contamination of the groundwater through insufficient cleaning of equipment between wells, and
- impacts of purge and sampling procedures as observed through changes in turbidity.

Sampling equipment is cleaned before and after field use and between uses at different sampling locations according to the decontamination procedures in this document. In addition to the use of properly cleaned equipment, three further precautions are followed:

- a clean pair of new, disposable latex (or similar) gloves will be worn each time a different well is sampled, and
- sample collection activities will progress from the up-gradient to the down-gradient area. Wells described as "background" or "up-gradient" wells will be sampled first unless dedicated purging and sampling equipment is used.
- A minimum of one gallone of well water is discharged through the sample hose prior to filling samples bottles.

The following paragraphs present procedures for the several activities that comprise groundwater sample acquisition. These activities are performed in the order presented. Exceptions to this procedure are noted in the permanent sampling record.

2.5.1 Preparation of Location

Prior to starting the sampling procedure, the area around the well will be cleared of foreign materials such as brush, debris, etc to reduce the possibility of surface materials contaminating the sampling equipment or the well.

2.5.2 Water-Level Measurement

The first sampling operation is water-level measurement. An electrical probe is used to measure the depth to groundwater below the datum to the nearest 0.03 foot (0.01 meters). The datum, is the top of the

sounding tubes in most wells or the top of the pump support plate in wells with out sounding tubes. The measurement and datum used should be entered in the Field Log Book.

Water levels will be measured in all monitoring wells prior to any quarterly purging and sampling event. The water level-probe will be cleaned in accordance with the decontamination procedures described in this document with distilled or de-ionized water rinse between usage at different wells. For wells with extended sampling frequency (e.g., the 600-series wells), the water level measurements will be recorded prior to the sampling event, or during the total well depth measurement once every two years, if no other sampling is scheduled for the year.

2.5.3 Total Depth Measurement

USEN will measure the total depth of the monitoring wells once every two years. The water level will be measured as described above prior to the total depth measurement. Once the water level has been measured and recorded, the water-level probe or a weighted tape will be lowered slowly to the bottom of the well. The depth to the bottom will be measured and recorded in the Field Log Book to the nearest 0.1 foot. The probe or tape then will be withdrawn slowly from the well. The bottom of the probe or tape will be observed after withdrawal for evidence of any immiscible materials. Observations, and measurements if possible, of such materials will be made from observation of the probe or tape.

2.5.4 Immiscible Layer Observations and Measurements

Immiscible layers are reflective of gross contamination in the groundwater. Groundwater containing low concentrations of organic contamination would not be expected to exhibit immiscble layers. Personnel at USEN will monitor groundwater sampling results and conduct an immiscible layer check on any well having concentrations of organic contaminants greater than 1% of the constituents solubility in water if the organic contaminants presence are verified in the groundwater. Example threshold concentration limits for some common waste constituents are attached in Table 1.

Table 1 - Solubility Based Indicator of Possible LNAPL / DNAPL

Constituent	Solubility Limit (mg/L)	NAPL Threshold Limit (mg/L)
Carbon Tetrachloride	800	8
Chloroform	9300	8.22
Tetrachloroethene	150	1.5
Toluene	510	5.15
100	1	

Notes: Threshold limit based on 1% of solubility limit from "Estimating Potential for Occurrence of DNAPL at Superfund Sites."

In the event that an organic contaminant exceeds the limits in Table 1, the following procedure for checking for immiscible layers will be followed.

Prior to the next well sampling event a check for the presence of immiscible layers should be performed before well purging using an electronic interface meter. The meter shall be calibrated in the laboratory prior to the sampling event following manufacturer's instructions. The measuring device must be properly

decontaminated in accordance with the procedures included in this document with a nonphosphate detergent followed by tap water and deionized water rinses.

The interface meter must be lowered slowly into the well and the meter response monitored continuously (as detailed in the device's instruction manual). The probe shall respond with different warnings if immiscible layers are detected. The probe must be slowly raised and lowered to determine if the appropriate response is occurring at both the surface of the groundwater and at the bottom of the well. The results of the measurement of the top of the phase and the bottom of the phase for either LNAPL (Light Non-Aqueous Phase Liquid) or DNAPL (Dense Non-Aqueous Phase Liquid) must be recorded in the Field Log Book. If non-aqueous phase liquids are detected, the Facility Manager or designee must be contacted immediately. The Facility Manager or designee shall contact NDEP within seven days of confirmation of immiscible layers. If immiscible liquids are detected, obtain a sample using a bailer. If the immiscible layer is a LNAPL, slowly lower the bailer until contact is made with the surface of the LNAPL. The bailer should then be lowered to allow a sample of the LNAPL to be collected, but not to submerge the top of the bailer. The sample should be placed in a 40 ml VOA vial (see Appendix 1 for a description of sampling containers). A double check valve bailer may be necessary to sample a DNAPL. To collect a DNAPL sample, the bailer should be slowly lowered to the bottom of the well, and the fluid sample collected. Care must be taken to prevent loss of the fluid during recovery. The bailer should be recovered through the water column in a smooth, continuous fashion to prevent the check valves from releasing the liquid.

2.5.5 Visual Inspection of Well Water

At the start of well purging, a small quantity of water is collected in a clean container for visual inspection. The water is inspected for clarity and odor. These observations regarding clarity or are recorded in the Field Log Book.

2.5.6 Well Bore Purging

Water contained within, and adjacent to, the well casing potentially can reflect chemical interaction with the atmosphere (by diffusion of gases down the casing) or the well construction materials (through prolonged residence adjacent to the casing). This water is removed (purged) from the well prior to sampling.

The volume of water contained within the well bore at the time of sampling is calculated, and three times the calculated volume is removed from the well. Decontaminated bailers, decontaminated pumps, or dedicated pumps are used for well bore purging.

Calculation of the volume of water to be evacuated is done as follows:

Volume of water in well:

$$V_w = \frac{3.142\,(d_w^2)\,(L_w)\,(7.48)}{4}$$

3 casing volumes

for 6" diameter wells = 4.4 x L_w

for 4" diameter wells = 2.0 x L_w

where:

V_W = water volume in well (gallons)

d_W = inside diameter of well (ft)

L_W = length of water column in well (ft).

The calculated water volume is recorded in the Field Log Book.

Purge rates for wells have been calculated and are located in the Field Log Book. Purge wells at rates of 1.0 to 1.3 gallons per minute and record the rate in the Field Log Book for each sampling event. The directions in the pump operating manual must be followed in purging the calculated volume of water. Record any problems with the pump or equipment in the Field Log Book.

Initially and approximately every 5 to 10 gallons (use larger intervals on high volume wells),obtain field readings for temperature, specific conductance, pH, and turbidity. A minimum of three readings will be obtained. Purging shall cease when the following equilibration/stabilization has occurred between successive readings:

- a minimum of 3 casing volumes
- pH plus, or minus, 0.1
- turbidity < 2.0 NTU plus, or minus, 10%
- conductivity, plus, or minus, 3%

For wells that have dedicated pumps, if, after three well volumes, the above parameters do not achieve the above equilibration, continue purging, taking readings every three minutes. For wells that are bailed, if, after three well volumes, the above parameters do not achieve the above equilibration, continue purging taking a sample from each new bail volume. If stabilization does not occur after a maximum of five well volumes is removed, purging will cease and the well will be sampled. Record all measurements in the Field Log Book including the notation that stabilization was not achieved. A maximum of five volumes is allowed for purging. Any additional purging will result in overdevelopment of the well.

For wells that can be evacuated to a dry state, the well is evacuated completely, and the sample taken as soon as sufficient water for sampling is present in the well within 24 hours. Wells incapable of yielding the calculated purge volume will be pumped to dryness, and so noted in the Field Log Book. Field samples are to be taken at each well volume obtained prior to the well going dry and one set must also be obtained

after the well sample has been obtained. Field samples should be recorded in the Field Log Book. Sample compositing, or sampling over a lengthy period by accumulating small volumes of water at different times to eventually obtain a sample of sufficient volume, is not allowed.

Purge water from wells will be collected and placed in the wash pad.

2.5.7 Sample Collection

Dedicated pumps and one non-dedicated pumps are used to collect water samples from the wells. Wells shall be sampled as soon as practical after purging. For low-yield wells (i.e., wells pumped to dryness), samples should be taken as soon as sufficient volume is available, if feasible. Purging and sampling of low-yield wells must be completed within a 24-hour period.

A down-hole, positive displacement pump is used in the wells where a dedicated pump is used for sampling. A non-dedicated pump is used for purging and sampling wells without dedicated pumps. In both situations the pump intake is positioned in the lower portion of the screened interval.

The procedures in the pump operating manual must be followed to avoid damage to the pump, however, the pump must be operated in a manner that does not compromise the samples (the pump fluctuation should be kept to a minimum). Handling of pump level controls and other fittings shall be minimized. Clean sampling gloves will be required before handling the lids of sampling containers if prolonged handling of controls, which require lubrication, is performed. All air hose quick-connections must be checked for a secure fit, and hoses must not be disconnected while still under pressure.

Appendix 1 describes the sample container and preservatives required for the parameters to be analyzed. Once sample containers have been filled they should be refridgerated as soon as possible. For shipment the samples shall be placed in a cooler with sufficient ice to ensure that the sample is kept chilled. Sample containers should not be allowed to remain in direct sunlight once they have been filled.

Prior to use, sampling containers received from the laboratory should be stored in a clean environment. Sampling containers should come from the laboratory that will be performing the analysis. Avoid using containers that have been cleaned on-site whenever possible (with the exception of field analysis containers).

The samples should be transferred directly from the pump discharge tube into the sample container, minimizing contact with the outside air. It is not an acceptable practice to pour samples into a wide-mouth container and then transfer to another sample container.

Samples shall not be obtained at a rate that exceeds the purge rate. When sampling for volatile organic compounds (VOCs), the pump should be reduced to the minimum sustainable rate.

Use caution when filling sampling containers that contain preservative to prevent sampler contact with the preservative and to possible loss of preservative. When sampling for VOCs, each vial should be filled until there is a meniscus over the lip of the vial. After tightening the lid, the vial should be inverted and

tapped to check for air bubbles. If any bubbles larger that 1 mm (based on visual estimation) are present, the vial must be refilled or sample added to minimize bubbles.

The samples collected by bailer should be collected in the order of volatilization sensitivity, as follows:

- Volatile Organic Compounds (Method 8240/8260)
- Semi-volatile Compounds (Method 8270)
- Organochlorine Pesticides and PCBs (Method 8082)
- Chlorinated Herbicides (Method 8150)
- Metals and Total Cyanide
- Major water quality cations and anions
- Radionuclides

Sample order is not significant when sampling by dedicated pumps. Each container must be capped securely and labeled. Labels should be legible and sufficiently durable even when wet. The label should be affixed to the sample container prior sampling, or use containers pre-labeled by the independent laboratory conducting the analysis. The following information must be recorded on the label:

- Sample identification number
- Date and time of sample collection
- Parameter(s) or analytical method(s) requested (if space permits)
- Preservatives used
- Place of Collection
- Name or initials of sampler

2.6 SAMPLE HANDLING

Samples are prepared, labeled, stored, and shipped in accordance with the procedures included in this document. Samples also are subject to the custody procedures included in this document.

The shipping container is sealed, so that it will be obvious if the seal has been tampered with or broken. The Chain-of-Custody documentation is placed on the inside of the container, so that it will be immediately apparent to the laboratory personnel receiving the container, but will not be damaged or lost during shipping.

Following sampling, the well cap will be locked and security sealed to assure its integrity for the next sampling. Record the new security seal in the Field Log Book. The Field Book Log will be reviewed for completeness before the sampler moves to another sample point.

All samples will be placed in shipping containers and transported to the dedicated sample refridgerator as soon as possible after sampling. In the event the sample refridgerator is inoperable or unavailable Ice packs or blue ice shall be used to ensure that samples are kept chilled until shipped to the laboratory.

Samples should be packed with sufficient packing material to minimize the potential for breakage during transport to the laboratory. Polyethylene overpack bags shall be used to contain the ice needed to keep the samples at 4 degrees C. As the samples are packed, all the required information shall be listed on the chain of custody form (Appendix 2). When all the samples have been packed, the shipping container will be sealed (See Section 3.2). The chain of custody shall be sealed in a zip lock plastic bag and placed inside the shipping container.

The samples will be analyzed per permit conditions.

Unless other instructions are given by the analytical laboratory, the sample containers will be completely filled. No air bubbles or headspace is allowed in samples collected for analysis for volatile organic compounds.

3. DOCUMENTATION OF FIELD ACTIVITIES

Identification and recordkeeping are as important as sound sampling techniques. This section addresses the documentation procedures required for field activities and transportation of the sample from the facility to the laboratory.

All information pertinent to field sampling must be documented, regardless of the type of sample. The Field Log Book should be a bound book, preferably with consecutively numbered pages. The following information must be documented and maintained in operational records.

- Sample location.
- Date.
- Depth to bottom of well (from surveyed measuring point), technique, and field meter used.
- Depth to water prior to purging (from surveyed measuring point), technique, and field meter used.
- Documentation of immiscible layer check, detection method, sample collected (if any), and field meter used.
- Time of purge, calculations for purge volume and actual volume purged, well yield, purged to dryness, any field changes in procedure made or deviations from the Sampling and Analysis Plan regarding purging, and purge pumping rate.
- Field measurements (pH, temperature, turbidity and specific conductance), method and field meter used.
- Purpose of sampling (i.e., RCRA, TSCA compliance).
- Field observations, includes general weather observations (air, temperature, wind direction, and strength), activity in sampling area, odor from the well, color and any other pertinent observations.
- Name of sample collector(s).
- Documentation of calibration of pH, and conductance meters, turbidity meter, well depth indicator (if separate from water level indicator), and immiscible layer meter used.

- The type of pump used for sampling will be entered in the log book at the beginning of the sampling event. If a sample is taken by equipment different from this pump, it shall be documented in the entry for that well.

Since sampling situations vary widely, no general rules are provided for the amount of information required. The best guideline is to record sufficient information so that anyone can reconstruct the sampling effort without reliance on the collector's memory. The Field Log Book(s) are filed chronologically when complete.

3.1 CHAIN OF CUSTODY RECORD

The Chain of Custody (COC) Record is the most important document in the entire process. When properly completed and signed, it is considered to be a suitable legal document in testimony regarding the validity of the sample. Each person who has the custody of the sample from the time it is collected until all analyses have been conducted should sign and date this document. Each signature acknowledges that the sample was secure from any outside forces (tampering) during the custody period. An example of a chain of custody form is included in Appendix B.

The COC Record also serves as official communication to the laboratory of the specific analyses required of each sample. After completing and signing the COC Record, the sample collector should file one copy and seal the original in the sample shipping container. When the samples are received at the laboratory, the individual taking possession of the samples should sign and date the COC form. The original COC Record will be returned to the facility with the analytical results.

3.1.1 Security Seals

Personnel from the delivery services employed to transport the samples to the laboratory are exempted from the Chain of Custody signatory requirements. As a protective measure, a security seal is affixed to the shipping container in such a way that the seal shall not come off and must be broken in order to access the container. The security seal is signed and dated by the sampling personnel. The integrity of the seal will be checked by the receiving laboratory's personnel before signing the Record. If the seal has been broken, the laboratory will inform the Environmental Manager or the Facility Manager.

3.2 SHIPMENTS

Groundwater monitoring samples should be forwarded to the analytical laboratory within 24 hours of sampling. If the sample cannot be shipped within 24 hours of sampling, or is to be held over night at the facility, it will be stored in the ground water laboratory refrigerator, along with the trip and field blanks, at about 4 degrees C until shipment.

Groundwater samples are shipped in containers maintaining temperatures at approximately 4^0C.

4. QUALITY ASSURANCE/QUALITY CONTROL

One equipment blank sample (distilled water) will be prepared for each sampling event. This sample will be obtained by collecting rinsate from the non-dedicated sampling equipment.

4.1 TRIP BLANKS

The independent laboratory shall provide trip blanks filled with deionized water. The blanks shall be transported to the sampling location and returned to the laboratory in a manner identical to the handling procedures used for the samples. The blank is not opened in the field. One trip blank shall be submitted to the laboratory each day that samples are taken, and analyzed at a minimum frequency of one per quarter. The trip blank shall be analyzed for volatile organics. The concentration levels of any contaminants found in the trip blank may not be used to correct the groundwater data. Comparison of trip blank contaminant levels to groundwater samples can form the basis for reassessing laboratory performance, discounting unreliable sample data, or deciding on well resampling requirements.

4.2 EQUIPMENT BLANKS

To ensure that any non-dedicated sampling devices have been properly cleaned between uses, the decontaminated device should be filled and or rinsed with deionized water and this water transferred to sample containers. The containers will be returned to the laboratory for the same analysis as the groundwater samples. If contaminants are found in the blanks, the source of contamination should be identified, and corrective action should be initiated, if appropriate. Equipment blanks will be submitted for analysis at the frequency of one per twenty samples for each type of non-dedicated sampling equipment and at a minimum frequency of once per quarter. Unless the equipment blank contains rinsate from all the above listed equipment, identification of which equipment rinsates were used should be included in the Field Log Book.

4.3 FIELD BLANKS

Field blanks are collected by pouring deionized water into labeled clean containers in the field. The blank is sent to the laboratory with the groundwater samples for analysis. Field blank samples are collected immediately after the well sample and at the well head with all equipment (air compressor and sample pump) operating. The intent is to fill the sample containers in the same manner and under the same environmental conditions as the ground water sample was collected. Field blanks shall be submitted at the minimum frequency of one per sampling event, not to exceed 20 wells. Field blanks will be analyzed for the most complete set of parameters for monitoring well samples collected.

4.4 LABORATORY QA/QC

USEN will only use a laboratory which exercises a proper QA/QC and data, management program, consistent or superior to SW-846 procedures. Upon receipt, the laboratory shall record the presence of headspace in VOA vials and the temperature of the sample.

4.5 REPORTING PROCEDURES

The Facility Manager or his desginee shall report data to NDEP on reporting sheets and/or electronically. The units of measure shall accompany each target analyte. The units of measure for a given target analyte shall be consistent throughout the report. The report shall include the value of the constituent determined by the laboratory, the date the sample was collected, the date the sample was received by the laboratory, the analytical method, and the detection limit. Data obtained from analysis of field and trip blanks shall also be submitted along with laboratory QA/QC data.

5. SAMPLING FREQUENCY

5.1.1 Detection Monitoring

The concentrations of the parameters listed in the permit will be determined for all detection monitoring wells during the active life and closure period of the facility quarterly.

The elevation of the groundwater surface and the total well depth must be determined at each monitoring well at least annually. Ground-water elevations are measured in wells prior to purging and sampling.

5.1.2 Compliance Monitoring

Compliance monitoring, if necessary, will be performed as specified in the permit. Compounds identified in Appendix IX Part 264 will be monitored at least every 2 years.

6. ANALYTICAL METHODS

Analytical methods are consistent with the intent and requirements of the latest edition of "Test Methods for Evaluating Solid Waste", U.S. EPA, SW-846. When an SW-846 method is not available or appropriate, alternative methods will be selected from sources such as "Standard Methods for the Examination of Water and Wastewater" and "Methods for Chemical Analysis of Water and Wastes", EPA 600/4-79-020 and submitted to NDEP as a permit modification.

Examples of specific methods are:

- Volatile Organic Compounds: SW-846 Method 8240/8260
- Organochloride Pesticides and PCBs: Method 8082
- Chlorinated Herbicides: Method 8150
- Semivolatile Organic Compounds: Method 8270

Examples of acceptable analytical methods are presented in Table 2.

7. MONITORING WELL AND EQUIPMENT INSPECTION

Monitoring wells and well monitoring equipment are inspected each time a sample is collected. The Facility Manager or designee will inspect for the following and record the results in the field log:

1. Inspect the protective well casings, locking cap and lock for cracks, damage, and any other signs of deterioration.
2. Inspect well pad for cracks or sign of deterioration.
3. Ensure that well identification number is legible.
4. Inspect pumping equipment for structural integrity and proper operation.

Any deficiencies noted will be brought to the attention of the Facility Manager or designee. Corrective actions will be taken, as expeditiously as possible, and will be noted in Field Log Book.

Table 2 - Sample Preparation and Analytical Methods

Parameter	Preparation Method	Analytical Method	Detection Limit
Volatile Organics	5030	8260	5 ug/L or PQL
Semi-volatile organics	3520	8270	PQL
Arsenic	3005,3010	7060	2 ug/L
Barium	3005,3010	6010	0.05 ug/L
Cadmium	3005,3010	6010, 7131	4 ug/L, 1 ug/L
Chloride		9250, 9251, 9252, 9553, 325.2	1 mg/L
Chromium	3005,3010	6010	0.05 mg/L
Fluoride		9200, 340.2	0.1 mg/L
Lead	3005,3010	9010, 7421	0.05 mg/L
Mercury	3005,3010	7470, 7471	0.004 mg/L
Nitrate		9200, 353.2, 353.1	0.05 mg/L
Sulfate		9036, 9038	1 mg/L
Sodium	3005,3010	7770, 6010	1 mg/L
Total Dissolved Solids		EPA 160.5, 160.1	1 mg/L
Selenium	3005,3010	6010, 7740	4 mg/L
Silver	3005,3010	6010	0.005 mg/L
Endrin	3510, 3520	8081, 8270	0.05 ug/L
Lindane	3510, 3520	8081, 8270	0.02 ug/L
Methoxyclor	3510, 3520	8081, 8270	0.2 ug/L
Toxaphene	3510, 3520	8081, 8270	0.5 ug/L
2,4-D	3510, 3520	8081, 8270	2ug/L
2,4,5-TP Silvex	3510, 3520	8081, 8270	2 ug/L
Radium		9315, 9320, SM704, SM705, 903, 904, 901.1M	Variable
Tritium		906.0	Variable
PCBs	3510, 3520	8082	0.5 ug/L
Cyanide		9010, 9012	0.005 mg/L

8. LEACHATE SAMPLING PROCEDURES

Leachate generated from the landfills are typically collected in 275 gallon plastic totes and always remain in the landfill area. Prior to sampling the totes will be moved to the outer edge of the landfill as to give the sampler better access to the totes. The method for extracting the leachate out of the totes is at the discretion of the sampler but several methods have been used in the past and are considered acceptable:

1. Use of a bottom feeding bailer with closure device
2. Disposable coliwasa
3. Dispenser valve at the bottom of the tote

Whatever method the sampler chooses to use to extract the leachate from the totes the removed leachate will be placed into a clean DI jug or container and then transferred into all the sampling containers. Once

the leachate samples have been collected they will be managed in a similar fashion as the other groundwater samples as described in Sections 2.6 to 3.2, 4.4, and 4.5 and analyzed using the methods outlined in Table 2.

Lastly, when filling out the Chain of Custody (COC) for the leachate samples it is a good idea to indicate "High Concentrations" in the comments section of the COC as to give the laboratory notice. This is not required but a courtesy to the laboratory analzing the samples.

APPENDIX A

SAMPLING AND PRESERVATION PROCEDURES

FOR DETECTION MONITORING

Appendix A

SAMPLING AND PRESERVATION PROCEDURES

FOR DETECTION MONITORING

Parameter	Container	Holding Time	Preservative
Volatiles	2 x 40 ml, glass vial with Teflon septum – no head space	14 days	HCl, pH<2; Cool 4° C
Arochlors, Semivolatiles, Pesticides/Herbicides	1 x 1 L, glass amber with lid lined with fluorocarbon resin	7/14 days (prep) 40 days (analysis)	Cool, 4° C
Metals (except mercury)	1 x 500 ml, plastic polyethylene bottle with polypropylene cap	6 months	HNO_3, Ph < 2
Cyanide	1 x 1 L, plastic polyethylene bottle with polypropylene cap	14 days	NaOH, pH >12
Radiochemistry	2 x 1 L, plastic polyethylene bottle with polypropylene cap	6 months	HNO_3, pH < 2
Nitrate and Sodium	1 x 1 L, glass amber bottle with a Teflon lined lid	28 days	H_2SO_4, pH < 2
Chloride, Fluoride, Sulfate	1 x 1 L, plastic polyethylene bottle with polypropylene cap	28 days	None
Total Dissolved Solids	1 x 1 L, plastic polyethylene bottle with polypropylene cap	7 days	None
Mercury	1 x 500 ml, plastic polyethylene bottle with polypropylene cap	28 days	HNO_3, pH < 2

Appendix 2

Sample Chain of Custody

CHAIN-OF-CUSTODY

WWW.ANALYSYSINC.COM

AnalySys Inc.
3512 Montopolis Drive, Austin, TX 78744
Phone: (512) 385-5886 Fax: (512) 385-7411
2209 N.P.I.D., Ste K, Corpus Christi, TX 78408
Phone: (361) 289-6384 Fax: (361) 289-0875

Send Reports To:
Company Name _____
Address _____
City _____ State ____ Zip _____
ATTN: _____
Phone _____ Fax _____

Bill to (if different):
Company Name _____
Address _____
City _____ State ____ Zip _____
ATTN: _____
Phone _____ Fax _____

Rush Status (must be confirmed with lab mgr.): _____
Project Name/PO#: _____ Sampler: _____

Analyses Requested (1)
Please attach explanatory information as required

Client Sample No. Description/Identification	Date Sampled	Time Sampled	No. of Containers	Soil	Water	Waste	Lab I.D. # (Lab only)									Comments

(1)Unless specifically requested otherwise on this Chain-of-custody and/or attached documentation, all analyses will be conducted using ASI's method of choice and all data will be reported to ASI's normal reporting limits (MDL/PQL). For GC/MS volatiles and extractables, unless specific analytical parameter lists are specified on this chain-of-custody or attached to this chain-of-custody, ASI will default to Priority Pollutants or ASI's HSL list at ASI's option. Specific compound lists must be supplied for all GC procedures.

Sample Relinquished By				Sample Received By			
Name	Affiliation	Date	Time	Name	Affiliation	Date	Time

[Tendering of above described samples to AnalySys, Inc. for analytical testing constitutes agreement by buyer/sampler to AnalySys, Inc.'s standard terms.]

Appendix 13 E

Statistical Analysis of Groundwater Monitoring Data

AquAeTer optimizing environmental resources | water, air, earth

7430 East Caley Avenue, Suite 310 ◦ Centennial, CO 80111 ◦ Phone (303) 771-9150 ◦ Fax (303) 771-8776

February 19, 2010 093196

US Ecology Nevada, Inc.
PO Box 578
Beatty, Nevada 89003

Attention: Mr. Scott Wisniewski

RE: Assistance with Statistical Analysis of Groundwater Monitoring Data
US Ecology Nevada, Inc., Beatty, Nevada

Dear Mr. Wisniewski:

AquAeTer, Inc. has completed the statistical analysis of groundwater monitoring data at the US Ecology Nevada, Inc. (USEN) facility located in Beatty, Nevada. The scope of monitoring data analysis is described in **AquAeTer's** proposal #093196P, as authorized by USEN on August 11, 2009.

BACKGROUND

AquAeTer assisted USEN with statistical analysis of monitoring data for background well MW-313 in 2003. At the time of that previous statistical analysis, the USEPA statistical program GRITS/STAT was used. The GRITS/STAT program, which no longer is supported by USEPA, was determined to be of limited value for long-term data management and was not used for the present data analysis. **AquAeTer** recommended and received your approval to integrate USEN's groundwater sampling database into the electronic data management and statistical analyses program DUMPStat®. **AquAeTer** has used DUMPStat® as a data management tool for other landfill facilities, where we have evaluated monitoring data by the methods offered by the program (e.g., intrawell or up-to-down-gradient) and in a manner that is compliant with regulatory requirements.

STATISTICAL ANALYSIS METHOD

DUMPStat® is a program for the statistical analysis of groundwater monitoring data using methods described in Statistical Methods for Groundwater Monitoring by Dr. Robert D. Gibbons. The program allows direct importation of laboratory analytical data in Laboratory Information Management System (LIMS) format. The program provides the capacity for complete analysis of wells and monitored constituents; allows selecting the appropriate statistical method to accomplish the desired data analyses while minimizing false positive and false negative rates. The DUMPStat® statistical procedures are consistent with USEPA Subtitle C

and D regulations and guidance, and with ASTM D6312-98, "Standard Guide for Developing Appropriate Statistical Approaches for Ground-Water Detection Monitoring Programs."

DUMPStat® statistical methods include interwell (up-gradient to down-gradient) comparisons where up-gradient well data characterize the natural temporal and spatial variability that is observed in the down-gradient wells, as well as intrawell comparisons where the data history for individual wells is evaluated to identify evidence of potential impacts. The intrawell method is applicable at unimpacted wells with a sufficiently long historical database, usually at least eight measurements for each parameter. DUMPStat® uses Microsoft Access® as the database management software.

REGULATORY APPROVAL

AquAeTer notes that using DUMPStat® as the statistical analysis method for the Beatty facility will be a deviation from current RCRA Permit requirements that likely will require NDEP approval in order that the regulatory requirements are satisfied by the statistical analyses performed and the DUMPStat® reporting format.

Section 10.8.4 of the facility's RCRA Permit requires that USEN "determine whether there is a statistically significant increase over the Groundwater Protection Standards for each parameter identified in Table 4 each time groundwater quality is determined at the compliance point." Further, at 10.8.4.1, the Permit says that "a statistically significant increase is determined by comparing each groundwater monitoring result to the corresponding background limit." **AquAeTer** notes that the exceedence the Permit defines as a "statistically significant increase" actually is a non-statistical comparison of the observed groundwater quality at POC wells and the pre-determined background criterion listed in Permit Table 4. Although the background criterion might have been developed by a statistical method when the Permit was written, the Table 4 values do not consider temporal changes to background since that time and probably do not consider the spatial variability that would be represented by considering data from all up-gradient wells.

Organic constituents seldom result from natural causes, thus are appropriately considered to be potential facility-caused impacts that can be identified by comparison to criteria that are not site-specific, such as laboratory reporting limits or State or federal water quality standards (e.g., GWPS values). Many inorganic and indicator constituents potentially are naturally occurring and, as such, potential facility-caused impacts appropriately are identified using statistical methods to identify conditions that differ from natural occurrences. The DUMPStat® interwell method used by **AquAeTer** for the data comparison summarized in this letter is a statistical method that makes a site-specific data comparison for inorganic and indicator constituents. That is, the statistically determined constituent concentrations (i.e., control limits or prediction limits) derived for data from the three up-gradient wells are site-specific and event-specific values that probably will differ from the groundwater quality standards in Table 4 of the Permit.

DUMPStat® manages, reports, and displays the results of groundwater monitoring for organic constituents and will provide tabulated or graphical comparisons between observed concentrations in monitor wells and groundwater quality criteria. Though not a statistical data evaluation, the program manages these organic constituent data and identifies exceedences that can be simple detections or actual exceedences of water-quality criteria concentrations. Examples of tabular and graphical output for organics are attached.

SITE-SPECIFIC STATISTICAL DATA EVALUATION

The first task of the statistical analysis required **AquAeTer** to import USEN groundwater monitoring data from three up-gradient monitor wells and 15 down-gradient monitor wells (i.e., point of compliance, POC, wells). The data import covered all groundwater monitoring constituent data collected between 2002 and 2009, except for radiological analysis. Since monitor well MW-313 was designated the up-gradient well for previous statistical analysis, additional data for this well covering the time period from December 1988 to December 2001 also were imported. Data import also included leachate data and groundwater data for 600-series Supplemental Wells. The result of the data import process is the availability of a comprehensive electronic groundwater database for the USEN facility that covers sampling events for POC wells between 2002 and 2009, and historical groundwater data for several wells. Future groundwater analytical data can be added to the database, providing future users with access to the comprehensive data set.

In order to provide NDEP with a sample of the data evaluation generated by DUMPStat® and the proposed format of future groundwater data statistical analysis, **AquAeTer** performed the following statistical analyses.

- Up-to-down-gradient comparisons. Such comparisons were made for three up-gradient wells (MW-313, MW-318, and MW-319) and 15 down-gradient POC wells (MW-001, MW-002, MW-308, MW-309, MW-310, MW-311, MW-315A, MW-316, MW-317, MW-320, MW-322, MW-324, MW-325, MW-326, and MW-327).

- Changes in analytical methods. Considered whether inorganic and indicator constituent results done by different analytical methods can be grouped together (called 'aliasing' in DUMPStat®). Accomplished by grouping concentration data by various analytical methods as a single data set for each inorganic or indicator constituent. The initial conclusion is that inorganic and indicator data from the different analytical methods can be grouped to provide acceptable results.

- Reporting of statistical analyses. Analysis output consists of trend graphs of concentration versus time, up-gradient prediction limit, and the 2009 groundwater quality standard from USEN's RCRA Permit. In addition, summary statistics and prediction limit tables are generated. Example trend graphs for metals and indicators are attached.

AquAeTer ran statistic analyses for three groupings of inorganic and indicator constituents. The results of these DUMPStat® statistical analyses are as follow.

1. Water-quality constituents (including chloride, specific conductance, cyanide, fluoride, nitrate/nitrite-n, pH, sulfate, TOX, TOC) in groundwater.

    - When using the up-gradient groundwater data set from 2002 to 2009, DUMPStat® determined that there were only two exceedences in the down-gradient (POC) data set. These are for pH at well MW-310 and MW-315A.

    - After increasing the time period included in the up-gradient data set by adding up-gradient groundwater monitoring results from 1988 to 2009, DUMPStat® determined that there were no exceedences in down-gradient wells.

2. Metals constituents (Ag, As, Ba, Cd, Cr, Hg, Na, Pb, and Se) in groundwater.

    - Using background data from 2002 to 2009, DUMPStat® determined that there were no exceedences in the down-gradient (POC well) data set.

    - After including up-gradient data from 1988 through 2009, DUMPStat® again determined that there were no exceedences.

3. Radiological constituents (gross alpha, gross beta, radium-226, radium-228, tritium) in groundwater.

    - Using background data from 2002 to 2009, DUMPStat® found no exceedences; however, the statistical analysis of these data probably does not appropriately consider the uncertainty associated with reporting of radiological analyses.

An attached tabulation summarizes the results of up-gradient monitoring data evaluation by DUMPStat® as a comparison between the prediction limits determined by the program for up-gradient well data through 2009 with the groundwater protection standards contained in the RCRA Permit.

As discussed previously, the evaluation of the results of 2009 groundwater monitoring for organic constituents is a non-statistical comparison between the analytical results for POC wells and the groundwater protection standards listed in Table 10.5 of the RCRA Permit. For any other organic parameters for which groundwater samples are analyzed, the data evaluation process is based on laboratory reporting limits or practical quantitation limits (PQLs), where a reported concentration equal to or greater than the PQL is a "detection." Under RCRA Permit Section 10.8.4.1.1, such "detection" is subject to verification in the next scheduled sampling event. With regard to monitoring data for organic constituents, no statistical data evaluation is

necessary, but DUMPStat® does manage and report the monitoring data in tabular and graphical form. Examples of both are attached.

CLOSING REMARKS

We recognize that this statistical method for groundwater data evaluation differs from that established in the current RCRA Permit, and that a permit modification probably will be required to change to using DUMPStat® or similar software for data analyses. Accordingly, the next step should include obtaining NDEP concurrence with the suggested statistical approach for analyses of groundwater monitoring data for inorganic and indicator constituents and the future use of DUMPStat® as an acceptable tool for identification of groundwater impact at the USEN Beatty facility. To begin a dialog with NDEP, **AquAeTer** suggests providing this letter or a similar summary to NDEP for review and comment.

We appreciate the opportunity to work with USEN on this project. If you should have questions or comments concerning the groundwater statistics performed or the use of DUMPStat®, please contact us by telephone at (303) 771-9150, by FAX at (303) 771-8776, or by electronic mail at cbolin@aquaeter.com.

Sincerely,
AquAeTer, Inc.

Chris A. Bolin
Project Manager

Stephen L. Wampler
Director of Engineering

Attachments: Comparison of Groundwater Criteria
Examples of DUMPStat® trend graphs for metals and indicator parameters
Examples of DUMPStat® monitoring data presentation for organics

US Ecology Nevada, Inc.
Mr. Scott Wisniewski
February 19, 2010

COMPARISON OF GROUNDWATER CRITERIA

COMPARISON OF GROUNDWATER CRITERIA
USEN - BEATTY, NV

RCRA Permit Table 10.4 Constituent	Units	Permit GWQS	DUMPStat® 2009 Prediction Limit	USEPA MCL
Arsenic	ug/L	10	15.2	10
Barium	ug/L	100	240	2,000
Cadmium	ug/L	20	5.3	5
Chromium	ug/L	60	185	100
Lead	ug/L	50	29.7	15
Mercury	ug/L	2	2	2
Selenium	ug/L	40	33.9	50
Silver	ug/L	40	62.7	*100*
Cyanide	ug/L	20	10	200
Fluoride	ug/L	4,055	4,522	4,000
Sodium	ug/L	175,000	324,000	NA
Sulfate	ug/L	230,000	274,000	*250,000*
Chloride	ug/L	80,000	106,000	*250,000*
TOX	ug/L	10	7	NA
TOC	ug/L	2,100	7,460	NA
pH	s.u.	7 to 8.4	7 to 8.72	*6.5 to 8.5*
Specific Conductance	umhos	980 to 1240	1,398	NA
Nitrate-Nitrite as N	ug/L	1700	2,000	10,000

NOTES:

Groundwater Quality Standard (GQWS) from RCRA Permit, Revision 3, June 2009.

DUMPStat® Prediction Limits are based on up-gradient monitoring well data from 1988 to 2009.

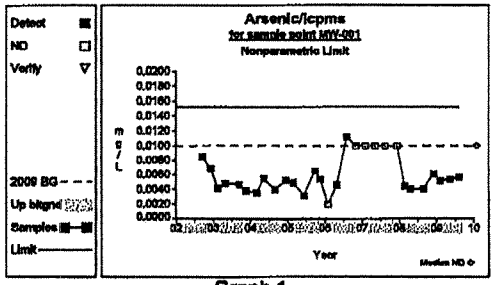
MCL Italics indicates a Secondary MCL.

Fluoride GWQS value is 1.4 (Ln of concentration in mg/L) which converts to concentration = 4.055 mg/L = 4,055 ug/L

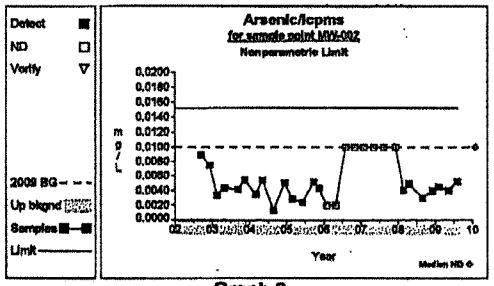
US Ecology Nevada, Inc.
Mr. Scott Wisniewski
February 19, 2010

EXAMPLE OF DUMPSTAT® TREND GRAPHS FOR METALS AND INDICATOR PARAMETERS

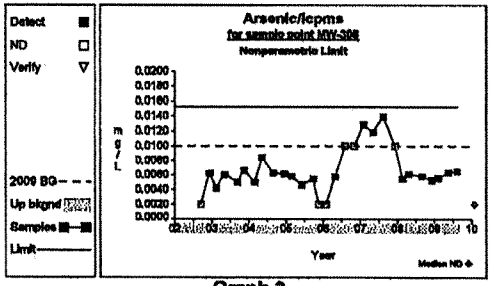
Up vs. Down Prediction Limits



Graph 1



Graph 2



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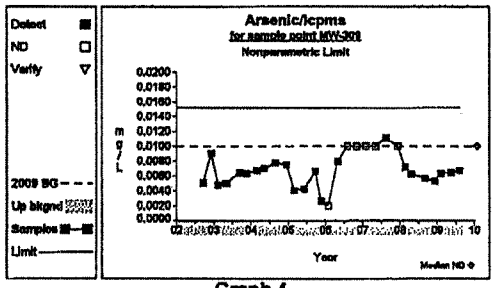
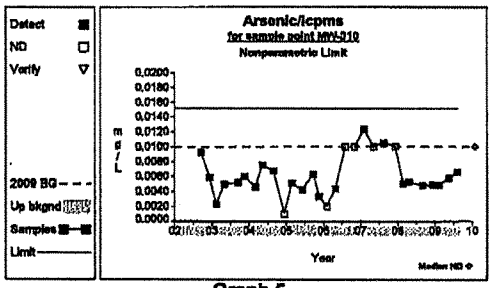
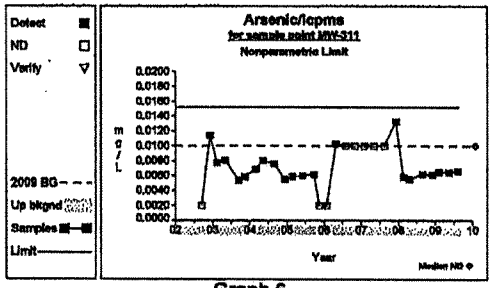


Graph 4



Graph 5



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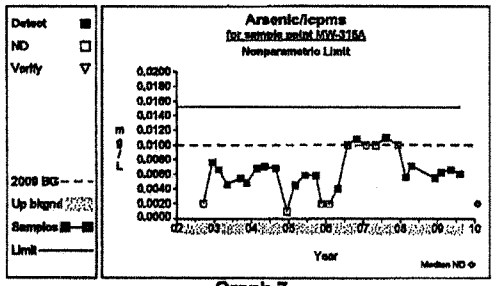

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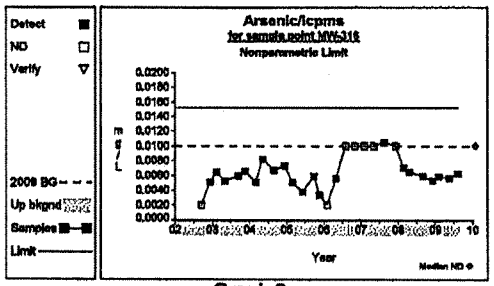
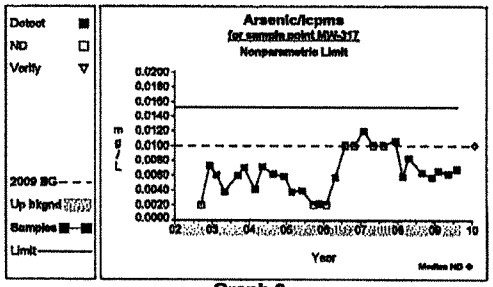
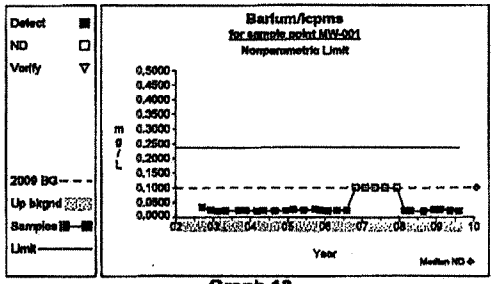


Graph 8

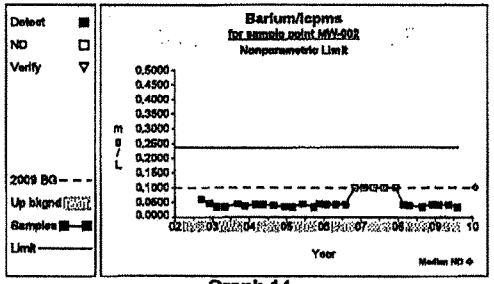


Graph 9

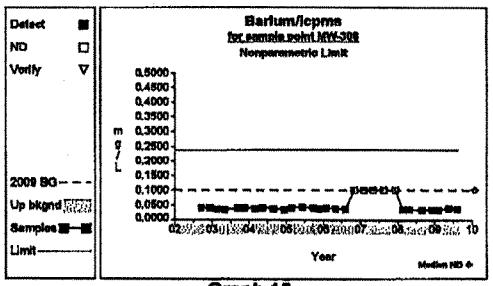
Up vs. Down Prediction Limits



Graph 13



Graph 14



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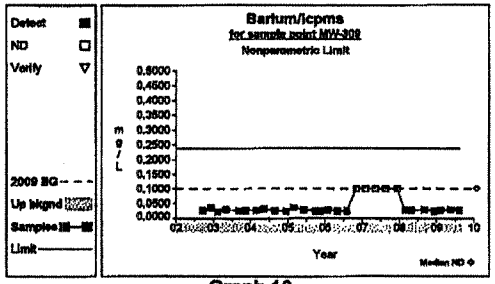
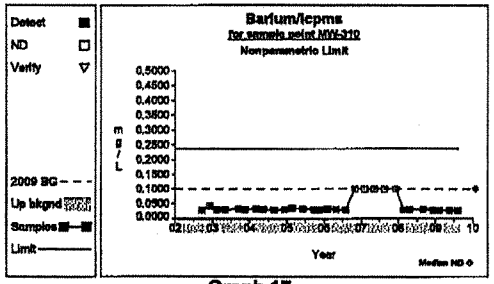
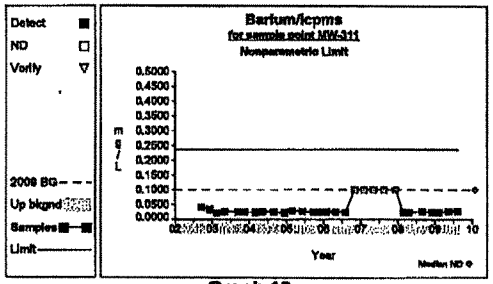


Graph 16



Graph 17



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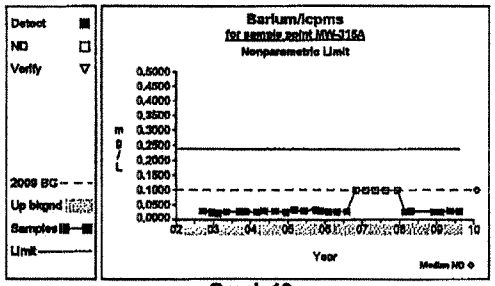
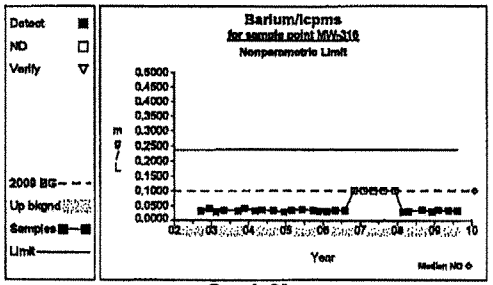
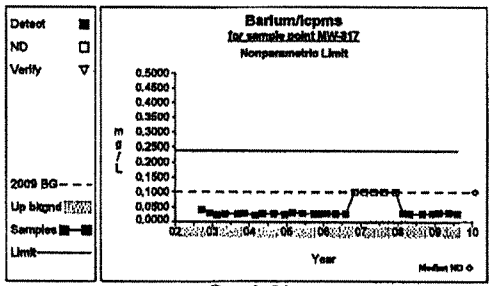


Graph 19

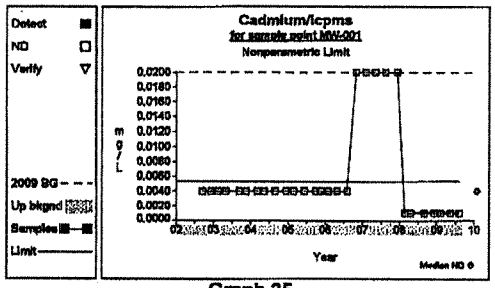


Graph 20

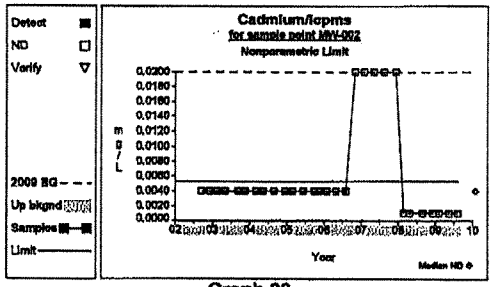


Graph 21

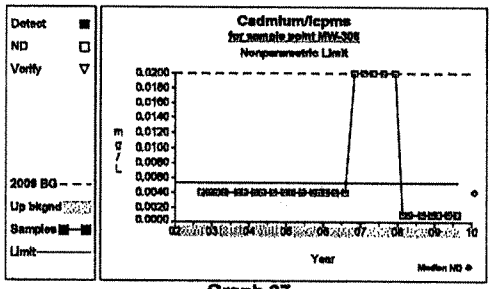
Up vs. Down Prediction Limits



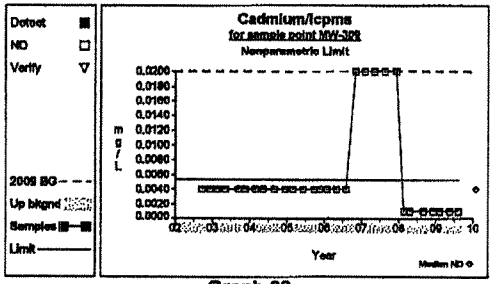
Graph 25



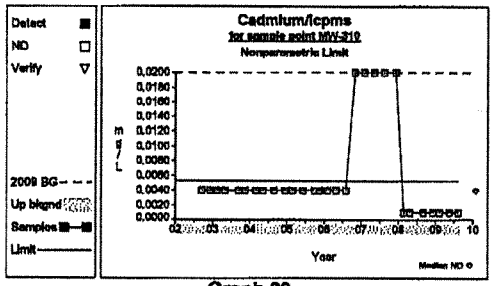
Graph 26



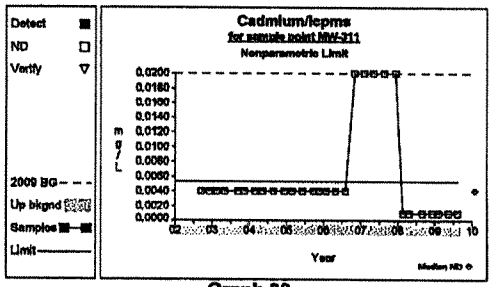
Graph 27



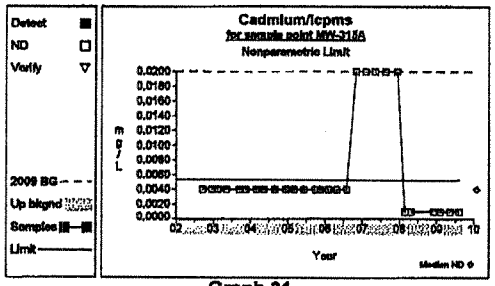
Graph 28



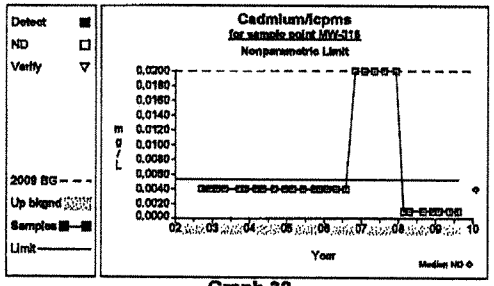
Graph 29



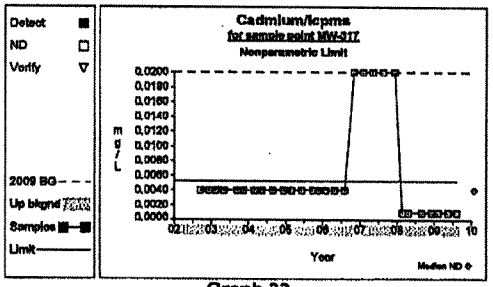
Graph 30



Graph 31

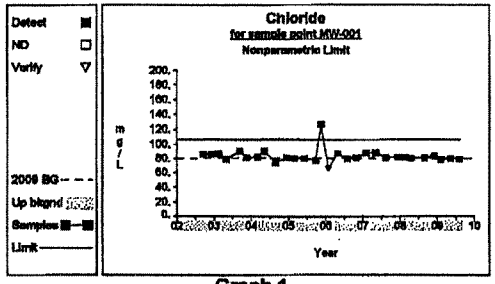


Graph 32

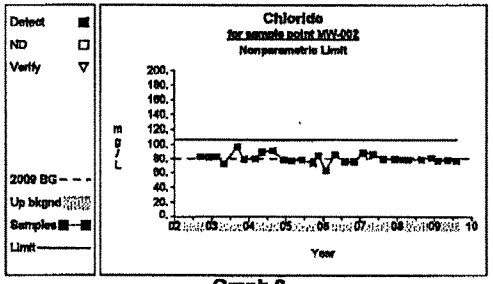


Graph 33

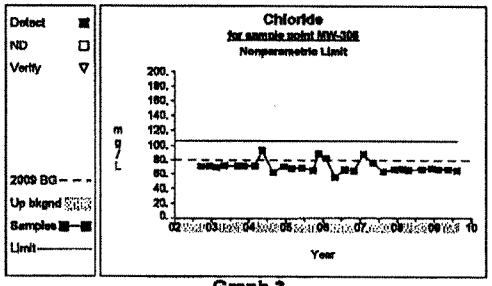
Up vs. Down Prediction Limits



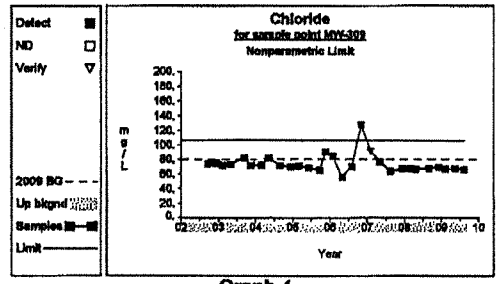
Graph 1



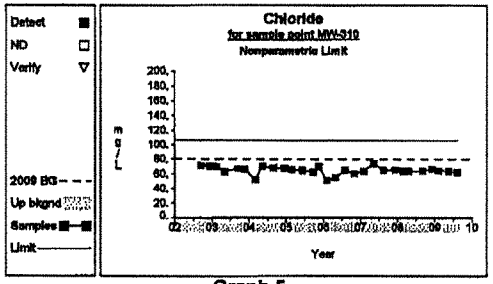
Graph 2



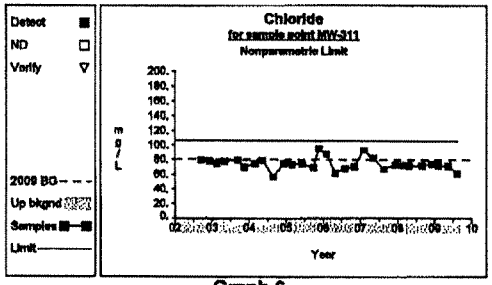
Graph 3



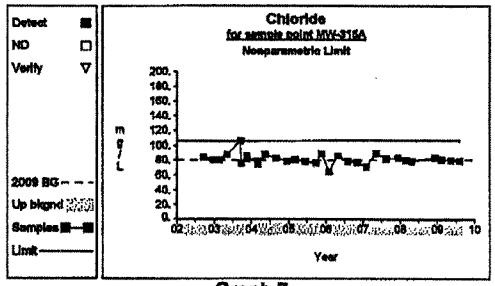
Graph 4



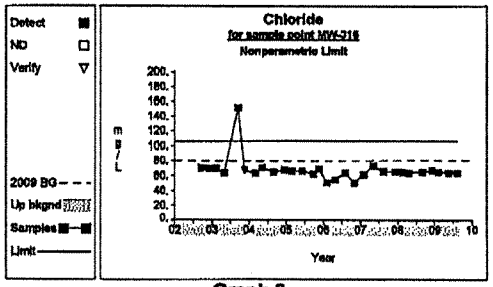
Graph 5



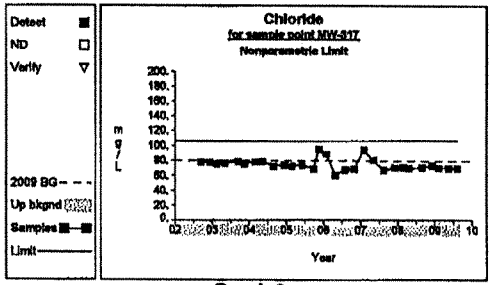
Graph 6



Graph 7



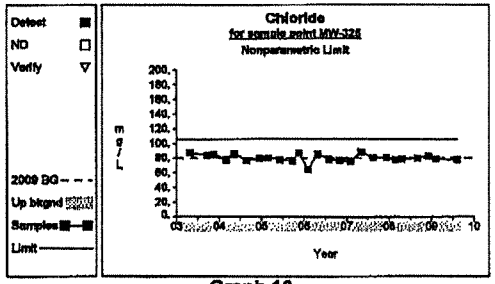
Graph 8



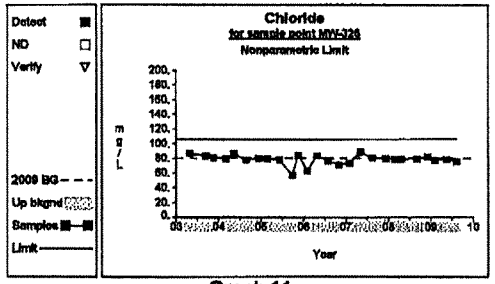
Graph 9

Prepared by: AquAeTer, Inc.

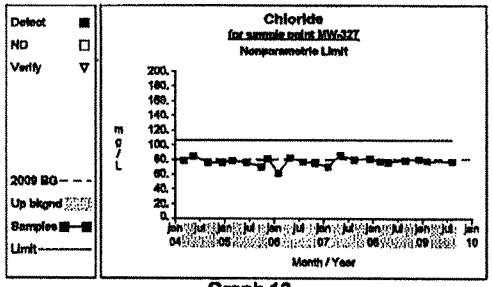
Up vs. Down Prediction Limits



Graph 10

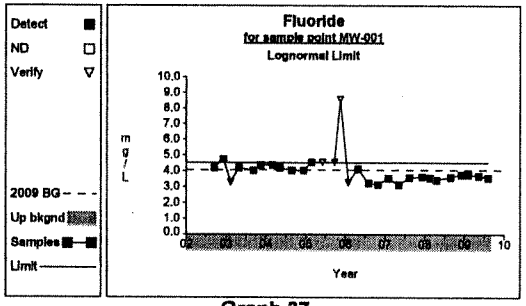


Graph 11

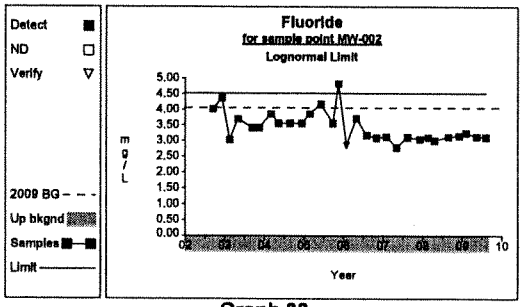


Graph 12

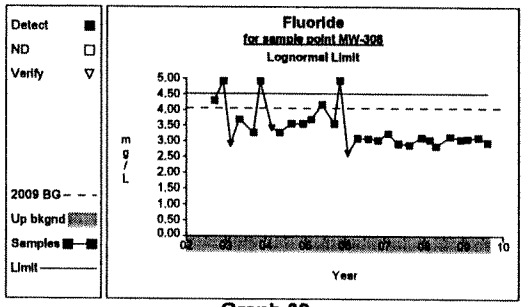
Up vs. Down Prediction Limits



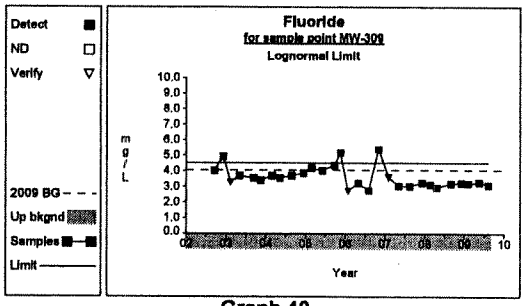
Graph 37



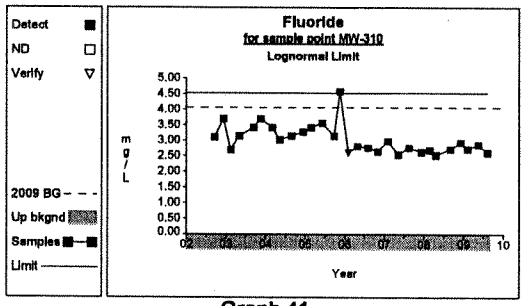
Graph 38



Graph 39



Graph 40



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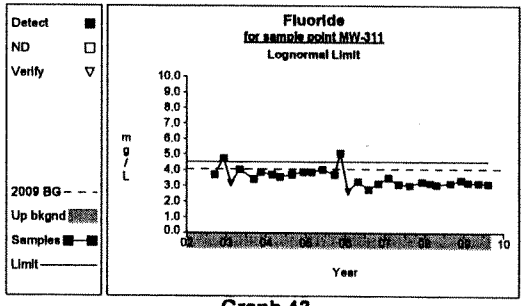

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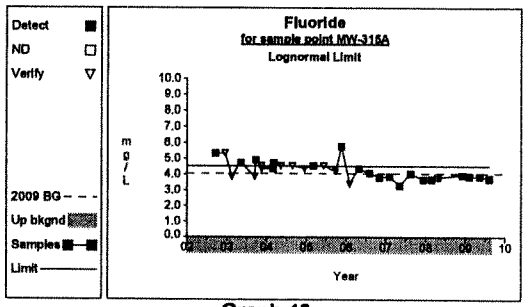

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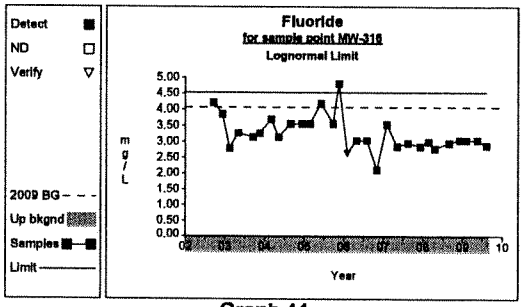
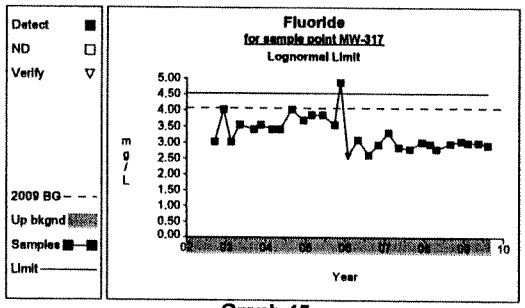


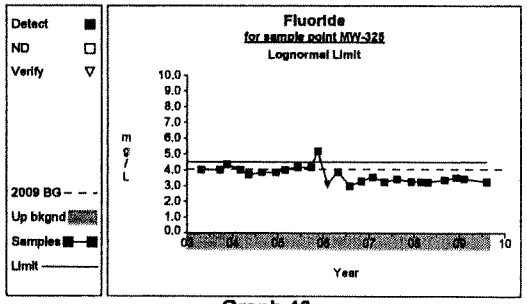
Graph 44



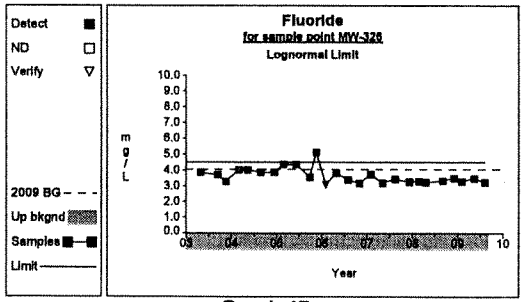
Graph 45

Prepared by: AquAeTer, Inc.

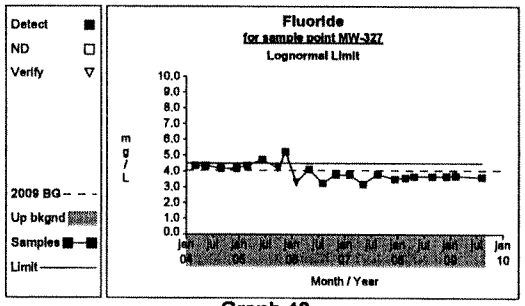
Up vs. Down Prediction Limits



Graph 46

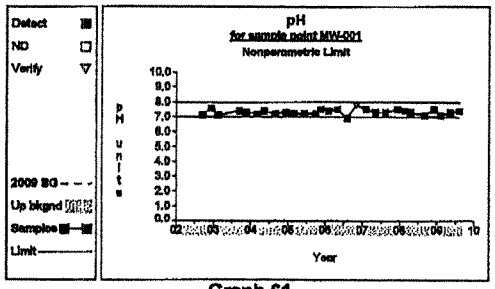


Graph 47

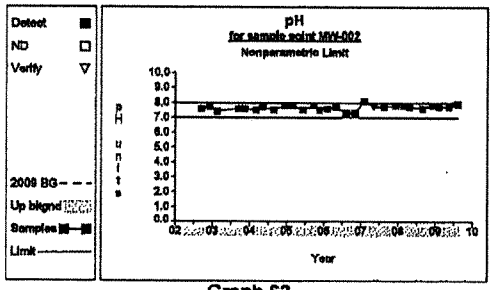


Graph 48

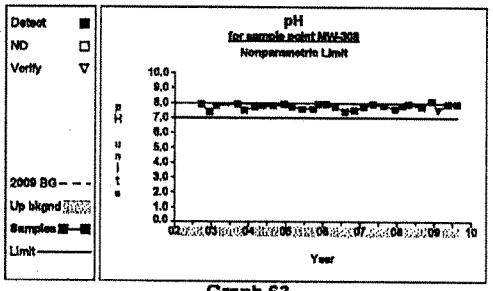
Up vs. Down Prediction Limits



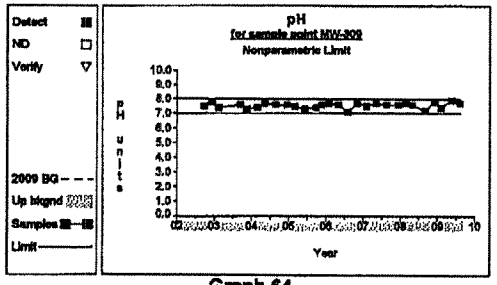
Graph 61



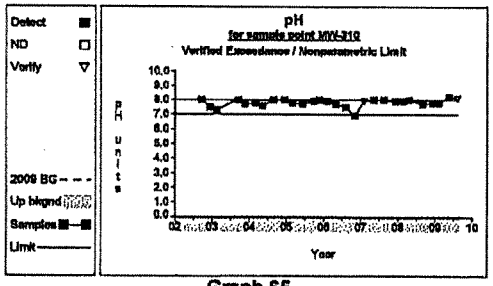
Graph 62



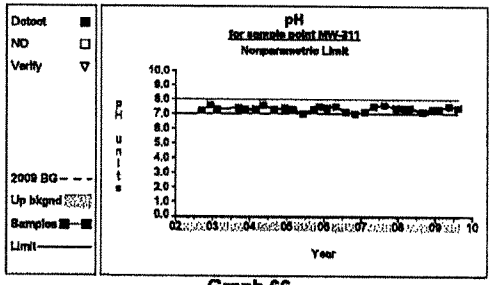
Graph 63



Graph 64



Graph 65



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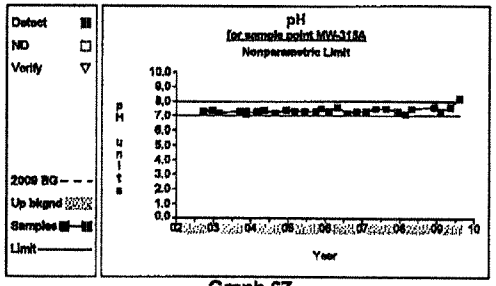
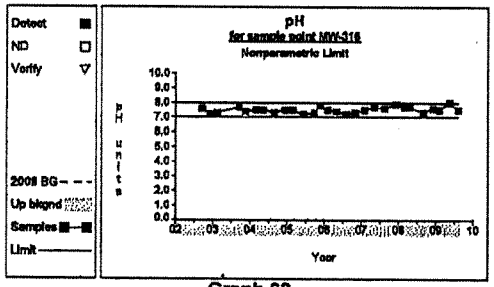
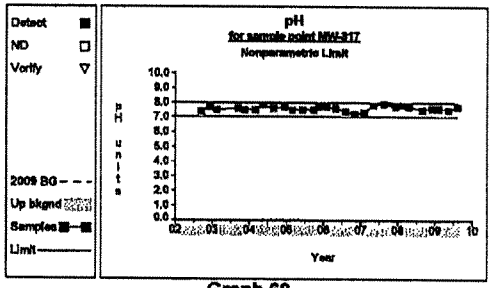


Graph 67

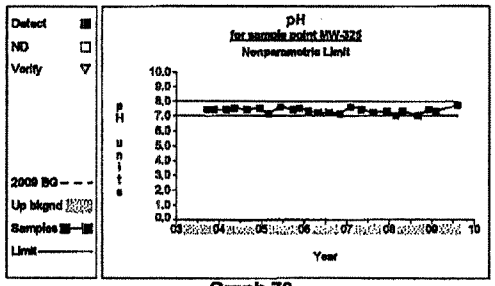


Graph 68

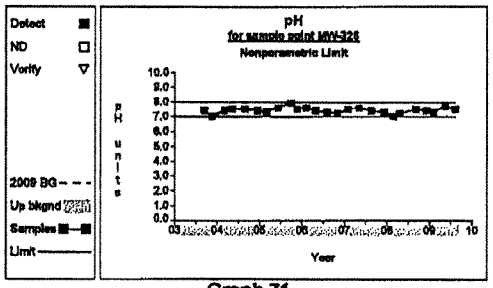


Graph 69

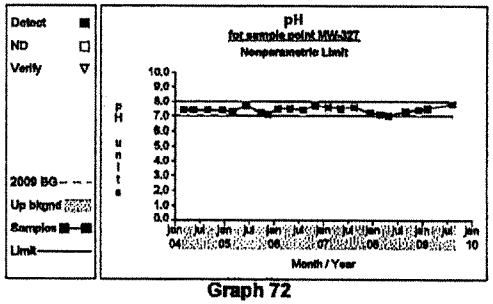
Up vs. Down Prediction Limits



Graph 70



Graph 71



Graph 72

US Ecology Nevada, Inc.
Mr. Scott Wisniewski
February 19, 2010

EXAMPLES OF DUMPSTAT® MONITORING DATA PRESENTATION FOR ORGANICS

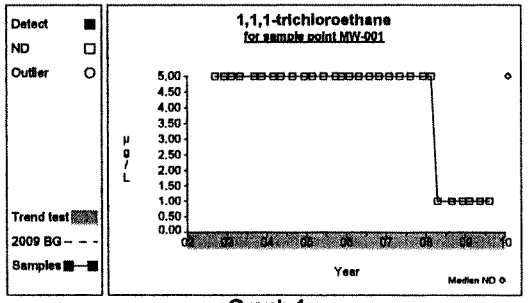
Table 1

Leachate Parameter Detections

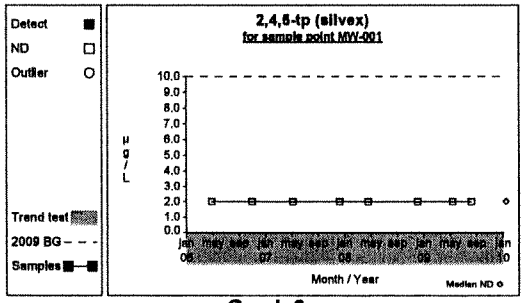
Constituent	Units	Well	Date	Result	Limit
Acetone	µg/L	MW-310	9/02/2008	14.3000	10.0000
Tetrachloroethene	µg/L	MW-310	4/20/2008	1.9300	1.0000
Tetrachloroethene	µg/L	MW-310	9/02/2008	2.4900	1.0000
Tetrachloroethene	µg/L	MW-310	12/05/2008	1.9900	1.0000
Tetrachloroethene	µg/L	MW-310	2/07/2009	1.8700	1.0000
Tetrachloroethene	µg/L	MW-310	5/16/2009	2.3500	1.0000
Tetrachloroethene	µg/L	MW-310	8/08/2009	1.7700	1.0000
Acetone	µg/L	MW-313	8/27/2008	10.6000	10.0000
Acetone	µg/L	MW-315A	12/10/2007	889.0000	100.0000
Chloroform	µg/L	MW-315A	9/22/2003	6.4700	5.0000
Chloroform	µg/L	MW-315A	11/14/2003	78.1000	5.0000
Chloroform	µg/L	MW-315A	11/17/2003	10.7000	5.0000
Chloroform	µg/L	MW-315A	2/28/2004	8.5400	5.0000
Chloroform	µg/L	MW-315A	3/01/2005	14.0000	5.0000
Chloroform	µg/L	MW-315A	6/08/2005	7.9700	5.0000
Chloroform	µg/L	MW-315A	9/27/2005	21.1000	5.0000
Pcb, total	µg/L	MW-315A	4/28/2006	.6880	.5000
Acetone	µg/L	MW-318	4/25/2003	586.0000	500.0000
Acetone	µg/L	MW-325	4/25/2003	107.0000	100.0000
Acetone	µg/L	MW-326	4/28/2003	6540.0000	2500.0000
Lindane	µg/L	MW-326	4/19/2008	.0290	.0200
Pcb, total	µg/L	MW-326	9/03/2008	2.5500	.5000
Pcb, total	µg/L	MW-327	8/15/2007	.7430	.5000

Detections are shown for constituents selected in the VOC list and all selected wells
The Limit column refers to the laboratory reporting limit

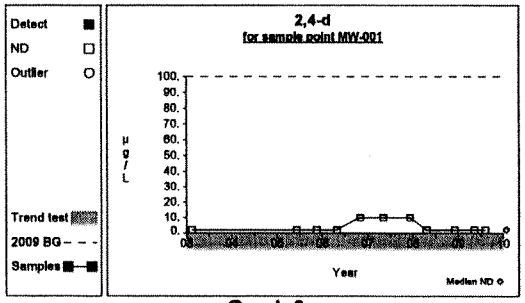
Time Series



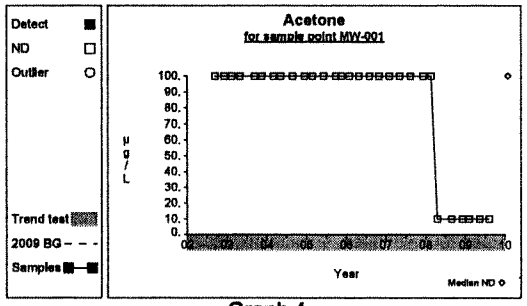
Graph 1



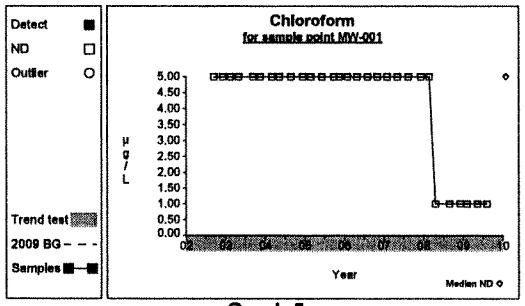
Graph 2



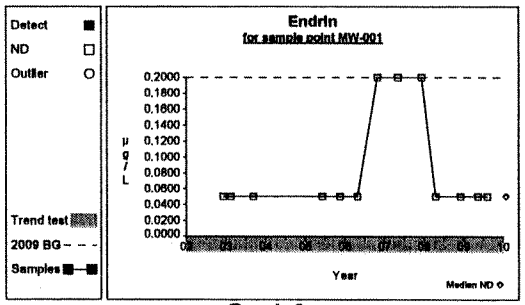
Graph 3



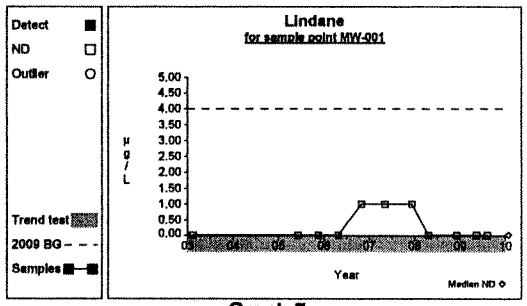
Graph 4



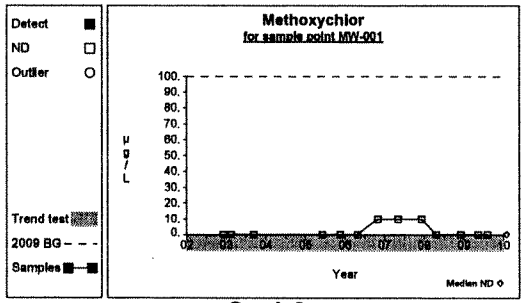
Graph 5



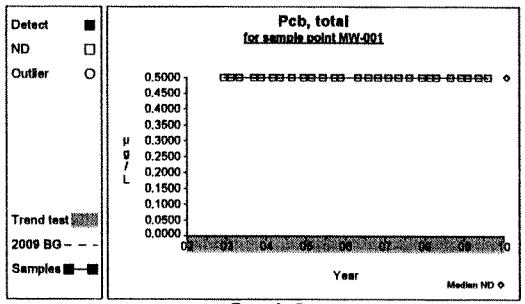
Graph 6



Graph 7

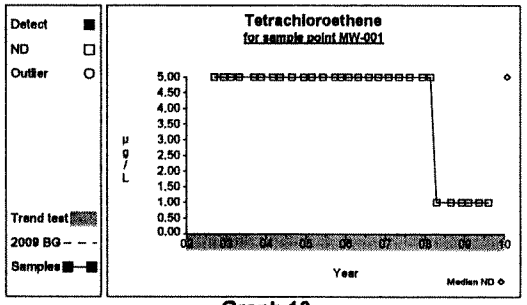


Graph 8

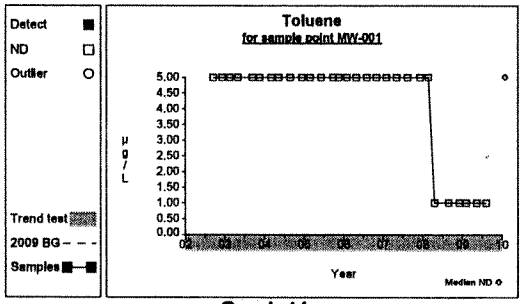


Graph 9

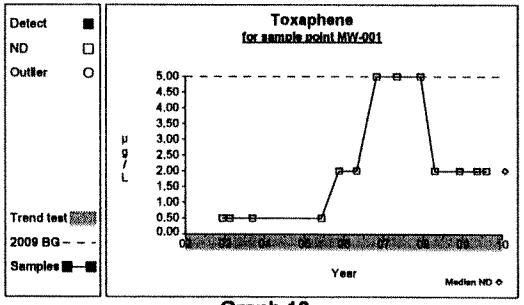
Time Series



Graph 10



Graph 11



Graph 12

Appendix 13 F

Corrective Measures Study Work Plan

CORRECTIVE MEASURES STUDY

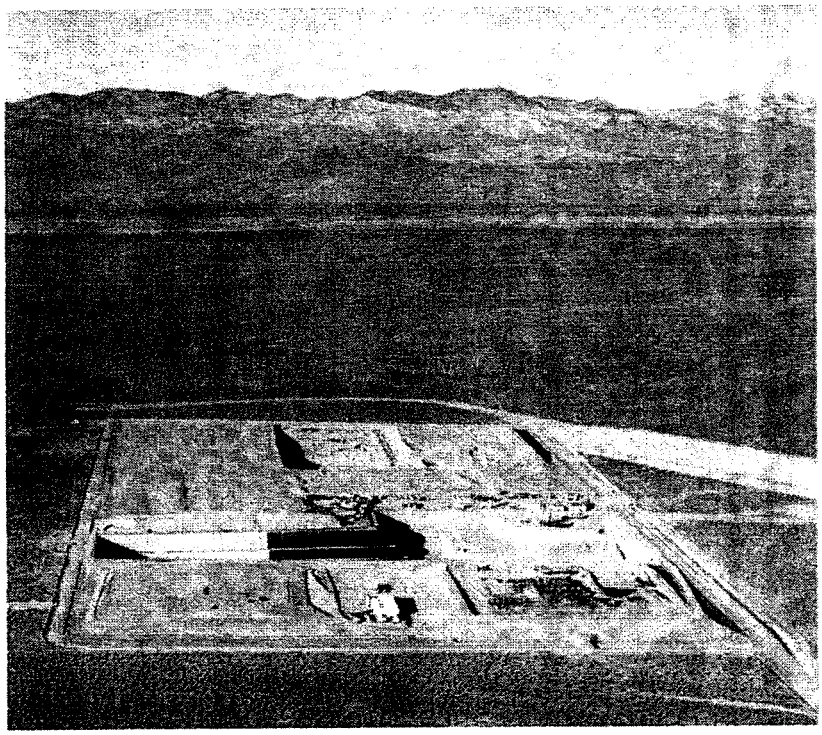
WORKPLAN

for

US Ecology, Inc.'s

HAZARDOUS WASTE MANAGEMENT FACILITY

LOCATED NEAR BEATTY, NEVADA



SUBMITTED February 8, 1999

HW Permit NEV0011, Rev. 1, April 1997

CORRECTIVE MEASURES STUDY WORKPLAN
CHEMICAL WASTE DISPOSAL FACILITY

BEATTY, NEVADA

Prepared By

US Ecology, Inc.

Beatty, Nevada

with

AquAeTer, Inc.

Englewood, Colorado

February 8, 1999

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EXECUTIVE SUMMARY

US Ecology is implementing a Corrective Measures Study Workplan to address statistically significant contamination found in several groundwater monitoring wells. It has been determined that liquids disposed in the pre-RCRA trenches and Trench 10, have leached and volatilized in the surrounding areas of the Vadose Zone. The conceptual site model for the potential release pathways, presented in the Current Conditions Report, determined that this soil gas vapor was the most likely transport mechanism for the groundwater contamination. However, the Current Conditions Report concluded that neither the Vadose Zone nor groundwater are an immediate hazard to human health or the environment.

The Corrective Measures Study Workplan will be implemented in accordance with the requirements contained in Section XIV.F.3 of HW Permit NEV HW0011, Revision 1, January 1998 (Permit) for the active US Ecology Hazardous Waste Management Facility located about 11 miles south of Beatty, Nevada, in Nye County. The preparation of this CMS Workplan, its implementation, as well as the subsequent report, is part of the corrective action process required by US Ecology's Permit. The goal of RCRA corrective action is to identify and evaluate alternatives for the correction action necessary to mitigate and/or remediate any releases of hazardous waste or hazardous constituents identified at the facility that potentially pose a threat to human health and the environment. US Ecology believes that this CMS Workplan will accomplish this objective.

The CMS Workplan presents the scope of work required to implement a pilot Soil Vapor Extraction system (SVE), as well as identify and evaluate additional potential remedial alternatives for the releases that have been identified at the facility. The major field work presented in the CMS Workplan is the pilot SVE. SVE is a remediation process utilizing the volatile properties of contaminants, allowing for mass transfer across the non-aqueous phase liquid (NAPL), solid, liquid, and gas interfaces. The process relies on diffusion and advection as the primary transport processes.

The vertical extent of groundwater containing organic compounds is limited to the Upper Water-Bearing Zone. The on-site pilot SVE system will utilize an extraction well, air vent network (e.g., inlet wells), mechanical vacuum equipment, and vapor effluent monitoring. SVE is widely applied to coarse-grained unsaturated soils contaminated with a variety of organic compounds. This technology description appears to be well suited to the US Ecology's Beatty, Nevada facility. The field pilot testing results will be evaluated to determine the effectiveness of this technology in remediating the statistically significant contamination in the groundwater at the facility.

1. PURPOSE OF CORRECTIVE MEASURES STUDY

US Ecology has prepared this Corrective Measures Study (CMS) Workplan in accordance with the requirements contained in Section XIV.F.3 of HW Permit NEV HW0011, Revision 1, January 1998 (Permit) for the active US Ecology Hazardous Waste Management Facility (HWMF) located about 11 miles south of Beatty, Nevada, in Nye County. The preparation of this CMS Workplan, and conducting and reporting the CMS, are part of the corrective action process required by the Permit.

These two CMS steps, the CMS Workplan and the actual CMS, will be completed in accordance with pertinent administrative and technical requirements contained in the December 15, 1998 "Report for RCRA Facility Investigation" that was approved by the Nevada Department of Environmental Protection (NDEP) on January 11, 1999.

1.1 FACILITY BACKGROUND

The US Ecology Facility near Beatty Nevada was opened and permitted to receive solid, low-level radiological waste in 1962. The last trench to receive radioactive wastes was closed in 1992. On December, 30, 1997, the Nevada Department of Health (NDH) accepted custodial care for the Low-Level Radioactive Waste Disposal Facility (LLRWDF) under terms of the 1977 lease, conditions of a 1993 settlement agreement, and provision of the Nevada Administrative Code (NAC). Effective December 30, 1997, US Ecology was no longer the leasee, licensee, or operator of the LLRWDF.

The Facility began receiving liquid and solid chemical waste in 1971. However, after 1979, liquid wastes were no longer accepted for disposal. The Facility submitted a RCRA Part B permit to USEPA Region 9 in 1983, and received the RCRA Permit in 1988.

The HWMF manages the disposal of hazardous waste using a trench system. Pre-RCRA Trenches 1 through 9 were unlined trenches that are closed with a soil cover, and no longer used. Trench 10 is a hybrid trench: unlined, but with a soil cover that incorporates a synthetic component. After waste reached the ground level, berms were constructed, and additional waste placed above grade. Trench 10 is closed with an impermeable flexible membrane liner cover, protected by a soil cover. Trench 11 was constructed in accordance with RCRA regulations, and is lined and has a leachate collection system. Trench 11 is the only operational trench at the Facility at this time. A site map is included as Figure 1.1.

1.1.1 Groundwater Contamination

The detection of contamination in the groundwater beneath the Facility is based on recurrent detections of a few compounds at low concentrations, isolated detections of other compounds, and intermittent detections of compounds that also appear in equipment blanks.

The vertical extent of groundwater containing organic compounds is limited to the Upper Water-Bearing Zone. No confirmed organic constituents have been detected in the Lower Water-Bearing Zone.

1.1.2 Soil Contamination

There are no known current soil contamination releases from the site. The detections of organic constituents in the soil have been isolated. Soil samples were collected during the excavation of Trench 11 in 1988. These samples were collected at depths between 21 and 48 feet. The greatest detections were observed at 33 feet below grade surface (bgs). These samples showed detections of methylene chloride, chloroform, and tetrachloroethene.

1.1.3 Soil Gas Contamination

The two Vadose Zone monitoring wells located along the southern boundary provide depth-discrete samples. The results of sampling in 1996 from the groundwater monitoring well casings (which screen across the Vadose Zone / groundwater interface) indicate elevated levels of organic compounds in the well casing air.

The horizontal distribution of the organic constituents in the soil gas (vapor) concentrations, based on vapor samples and analyses, suggests a strong influence of the well construction on the vadose sample results, especially when compared to the results from other nearby wells. The extent maps indicate greatest vapor concentrations along the south boundary of the Trenches 1 through 9 area and along the west side of Trench 11. Vapor readings in three distant wells provide information about what essentially can be considered background locations.

Vapor readings along the east and southeast side of the Facility are relatively low and only slightly elevated when compared to the background wells. Vapor concentrations in the south and southwest portions of the facility are elevated, but decrease with distance from the trenches. Along the southern extent, the depth-discrete samples have the highest recorded vapor concentrations. The extent is not clearly bounded along the south and southwest sides of the chemical disposal area. There are no sampling locations between the northern boundary of the Trench 10 area and the Facility upgradient well. The vapor extent is assumed to be between these points.

Trench 10 is covered with an impermeable cap to reduce infiltration into the waste. An impermeable surface cover also reduces natural venting; vapors may eventually spread beyond the limits of a surface cover. However, sampling data from wells along the east side of the Facility and photoionization detection (PID) monitoring of ambient air do not indicate elevated concentrations of organic constituents.

1.2 PURPOSE OF CORRECTIVE MEASURES STUDY

The goal of RCRA corrective action is to identify and evaluate alternatives for the correction action necessary to mitigate, and/or remediate, any releases of hazardous waste or hazardous

constituents identified at the facility that potentially pose a threat to human health and the environment. The CMS will identify and evaluate potential remedial alternatives for the releases that have been identified at the site. The on-going corrective measures activities at the facility are regulated under a RCRA Hazardous Waste Permit NEV HW0011 (Permit). The Permit specifies that US Ecology conduct corrective actions at the Beatty facility. These corrective actions are intended to evaluate the nature and extent of the releases of hazardous waste or constituents; to evaluate facility characteristics; and to identify, develop, and implement an appropriate corrective measure or measures to protect human health and the environment. The following are the main components of the required corrective action process:

- Interim/Stabilization Measures,
- RCRA Facility Investigation,
- Corrective Measures Study, and
- Corrective Measures Implementation.

Measures to stabilize affected areas, reducing the potential for migration of impacts to unaffected areas, have been implemented and are continuing. US Ecology finalized the RFI and Interim Measures in 1998 and submitted the Final RFI Report to NDEP on December 15, 1998 (approved January 11, 1999).

The CMS Workplan presents the scope of work required to identify and evaluate potential remedial alternatives for the releases that have been identified at the facility. US Ecology will implement a site-specific strategy to focus the selection and identification of corrective measures. Exposure pathway evaluation, future facility use, and technical limitations will be considered as site-specific characteristics regarding the identification and selection of corrective measures.

1.2.1 Exposure Pathway

An exposure pathway analysis links the sources, locations, and types of environmental releases with population locations and activity patterns to determine significant pathways of human exposure. An exposure pathway is complete if there is (1) a source or chemical release from a source, (2) an exposure point where contact can occur, and (3) an exposure route by which the release can migrate to the exposure point. Therefore, to be effective in the protection of human health, corrective measures must mitigate the exposure pathway by controlling either the release source, the exposure point, or exposure route.

Identification and selection of corrective measures will focus on their effectiveness in mitigating exposure pathways. The RFI Report (US Ecology, 1998) identified groundwater and soil gas as potential exposure pathways. Soil is included in this CMS Workplan as a medium which may contain groundwater or soil gas.

1.2.2 Future Facility Use

The Beatty facility is permitted as a HWMF. A LLRWDF operated adjacent to the HWMF until 1992; maintenance of the LLRWDF has since transferred to the State of Nevada. Future use for the Facility will remain as HWMF.

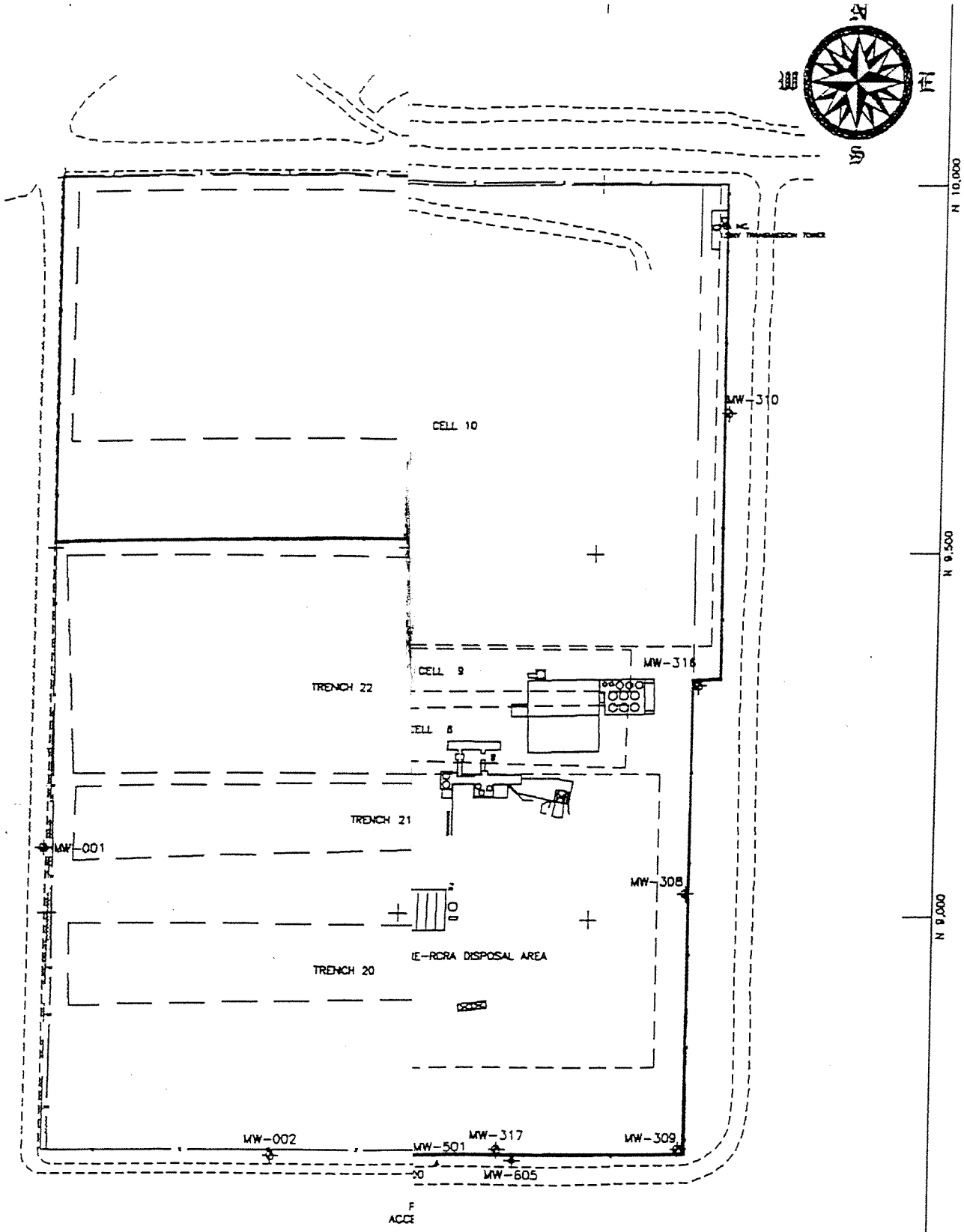
1.2.3 Technical Limitations

The Facility is underlain by a thick Vadose Zone that serves to isolate the facility from human health and environmental impacts. Moisture travel times through the Vadose Zone are long. In addition, the site is remote and the nearest potential receptors are 13 miles away. US Ecology will consider these factors in the evaluation of corrective measures. US Ecology believes that a practicable combination of corrective measures will be identified in the CMS that is protective of human health and the environment.

1.3 CMS REQUIREMENTS AND GUIDANCE

The requirements for this CMS Workplan are contained in the HW Permit (Section XIV). The requirements closely follow EPA's guidance for the CMS process contained in the EPA guidance document entitled "RCRA Corrective Action Plan (Final)" dated May 1994. The requirements for the CMS Workplan are as follow:

HW Permit Requirements (Attachment D, NEV HW0011)	Section of CMS Workplan
1. Statement of purpose	1
2. Description of objectives including proposed cleanup standards	2
3. Description of measures to be studied	3
4. Description of evaluation approach	4
5. Description of any proposed pilot or laboratory demonstration studies	5
6. CMS Report outline	6
7. Project management information, including organization	7
8. Schedule for CMS and CMS Report	8
9. References	9



LEGEND

- PERMIT LINE
- FENCE LINE
- UNIMPROVED ROAD
- POINT OF COMPLIANCE
- SITE COORDINATE SYSTEM MARKER LOCATION IN NORTHING AND EASTING
- MW-002
- MW-603
- MW-500
- B96-1

Drawn By:	DKK
Checked By:	L.IRWIN
Appr. By:	
Date:	12/95
Scale:	AS SHOWN
Project No.:	NV-163

Figure 1-1
SITE MAP

HAZARDOUS WASTE MANAGEMENT FACILITY
U.S. Ecology
BEATTY, NEVADA

Drawing No.
NV-163-GMS-010

2. CORRECTIVE MEASURES OBJECTIVES

The goal of RCRA corrective action is to identify and evaluate alternatives for the correction action necessary to mitigate, and/or remediate, any releases of hazardous waste or hazardous constituents identified at the facility that potentially pose a threat to human health and the environment. Therefore, the screening, development, and evaluation of corrective measures is the main focus of the CMS process. The objective of screening and evaluation of corrective measures will be to:

- Provide a systematic, comparative corrective measure evaluation that meets the requirements of the CMS in accordance with the facility RCRA Permit and USEPA guidance;
- Develop corrective measures appropriate for site remediation to conditions consistent with likely future land uses based on initial screening, and further evaluation considering four general standards and five decision factors;
- Develop recommendations for continuing and, as appropriate, modifying the corrective measures at the facility;
- Identify the preferred approach for implementing continued corrective measures; and
- Develop protocol to implement a pilot study of a recommended remedial alternative, and evaluate the study's effectiveness.

2.1 SCREENING OBJECTIVES

The CMS will be conducted using three screening steps for potentially effective corrective measures. These steps, initial screening, evaluation against general standards, and evaluation against decision factors, are summarized below.

1. **Initial Screening.** The results of the screening process are presented in Section 3 of this CMS workplan. Corrective measures are evaluated based on their applicability to the physical and chemical conditions at the facility and their effectiveness in preparing the facility for permanent closure. For this initial screening, the level of technology development, performance record, general effectiveness regarding risk reduction, and inherent construction, operation, and maintenance problems are considered. Measures that are unreliable, perform poorly, or have not been fully demonstrated are eliminated from further consideration, as described in Section 3.

2. **General Standards Evaluation.** Individual and combined corrective measures retained after the initial screening step will be evaluated against four general standards. These are: 1) be protective of human health and the environment; 2) be able to attain media cleanup standards where technologically possible; 3) have the ability to control the sources of

releases so as to reduce or eliminate, to the extent practical, further releases that may pose a threat to human health and the environment; and 4) comply with federal and State regulations. Corrective measures satisfying the four general standards will be included in the Corrective Measures Report. These measures will be subjected to the final evaluation step, as described in Section 4.

3. **Decision Factors Evaluation.** Retained individual and combined corrective measures will be evaluated against five decision factors. These are 1) long-term reliability and effectiveness; 2) reduction of waste toxicity, mobility or volume; 3) short-term effectiveness; 4) implementability; and 5) cost. In this evaluation, each remedial alternative will be given a weighted numerical ranking for each criterion. The ranking will be based on the potential of an alternative to satisfy the criterion. The recommendation of individual or combined remedial alternatives to be implemented, based on the combination of rankings for these five criteria, will be included in the Corrective Measures Report, as described in Section 4.

US Ecology will implement a site-specific strategy to focus these three evaluation steps by considering migration pathway, future facility use, and technical limitations as the primary site-specific characteristics regarding the identification and selection of corrective measures. US Ecology anticipates that a comprehensive corrective measures program will be developed through this process. This program probably will be a combination of several different measures addressing contaminants in different areas.

3. IDENTIFICATION OF REMEDIES TO BE EVALUATED

The RFI Report (US Ecology, 1998) identifies constituent sources and delineates impacts to soil, soil gas, and groundwater that potentially are related to the facility. In addition, the RFI Report identifies constituent migration pathways and potential receptors. Collectively, sufficient information was gathered during the RFI to support the CMS. Specifically, for those measures passing the initial screening step, the CMS will utilize RFI data to evaluate the effectiveness of corrective measures regarding the mitigation of exposure pathways in soil gas (unsaturated zone) and groundwater (saturated zone). Corrective measures for these exposure pathways are addressed by this CMS Workplan.

3.1 GROUNDWATER REMEDIES

The purpose of groundwater remediation is to mitigate human and environmental exposure to impacted groundwater. Specifically, the groundwater remedy will contain or restore impacted groundwater to eliminate any hazard to human health or the environment, and to prevent migration of the contaminants.

3.1.1 Results of Initial Screening of Groundwater Remedies

Table 3.1 summarizes US Ecology's initial screening of groundwater remedies. This initial screening eliminates several remedial alternatives from further consideration. These specific remedies are not applicable to the site conditions or the objectives for remedial measures. These remedies are eliminated from further consideration based on reasoning presented in Table 3.1. Several remedial alternatives to contain affected groundwater, including horizontal barriers and immobilization, are eliminated as are some approaches to in-situ chemical and physical treatment. The basis for measure elimination is the likelihood that these methods are infeasible or ineffective.

3.1.2 Groundwater Remedies Retained for Further Evaluation

Remedial alternatives which can be reasonably expected to apply to site conditions will address the groundwater exposure pathway. This exposure pathway consists of impacted groundwater and soil in the saturated zone media. The RFI Report identifies dissolved constituent impacts in the saturated zone.

The groundwater corrective measures that can be used to attain these objectives are divided into four categories: monitored natural attenuation, containment, treatment, and recovery. The CMS will consider potentially effective groundwater corrective measures in these categories and provide a description and evaluation for each measure retained as a result of the initial screening evaluation.

3.1.2.1 Monitored Natural Attenuation

The facility's isolated location, distance to point of exposure, and the limited use of groundwater makes monitored natural attenuation a viable consideration.

3.1.2.2 Containment

Containment utilizes natural or engineered barriers to reduce or eliminate migration of contaminants to uncontaminated media. Containment may involve leaving contaminated materials in-place for full or partial remediation in conjunction with other processes. Containment barrier technologies do not pass initial screening evaluation because of the depth to groundwater at the Beatty Facility (about 300 feet) and the impracticability of constructing such barriers at these depths. However, the use of pumping wells to form a hydraulic containment is retained from the initial screening.

3.1.2.3 Treatment

Treatment of groundwater can be conducted in-situ or ex-situ. In-situ treatment is done in place and is an alternative to the removal and subsequent treatment of contaminated groundwater. In-situ methods can require fewer surface facilities and reduce the likelihood of human exposure to the contaminant. However, in-situ treatment is not applicable to groundwater at this location and does not pass initial screening.

Ex-situ treatment requires the removal and subsequent treatment of groundwater. Ex-situ treatment technologies passing the initial screening evaluation include biological, chemical, and physical treatment.

3.1.2.4 Removal (Recovery)

Pumping systems for recovery is one of the processes often used for aquifer remediation. Groundwater pumping techniques involve the active manipulation and management of groundwater in order to partially or fully remove a plume. Because of the depth to groundwater, wells would be necessary to remove groundwater. Removal technologies that pass the initial screening evaluation include extraction by pumping.

3.2 SOIL GAS REMEDIES

The purpose of the soil gas remedy is to mitigate human and environmental exposure to impacted soil gas and the possibility of continued migration of contaminants. Specifically, the Vadose Zone remedy will contain or remove impacted soil gas to eliminate any hazard to human health or the environment, and to prevent migration of the contaminants.

3.2.1 Results of Initial Screening of Soil Gas Remedies

Table 3.1 summarizes the initial screening of soil gas remedies. Initial screening eliminates several remedial alternatives from further consideration. These specific remedies are not applicable to the site conditions or the objectives for remedial measures. These remedies are eliminated from further consideration based on reasoning presented in Table 3.1. Remedial alternatives for soil gas, including containment and immobilization, and in-situ treatment were eliminated. The basis for elimination is the likelihood that the measure would be infeasible or ineffective.

3.2.2 Soil Gas Remedies Retained for Further Evaluation

Remedial alternatives which can be reasonably expected to apply to site conditions will address the soil gas exposure pathway. This exposure pathway consists of the Vadose Zone impacted by waste constituents. Soil gas remediation measures are divided into four categories: monitored natural attenuation, containment, treatment, and removal. The CMS will consider potentially effective soil gas corrective measures and provide a detailed description and evaluation for each measure retained as a result of the initial screening evaluation.

3.2.2.1 Monitored Natural Attenuation

The monitored natural attenuation measure for soil gas is retained with the assumption that risks associated with the observed concentrations of contaminants are acceptable, that the source has been delineated, and that natural degradation can continue to reduce chemical concentrations. If no action is taken for soil gas, monitored natural attenuation corrective measures will be implemented.

3.2.2.2 Containment

Containment is not a viable remedial alternative for soil gas. The technology for immobilizing soil gas is unknown. Methods for soil gas containment may include use of barriers such as caps, walls, or in-situ grouting. The thickness of the Vadose Zone (about 300 feet) precludes construction of barriers.

3.2.2.3 Treatment

Treatment of the soil gas can be conducted in-situ or ex-situ. In-situ treatment technology, in which impacted soil gas is treated in-place, utilizing chemical or biological agents, or physical manipulations, to degrade, remove, or immobilize contaminants, is unknown. Only ex-situ physical treatment technologies passed the initial screening evaluation. Ex-situ physical soil gas treatment technologies that are viable include carbon adsorption and thermal destruction.

3.2.2.4 Removal

The removal of soil gas from the Vadose Zone is a viable alternative. The soil gas may be pumped from the Vadose Zone using active (soil vapor extraction) or passive (barometric pumping) methods, or a combination.

3.3 SOIL REMEDIES

The purpose of the soil remedy is to mitigate human and environmental exposure to impacted soil. Specifically, the soil remedy will contain or restore impacted soil to eliminate any hazard to human health or the environment, and to prevent migration of the contaminants from soil to other media. The impacted soil at the Facility consists of the Vadose Zone beneath the trenches and where volatile organic compounds have migrated with the soil gas.

3.3.1 Results of Initial Screening of Soil Remedies

Table 3.1 summarizes the initial screening of soil remedies. Initial screening eliminated several remedial alternatives from further consideration. These specific remedies are not applicable to the site conditions or to the objectives for remedial measures. These remedies are eliminated from further consideration based on reasoning presented in Table 3.1. Remedial alternatives for soil, including containment by barriers or immobilization, in-situ treatment by chemical methods, and ex-situ treatment by biological, chemical, and physical treatment methods, were eliminated from further consideration. The basis for elimination was the likelihood that the measure would be infeasible or ineffective.

3.3.2 Soil Remedies Retained for Further Evaluation

Remedial alternatives which can be reasonably expected to apply to site conditions will address the soil exposure pathway. This exposure pathway consists of soil in the unsaturated zone. Soil remediation measures are divided into four categories: monitored natural attenuation, containment, treatment, and removal measures. The CMS will consider potentially effective soil corrective measures and provide a detailed description and evaluation for each measure retained as a result of the initial screening evaluation.

3.3.2.1 Monitored Natural Attenuation

The monitored natural attenuation measure for soil is considered with the assumption that risks associated with the observed concentrations of contaminants are acceptable, that the source potential from both the unsaturated and saturated zones has been delineated, and that natural degradation can continue to reduce chemical concentrations. If no additional action is taken for soil, monitored natural attenuation corrective measures will be implemented. Current systems constructed during past closure of units, such as soil covers and caps, will remain in-place.

3.3.2.2 Containment

Containment utilizes natural or engineered barriers to reduce or eliminate migration of contaminants to uncontaminated media. Containment may involve leaving contaminated materials in-place for full or partial remediation in conjunction with other processes. Contaminants at the Facility already are contained in disposal trenches, and additional containment will not lead to soil objectives. No containment technologies passed the initial screening evaluation.

3.3.2.3 Treatment

Treatment of soil can be conducted in-situ or ex-situ. In-situ treatment is an alternative to soil excavation and removal. In-situ treatment, in which impacted soils are treated in-place, utilizes chemical or biological agents, or physical manipulations, to degrade, remove, or immobilize contaminants. In-situ biological and physical treatment methods can be effective for the constituent types and soil types present at the site.

Ex-situ treatment involves the excavation and on-site or off-site treatment or disposal of the contaminated soil. Once the soil has been excavated, it can be physically altered or treated to detoxify, immobilize, or reduce the concentration of the contaminants, or be transferred to another location for disposal. Ex-situ treatment technologies such as biological treatment (land treatment and slurry treatment), chemical treatment (soil washing), and physical treatment (incineration and thermal desorption) did not pass the initial screening evaluation. The presence of immovable surface structures, including RCRA-permitted waste disposal trenches, eliminated removal (a precursor of ex-situ treatment) as a viable option.

3.3.2.4 Removal

Soil excavation and removal for site remediation did not pass the initial screening evaluation. The presence of immovable surface structures, including RCRA-permitted waste disposal trenches, eliminated removal as a viable option.

TABLE 3.1
INITIAL SCREENING EVALUATION OF CORRECTIVE MEASURES

REMEDIAL ALTERNATIVE	Level of Technology Development	Performance Record at Similar Sites	Effectiveness in Risk Reduction at Similar Sites	Construction, Operation, and Maintenance Problems	APPLICABILITY TO PHYSICAL & CHEMICAL CONDITIONS AT FACILITY	LIKELY EFFECTIVENESS IN ACHIEVING CLEANUP OBJECTIVES	RETAIN FOR FURTHER CORRECTIVE MEASURES STUDY
A. MONITORED NATURAL ATTENUATION							
GROUNDWATER	High	Good	Good	Low	Natural attenuation already is occurring. Natural degradation will continue to reduce contaminant concentrations in groundwater.	Natural attenuation can be effective in achieving objectives, especially when realistic receptor locations are considered. Long-term groundwater effectiveness is directly related to soil and soil gas effectiveness	YES
SOIL GAS	High	Good	Good	Low	Natural attenuation already is occurring. Natural degradation will continue to reduce contaminant concentrations in soil gas.	Natural attenuation can be effective in achieving objectives. Long-term soil gas effectiveness is directly related to soil effectiveness.	YES
SOIL	High	Good	Good	Low	Natural attenuation already is occurring. In-place soil covers are effective measures to separate contaminant from the surface environment and limit infiltration. Natural degradation will continue to reduce contaminant concentrations in soil.	Natural attenuation can be effective in achieving objectives, especially because the depth of contaminants prevents contact with human or environmental receptors.	YES
B. CONTAINMENT (physical measures to reduce or eliminate migration of contaminants to uncontaminated areas or media)							
GROUNDWATER							
horizontal barriers	High	Unknown	No	High	Horizontal barriers, including disposal cell covers and other than natural features (thick, dry, low permeability geologic materials), exist above groundwater. Additional horizontal barriers would be of no benefit in this instance.	This is not an effective measure.	No
vertical barrier walls (low permeability barrier, e.g. slurry wall, sheet piling)	High	Unknown	Unknown	Very High	Up- or down-gradient flow cutoffs or diversions of groundwater to minimize ground-water movement typically are not effective below about 70 feet deep. They are not economically or technically feasible at site depths that would exceed 250 feet.	This is not an effective measure.	No
pumping controls (extraction wells)	High	Fair	Fair	Moderate	Removal or containment of a contaminant plume is possible; however, to be effective favorable (e.g. high permeability) hydrogeologic conditions are necessary.	Complete or partial plume containment might be achievable using extraction wells.	YES
pumping and injection controls (extraction/injection wells)	High	Fair	Fair	Moderate	Removal or containment of a contaminant plume is possible; however, to be effective favorable (e.g. high permeability) hydrogeologic conditions are necessary.	Using water injection to control groundwater flow is desirable only under favorable and well-characterized groundwater conditions. At this site, the likelihood that injection might cause spreading, rather than containment, of the plume makes this an undesirable measure.	No

TABLE 3.1
INITIAL SCREENING EVALUATION OF CORRECTIVE MEASURES

REMEDIAL ALTERNATIVE	Level of Technology Development	Performance Record at Similar Sites	Effectiveness in Risk Reduction at Similar Sites	Construction, Operation, and Maintenance Problems	APPLICABILITY TO PHYSICAL & CHEMICAL CONDITIONS AT FACILITY	LIKELY EFFECTIVENESS IN ACHIEVING CLEANUP OBJECTIVES	RETAIN FOR FURTHER CORRECTIVE MEASURES STUDY
immobilization (grouting)	Low	Unknown	Poor	High	There are no practical methods to immobilize groundwater on a large scale. Grouting to reduce aquifer permeability is very expensive and seldom is used in unconsolidated sediments. Success likely would be limited when the aquifer is deep and permeability is low, as at this site.	Success in containing the plume is not likely.	No
SOIL GAS							
horizontal barriers (liners and covers)	Moderate	Unknown	Unknown	High	Liners and covers, using soil or man-made materials, can separate soil gas from the surface environment. Such liners and covers are in-place over portions of the facility.	Existing liners and covers reduce soil gas discharge to the surface environmental, but the potential for soil gas migration to unlined or uncovered areas is significant. Use of additional horizontal liners and covers will not lead to achieving soil gas objectives.	No
vertical barriers	Low	Unknown	Unknown	High	Vertical barriers typically are not effective below about 70 feet deep. They are not economically or technically feasible at site Vadose Zone depths that would exceed 100 feet.	This is not an effective measure.	No
immobilization	Unknown	Unknown	Unknown	Unknown	No soil gas immobilization methods potentially applicable to this site are known.	This is not an effective measure.	No
SOIL							
horizontal barriers (liners and covers)	High	Good	Fair	Low	Liners and covers, using soil or man-made materials, can separate soil from the surface environment and can limit infiltration of precipitation. Such liners and covers are in-place over portions of the facility.	Use of additional liners and covers above contaminated Vadose Zone soil will not lead to achieving soil objectives.	No
vertical barriers	High	Good	Fair	High	Vertical barriers typically are not effective below about 70 feet deep. They are not economically or technically feasible at site Vadose Zone depths that would exceed 100 feet.	This is not an effective measure.	No

TABLE 3.1
INITIAL SCREENING EVALUATION OF CORRECTIVE MEASURES

REMEDIAL ALTERNATIVE	Level of Technology Development	Performance Record at Similar Sites	Effectiveness in Risk Reduction at Similar Sites	Construction, Operation, and Maintenance Problems	APPLICABILITY TO PHYSICAL & CHEMICAL CONDITIONS AT FACILITY	LIKELY EFFECTIVENESS IN ACHIEVING CLEANUP OBJECTIVES	RETAIN FOR FURTHER CORRECTIVE MEASURES STUDY
immobilization	Low	Unknown	Unknown	Unknown	Includes many high-cost physical and chemical methods to immobilize contaminants in soil, such as high-temperature vitrification, ground freezing, and chemical treatment. Site applicability limited by high cost of unproved techniques and low soil permeability.	This is not an effective measure.	No
C. TREATMENT (biological, chemical, or physical methods to degrade, remove, attenuate, or immobilize contaminants)							
IN-SITU MEASURES (implemented without medium removal)							
GROUNDWATER							
in-situ biological treatment	Moderate	Fair	Fair	High	In-situ biological processes can be effective for these contaminants; however, low contaminant concentrations in groundwater limit measure usefulness, and low permeability limits likely effectiveness. The applicability of such methods at the site is unknown, and would have to be determined through costly testing. Technical and economic feasibility is questionable.	Not applicable	No
in-situ chemical treatment	Low	Unknown	Unknown	Unknown	There are chemical methods that can be used for in-situ treatment of volatile constituents in groundwater. The applicability of such methods at the site is unknown, and would have to be determined through costly testing. Technical and economic feasibility is questionable.	Not applicable.	No
in-situ physical treatment	Moderate	Unknown	Unknown	Unknown	The applicability of in-situ physical treatment measures for volatile constituents in deep site groundwater, such as by air sparging, would have to be determined through costly testing. Technical and economic feasibility is questionable.	Not applicable.	No
SOIL GAS							
in-situ biological treatment	Unknown	Unknown	Unknown	Unknown	There is no known in-situ biological treatment process applicable to soil gas.	Not applicable	No
in-situ chemical treatment	Unknown	Unknown	Unknown	Unknown	There is no known in-situ chemical treatment process applicable to soil gas.	Not applicable.	No
in-situ physical treatment	Unknown	Unknown	Unknown	Unknown	There is no known in-situ physical treatment process applicable to soil gas.	Not applicable.	No

TABLE 3.1
INITIAL SCREENING EVALUATION OF CORRECTIVE MEASURES

REMEDIAL ALTERNATIVE	Level of Technology Development	Performance Record at Similar Sites	Effectiveness in Risk Reduction at Similar Sites	Construction, Operation, and Maintenance Problems	APPLICABILITY TO PHYSICAL & CHEMICAL CONDITIONS AT FACILITY	LIKELY EFFECTIVENESS IN ACHIEVING CLEANUP OBJECTIVES	RETAIN FOR FURTHER CORRECTIVE MEASURES STUDY
SOIL							
in-situ biological treatment	Moderate	Fair	Fair	Moderate	In-situ biological processes can be effective for these contaminants; however, low permeabilities and high clay contents of soils could reduce effectiveness.	Biological treatment could be effective for volatile constituents in site soil. However, soil depth, thickness, and permeability could limit effectiveness.	YES
in-situ chemical treatment	Low	Unknown	Unknown	Unknown	There are no practical chemical methods that can be used for in-situ treatment of volatile constituents in soil.	Not applicable.	No
in-situ physical treatment	High	Good	Good	High	In-situ physical processes can be effective for these contaminants; however, low permeabilities and high clay contents of soils could reduce effectiveness.	Soil vapor extraction could be effective for volatile constituents in site soil. However, soil depth, thickness, and permeability could limit effectiveness.	YES
EX-SITU MEASURES (implemented after medium is removed)							
GROUNDWATER: All ex-situ treatment measures require groundwater removal before treatment occurs; thus, the method must be used in combination with a removal measure.							
ex-situ biological treatment	High	Good	Good	High	Biological treatment for site constituents in recovered groundwater has been proven to be effective at other sites.	Biological treatment can be effective in treatment of contaminated groundwater.	YES
ex-situ chemical treatment	High	Good	Good	High	Chemical treatment for site constituents in recovered groundwater has been proven to be effective at other sites.	Chemical treatment can be effective in treatment of contaminated groundwater.	YES
ex-situ physical treatment	High	Good	Good	High	Physical treatment for site constituents in recovered groundwater has been proven to be effective at other sites.	Physical treatment can be effective in treatment of contaminated groundwater.	YES

TABLE 3.1
INITIAL SCREENING EVALUATION OF CORRECTIVE MEASURES

REMEDIAL ALTERNATIVE	Level of Technology Development	Performance Record at Similar Sites	Effectiveness in Risk Reduction at Similar Sites	Construction, Operation, and Maintenance Problems	APPLICABILITY TO PHYSICAL & CHEMICAL CONDITIONS AT FACILITY	LIKELY EFFECTIVENESS IN ACHIEVING CLEANUP OBJECTIVES	RETAIN FOR FURTHER CORRECTIVE MEASURES STUDY
SOIL GAS							
ex-situ biological treatment	Unknown	Unknown	Unknown	Unknown	There are no known practical methods for ex-situ biological treatment of soil gas.	Not applicable	No
ex-situ chemical treatment	Unknown	Unknown	Unknown	Unknown	There are no known practical methods for ex-situ chemical treatment of soil gas.	Not applicable	No
ex-situ physical treatment	High	Good	Good	Moderate	There are practical methods for ex-situ physical treatment of soil gas, including carbon adsorption and thermal destruction.	Ex-situ physical treatment methods can be effective in reducing contaminant concentrations in recovered soil gas.	YES
SOIL: All ex-situ treatment measures require soil removal before on-site or off-site treatment occurs; thus, the method must be used in combination with a removal measure.							
ex-situ biological treatment	High	Good	Good	Moderate	Biological treatment for site constituents in soil has been proven to be effective at other sites. However, removal of contaminated soil for ex-situ treatment is technically and economically infeasible.	Biological treatment can be effective in treatment of contaminated soil; but, soil removal is not feasible.	No
ex-situ chemical treatment	Moderate	Fair	Unknown	Very High	Chemical treatment for site constituents in soil has been proven to be effective at other sites. However, removal of contaminated soil for ex-situ treatment is technically and economically infeasible.	Chemical treatment can be effective in treatment of contaminated soil; but, soil removal is not feasible.	No
ex-situ physical treatment (including incineration)	High	Good	Good	High	Physical treatment for site constituents in soil has been proven to be effective at other sites. However, removal of contaminated soil for ex-situ treatment is technically and economically infeasible.	Physical treatment can be effective in treatment of contaminated soil; but, soil removal is not feasible.	No

TABLE 3.1
INITIAL SCREENING EVALUATION OF CORRECTIVE MEASURES

REMEDIAL ALTERNATIVE	Level of Technology Development	Performance Record at Similar Sites	Effectiveness in Risk Reduction at Similar Sites	Construction, Operation, and Maintenance Problems	APPLICABILITY TO PHYSICAL & CHEMICAL CONDITIONS AT FACILITY	LIKELY EFFECTIVENESS IN ACHIEVING CLEANUP OBJECTIVES	RETAIN FOR FURTHER CORRECTIVE MEASURES STUDY
D. REMOVAL (measures that remove the impacted medium are used in combination with disposal or a treatment measure)							
GROUND WATER							
Recovery of impacted groundwater by pumping	High	Good	Good	High	Removal of contaminant plume by pumping is possible.	Pumping to remove contaminated groundwater can be effective in achieving cleanup objectives.	YES
SOIL GAS							
Soil gas removal by air pumping	High	Good	Good	Moderate	Removal of soil gas by air pumping (e.g. soil vapor extraction, SVE) is possible.	Pumping to remove contaminated soil gas can be effective in achieving cleanup objectives.	YES
SOIL							
soil excavation for disposal or treatment	High	Unknown	Unknown	Very High	Contaminated soil removal is not applicable at this site because of the extreme depth of such soil (potentially more than 100 feet) and the presence of immovable surface obstructions.	Not applicable.	No

REFERENCES:

1. USEPA Handbook, Remedial Action at Waste Disposal Sites (Revised), October 1985
2. USEPA Innovative Treatment Technologies: Annual Status Report (Sixth Edition), September 1994
3. USEPA Technology Profiles Seventh Edition, November 1994

4. GENERAL APPROACH TO FURTHER REMEDY EVALUATION

The general approach to further remedy evaluation consists of implementing a systematic, comparative corrective measure evaluation with a site-specific strategy. The systematic corrective measures evaluation will meet the requirements of the CMS in accordance with the facility RCRA Permit and USEPA guidance.

The CMS will be continued using two additional steps for evaluating potentially effective corrective measures. These steps, evaluation against general standards and evaluation against decision factors, are discussed below and presented in Figure 4.1 (flow chart).

4.1.1 Evaluation Against General Standards

The next step, after initial screening, in the selection of the corrective measures will be based upon evaluation against the general standards listed below. Each remedial measure will be evaluated against these standards. Measures not satisfying these standards, independently or when combined with other alternatives, will be eliminated from further consideration. Satisfaction of these general standards will advance the remedial measure for further consideration against the decision factors discussed in Section 4.1.2.

The four general standards for corrective measure evaluation are the following:

- be protective of human health and the environment,
- be able to attain media cleanup standards where this is technologically possible,
- have the ability to control the sources of releases so as to reduce or eliminate, to the extent practical, further releases that could pose a threat to human health and the environment, and
- comply with applicable requirements for waste management.

A table will be included in the CMS Report that demonstrates the evaluation of remedial alternatives against general standards.

4.1.2 Remedy Selection Decision Factors

Evaluation of potentially effective corrective measures also will be based on decision factors which satisfy an appropriate combination of technical objectives and management controls for addressing environmental releases at the facility. These decision factors are the following.

Long-Term Reliability and Effectiveness - usually based on the measure's effectiveness demonstrated at other facilities, and assessment of the useful life of hardware components.

Reduction in the Toxicity, Mobility, or Volume of Wastes - measures that can reduce these factors are considered preferable to those that do not.

Short-Term Effectiveness - usually based on an assessment of any increased risk to human health (including remediation workers) or the environment that could be associated with implementing a measure.

Implementability - usually an assessment of administrative feasibility (permits, access, and public acceptance) and technical feasibility or "constructibility."

Cost - estimates of initial capital cost and on-going operating costs are important considerations when several measures are capable of achieving corrective action objectives.

A table will be included in the CMS Report that demonstrates the evaluation of remedial alternatives based on decision factors.

4.2 REMEDY EVALUATION APPROACH

The remedy evaluation approach also will include the selection of the media action levels, and the selection of a preferred measure. These items are discussed below.

4.2.1 Media Action Level Identification

The RFI conducted in 1998 identified impacts to groundwater, soil, and soil gas in the Vadose Zone that potentially could be related to the facility. No such impacts to air, surface water or surface water sediments were identified. The CMS will develop media action levels for groundwater, soil, and soil gas to evaluate the necessity for and effectiveness of corrective measures.

The development of action levels to be used to determine the need for and adequacy of corrective measures will consider realistic human and environmental exposure scenarios. US Ecology envisions developing and applying action levels that are compatible with likely future land uses at this facility.

4.2.1.1 Groundwater Action Levels

The RCRA Permit directs US Ecology to maintain and implement a groundwater corrective action program and establishes groundwater protection standards for waste constituents. The constituent maximum concentration limits specified in the RCRA Permit are proposed as the groundwater protection standard (GWPS) for the SWMUs. These limits are listed in Table 4.1. US Ecology proposes these limits as the initial action levels under the CMS.

4.2.1.2 Soil Action Levels

Action levels for soil are not established by the RCRA Permit. Therefore, no soil action levels are established.

4.2.1.3 Soil Gas Action Levels

Action levels for soil gas have not been established by the RCRA Permit. Therefore, no soil action levels are established. The CMS will propose that corrective action at the Facility results in releases to the atmosphere that are below regulatory limits for air quality permitting.

4.2.2 Selection of Preferred Measure

The CMS will identify the preferred corrective measures. Measures evaluated in this manner will be ranked on the basis of the relative importance of each decision factor and the degree to which the decision factor is satisfied. The resultant ranking will be used to identify the preferred measure or combination of measures.

The CMS also will present a schedule of corrective action implementation, with consideration given to the corrective actions previously implemented at the facility. Based on the results of Table 3.1, Initial Screening Evaluation of Corrective Measures, a pilot test study of the remedial alternative for soil gas is proposed to be implemented. The pilot test will be a soil vapor extraction (SVE) system. The implementation and operational objectives of the pilot test study are presented in Section 5 of the CMS Workplan. The schedule for implementation and monitoring of the pilot test study is presented in Section 8. The results of the pilot test study are expected to provide supporting information for the selection of the preferred measure. These results will be included in the CMS Report.

TABLE 4.1
RECOMMENDED GROUNDWATER PROTECTION STANDARDS

Table XI-3 Metals[1]						
Common name	CAS RN	Chemical abstracts service index name[4]	Analytical Methods[5]	Background (BKG) (ug/l)	Groundwater Protection Standard (GPS) (ug/L)	Reference BKG/GPS
Arsenic		Arsenic	6010 7060	15.6	50	BKG/MCL
Barium		Barium	6010	49.5	1000	BKGMCL
Cadmium		Cadmium	6010 7131	5	5	PQL/MCL
Chromium		Chromium	6010	100	100	PQL/PQL
Lead		Lead	6010 7421	15	15[2]	PQL/PQL
Sodium		Sodium	6010	290,000	NA	BKG
Selenium		Selenium	6010 7740	50	50[1]	PQL/PQL
Silver		Silver	6010	70	70[2]	PQL/PQL
Mercury		Mercury	7470 7471	2	2	PQL/PQL

1 The metals analyses are from non-filtered samples.

Table XI-4 PCB's and Pesticides

Common name	CAS RN	Chemical abstracts service index name[4]	Analytical Methods[5]	Background (ug/l)	GPS (µg/L)	Reference BKG/GPS
Aldrin	309-00-2	1,4:5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexanydro-(1alpha,4alpha,4abeta,5alpha,8alpha,8abeta)-	8080 8081	0.05	0.05	PQL/ PQL
Endrin	72-20-8	2,7:3,6-Dimethanonaphth[2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,-7,7a-octahydro-, (1aalpha, 2beta,2abeta,3alpha,6alpha, 6abeta,7beta,7aabeta)-	8080 8081	0.1	2	PQL/ MCL
Methoxychlor	72-43-5	Benzene, 1,1'-(2,2,2,trichloroethylidene)bis [4-methoxy-	8080 8081	2	40	PQL/ MCL
Polychlorinated biphenyls; PCBs	1336-36-3	1,1'-Biphenyl, chloro derivatives	8080 8081		0.5	MCL
Aroclor-1016	12674-11-2		8080 8081	50		PQL
Aroclor-1221	11104-28-2		8080 8081	50		PQL
Aroclor-1232	11141-16-5		8080 8081	50		PQL
Aroclor-1242	53469-21-9		8080 8081	50		PQL
Aroclor-1248	12672-29-6		8080 8081	50		PQL
Aroclor-1254	11097-69-1		8080 8081	50		PQL
Aroclor-1260	11096-82-5		8080 8081	50		PQL
2,4,5-T, 2,4,5-Trichlorophenoxyacetic acid	93-76-5	Acetic acid, (2,4,5-trichlorophenoxy)-	8150	2	2	PQL/ PQL
Silvex: 2,4,5-TP	93-72-1	Propanoic acid, 2-(2,4,5-trichlorophenoxy)-	8150	2	50	PQL/MCL

Table XI-4 PCB's and Pesticides

Common name	CAS RN	Chemical abstracts service index name[4]	Analytical Methods[5]	Background (ug/l)	GPS (ug/L)	Reference BKG/GPS
Toxaphene	8001-35-2	Toxaphene	8080 8081	2	3	PQL/MCL

Table XI-5 Volatiles

Common name	CAS RN	Chemical abstracts service index name[4]	Analytical Methods[5]	Background (ug/l)	Groundwater Protection Standard (ug/L)	Reference
1,2-Dichloroethane; Ethylene dichloride	107-06-2	Ethane, 1,2-dichloro-	8240/ 8260	5	5	PQL/MCL
1,1,2-Trichloroethane	79-00-5	Ethane, 1,1,2-trichloro-	8240/ 8260	5	5	PQL/MCL
1,1,1-Tri-chloroethane; Methylchlor-oform	71-55-6	Ethane, 1,1,1-trichloro-	8240/ 8260	5	200	PQL/MCL
1,1-Dichloroethane	75-34-3	Ethane, 1,1-dichloro-	8240/ 8260	5	5	PQL/PQL
1,1-Dichloroethylene; Vinylidene chloride	75-35-4	Ethene, 1,1-dichloro-	8240/ 8260	5	7	PQL/MCL
1,2-Dichloropropane	78-87-5	Propane, 1,2-dichloro-	8240/ 8260	5	5	PQL/MCL
1,1,2,2-Tetrachloro-ethane	79-34-5	Ethane, 1,1,2,2-tetrachloro-	8240/ 8260	5	5	PQL/PQL
2-Hexanone	591-78-6	2-Hexanone	8240/ 8260	50	50	PQL/PQL
4-Methyl-2-pentanone; Methyl isobutyl ketone	108-10-1	2-Pentanone, 4-methyl-	8240/ 8260	50	50	PQL/PQL
Acetone	67-64-1	2-Propanone	8240/ 8260	100	100	PQL/PQL
Benzene	71-43-2	Benzene	8240/ 8260	5	5	PQL/MCL
Bromodichloromethane	75-27-4	Methane, bromodichloro-	8240/ 8260	5	5	PQL/PQL
Bromoform; Tribromomethane	75-25-2	Methane, tribromo-	8240/ 8260	5	5	PQL/PQL
Carbon disulfide	75-15-0	Carbon disulfide	8240/ 8260	5	5	PQL/PQL
Carbon tetrachloride	56-23-5	Methane, tetrachloro-	8240/ 8260	5	5	PQL/MCL
Chlorobenzene	108-90-7	Benzene, chloro-	8240/ 8260	5	100	PQL/MCL

Table XI-5 Volatiles

Common name	CAS RN	Chemical abstracts service index name[4]	Analytical Methods[5]	Background (ug/l)	Groundwater Protection Standard (ug/L)	Reference
Chloroethane; Ethyl chloride	75-00-3	Ethane, chloro-	8240/ 8260	10	10	PQL/PQL
Chloroform	67-66-3	Methane, trichloro-	8240/ 8260	5	5	PQL/PQL
cis-1,3-Dichloropro-pene	10061-01-5	1-Propene, 1,3-dichloro-, (Z)-	8240/ 8260	5	5	PQL/PQL
Dibromochlorome-thane; Chlorodibro-momethane	124-48-1	Methane, dibromochloro-	8240/ 8260	5	5	PQL/PQL
Ethylbenzene	100-41-4	Benzene, ethyl-	8240/ 8260	5	700	PQL/MCL
Methyl chloride; Chloromethane	74-87-3	Methane, chloro-	8240/ 8260	10	10	PQL/PQL
Methyl bromide; Bromomethane	74-83-9	Methane, bromo-	8240/ 8260	10	10	PQL/PQL
Methyl ethyl ketone; MEK	78-93-3	2-Butanone	8240/ 8260	100	100	PQL/PQL
Methylene chloride; Dichloromethane	75-09-2	Methane, dichloro-	8240/ 8260	5	5	PQL/MCL
Styrene	100-42-5	Benzene, ethenyl-	8240/ 8260	5	100	PQL/MCL
Tetrachloroethylene; Perchloroethylene; Tetrachloroethene	127-18-4	Ethene, tetrachloro-	8240/ 8260	5	5	PQL/MCL
Toluene	108-88-3	Benzene, methyl-	8240/ 8260	5	1000	PQL/MCL
trans-1,2-Dichloroe-thylene	156-60-5	Ethene, 1,2-dichloro-, (E)-	8240/ 8260	5	100	PQL/MCL
trans-1,3-Dichloropro-pene	10061-02-6	1-Propene, 1,3-dichloro-, (E)-	8240/ 8260	5	5	PQL/PQL
Trichloroethylene; Trichloroethene	79-01-6	Ethene, trichloro-	8240/ 8260	5	5	PQL/MCL
Trichlorofluoromethane	75-69-4	Methane, trichlorofluoro-	8240/ 8260	5	5	PQL/PQL
Vinyl acetate	108-05-4	Acetic acid, ethenyl ester	8240/ 8260	5	5	PQL/PQL
Vinyl chloride	75-01-4	Ethene, chloro-	8240/ 8260	5	2	PQL/MCL
Xylene (total)	1330-20-7	Benzene, dimethyl-	8240/ 8260	5	10,000	PQL/MCL

Table XI-6 Semi-Volatiles

Common name	CAS RN	Chemical abstracts service index name[4]	Analytical Methods[5]	Background (ug/l)	GPS (ug/L)	Reference
1,2,4-Trichlorobenzene	120-82-1	Benzene, 1,2,4-trichloro-	8270	10	70	PQL/MCL
2,4,6-Trichlorophenol	88-06-2	Phenol, 2,4,6-trichloro-	8270	10	10	PQL/PQL
2,4,5-Trichlorophenol	95-95-4	Phenol, 2,4,5-trichloro-	8270	10	10	PQL/PQL
2,4-Dimethylphenol	105-67-9	Phenol, 2,4-dimethyl-	8270	10	10	PQL/PQL
2,4-Dichlorophenol	120-83-2	Phenol, 2,4-dichloro-	8270	10	10	PQL/PQL
2,4-Dinitrotoluene	121-14-2	Benzene, 1-methyl-2,4-dinitro-	8270	10	10	PQL/PQL
2,6-Dinitrotoluene	606-20-2	Benzene, 2-methyl-1,3-dinitro-	8270	10	10	PQL/PQL
2-Chloronaphthalene	91-58-7	Naphthalene, 2-chloro-	8270	10	10	PQL/PQL
2-Chlorophenol	95-57-8	Phenol, 2-chloro-	8270	10	10	PQL/PQL
2-Methylnaphthalene	91-57-6	Naphthalene, 2-methyl-	8270	10	10	PQL/PQL
3,3'-Dichlorobenzidine	91-94-1	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dichloro-	8270	20	20	PQL/PQL
4-Bromophenyl phenyl ether	101-55-3	Benzene, 1-bromo-4-phenoxy-	8270	10	10	PQL/PQL
4-Chlorophenyl phenyl ether	7005-72-3	Benzene, 1-chloro-4-phenoxy-	8270	10	10	PQL/PQL
Acenaphthene	83-32-9	Acenaphthylene, 1,2-dihydro-	8270	10	10	PQL/PQL
Acenaphthylene	208-96-8	Acenaphthylene	8270	10	10	PQL/PQL
Anthracene	120-12-7	Anthracene	8270	10	10	PQL/PQL
Benzo[a]anthracene; Benzanthracene	56-55-3	Benz[a]anthracene	8270	10	10	PQL/PQL
Benzo[a]pyrene	50-32-8	Benzo[a]pyrene	8270	10	0.2	PQL/MCL
Benzo[b]fluoranthene	205-99-2	Benz[e]acephenanthrylene	8270	10	10	PQL/PQL
Benzo[ghi]perylene	191-24-2	Benzo[ghi]perylene	8270	10	10	PQL/PQL
Benzo[k]fluoranthene	207-08-9	Benzo[k]fluoranthene	8270	10	10	PQL/PQL
Bis(2-chloro-1-methylethyl) ether; 2,2'-Dichlorodiiso-propyl ether	108-60-1	Propane, 2,2'-oxybis(1-chloro-	8270	10	10	PQL/PQL
Bis(2-chloroethoxy)-methane	111-91-1	Ethane, 1,1'-[methylenebis (oxy)]bis(2-chloro-	8270	10	10	PQL/PQL

Table XI-6 Semi-Volatiles

Common name	CAS RN	Chemical abstracts service index name[4]	Analytical Methods[5]	Background (ug/l)	GPS (ug/L)	Reference
Bis(2-chlor-oethyl)ether	111-44-4	Ethane, 1,1'-oxybis[2-chloro-	8270	10	10	PQL/PQL
Bis(2-ethylhexyl) phthalate	117-81-7	1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl)ester	8270	10	6	PQL/MCL
Butyl benzyl phthalate; Benzyl butyl phthalate	85-68-7	1,2-Benzenedicarboxylic acid, butyl phenylmethyl ester	8270	10	10	PQL/PQL
Chrysene	218-01-9	Chrysene	8270	10	10	PQL/PQL
Di-n-butyl phthalate	84-74-2	1,2-Benzenedicarboxylic acid, dibutyl ester	8270	10	10	PQL/PQL
Di-n-octyl phthalate	117-84-0	1,2-Benzenedicarboxylic acid, dioctyl ester	8270	10	10	PQL/PQL
Dibenzofuran	132-64-9	Dibenzofuran	8270	10	10	PQL/PQL
Dibenz[a,h]-anthracene	53-70-3	Dibenz[a,h]anthracene	8270	10	10	PQL/PQL
Diethyl phthalate	84-66-2	1,2-Benzenedicarboxylic acid, diethyl ester	8270	10	10	PQL/PQL
Dimethyl phthalate	131-11-3	1,2-Benzenedicarboxylic acid, dimethyl ester	8270	10	10	PQL/PQL
Fluoranthene	206-44-0	Fluoranthene	8270	10	10	PQL/PQL
Fluorene	86-73-7	9H-Fluorene	8270	10	10	PQL/PQL
Hexachlorobenzene	118-74-1	Benzene, hexachloro-	8270	10	1	PQL/MCL
Hexachloro-butadiene	87-68-3	1,3-Butadiene, 1,1,2,3,4,4-hexachloro-	8270	10	10	PQL/PQL
Hexachloroethane	67-72-1	Ethane, hexachloro-	8270	10	10	PQL/PQL
Indeno(1,2,-3-cd)pyrene	193-39-5	Indeno[1,2,3-cd]pyrene	8270	10	10	PQL/PQL
Isophorone	78-59-1	2-Cyclohexen-1-one, 3,5,5-trimethyl-	8270	10	10	PQL/PQL
m-Cresol	108-39-4	Phenol, 3-methyl-	8270	10	10	PQL/PQL
m-Dichlorobenzene	541-73-1	Benzene, 1,3-dichloro-	8270	10	600	PQL/MCL
Naphthalene	91-20-3	Naphthalene	8270	10	10	PQL/PQL
Nitrobenzene	98-95-3	Benzene, nitro-	8270	10	10	PQL/PQL
o-Cresol	95-48-7	Phenol, 2-methyl-	8270	10	10	PQL/PQL
o-Dichlorobenzene	95-50-1	Benzene, 1,2-dichloro-	8270	10	600	PQL/MCL
o-Nitrophenol	88-75-5	Phenol, 2-nitro-	8270	10	10	PQL/PQL
p-Cresol	106-44-5	Phenol, 4-methyl-	8270	10	10	PQL/PQL

Table XI-6 Semi-Volatiles

Common name	CAS RN	Chemical abstracts service index name[4]	Analytical Methods[5]	Background (ug/l)	GPS (ug/L)	Reference
p-Dichlorobenzene	106-46-7	Benzene, 1,4-dichloro-	8270	10	75	PQL/MCL
p-Nitroaniline	100-01-6	Benzenamine, 4-nitro-	8270	50	50	PQL/PQL
Phenanthrene	85-01-8	Phenanthrene	8270	10	10	PQL/PQL
Phenol	108-95-2	Phenol	8270	10	10	PQL/PQL
Di-n-propylnitrosamine	621-64-7		8270	10	10	PQL/PQL
Pyrene	129-00-0		8270	10	10	PQL/PQL

Table XI-7
Water Quality Parameters

Common name	CAS RN	Chemical abstracts service index name[4]	Analytical methods[5]	Background (ug/l)	GPS (µg/L)	Reference
Sulfate		Sulfate	9030	250,000	250,000	BKG/BKG
Cyanide		Cyanide	9010, 9012	10	0.2	PQL/MCL
pH		pH	9040	≥6.47 ≤8.38	≥6.47 ≤8.38	BKG/BKG
Specific Conductance		SCON	9050	1320 µMHOS		
Groundwater Elevation				NA[11]	NA	
Chloride			9250, 9251, 9252, 9553, 325.3[6]	81,600	81,600	BKG/BKG
Fluoride			340.2[6]	4,600	4,600	BKG/BKG
Nitrate-Nitrite as N			9200, 353.2[6], 353.3[6]	1,200	1,200	BKG/BKG
Gross Alpha			9310, 900.0[7]	21.86pCi/l	21.86pCi/l	BKG/BKG
Gross Beta			9310, 900.0[7]	48.23pCi/l	48.23pCi/l	BKG.BKG
Radium 226			9315, SM704[8], 903[7]	TBD[9]	5pCi/l (combination of Radium 226 and 228)	MCL
Radium 228			9320, SM705[7], 904[8]	TBD[9]	See above	MCL
Tritium			SM7500	TBD[9]	20,000pCi/l	MCL
Total Organic Carbon		TOC	9060, 415.2[6]	2,600	2,600	BKG/BKG
Turbidity				NA	NA	
Temperature				NA	NA	
Total Dissolved Solids		TDS	EPA 160.1	TBD[9]	TBD[9]	

FOOTNOTE: [1]MCL
FOOTNOTE: [2]MDL OF METHOD 6010
FOOTNOTE: [3]MDL OF METHOD 7470
FOOTNOTE: [4]CAS index names are those used in the 9th Cumulative Index.
FOOTNOTE: [5]Analytical Methods refer to analytical procedure numbers used in EPA Report SW-846 "Test Methods for Evaluating Solid Waste", third edition, November 1986 or more recent updates.
FOOTNOTE: [6] Methods for Chemical Analysis of Water and Wastewater, EPA 1983
FOOTNOTE: [7] Prescribed Procedures for Measurement of Radioactivity in Drinking Water, EPA 600/4-80-32, USEPA, August, 1980
FOOTNOTE: [8] Selected Analytical Methods Approved and Cited by the USEPA, Supplement to the 15th Edition of Standard Methods for the Examination of Water and Wastewater, American Public Health Association, American Water Works Association, Water Pollution Control Federation, 1981
FOOTNOTE: [9] TBD stands for To Be Determined

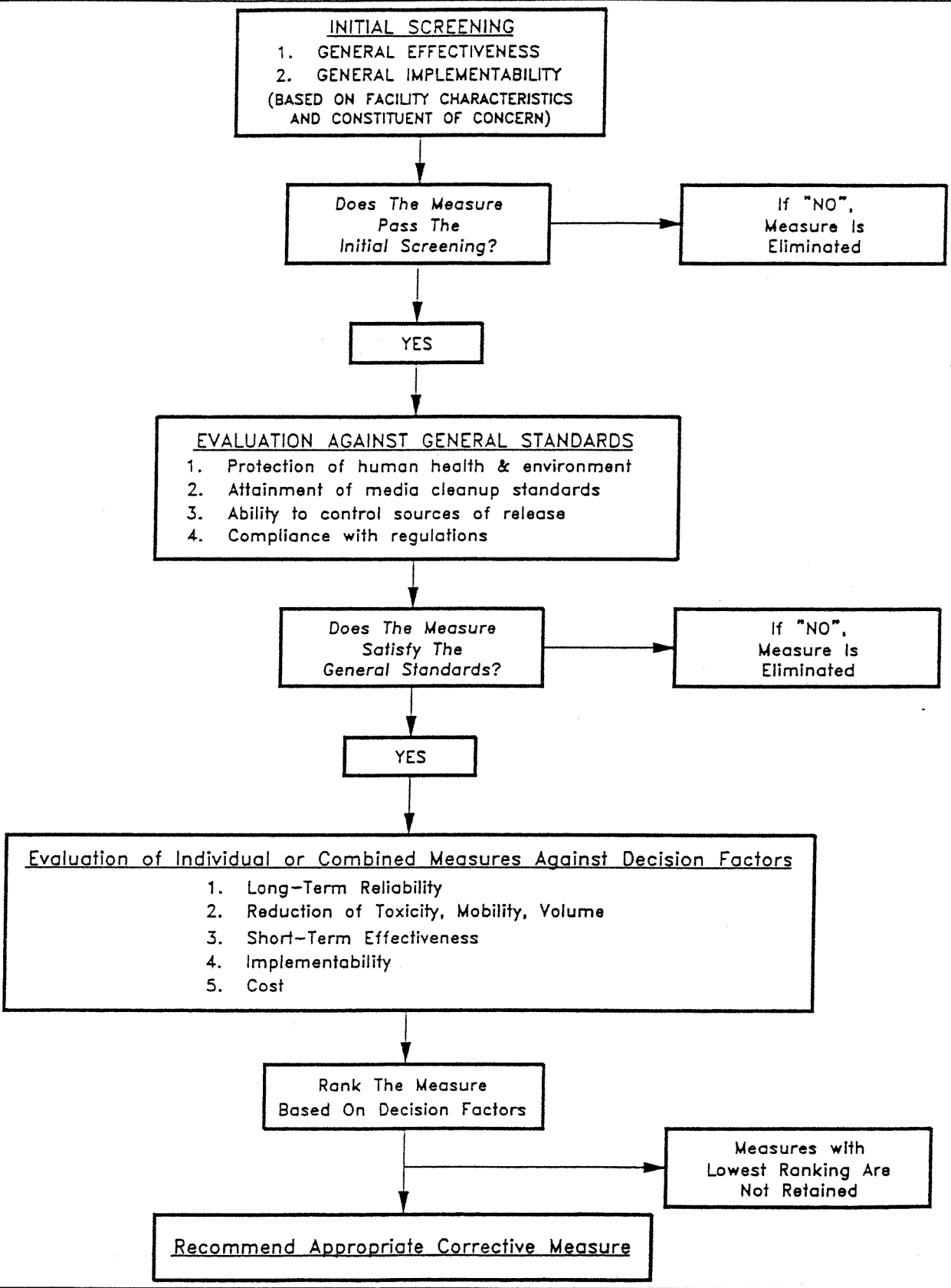


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Figure 4.1

FLOW CHART FOR CORRECTIVE MEASURES STUDY

5. CMS TASKS AND PILOT STUDIES

The following activities comprise the CMS tasks to be performed. The field pilot test will be performed to determine the effectiveness of this technology in remediating the statistically significant contamination in the groundwater at the facility. The remaining activities are included to enhance monitoring and data gathering during the study.

5.1 ADDITIONAL VADOSE ZONE SAMPLING

Two additional Vadose Zone sampling events (summer and winter) will be performed. Vadose Zone sampling will include the 500-series wells, the 300-series wells, the two piezometers B96-01 and B96-02, and wells MW-001 and MW-002. Continuation of the sampling will be evaluated based on SVE operational effectiveness.

The procedure for this task is included in Appendix 1.

5.2 DOWNHOLE TELEVIEWER

Physical investigation of all monitoring wells at the HWMF will be performed. A downhole televiewer will be used in all HWMF monitoring wells to evaluate if they are potential conduits contributing to vertical migration. Based on the results of that examination, some wells could require additional evaluation or repair or abandonment.

The procedure for this task is included in Appendix 1.

5.3 SOIL VAPOR EXTRACTION

Soil vapor extraction (SVE) is a remediation process utilizing the volatile properties of contaminants, allowing for mass transfer across the non-aqueous phase liquid (NAPL), solid, liquid, and gas interfaces. The process relies on diffusion and advection as the primary transport processes when placed under a vacuum.

An SVE system typical utilizes an extraction well network, air vents (or inlet wells), vapor/liquid separator, vacuum blower, vapor treatment/release, and liquid wastewater treatment/release. SVE is widely applied to coarser-grained (e.g., sands, silty sands, etc.) unsaturated soils contaminated with a variety of organic compounds. A schematic of the SVE system is included in Figure 5.1.

5.3.1 Site Characterization Data Requirements

Based on the data and the interpretations presented in the CCR, Section 5, there is sufficient knowledge of the extent of contamination in the subsurface for development of alternative

remedial approaches and to begin the CMS. No additional site characterization is necessary to proceed with the SVE pilot study.

5.3.2 Key Factors Affecting Application

Key factors influencing the application of SVE can be broken into contaminant properties and specific site characteristics.

5.3.2.1 Contaminant Properties

1. Volatile organics are the target COCs.
2. Minimum vapor pressure greater than 0.5 mm Hg (desirable to have vapor pressure greater than 10 mm Hg).

5.3.2.2 Contaminated Media Characteristics

1. Suitable sites include permeable unsaturated porous media.
2. Hydraulic conductivity greater than 0.001 cm/sec and greater than 10 percent air-filled voids, or air permeability greater than 10^{-8} cm^2.

SVE operations and performance can be enhanced and/or facilitated by manipulation methods including subsurface fracturing and heating. In addition, hot fluids can be injected (e.g., heated air or steam) rather than ambient air.

5.3.2.3 Fate and Transport

The key chemical properties affecting the relevant behavior of the contaminants of concern that make them amenable to SVE include:

1. Volatility (boiling point, vapor pressure)
2. Relative polarity (solubility)
3. Sorption affinity (solubility and chemical structure/activity)
4. Diffusivity (molecular weight)
5. Density and viscosity

The principal governing relationships include Henry's Law for dilute aqueous solutions and Raoult's Law for NAPL to vapor phase.

5.3.3 Proposed Design

5.3.3.1 Operational Unit

The SVE system at the US Ecology facility will be used to extract the contaminant vapor in the unsaturated or Vadose Zone and to a lesser degree VOC contamination in the groundwater. The proposed design is to install, operate and sample a pilot SVE well (SVE-1) in the Vadose Zone near the location of former well MW-307. The SVE well will be located between Trenches 9 and 10, in an effort to maximize the removal of waste constituents from the Vadose Zone. The proposed location of SVE-1 was chosen after a review of facility history. This review included groundwater monitoring data, MW-307 boring logs and the US Ecology Monitoring Well 307 Evaluation Report (4-15-87), and Geraghty and Miller report titled Abandonment of Five Groundwater Monitoring Wells at US Ecology, Beatty Nevada. Facility (7-20-90). Vadose well 104 was also located near MW-307.

The SVE well construction will be installed with standard water well drilling equipment with a nominal borehole diameter of 18 inches. It will be installed to a depth of about 100 feet. Centered in the 18-inch diameter well will be a 4-inch diameter riser/screen. The 4-inch diameter PVC well will be equipped with a 50-feet long slotted screen starting at the elevation of the bottom of Trench 10 (elevation 2727) approximately 50 feet below ground surface. The annulus around the screen will be a coarse gravel filter pack. A five-feet thick dry granular or pellet bentonite seal will be placed above the filter pack. The annulus above the bentonite seal will be grouted to the surface. The grout will be a neat cement mixed with 3 to 5% bentonite prior to placement. A pad will be constructed at the surface. The mechanical portion of SVE-1 will be placed upon the well pad, as illustrated in Figure 5.3. The final depth of the well will be based on the lithologic conditions and the observed presence of contamination. The SVE well will not be screened through low permeability zones. The SVE well installation procedure is included in Appendix 1.

The SVE mechanical setup will include a 20 standard cubic feet per minute (scfm) vacuum pump connected to the SVE well head. The piping will have pressure and flow gauges as well as sampling connections. The equipment housing will be located on the SVE well pad. Power is available from the nearby PCB building.

The SVE remediation component will use existing wells for air influent at locations along the south, east and west sides of the HWMF, with monitoring points surrounding the site. A schematic is included as Figure 5.2.

The concentration of waste constituents extracted by the SVE system will be monitored to demonstrate extraction rates. The concentration of waste constituents also will be monitored to determine compliance with air quality regulations or the need for effluent treatment to be protective of human health and the environment. Other associated data will be collected from the SVE system in order to optimize the system's operating flow and effective radius of influence. Data will be gathered at the monitoring wells to determine influent air flow and pressure changes. SVE effluent and well influent rates will be measured to identify operational effects

and limitations. If the pilot testing of the SVE demonstrates that off-gas treatment is required, the system will be field-fitted with the appropriate equipment.

The objective is to screen a 50-feet interval below the lowest point in Trench 10. If noticeable contamination is encountered in the soil materials, drilling may either be stopped and the borehole relocated, or proceed, but not beyond the extent of the contaminated soil depth.

5.3.3.2 System Operation, Maintenance and Evaluations

After installation of the system is complete, system startup activities will be performed to determine that all mechanical and electrical components are operating properly. A complete as-built description of the system will be provided in the CMS report.

The facility monitoring system will undergo a pre-operational (base line) groundwater and soil vapor sampling several weeks prior to the SVE system operations. The procedure for soil vapor sampling is included in Appendix 1. Normal environmental monitoring will be evaluated to assess the performance of the SVE system remedial effectiveness on groundwater. SVE system monitoring will include laboratory and field measurements of Vadose Zone soil gas and SVE effluent air monitoring. VOCs are the main COC. However, the normal quarterly groundwater monitoring also will be monitoring for the additional constituents required by the permit.

After it has been determined that each aspect of the SVE system is operating properly, monitoring of the system's performance will be documented. The documentation will include:

- field and laboratory sampling of the SVE performance parameters;
- maintenance of system component;
- trouble shooting system; and
- field data on the influent wells flow rate and pressure drop.

5.3.3.3 Schedule

Field work will commence within two weeks of receipt of NDEP approval of the CMS Workplan. The installation of the SVE pilot system is expected to be completed within six weeks of receipt of NDEP approval of the CMS Workplan. It is anticipated that the pilot SVE system will run for at least one year. This will allow data to be gathered under varied conditions (operational and environmental). The pilot SVE system may be modified during the pilot test period to examine operational protocol. Additionally, depending on the results from the pilot test period, the pilot SVE system may be incorporated into the selected remedy.

5.4 SOIL VAPOR EXTRACTION (SVE) SYSTEM MONITORING

The intent of the SVE monitoring and sampling is to gather information that will be used to determine the performance of SVE-1. The following monitoring, inspections and sampling plan describes the process that will be used to obtain the data needed to make this assessment.

- Daily inspections will consist of those elements found in Field Data Soil Vapor Extraction System Daily Inspection, Appendix 3. The performance of the daily inspection shall be in accordance with the following.

- Weekly inspections shall consist of those elements contained in Field Data Soil Vapor Extraction Weekly Assessment, Appendix 3.

- Monthly VOC samples shall be taken at the discharge of SVE-1 exhaust and analyzed in accordance with USEPA TO-14 Method.

- Quarterly Groundwater Monitoring

  For the purposes of this CMS, no special sampling is required. Normal facility quarterly groundwater monitoring data shall be used in assessing SVE performance and affect on groundwater.

  If contaminants are detected using routine facility sampling protocol, those wells will be subjected to the effect of purge time on organic constituent concentrations observed in groundwater due to vadose contaminants.

  The procedure for this task is included in Appendix 2.

5.4.1 Soil Vapor Extraction Well (SVE-1)

The reduction in vapor concentration in the Vadose Zone or groundwater contamination beneath the Facility will be used as an empirical evaluation to describe the effectiveness of the pilot SVE system. Several operational scenarios for both extraction and influent rate and location management are expected to be evaluated. These operational scenarios will be based on field and laboratory monitoring data to determine the optimum operation of the SVE system. Each tested operational scenario will be discussed in the CMS Report with an evaluation and recommendation for future consideration.

Discharge of extracted vapors will be monitored to determine compliance with State air discharge standards. If the pilot field testing of the SVE demonstrates that off-gas treatment is required, the system will be field-fitted with the appropriate equipment. The information from the SVE effluent air monitoring will be evaluated with Vadose Zone sampling data to determine the effectiveness of the pilot system.

5.4.2 Geoprobe Wells

Geoprobe or small diameter sampling points will be installed to be used as monitoring locations in the pilot SVE study. The initial locations for shallow monitoring points are indicated in Figure 5.4. It is likely that the installation of the monitoring points may be performed in phases, in response to monitoring requirements determined by the pilot SVE system. For example, to determine the radius of influence of the SVE system, it may be necessary to install monitoring

locations at distances that identify the boundary between those areas that are influenced, and those that are not influenced by the SVE system. Different operational parameters may affect the distances at which the monitoring points are useful.

Data that may be gathered during monitoring would include depth of installation, distance to SVE well, air flow into or out of the monitoring point, and concentration of waste constituents in the Vadose Zone.

The procedure for this task is included in Appendix 1. Data quality assurance procedures also are included in Appendix 1.

5.4.3 Assessment of SVE-1 System

The assessment of performance and viability of SVE-1 will be a dynamic process as data are obtained. The information gathered during the daily, weekly, and monthly sampling and quarterly groundwater monitoring will be used to fine-tune the system to optimize system performance. This process will include range of influence and environmental conditions that enhance or reduce the effectiveness of the system. VOC extraction rates will be tracked and trends will be developed to assess these influences. The configuration of those monitoring wells incorporated into the SVE system may be changed as information is obtained. If contaminants (VOC) are detected during groundwater monitoring in wells previously non-detect, those wells will be incorporated into the system. The decision matrix for this process is found as Figure 5.5.

5.5 EVALUATION OF VAPOR BARRIER

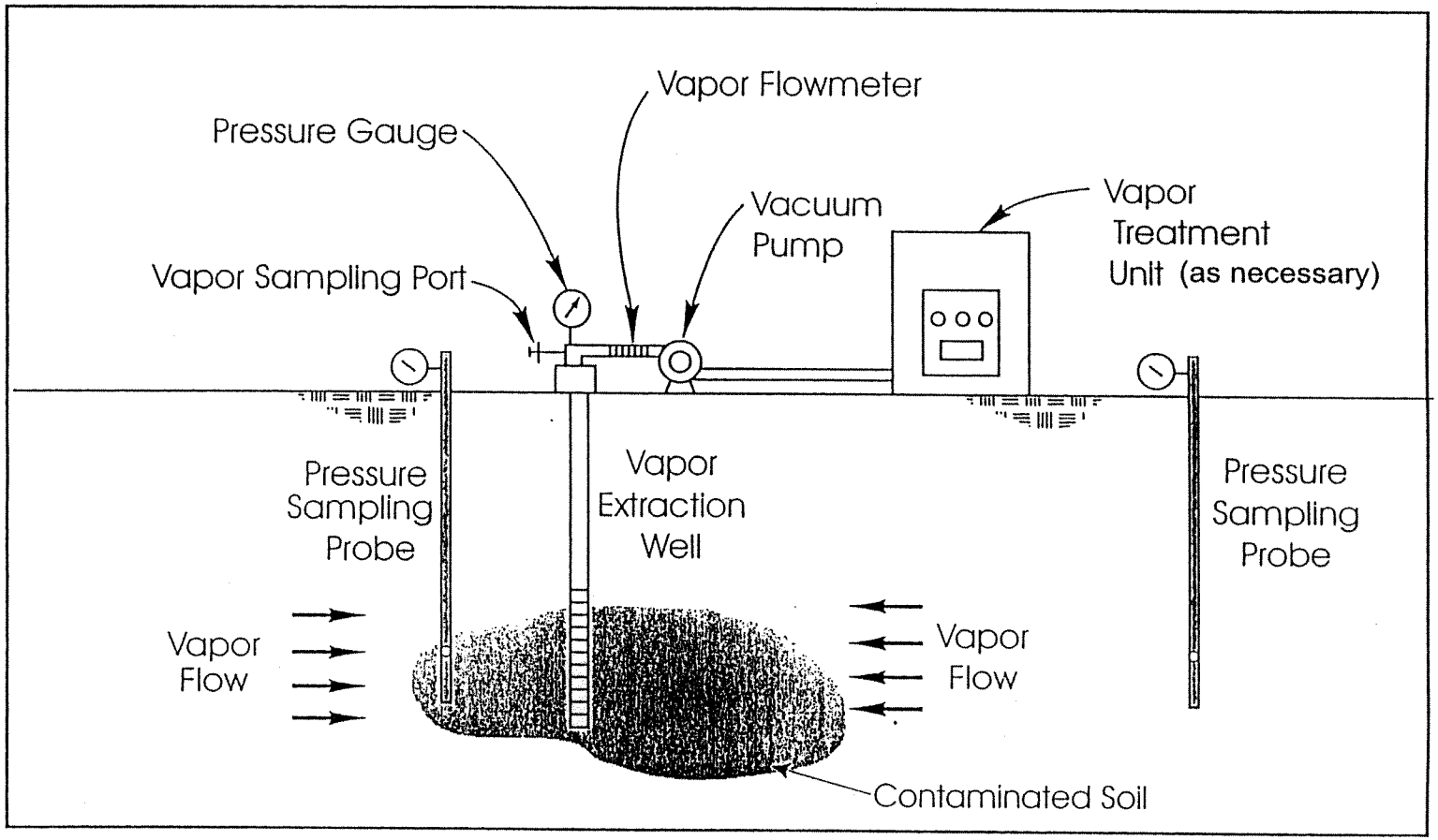
Existing monitoring wells will be incorporated into pilot SVE system as boundary wells. The groundwater monitoring wells are located near the site boundary. Currently, it is envisioned that caps with one-way valves allowing downward movement of ambient air in response to SVE pumping will serve to create a boundary system around the HWMF. Because the monitoring wells are screened partially in the groundwater and partially in the Vadose Zone, the SVE system should allow deep recharge of ambient air.

Data that may be gathered during monitoring would include distance to SVE well, air flow into the well, and concentration of waste constituents in the groundwater.

5.6 CONTINUE MODIFIED SAMPLING PROTOCOL

The sampling protocol experiment will be continued in the potentially damaged wells (MW-312 and MW-315), to examine the effect of purge volume on organic constituent concentrations observed in groundwater.

The procedure for this task is included in Appendix 1.



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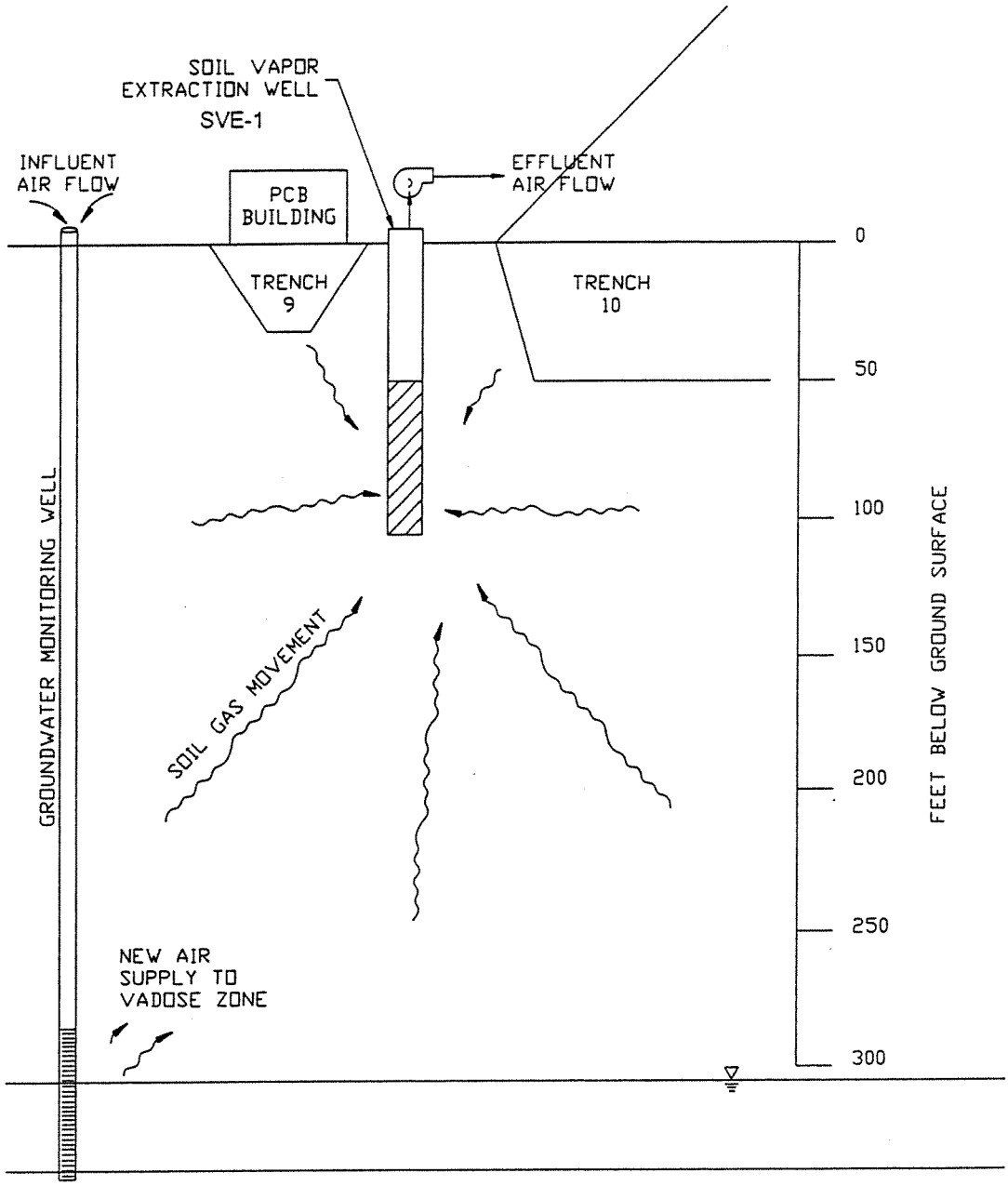
from: Nyer, E.K. et al., 1996, In Situ Treatment Technology

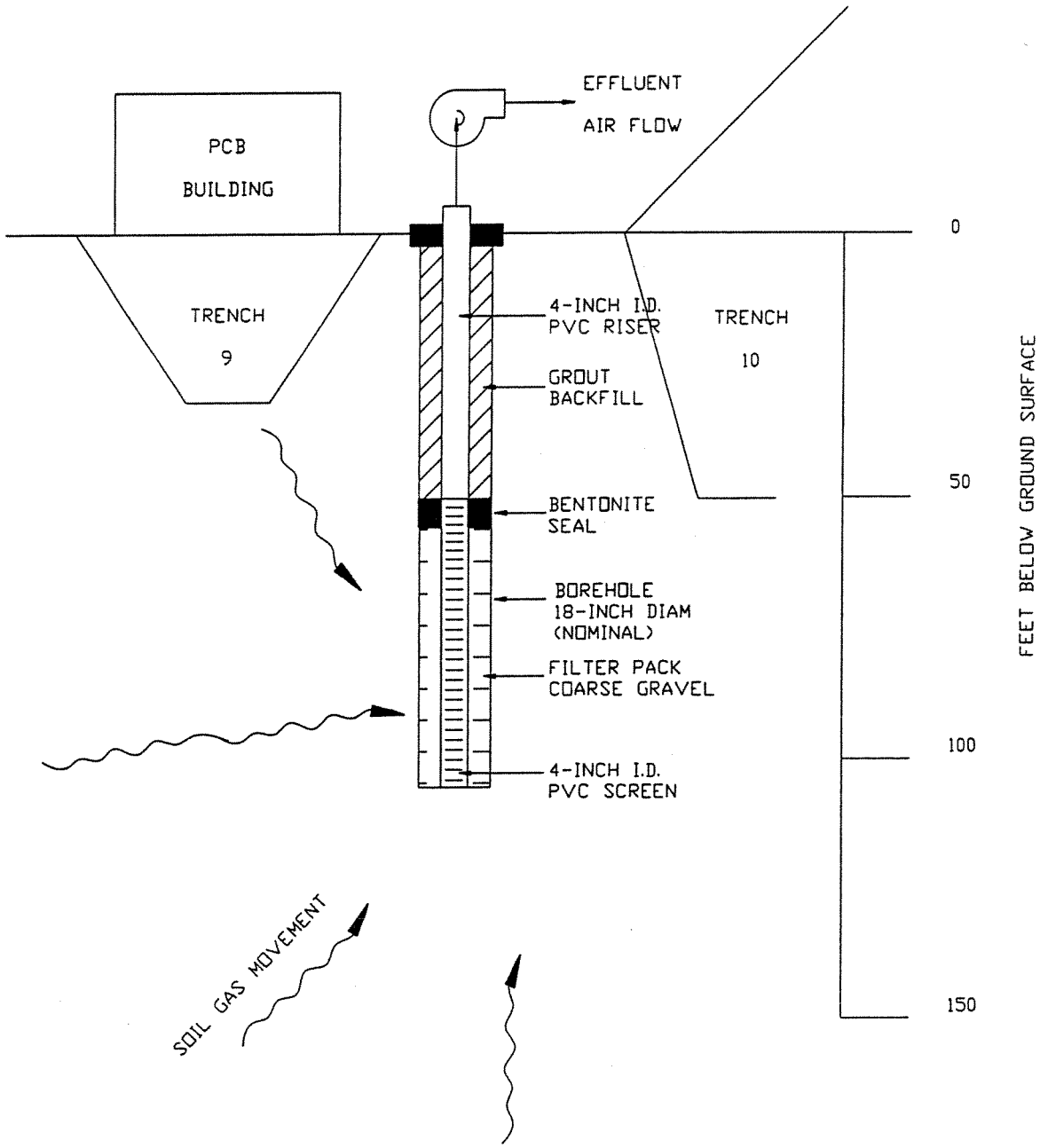
Figure 5.1
Typical Soil Vapor Extraction System



NOT TO SCALE

ENGLEWOOD, COLORADO AquAeTer

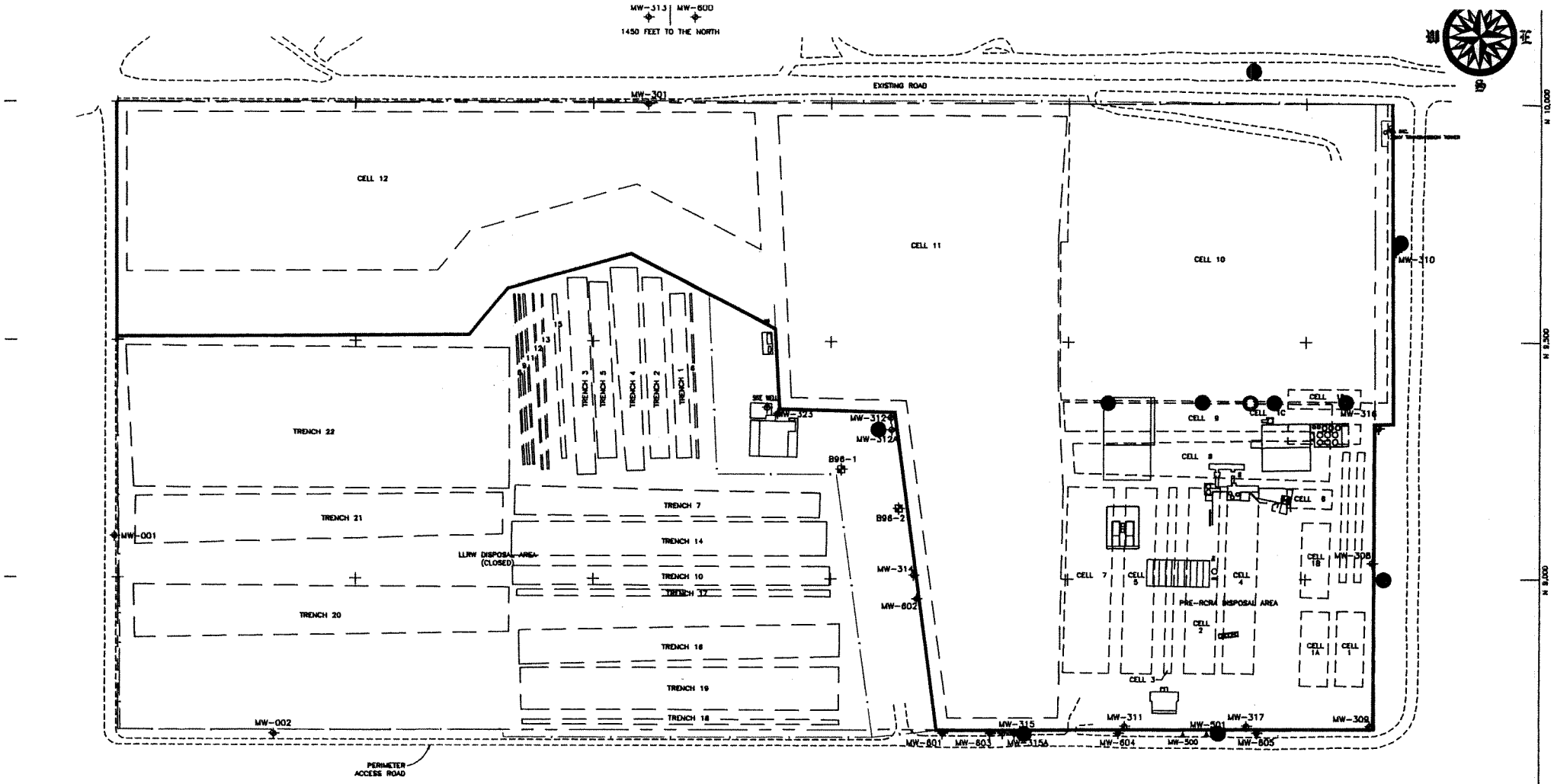
FIGURE 5.2
SCHEMATIC OF
SOIL VAPOR EXTRACTION SYSTEM
U.S. ECOLOGY
BEATTY, NEVADA



NOT TO SCALE

ENGLEWOOD, COLORADO AquaeTer

FIGURE 5.3
SCHEMATIC OF SOIL VAPOR
EXTRACTION WELL
U.S. ECOLOGY
BEATTY, NEVADA



LEGEND

- PERMIT LINE
- FENCE LINE
- UNIMPROVED ROAD
- POINT OF COMPLIANCE
- SITE COORDINATE SYSTEM MARKER LOCATION IN NORTHING AND EASTING
- MW-002 — DETECTION MONITOR WELL LOCATION AND NUMBER
- MW-603 — SUPPLEMENTAL MONITOR WELL LOCATION AND NUMBER
- MW-500 — VALDOSE ZONE MONITOR WELL LOCATION AND NUMBER
- B98-1 — CORRECTIVE ACTION BORING LOCATION AND NUMBER
- GEOPROBE MONITORING LOCATION
- SOIL VAPOR EXTRACTION WELL

100 50 0 100
SCALE FEET

Rev	Drawn	Check	Appr	Date	Description

REVISIONS

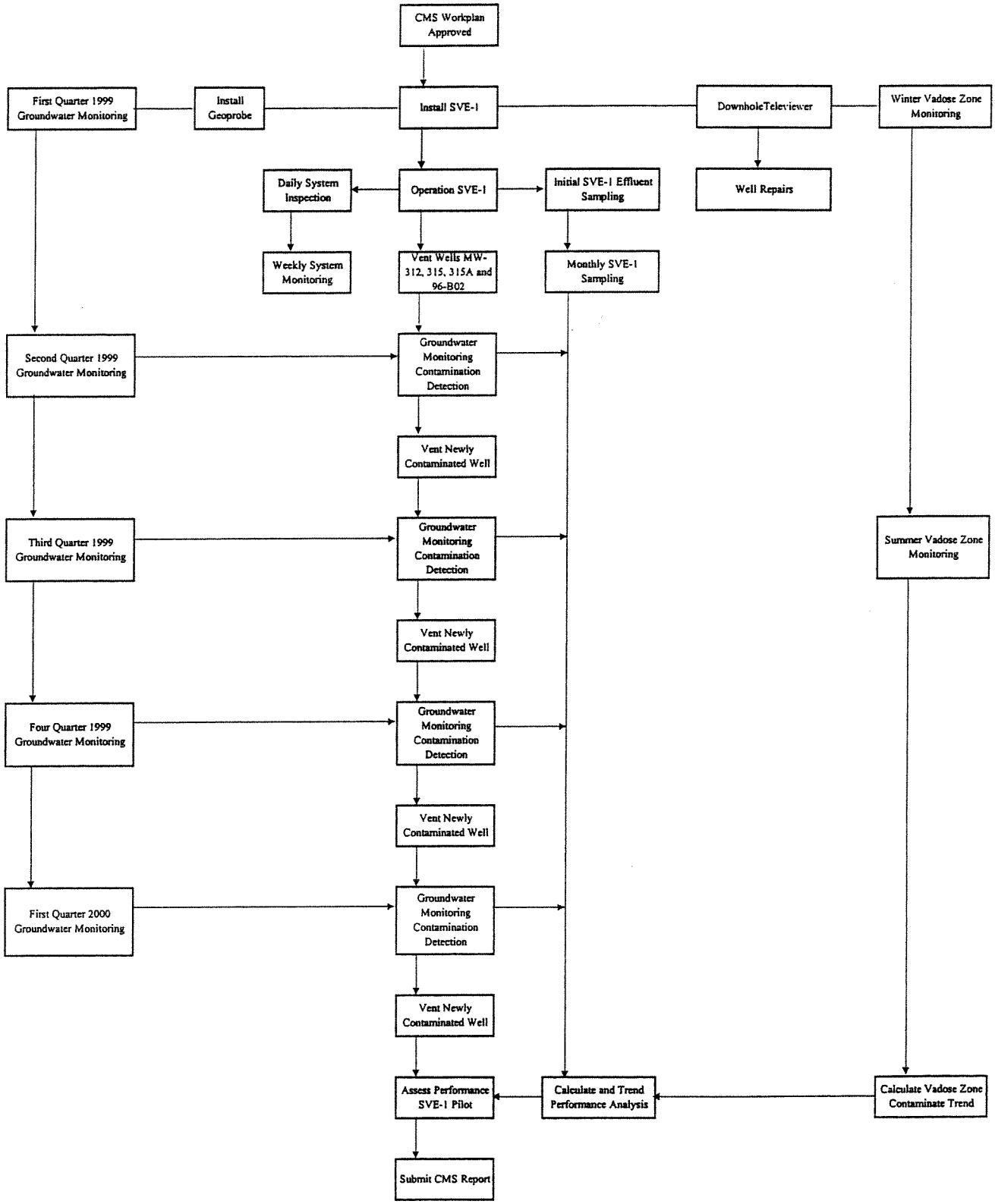
SOIL VAPOR EXTRACTION SYSTEM LOCATIONS

HAZARDOUS WASTE MANAGEMENT FACILITY
U.S. Ecology
BEATTY, NEVADA

Drawing No.

Figure 5.4

Figure 5.5
CMS Workplan Flow Chart



6. REPORT FORMAT

The following is the anticipated outline for the CMS Report.

EXECUTIVE SUMMARY

1. INTRODUCTION/PURPOSE
   - Facility Description and History
   - Facility Environmental Setting

2. DESCRIPTION OF CURRENT CONDITIONS
   - Potential Sources of Contamination
   - Migration Pathways
     - Groundwater Pathway
     - Soil Pathway
     - Soil Gas Pathway
   - Summary of Impacted Areas
   - Voluntary Corrective Measures
     - SWMU Closure
     - Interim Corrective Actions

3. CORRECTIVE ACTION OBJECTIVES
   - Groundwater Standards

4. IDENTIFICATION AND SCREENING OF CORRECTIVE MEASURE TECHNOLOGIES APPROACH
   - Groundwater Corrective Measures
   - Soil Corrective Measures
   - Soil Gas Corrective Measures

5. CORRECTIVE MEASURE ALTERNATIVE DEVELOPMENT
   - Groundwater Corrective Measures
   - Soil Corrective Measures
   - Soil Gas Corrective Measures

6. EVALUATION OF CORRECTIVE MEASURE ALTERNATIVES
Evaluation of Corrective Measures Based on General Standards
Evaluation of Corrective Measures Based on Decision Factors
Summary of Options Retained
Groundwater Remedial Alternatives
Soil Remedial Alternatives
Soil Gas Remedial Alternatives

7. RECOMMENDATION AND JUSTIFICATION OF THE CORRECTIVE MEASURE ALTERNATIVE

8. SUMMARY AND RECOMMENDED CORRECTIVE MEASURE ALTERNATIVE / CONCLUSIONS
Groundwater Corrective Measure
Soil Corrective Measure
Soil Gas Corrective Measure

9. SCHEDULE FOR IMPLEMENTATION

10. REFERENCES

7. CMS PROJECT MANAGEMENT

7.1 PROJECT PERSONNEL

The project team that will perform the CMS will include qualified US Ecology personnel. Key members of the US Ecology project team have been involved in previous investigations of the HWMF.

The remainder of the project team will consist of contractor personnel, hydrogeologic consultants and analytical laboratory personnel, and other support services. Subcontractors will be identified promptly after this CMS Workplan has been approved by NDEP.

The field data acquisition team, including professional and support personnel, will be experienced in the specific technical activities to which they will be assigned. Personnel will be experienced in pertinent field data collection activities described in this CMS Workplan. Laboratory personnel will be experienced in USEPA-approved procedures for conducting the assigned analyses.

CMS team members will have completed safety training required for their specific work assignment in accordance with Occupational Health and Safety Administration (OSHA) requirements and US Ecology standard operating practices.

7.2 CMS MANAGEMENT

7.2.1 Corrective Action Project Coordinator

The US Ecology Corrective Action Project Coordinator (CAPC) for the CMS implementation will be Mr. Zaki Naser. Mr. Naser is US Ecology's, Beatty, NV, HWMF General Manager.

7.2.2 Health and Safety Officer

Health and safety issues during the CMS will be administered by the Health and Safety Officer. The Health and Safety Officer will be a US Ecology employee. The CAPC will identify the Health and Safety Officer. The Health and Safety Officer will be responsible for monitoring compliance with the Health and Safety Plan. The Health and Safety Officer will identify health and safety issues or non-compliance with the Health and Safety Plan, and will initiate, recommend or provide solutions or corrective actions. The Health and Safety Officer will verify implementation of correction actions.

7.2.3 QA Officer

CMS quality assurance (QA) will be administered by the CMS Quality Assurance Officer (QAO). The CAPC will determine which organization will provide the QAO.

The QAO will be responsible for reviewing project records for the adequacy of compliance with this CMS Workplan. The QAO will identify quality problems or non-compliance with the Workplan, and will initiate, recommend, or provide solutions or corrective actions to correct deficiencies. The QAO will document implementation of corrective action.

In a quality assurance position, this person will not be directly responsible for performing or directing CMS data collection or reporting. However, this person can work under the general direction of the Corrective Action Project Coordinator.

7.3 CMS ORGANIZATION

Figure 7.1 illustrates the organization planned for the CMS and shows the relationship between US Ecology and contractor personnel.

7.3.1 US Ecology Personnel

The CAPC, Mr. Naser of US Ecology, will be assisted by US Ecology and contractor environmental specialists and scientists. Ms. Lori Taguchi of US Ecology, and other US Ecology personnel, will assist Mr. Naser with the CMS Workplan implementation.

7.3.2 Contractor Personnel

A hydrogeology consultant, drilling contractor, surveying contractor, and chemical laboratory will be required. Contractors in other areas might be required as the CMS proceeds. Contractors involved in on-site activities will be required to provide documentation of acceptable training.

7.3.2.1 Hydrogeology Consultant

The hydrogeology consultant will be knowledgeable of the tasks to be fulfilled as part of this CMS Workplan, and familiar with the necessary approach to successful completion.

7.3.2.2 Drilling Firm

The drilling firm will be selected on the basis of state certification and commitment to providing timely and cost-effective drilling and well installation services in accordance with the procedures included in this RFI Workplan. The quality of available equipment and the OSHA training and experience of field personnel also will be considered.

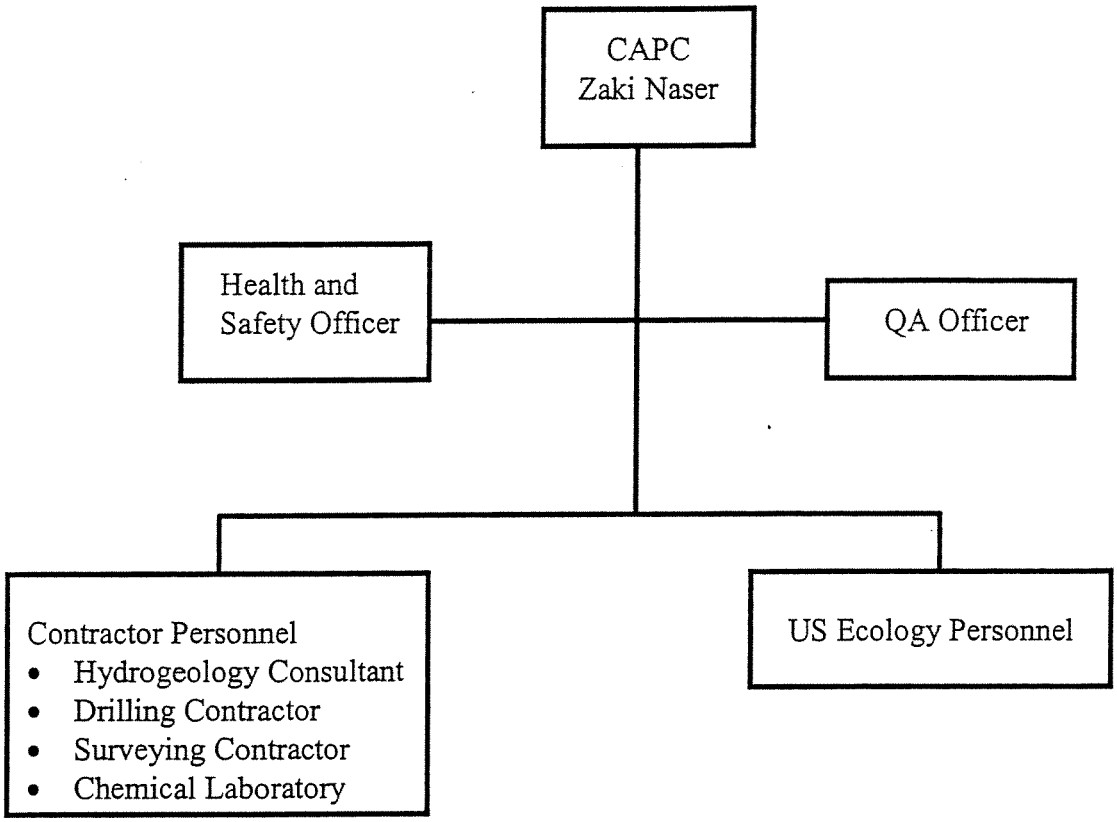
7.3.2.3 Land Surveyor

The land surveyor retained to conduct surveys for the RFI will be selected on the basis of availability of Nevada-licensed personnel, proximity to the HWMF, and commitment to providing timely and cost-effective surveying in accordance with the specific requirements of this RFI Workplan.

7.3.2.4 Chemical Laboratory

The laboratory retained to conduct chemical analyses of samples will be selected on the basis of commitment to providing timely and cost-effective testing service in accordance with a documented and operative QA/QC program.

Figure 7.1
CMS Organization



8. CMS SCHEDULE

The RCRA Permit contains the schedule requirement for the CMS. The CMS Workplan must be submitted to the agency within 60 days after US Ecology receives notification that the CMS is required. US Ecology received this notification on January 11, 1999, and has been informed that the CMS Workplan must be submitted to the NDEP by February 8, 1999.

US Ecology presents the following schedule for the submittal and projected approval date for the CMS Workplan, and the projected time for the start of field work.

Item	Date
RFI Report Approved	1/11
CMS Workplan Due (4 weeks)	2/08
CMS Workplan Approved (2 weeks)	2/22 projected
CMS Workplan Field Work Start (2 weeks)	3/08 projected

US Ecology has developed a detailed sequence schedule to aid in the identification of critical path items. As part of this sequence, US Ecology has developed an "early start" and "late start" schedule, with corresponding "early finish" and "late finish" dates. The early schedule is dependent on several items including:

- availability of contractors,
- availability of mechanical equipment for SVE,
- favorable weather, and
- no unforeseen subsurface conditions or difficulties.

The late schedule includes the possibilities for delays related to these above mentioned items that are outside of US Ecology's control.

CMS Tasks	Early Start	Late Start	Early Finish	Late Finish
• All Groundwater Sampling w/ Special Sampling (Task 6)	1/18	1/18	2/19	2/19
• Pull Well Internals (pumps and piping)	1/25	1/25	2/19	2/19
• Vadose Zone Sampling of All Site Wells (Winter Event) (Task 1)	2/22	3/1	2/26	3/5
• Down-Hole Televiewer (Task 2)	2/23	3/2	3/9	3/9

• SVE Pilot System Start-up (Task 3)				
Contract paper work	~1/18	2/22	3/9	3/9
Mobilize/on site (complete within 7 days of CMS Workplan Approval)			3/1	3/8
Order and Assemble Mechanical Equipment	2/22	2/22	3/5	3/8
Install Well and Equipment Setup/Preoperation Testing/Sealing Wells	3/1	3/8	3/12	3/26
Operational Start-up (Task 5)	3/5	3/26		
• Vadose Zone Monitoring Point Geoprobe (Task 4)				
Contract paper work	1/18	2/22	1/29	3/5
Mobilize/on site (complete within 7 days of CMS WP Approval)			3/1	3/8
Install	3/1	3/8	3/8	3/19
Sample	3/8	3/22	3/12	3/26
• Vadose Sampling of All Site Wells (Summer Event) (Task 1)	8/23	8/23	8/27	8/27

Sampling

Sampling	Daily	Weekly	Month	Quarterly	Semi-Annually
SVE					
Air Flow & Pressure	x				
SVE-1 (Summa canisters)			x		
Well Vapor					
All wells & Geoprobe (Summa canisters)					x
GW Sampling				x	
Air Flow, PID, LEL (all wells in system, and geoprobe)		x			
SVE Physical inspection (physical conditions, mechanical conditions, measured values, date/time/weather)	x				

Reporting

Item	Frequency	Content
CMS Progress Reporting	15 days following the end of the bimonthly period (starting 60 days following approval of the CMS Workplan)	Description of significant activities and work completed Summary of system effectiveness. Compare with prediction. Summary of findings, SVE effluent data, monitoring well data Contact with agency/public Any problems and solutions Personnel changes Projected work
CMS Report	90 days after completion of pilot test	Introduction/Purpose DOCC Corrective Action Objectives Identification and Screening of Corrective Measures Technologies Corrective Measures Alternative Development Evaluation of Corrective Measure Alternatives Recommendation and Justification of Corrective Measure Alternative Summary of Recommended Corrective Measure Alternative
Revised CMS Report	30 days following receipt of NDEP review comments	Incorporate review comments

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Appendix 13 G

Justification for Elimination of Monitoring Requirements for the 600-series Wells

AquAeTer

optimizing
environmental resources | water, air, earth

7430 East Caley Avenue, Suite 310 ◦ Centennial, CO 80111 ◦ Phone (303) 771-9150 ◦ Fax (303) 771-8776

August 25, 2010

093205

US Ecology Nevada, Inc.
P.O. Box 578
Beatty, Nevada 89003

Attention: Mr. Scott Wisniewski

RE: Justification for Elimination of Monitoring Requirements at 600-series Wells US Ecology Nevada, Inc., Beatty, Nevada

Dear Mr. Wisniewski:

AquAeTer, Inc. has completed a review of groundwater conditions at the US Ecology Nevada, Inc. (USEN) facility located in Beatty, Nevada in support of justification for elimination of monitoring and reporting for 600-series monitoring wells. The scope of this review of monitoring well data and water bearing zone characteristics was initially proposed in **AquAeTer's** proposal #093205P, as authorized by USEN on October 6, 2009 and refined in recent telephone conversations between you and Mr. Chris Bolin.

BACKGROUND

Natural subsurface materials at the USEN facility include about 300 feet of unsaturated strata above groundwater (the Vadose Zone) that consist of primarily of interbedded sandy gravels and gravelly sands, with some layers of fine-grained materials (i.e., silt and clay). Typically, individual layers of fine-grained in the Vadose Zone are not continuous beneath the entire Facility area, but the sequence of discontinuous fine-grained sediment layers in the Vadose Zone impedes downward movement of infiltrating water or contaminants. Further, downward movement of infiltrating water is significantly impeded by the extremely low moisture content of Vadoze Zone sediments. Research conducted at the Amargosa Desert Research Site (ADRS), located adjacent to the Facility, indicates that the dominant direction of moisture movement within the Vadose Zone is upward[1].

Groundwater occurs below the Vadose Zone in two zones. The Upper Water-Bearing Zone occurs between about 326 and 340 feet deep, and the Lower Water-Bearing Zone occurs at about 350 feet deep. A continuous fine-grained stratum separates the Upper Water-Bearing Zone and

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[1] Stonestrom, D.A., Abraham, J.D., Andraski, B.J., Baker, R.J., Mayers, C.J., Michel, R.L., Prudic, D.E., Striegl, R.G., and Walvoord, M.A., 2004, Monitoring Radionuclide Contamination in the Unsaturated Zone--Lessons Learned at the Amargosa Desert Research Site, Nye County, Nevada: Proceedings, Workshop on Long-Term Performance Monitoring of Metals and Radionuclides in the Subsurface, Reston, VA, April 20-22.

Lower Water-Bearing Zone. The Upper Water-Bearing Zone is considered to be semi-confined to confined and is monitored by the 300-series groundwater monitoring wells. The Lower Water-Bearing Zone is confined and is composed of thin interbedded sand and gravel layers. It occurs at depths of about 350 feet and greater below the ground surface, and is monitored by the 600-series monitoring wells.

AquAeTer assisted USEN with groundwater monitoring reporting in the past and recently assisted USEN with statistical analyses of groundwater data. Recently, we were made aware of Facility RCRA Permit modifications being done as part of your Permit renewal. Also, we understand that a notice of deficiency (NOD) was issued by the State for failure to address sampling at 600-series wells in the Permit renewal.

It is **AquAeTer**'s understanding that the current RCRA Permit (NVT330010000) specifies wells to be sampled, parameters to be analyzed, and schedule for sampling. The 600-series wells include MW-600, 601, 603, 604, and 605. The wells are identified in the Permit as supplemental lower aquifer monitoring wells. Samples from the supplemental wells are analyzed for constituents included in Tables 10.4, 10.5, and 10.6 (in accordance with Section 10.7.1.1). 600-series well monitoring is scheduled to occur once every five quarters.

USEN has monitored both the 300-series and 600-series wells as a condition of the RCRA Permit. Recent updates to the Permit include a re-evaluation of the applicability of sampling the 600-series wells. Based on **AquAeTer**'s review of data collected from the 600-series wells and assessment of the water bearing zone characteristics we provide the following justification for their elimination from the groundwater monitoring plan.

WELL PAIRS

The USEN groundwater monitoring system includes wells located in the Upper Water-Bearing Zone and Lower Water-Bearing Zone. Wells in close proximity to each other, but screened in separate water bearing zones are considered to be "well pairs" in this justification, for the purpose of comparing their hydrologic and chemical properties. Well pairs include the following:

1. MW-313/MW-600
2. MW-327/MW-601
3. MW-315A/MW-603
4. MW-311/MW-604
5. MW-317/MW-605

INDICATOR PARAMETER AND METALS CONSTITUENT CONCENTRATION COMPARISONS

AquAeTer has imported USEN groundwater data into the statistical database program, DUMPStat™. The database program allows the query or inorganic and indicator parameters in 300 and 600-series wells including:

1. Water-quality constituents (including chloride, specific conductance, cyanide, fluoride, nitrate/nitrite-n, pH, sulfate, TOX, TOC); and

2. Metals (Ag, As, Ba, Cd, Cr, Hg, Na, Pb, and Se).

DUMPStat™ query outputs consist of trend graphs of concentration versus time, and up-gradient prediction limits. The trend graphs are used to compare indicator parameter and metals concentrations at respective well pairs and to determine if variances in concentrations support a justification that these are separate groundwater bearing zones. The graphical displays included in Attachment 1 summarize the results for 300-series and 600-series wells. Representative parameter concentrations are summarized in Table 1. Comparison of constituent concentration at 300-series wells and their respective 600-series well pair confirms the similarity of water quality and metals concentrations. Although some variations exist, they appear to be minimal and indicate the waters likely are of similar origin and that the water-bearing strata are of similar composition and chemical makeup. Given the similarity of the geologic origins of the water-bearing strata, this physical and chemical similarity is expected. However, the similarity of the indicators of basic water quality should not be considered to be evidence that the two zones are not hydraulically separated beneath the Facility. The two zones, though possibly interconnected at an up-gradient (off-site) location, are hydraulically separated beneath the Facility. Other data and interpretations supportive of this separation are presented below.

CROSS SECTIONS

AquAeTer reviewed cross-sections and monitor well installation logs to evaluate subsurface media. The pertinent cross-sections are included as Attachment 2. The two water-bearing zones are shown to be separated by a confining layer that is made up of several feet of low to high plasticity silts and clays. The hydraulic conductivity of the fine-grained confining layer, though not confirmed by site-specific testing, is likely to be several orders of magnitude lower than that of the coarser-grained materials comprising the matrix of the two water-bearing zones. Based on our evaluation, it appears to be unlikely that the two zones are hydraulically connected beneath the USEN Facility and contaminant impacts to the Upper Water-Bearing Zone are unlikely to impact the Lower Water-Bearing Zone within the area monitored by 300 and 600-series wells. .

GROUNDWATER ELEVATIONS

Historic groundwater elevation data was examined to determine if variability exists between the 300 and 600-series well pairs. As shown on Figure 1 and included in Attachment 3, variations do exist at the well pairs. All well pairs except MW-327/MW-601 show approximately 20 feet of vertical difference with the 300 series wells being the upper potentiometric surface.

MW-327 is about 200 feet from MW-601. Based on the February 2009 potentiometric map, the groundwater elevation in the Upper Water-Bearing Zone, at a location equivalent to MW-601, is approximately 2452 ft msl or approximately 8 feet higher than the Lower Water-Bearing Zone The actual and theoretical differences in groundwater elevation for this well pair are shown on Figure 1.

The variations in groundwater elevation data provide an additional line of evidence that the two zones are not hydraulically connected.

WATER-BEARING ZONE CHARACTERISTICS

Historic groundwater flow directions have minor variations as illustrated on potentiometric maps included in Attachment 3. The Upper Water-Bearing Zone has a localized flow direction that varies across the site, a hydraulic conductivity of 61 feet per day and a hydraulic gradient of approximately 0.03 to 0.04 feet per foot. The Lower Water-Bearing Zone has a localized flow direction towards the south-southwest, a hydraulic conductivity of 2 feet per day and a hydraulic gradient of approximately 0.01 feet per foot. The differences, particularly the differences in groundwater flow direction, are indications of hydraulic separation. More closely comparable flow directions and rates would be expected if the two zones were hydraulically connected.

The facility water production well is located in close proximity to MW-313 and MW-600 and is completed in the Lower Water-Bearing Zone. The hydrograph of this well pair (included on Figure 1) shows significant fluctuations in groundwater levels in MW-600, believed to be the result of pumping from the facility production well. These same fluctuations are not observed in MW-313, evidence that the two zones are not hydraulically connected.

DETECTIONS OF VOCS

Volatile organics are not naturally occurring constituents of water-bearing zones and, where present, indicate impact that is attributable to the history of waste disposal at the Facility. Within the USEN monitoring system, some 300-series wells have been impacted by VOCs in the past. Those detections have occurred at wells located in close proximity to the disposal cells and are generally thought to be the result of the presence of soil gas containing volatile constituents in the Vadose Zone and migration of soil gas within the vadose zone and diffusion into the groundwater of the Upper Water-Bearing Zone. Further, it is believed that vertical migration of soil gas (and VOCs) in the Vadose Zone might be associated with monitor well borings, allowing gas to move vertically along preferential pathways associated with the borings. Where gas contacts groundwater (or interstitial water) in the vadose zone, VOCs can partition from the gas into the water. The low concentration detections of some VOCs in USEN wells offer confirmation of the influence of vadose zone gas on groundwater.

Gas-related VOC movement is limited by the presence of groundwater. That is, the groundwater surface provides a distinct lower boundary to gas movement. Thus, the migration mechanism that is suspected of being the primary cause for VOC impact to the upper zone cannot affect the lower zone.

VOC impacts are not observed in the Lower Water-Bearing Zone. The absence of such impacts in the lower zone is an indication of the effectiveness of the fine-grained stratum separating the upper and lower zones, and the absence of hydraulic connectivity between the zones.

CONCLUSIONS

The Upper and Lower Water-Bearing Zones located at the USEN facility have distinctive characteristics that support the conclusion that the two zones are not hydraulically connected. The geologic makeup of the two zones are similar and they exhibit similar historic water quality (indicator parameters and metals) suggesting that the water within each zone originated from a similar source, such as the surrounding zones of higher elevation. However, at the USEN Facility they are separate units.

Consideration of historic groundwater levels indicates the head pressures are different at the paired wells. Connected water-bearing zones would be expected to have the similar head pressures at similar locations. In addition, the characteristics of the water-bearing zones are different, including different groundwater flow directions, different hydraulic conductivities, and variations in potentiometric gradient. Finally, VOCs have been detected in the Upper Water-Bearing Zone, but not in the Lower Water-Bearing Zone.

Based on the findings of this assessment, it is concluded that the Upper and Lower Water-Bearing Zones are separated by a less permeable (lower hydraulic conductivity) stratum that is continuous beneath the Facility. With the intervening stratum limiting hydraulic connection between the water-bearing zones, the potential for vertical contaminant migration from the upper to lower zones is unlikely. The absence of impact and the poor hydraulic connectivity between the zones provides justification for the conclusion that monitoring of the 600-series wells is unnecessary. **AquAeTer** recommends that the 600-series wells be eliminated from the requirement for groundwater monitoring through the RCRA Permit modification process.

CLOSING REMARKS

We recognize that this groundwater monitoring recommendation differs from the requirements established in the current RCRA Permit, and that a Permit modification probably will be required to make the requested change. Accordingly, the next step should include obtaining NDEP concurrence with the suggested approach for monitoring of groundwater impact at the USEN Beatty facility. To begin a dialog with NDEP, **AquAeTer** suggests providing this letter or a similar summary to NDEP for review and comment.

We appreciate the opportunity to work with USEN on this project. If you should have questions or comments concerning this justification, please contact us by telephone at (303) 771-9150, by FAX at (303) 771-8776, or by electronic mail at cbolin@aquaeter.com.

Sincerely,
AquAeTer, Inc.

Chris A. Bolin
Project Manager

Stephen L. Wampler
Director of Engineering

Attachments: as stated

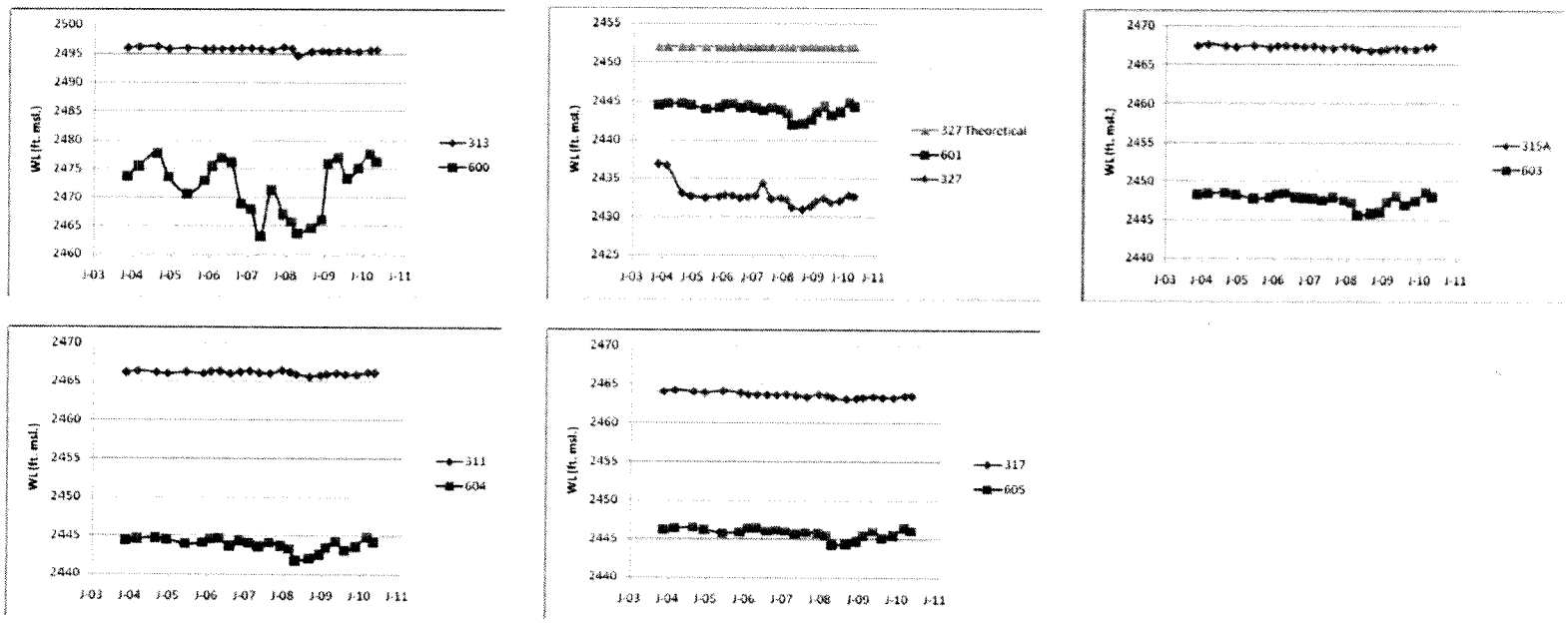
US Ecology Nevada, Inc.
Mr. Scott Wisniewski
August 25, 2010

Table 1 Summary of Indicator Parameter and Metals Constituent Concentration Comparisons

Parameter	Well Pair									
	MW-313/MW-600		MW-327/MW-601		MW-315A/MW-603		MW-311/MW-604		MW-317/MW-605	
	MW-313	MW-600	MW-327	MW-601	MW-315A	MW-603	MW-311	MW-604	MW-317	MW-605
Water Quality										
Chloride	75	75	80	80	80	80	75	80	75	75
Specific Conductance	1100	1000	1100	1050	1100	1000	1100	1000	1050	1000
Cyanide	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoride	3.5	3.5	3.5	3.0	4.0	3.0	3.0	3.0	3.0	3.0
Nitrate/Nitrite	0.25	0.2	0.2 t 0.4	0.2	0.2 to 0.6	0.2	0.3 to 0.8	0.2	0.1 to 0.7	0.2
pH	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Sulfate	200	160	175	190	190	175	175	175	190	175
TOX	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Metals										
Arsenic	0.005 to 0.010	0.0150 to 0.020	0.001	0.01	0.007	0.01	0.006	0.01	0.007	0.01
Barium	0.025	0.02	0.025	0.02	0.025	0.03	0.025	0.02	0.025	0.04
Cadmium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium	0.020	0.020	0.030	0.040	0.020	0.010	0.025	0.020	0.020	0.020
Lead	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mercury	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium	175	175	175	175	175	175	160	175	150	175

US Ecology Nevada, Inc.
Mr. Scott Wisniewski
August 25, 2010

Figure 1 Groundwater Elevation Data (Presentation by Well Pairs)



Note: MW-327 is about 200 feet from MW-601. Based on the February 2009 potentiometric map, the groundwater elevation in the Upper Water-Bearing Zone, at a location equivalent to MW-601, is approximately 2452 ft msl or approximately 8 feet higher than the Lower Water-Bearing Zone (as shown on the above figure as "327 Theoretical").

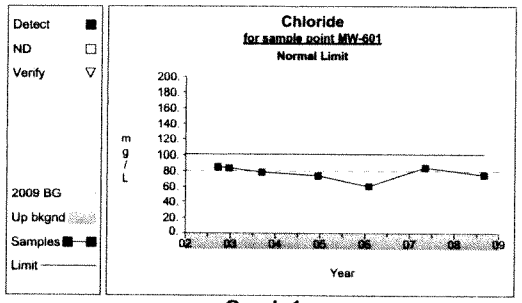
ATTACHMENT 1

WATER QUALITY AND METALS CONCENTRATION TREND GRAPHS FOR 300 AND 600 SERIES WELLS

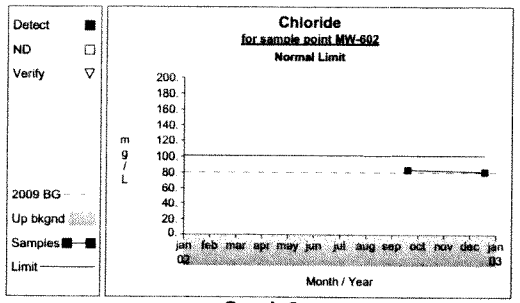
Beatty [wqdeep]

Analysis prepared on: 8/11/2010

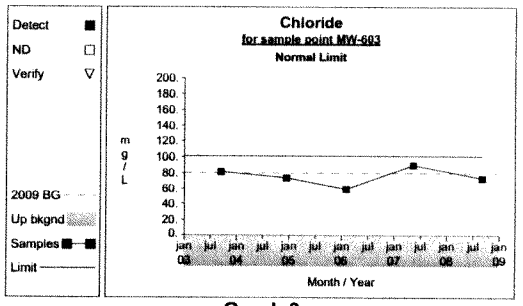
Up vs. Down Prediction Limits



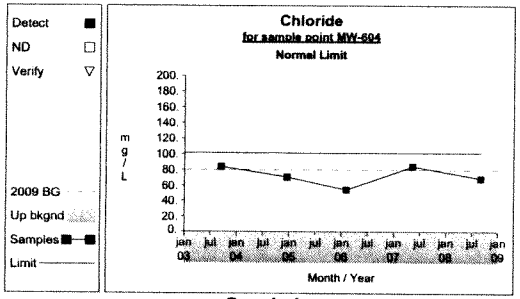
Graph 1



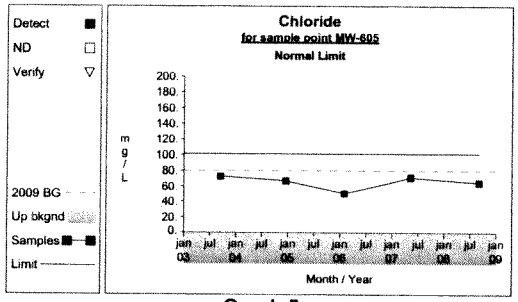
Graph 2



Graph 3



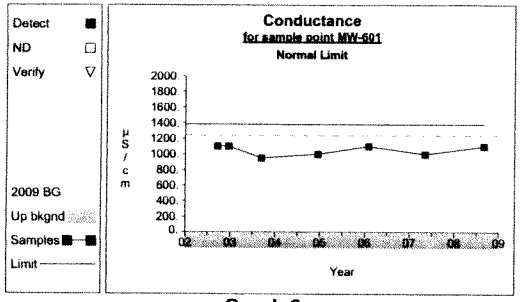
Graph 4



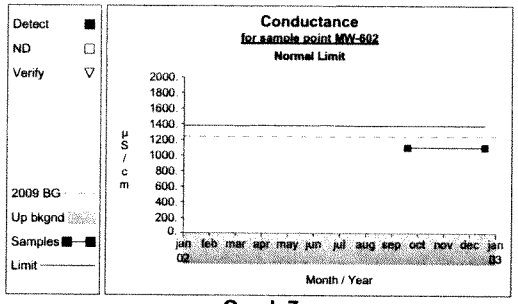
Graph 5

Prepared by: AquAeTer, Inc.

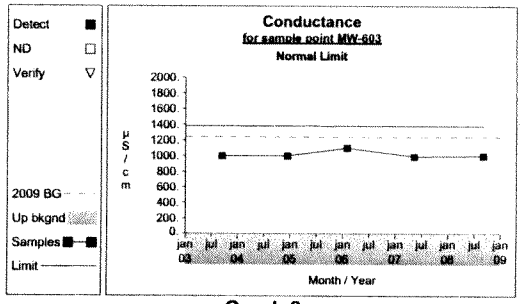
Up vs. Down Prediction Limits



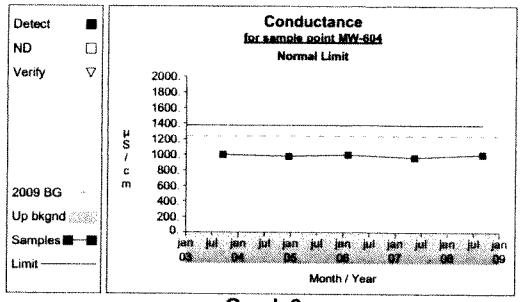
Graph 6



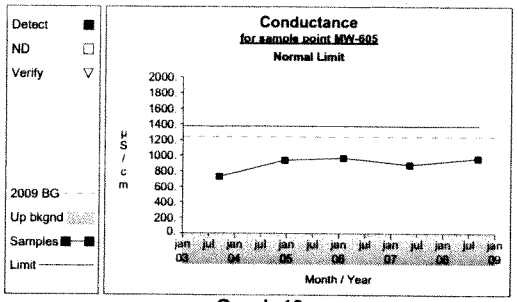
Graph 7



Graph 8

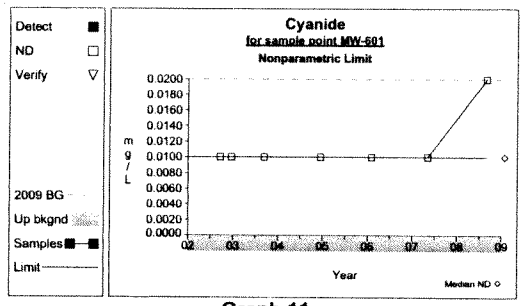


Graph 9

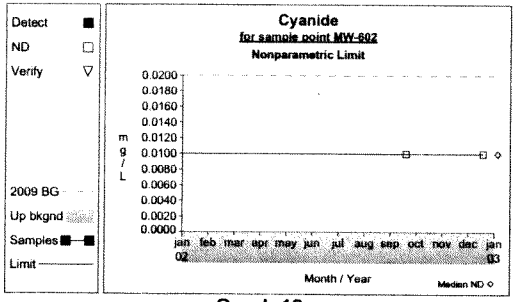


Graph 10

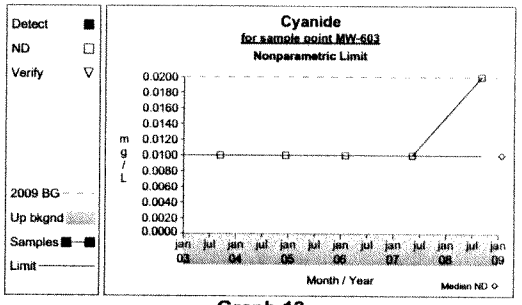
Up vs. Down Prediction Limits



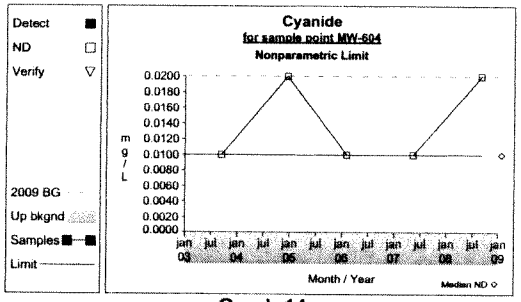
Graph 11



Graph 12



Graph 13



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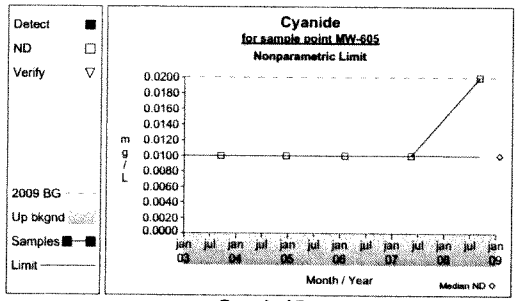
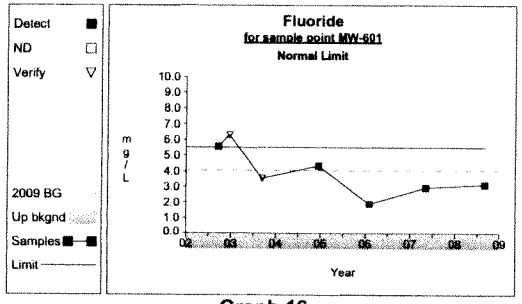
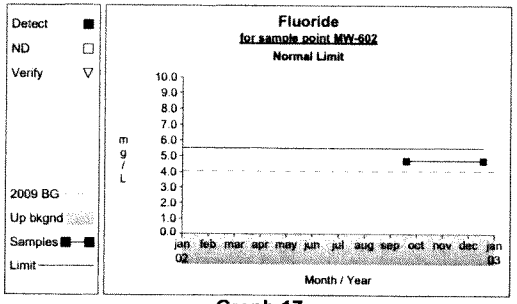


Graph 15

Up vs. Down Prediction Limits



Graph 16



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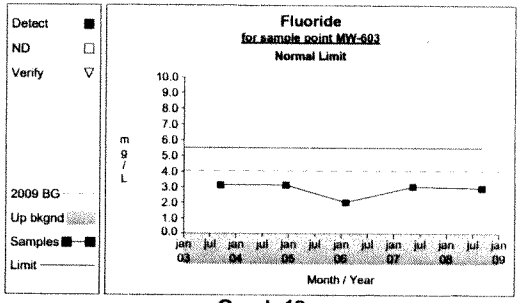

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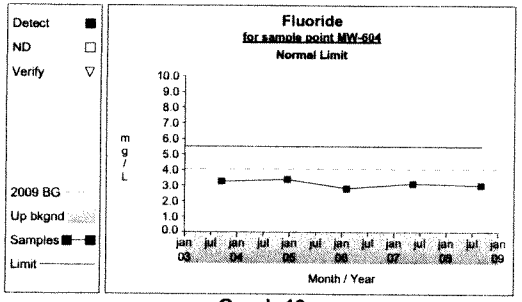

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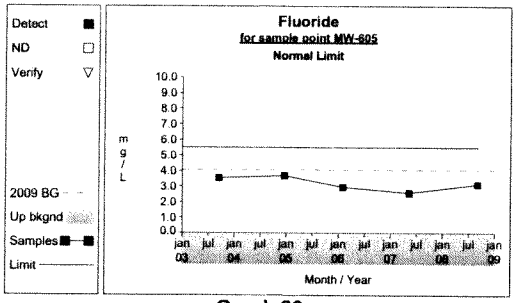
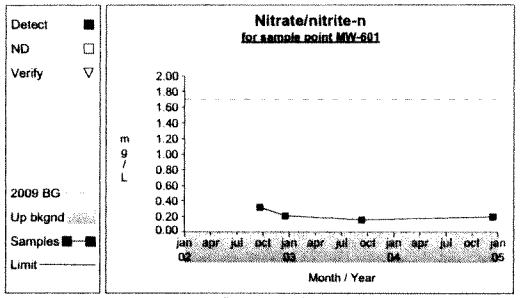
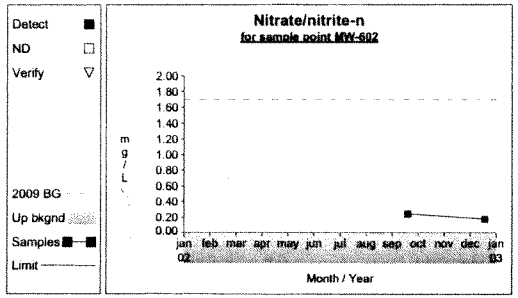


Graph 20

Up vs. Down Prediction Limits



Graph 21



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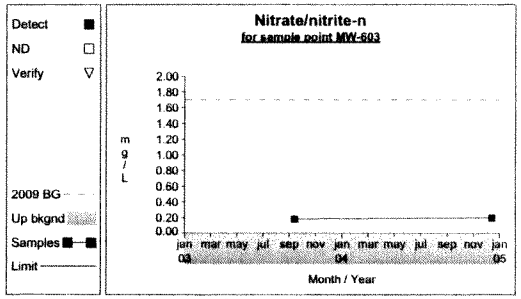

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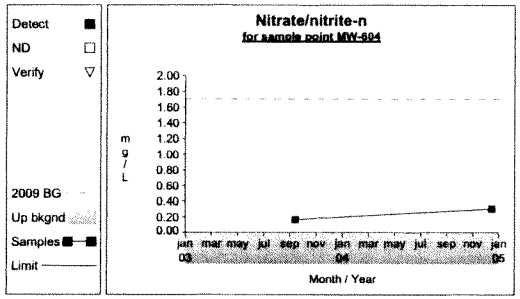

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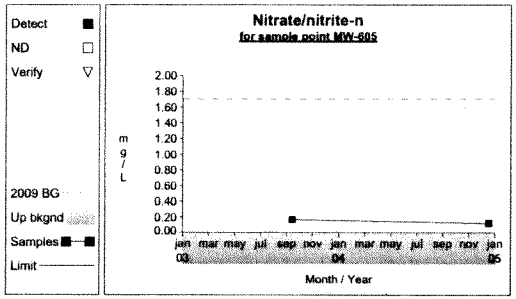
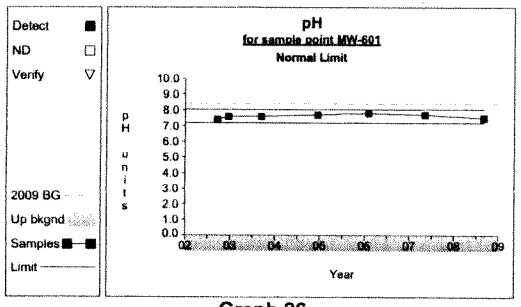


Graph 25

Up vs. Down Prediction Limits



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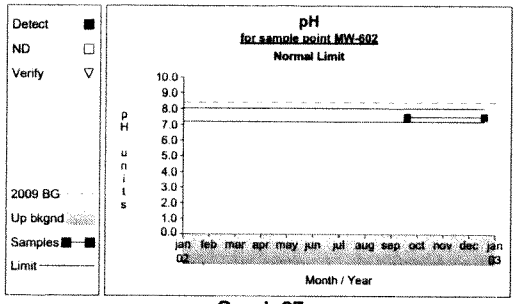

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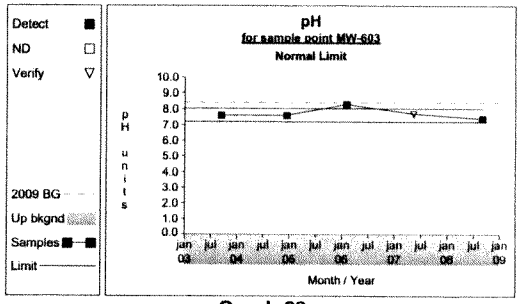

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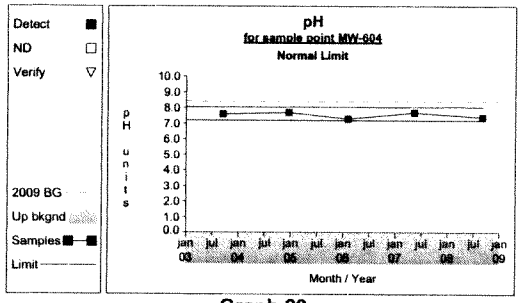

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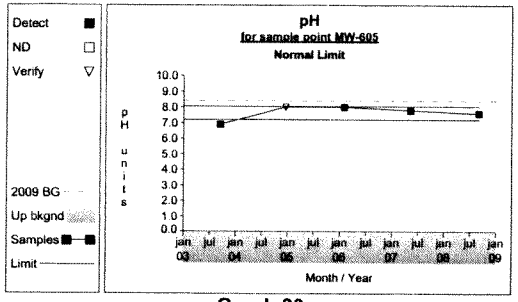
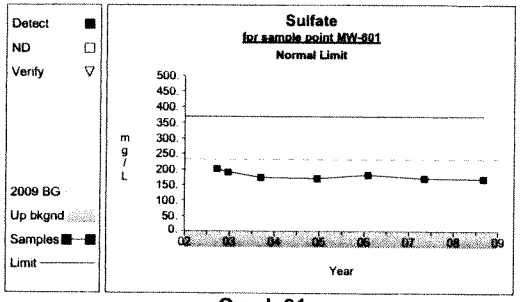


Graph 30

Up vs. Down Prediction Limits



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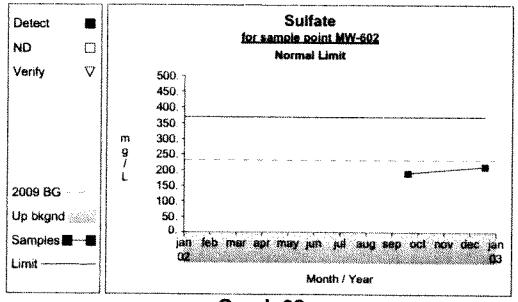

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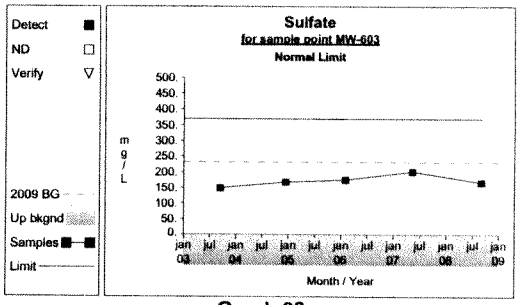

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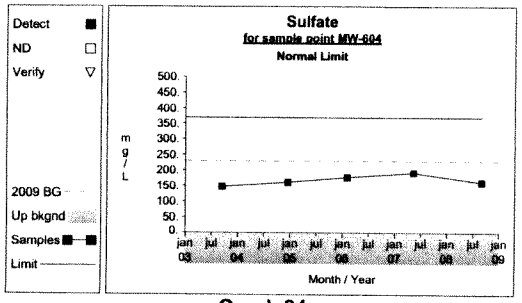

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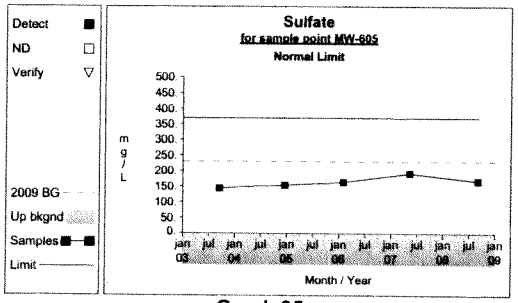
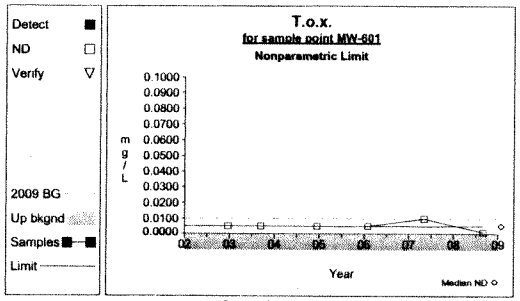


Graph 35

Up vs. Down Prediction Limits



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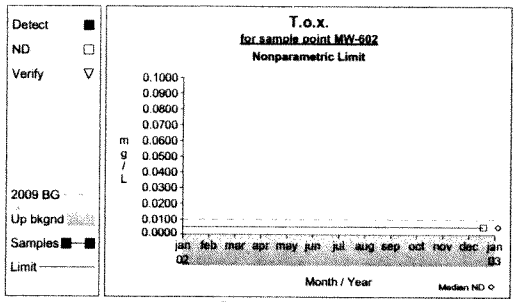

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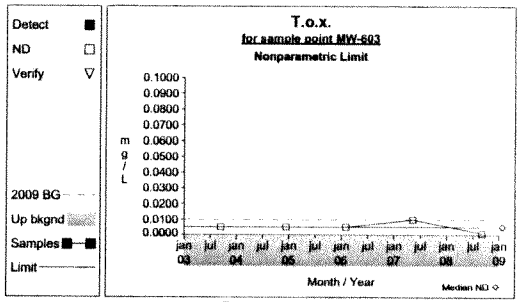

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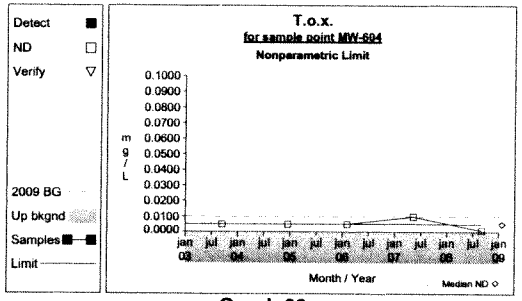

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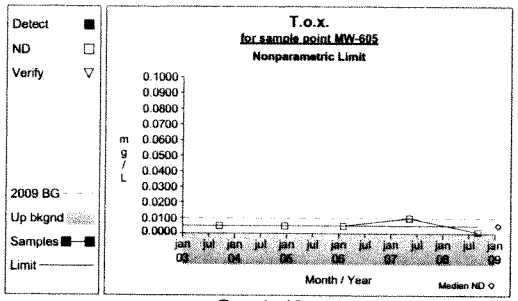
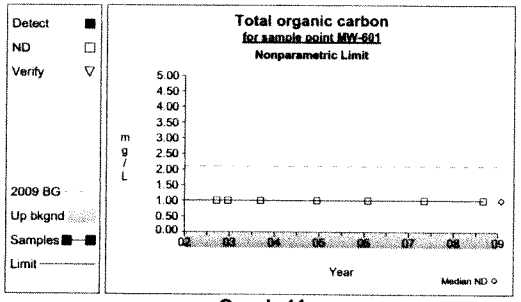


Graph 40

Up vs. Down Prediction Limits



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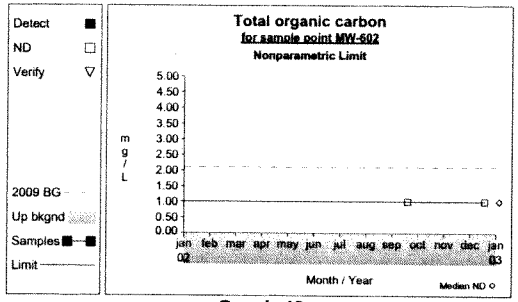

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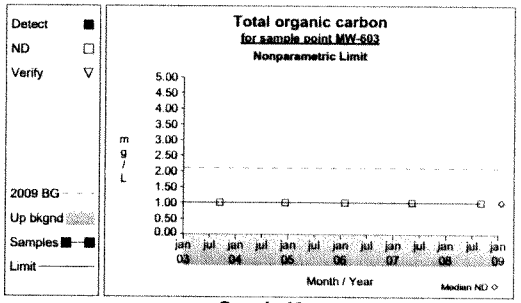

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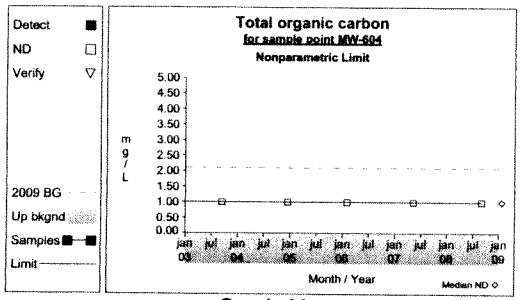

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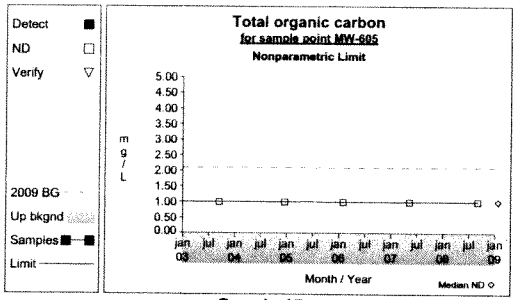

Graph 45

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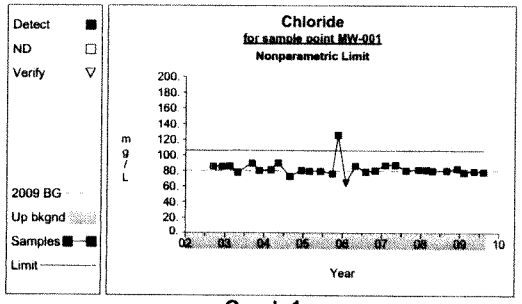
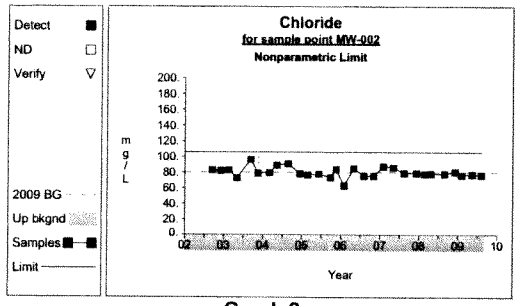
Analysis prepared on: 12/30/2009

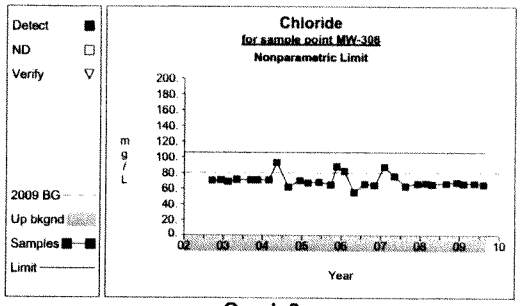
Up vs. Down Prediction Limits



Graph 1



Graph 2



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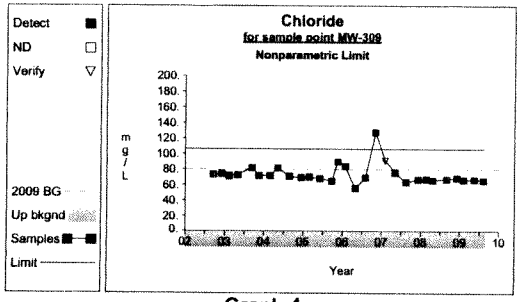

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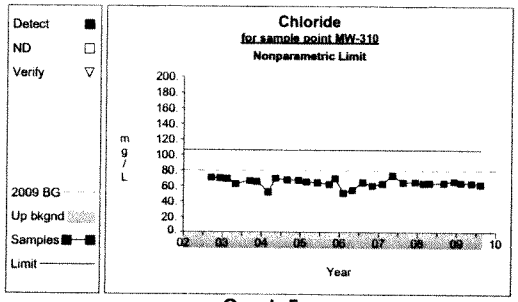

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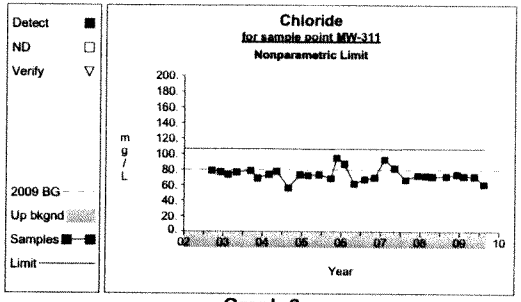

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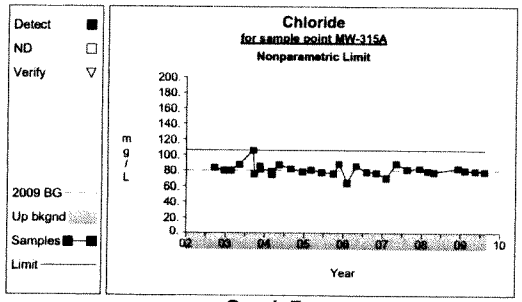

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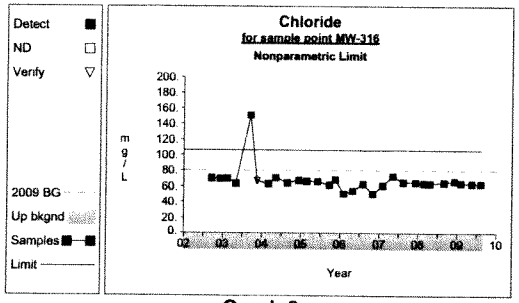

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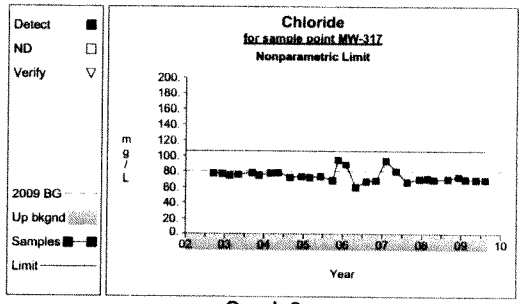
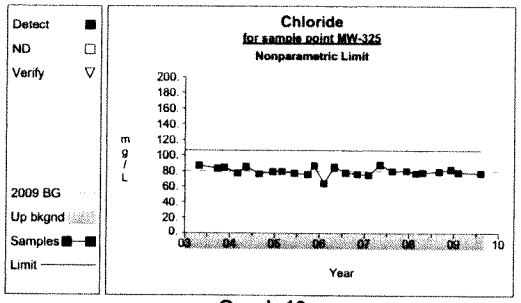


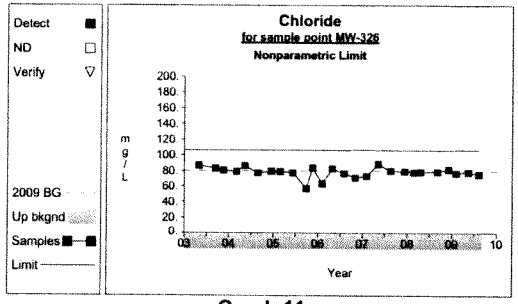
Graph 9

Prepared by: AquAeTer, Inc.

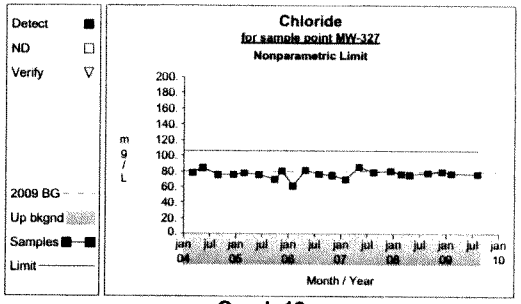
Up vs. Down Prediction Limits



Graph 10

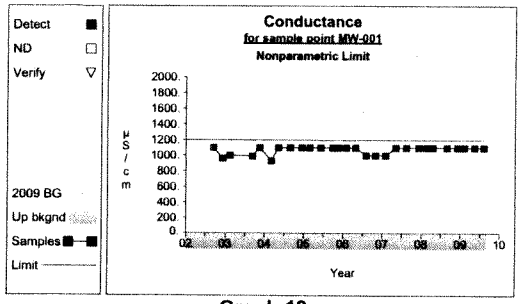


Graph 11

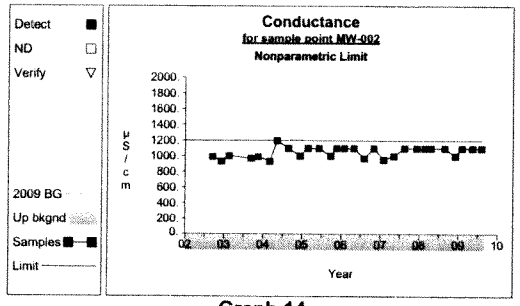


Graph 12

Up vs. Down Prediction Limits



Graph 13



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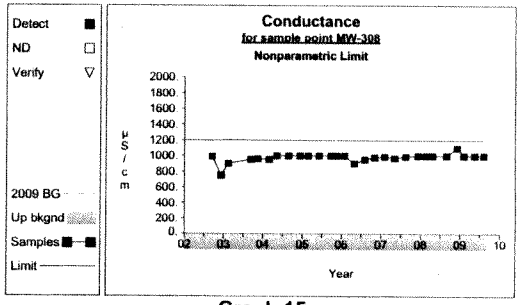
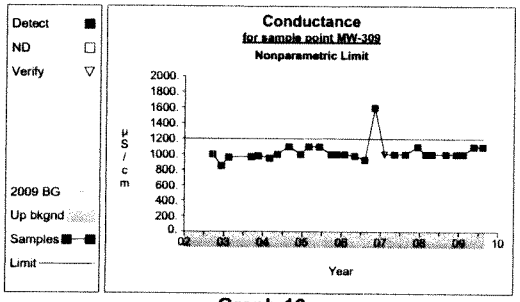
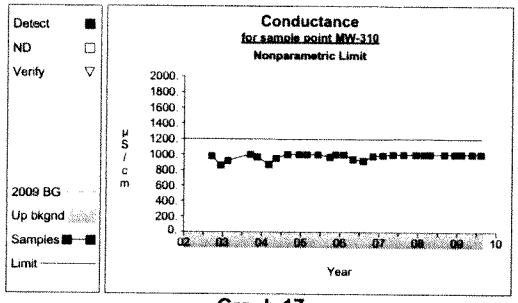


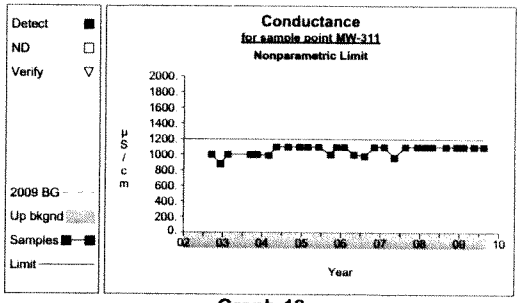
Graph 15



Graph 16



Graph 17



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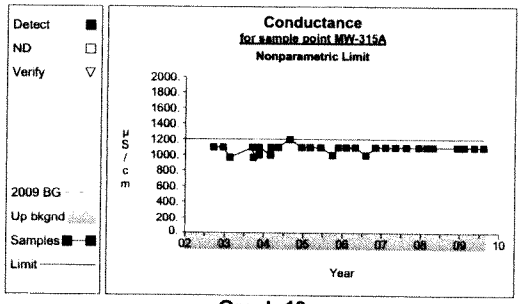
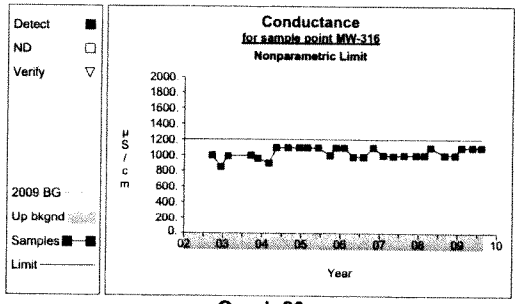
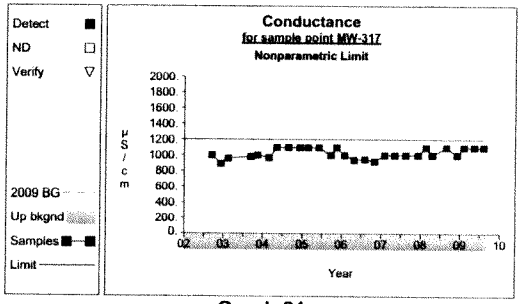


Graph 19



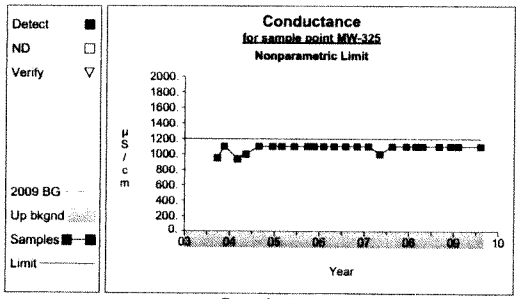
Graph 20



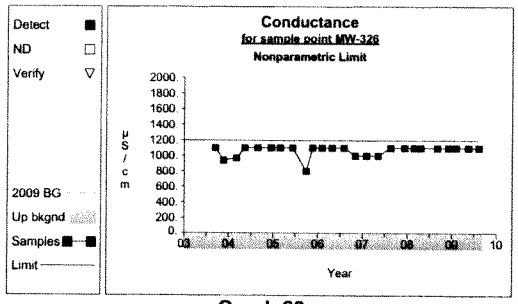
Graph 21

Prepared by: AquAeTer, Inc.

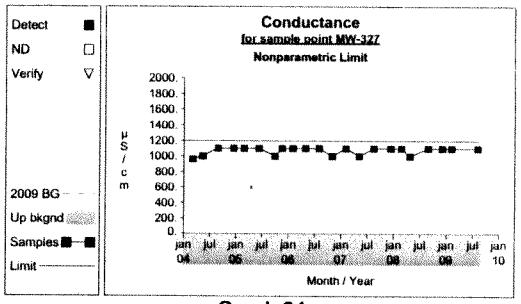
Up vs. Down Prediction Limits



Graph 22

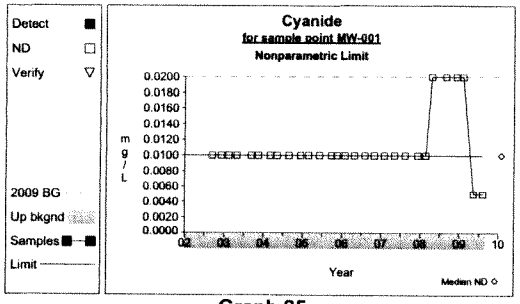


Graph 23

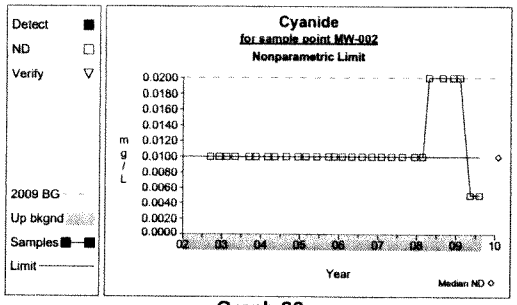


Graph 24

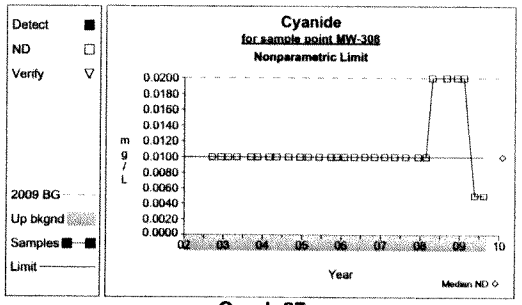
Up vs. Down Prediction Limits



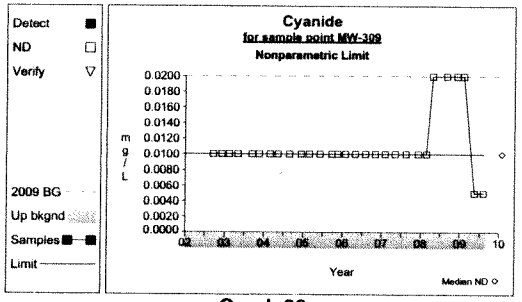
Graph 25



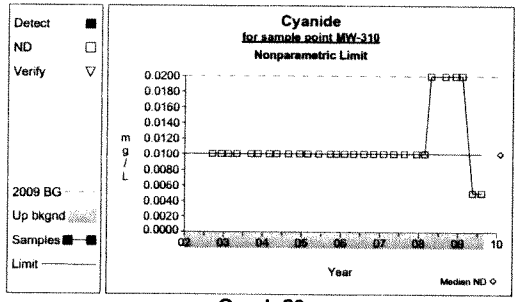
Graph 26



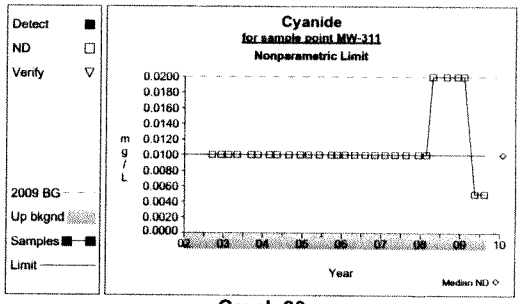
Graph 27



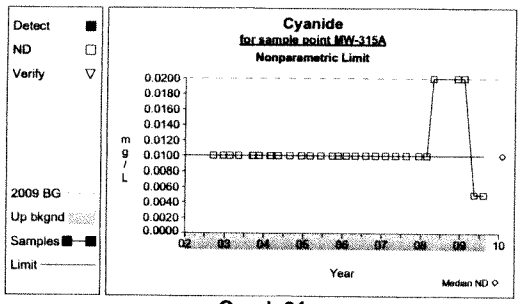
Graph 28



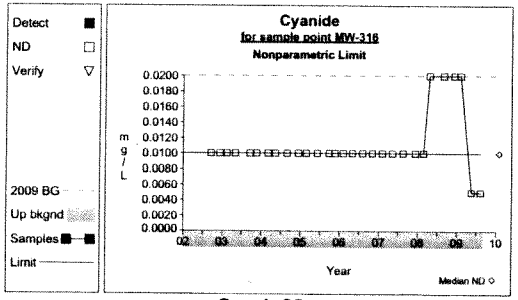
Graph 29



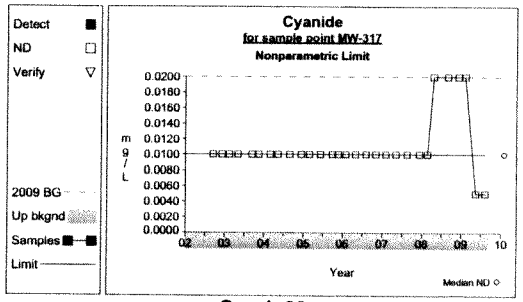
Graph 30



Graph 31

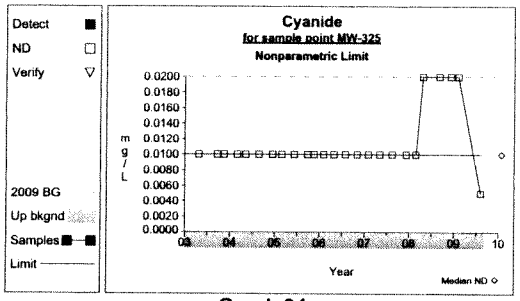


Graph 32

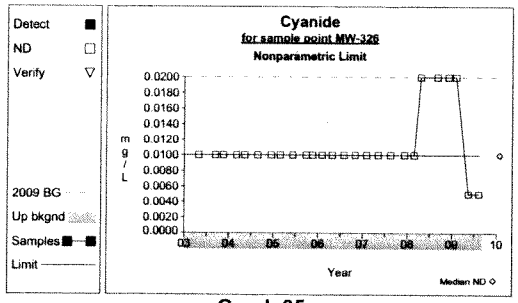


Graph 33

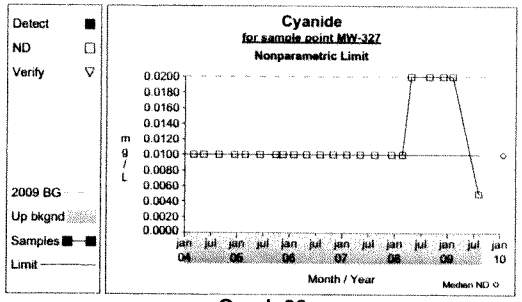
Up vs. Down Prediction Limits



Graph 34

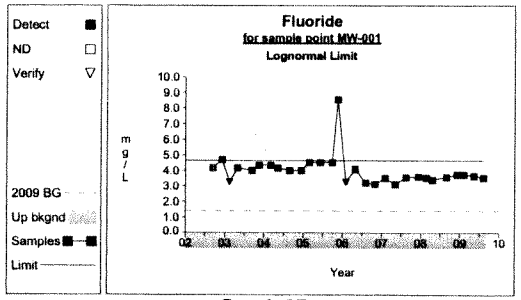


Graph 35

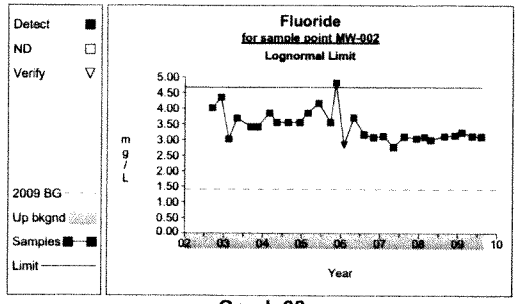


Graph 36

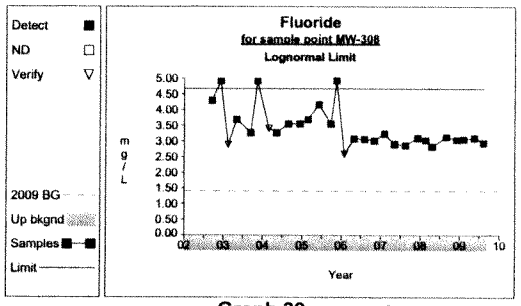
Up vs. Down Prediction Limits



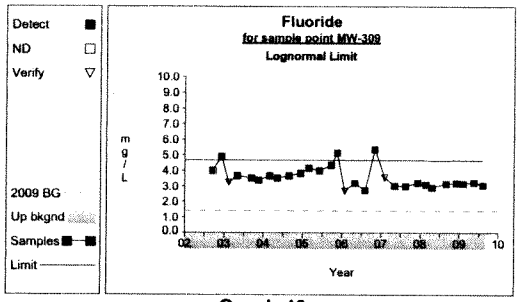
Graph 37



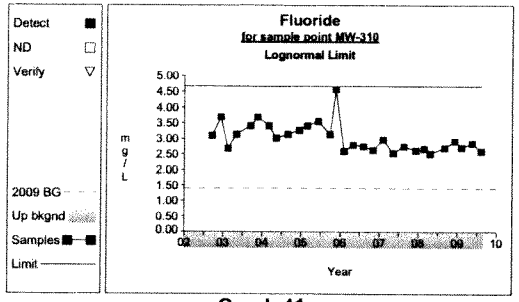
Graph 38



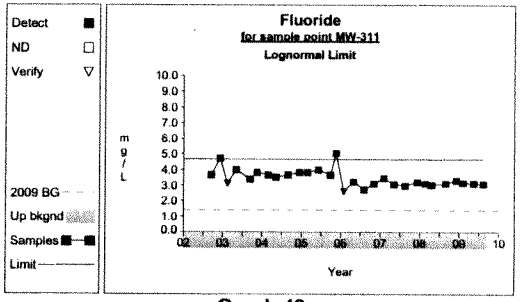
Graph 39



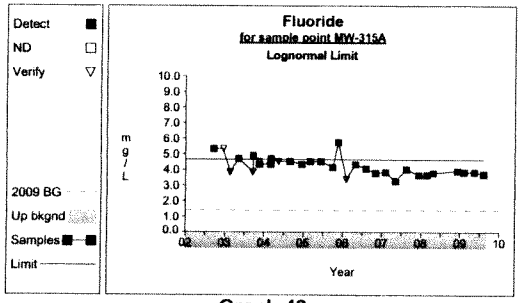
Graph 40



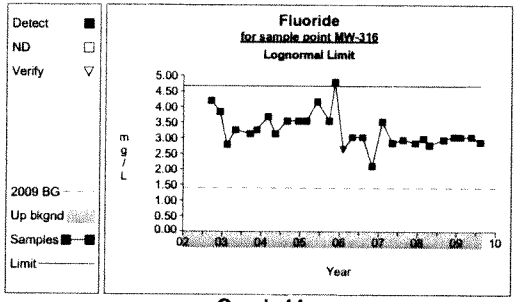
Graph 41



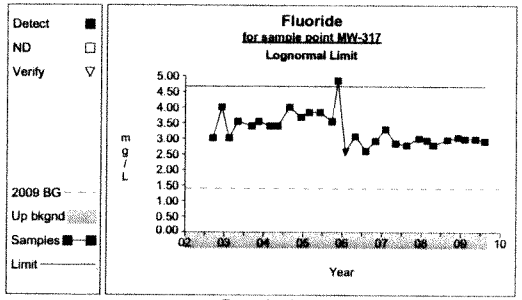
Graph 42



Graph 43

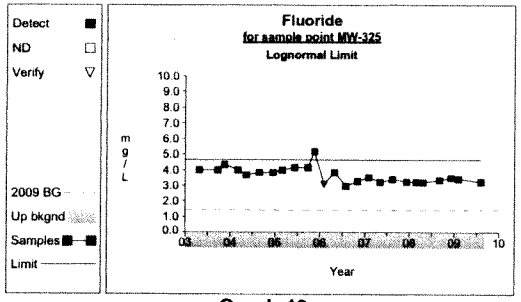


Graph 44

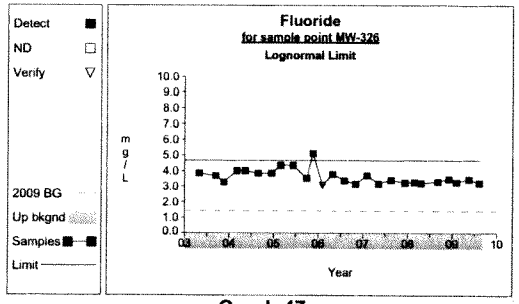


Graph 45

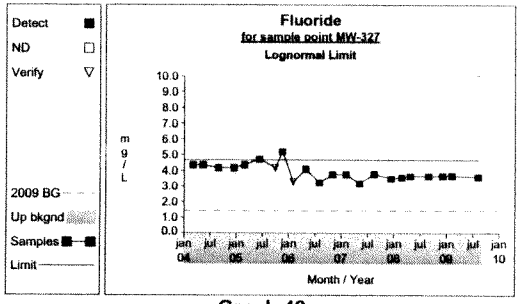
Up vs. Down Prediction Limits



Graph 46

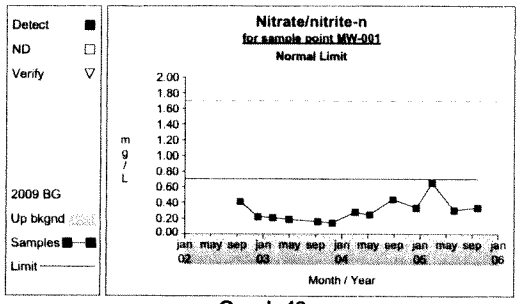


Graph 47

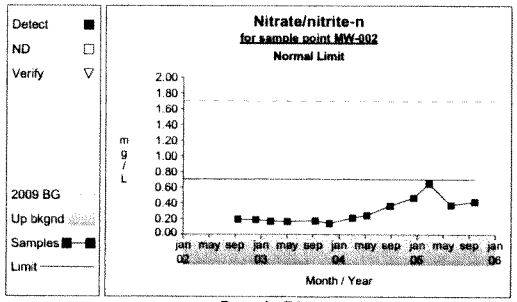


Graph 48

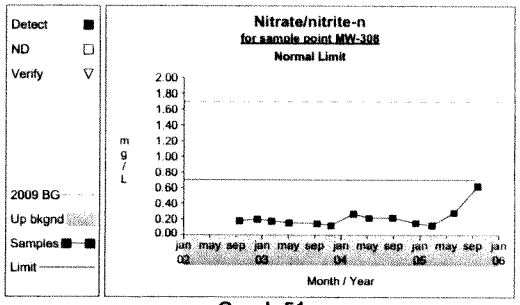
Up vs. Down Prediction Limits



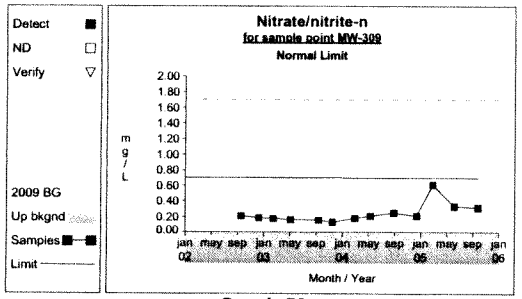
Graph 49



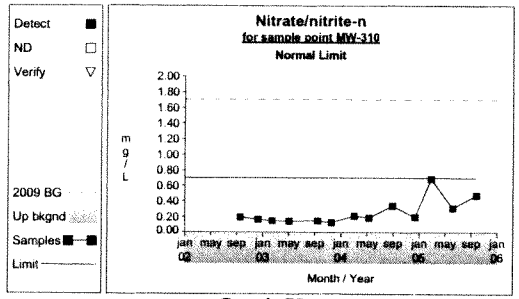
Graph 50



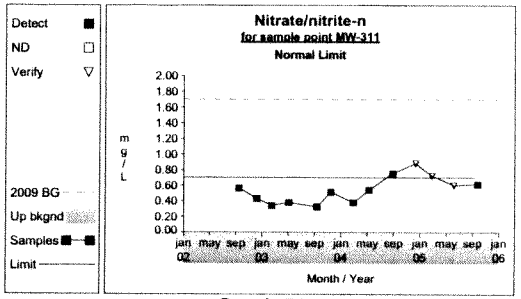
Graph 51



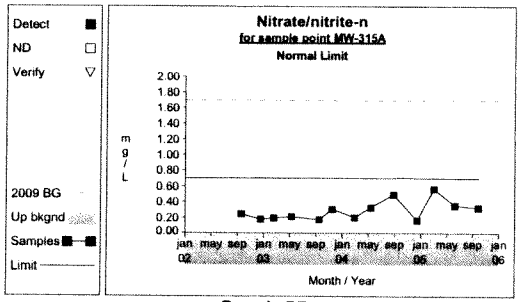
Graph 52



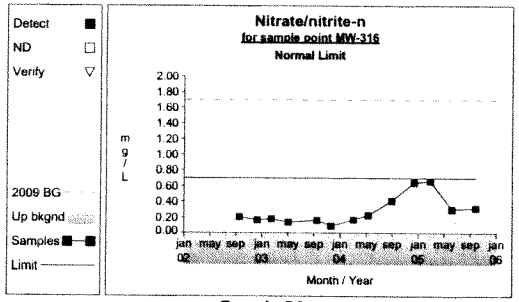
Graph 53



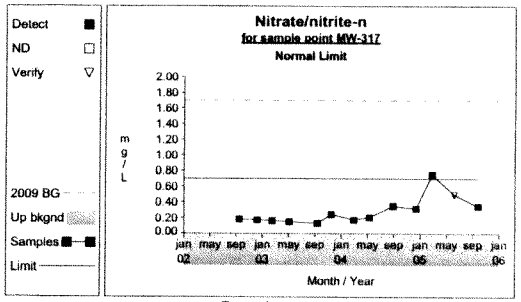
Graph 54



Graph 55

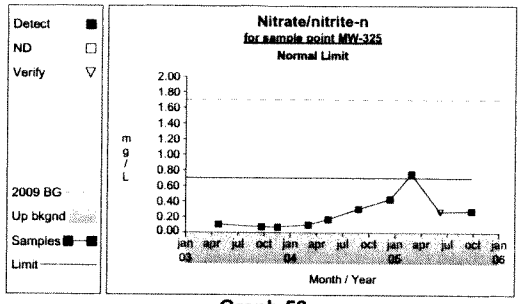


Graph 56

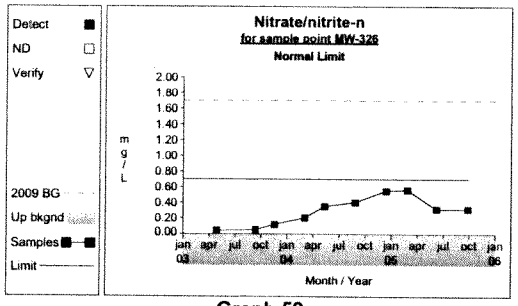


Graph 57

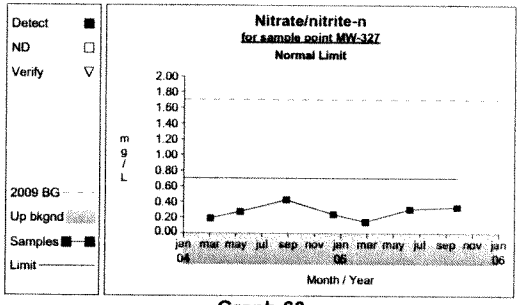
Up vs. Down Prediction Limits



Graph 58

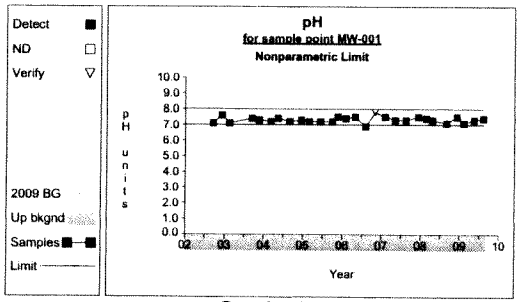


Graph 59

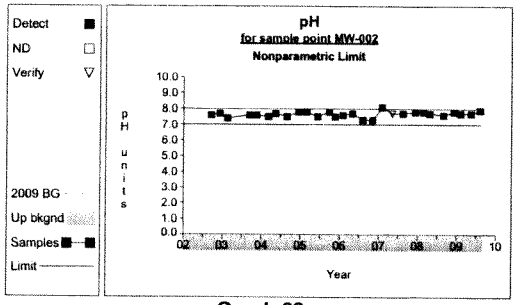


Graph 60

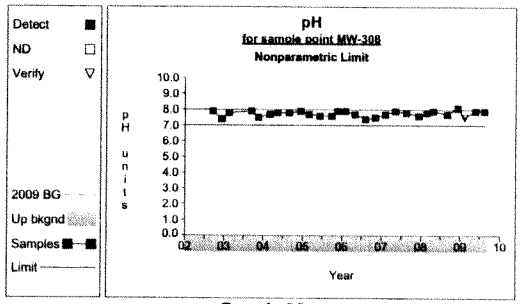
Up vs. Down Prediction Limits



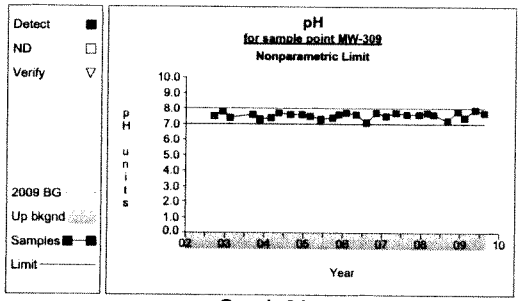
Graph 61



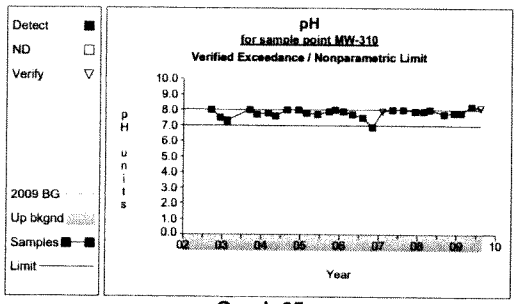
Graph 62



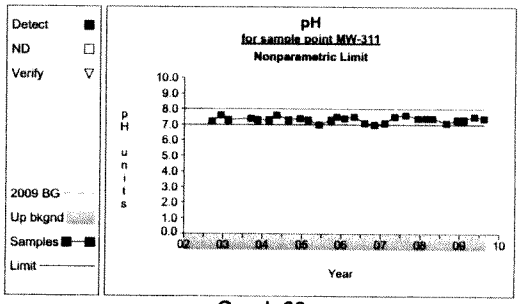
Graph 63



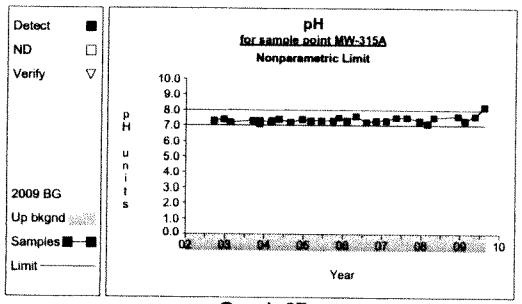
Graph 64



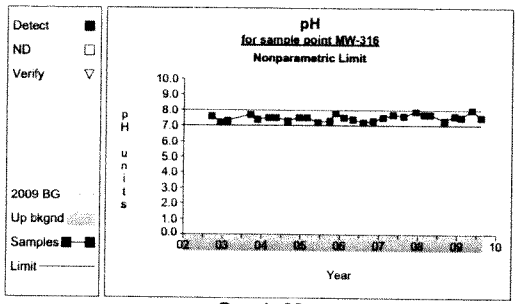
Graph 65



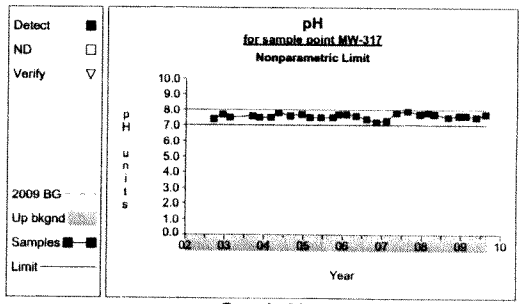
Graph 66



Graph 67

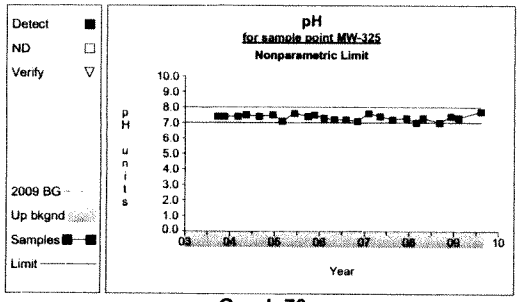


Graph 68

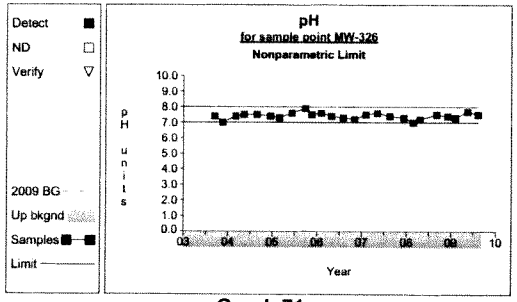


Graph 69

Up vs. Down Prediction Limits



Graph 70



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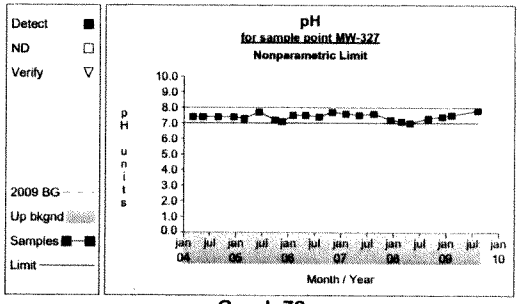
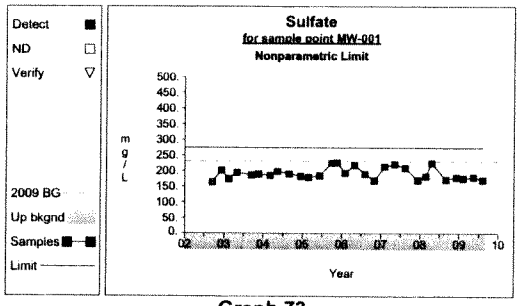
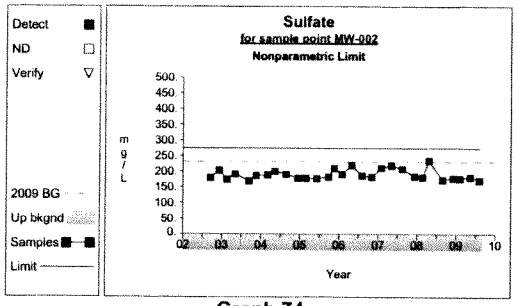


Graph 72

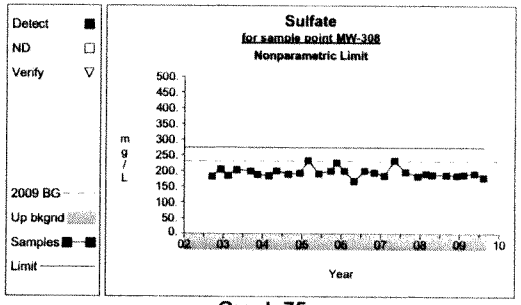
Up vs. Down Prediction Limits



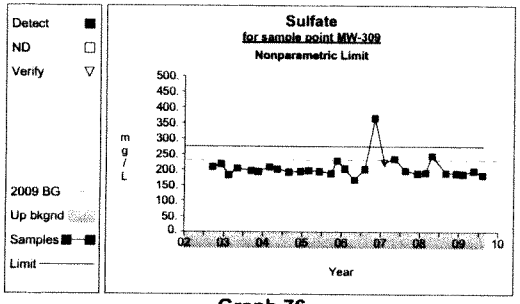
Graph 73



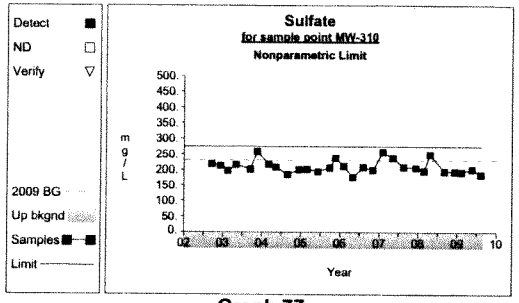
Graph 74



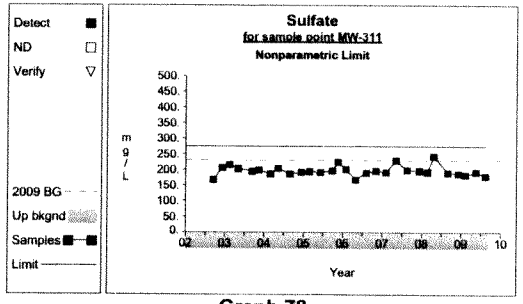
Graph 75



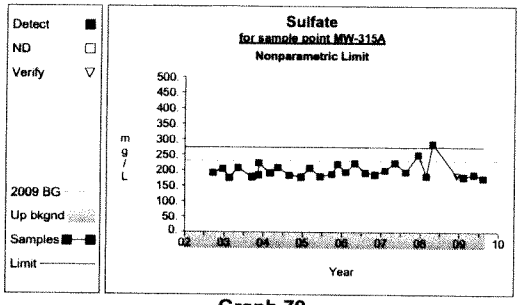
Graph 76



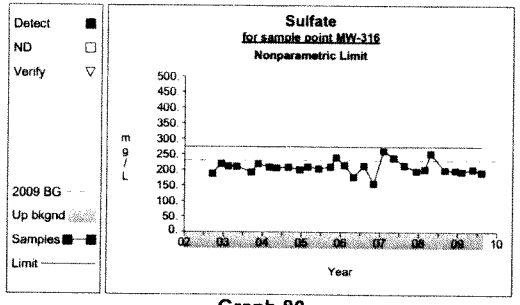
Graph 77



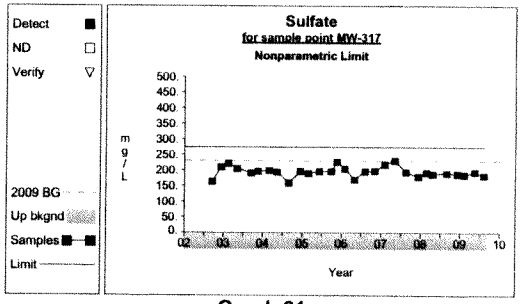
Graph 78



Graph 79

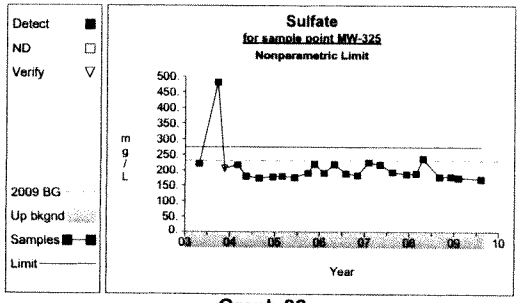


Graph 80

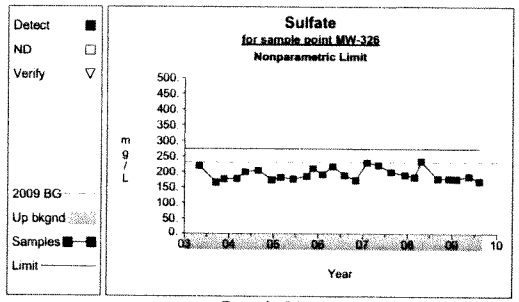


Graph 81

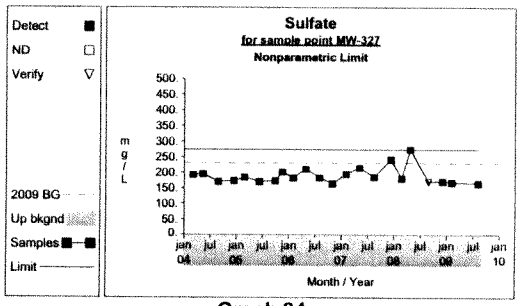
Up vs. Down Prediction Limits



Graph 82

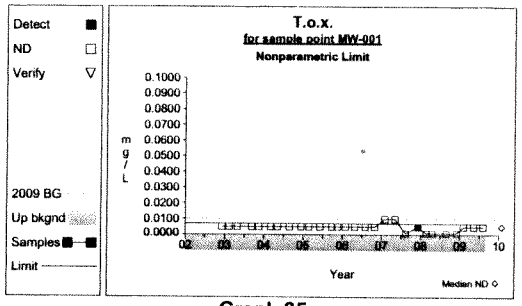


Graph 83

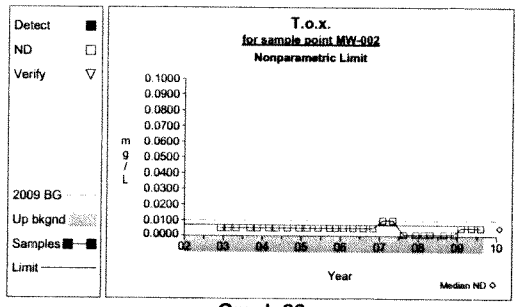


Graph 84

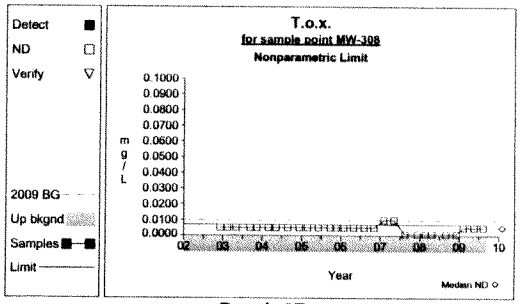
Up vs. Down Prediction Limits



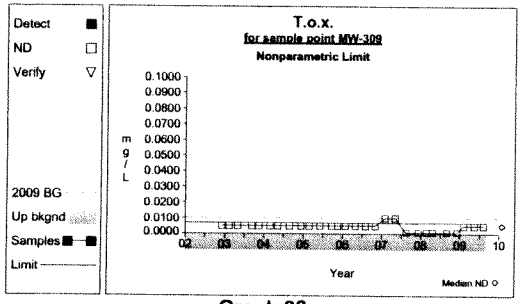
Graph 85



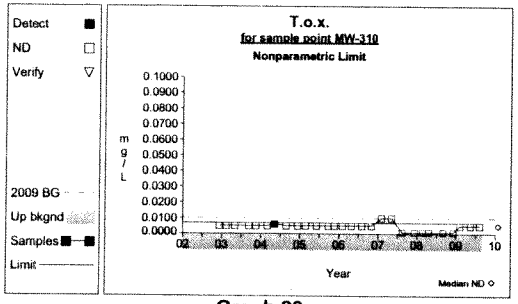
Graph 86



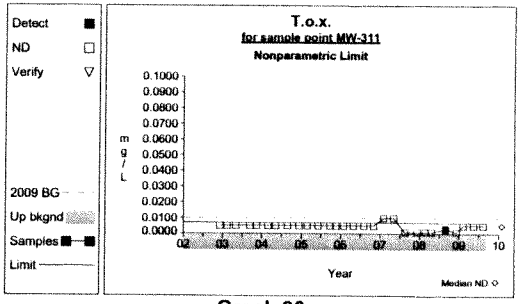
Graph 87



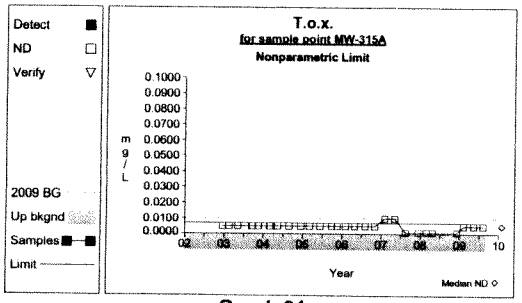
Graph 88



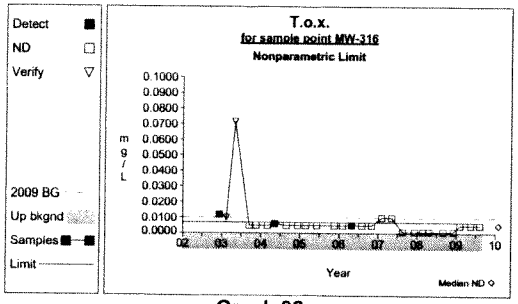
Graph 89



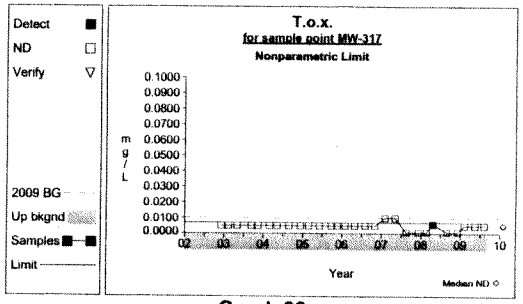
Graph 90



Graph 91

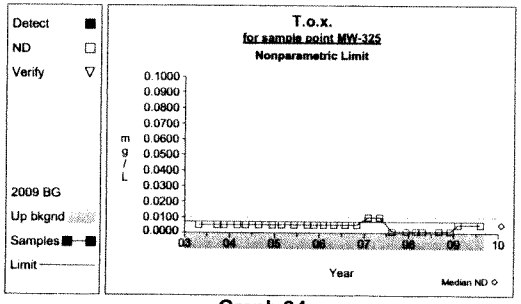


Graph 92

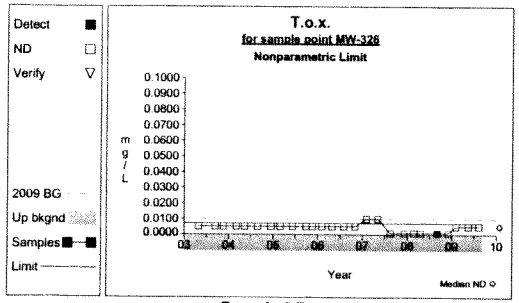


Graph 93

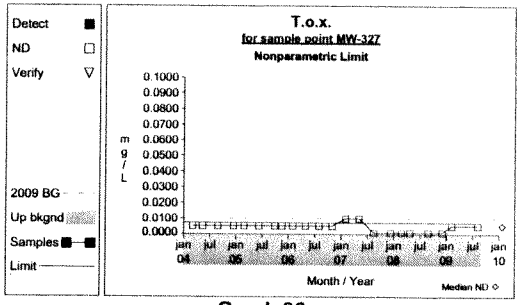
Up vs. Down Prediction Limits



Graph 94

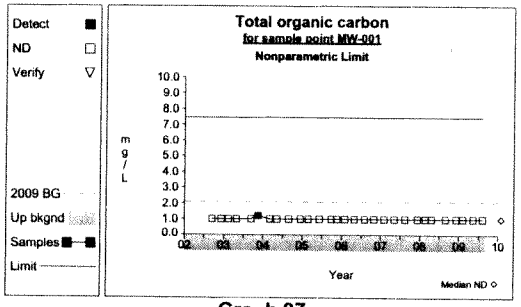


Graph 95

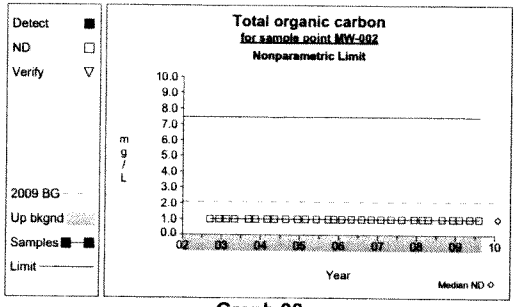


Graph 96

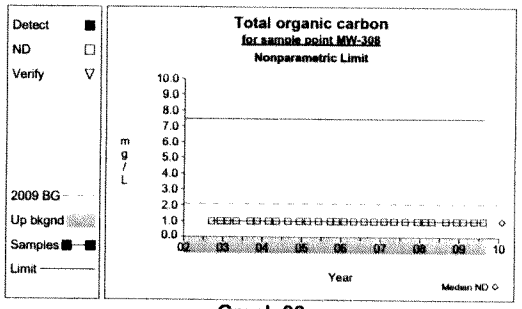
Up vs. Down Prediction Limits



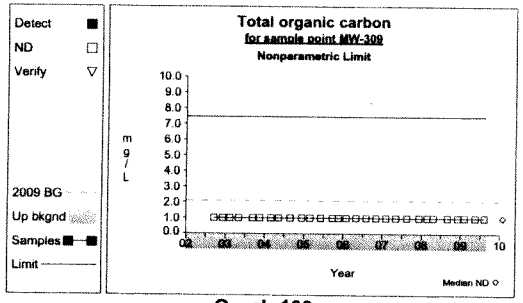
Graph 97



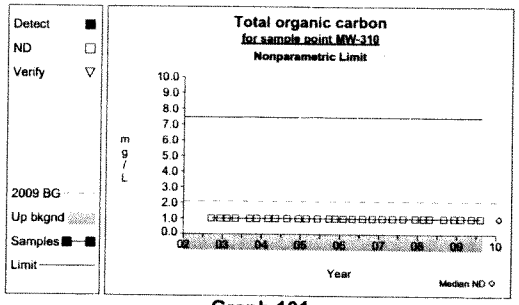
Graph 98



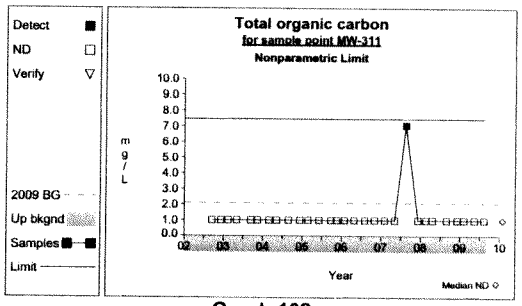
Graph 99



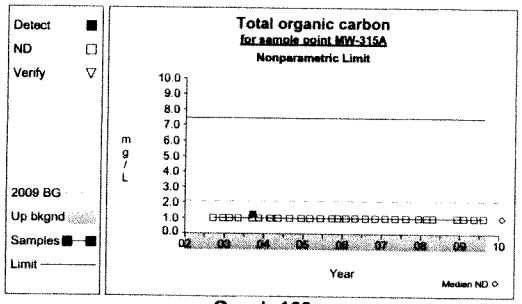
Graph 100



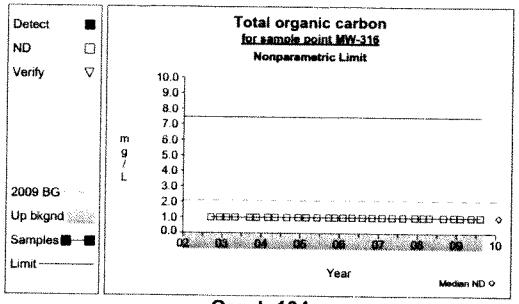
Graph 101



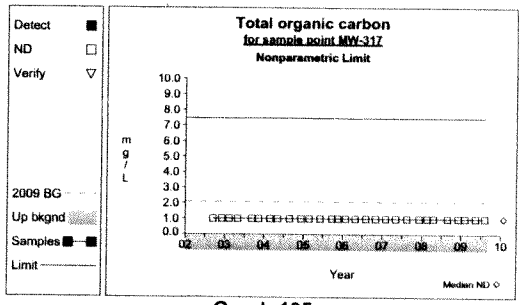
Graph 102



Graph 103

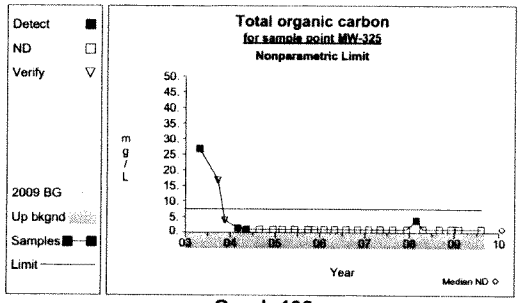


Graph 104

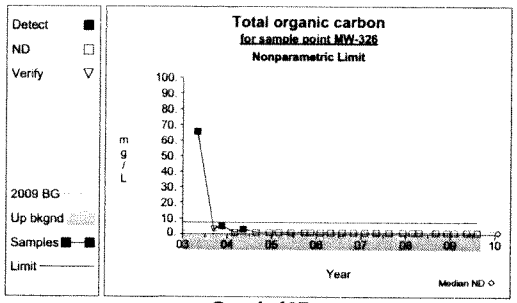


Graph 105

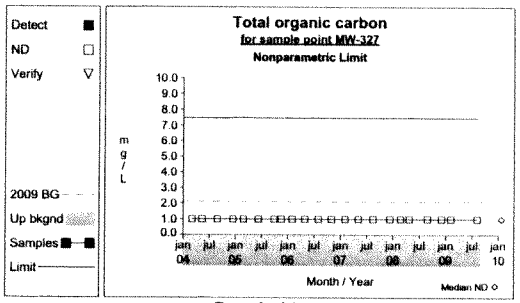
Up vs. Down Prediction Limits



Graph 106



Graph 107

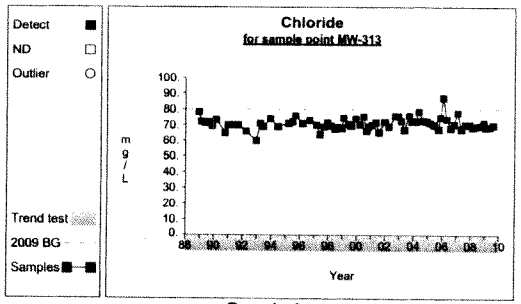


Graph 108

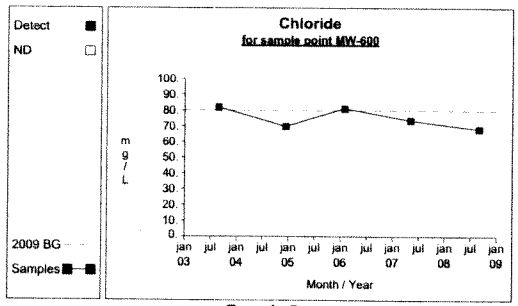
Beatty [wq_ug]

Analysis prepared on: 8/13/2010

Time Series



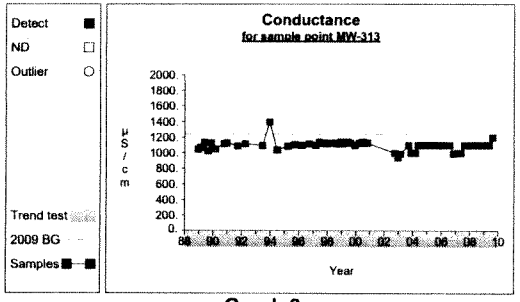
Graph 1



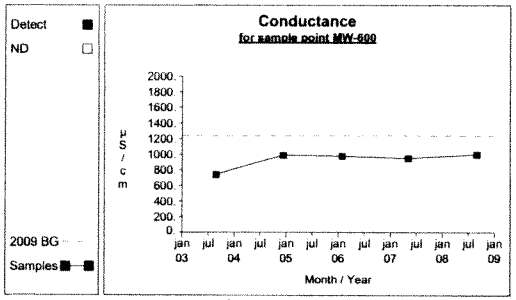
Graph 2

Prepared by: AquAeTer, Inc.

Time Series

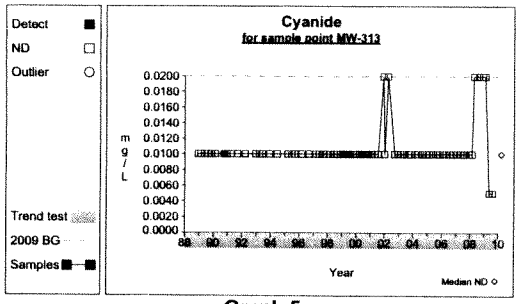


Graph 3

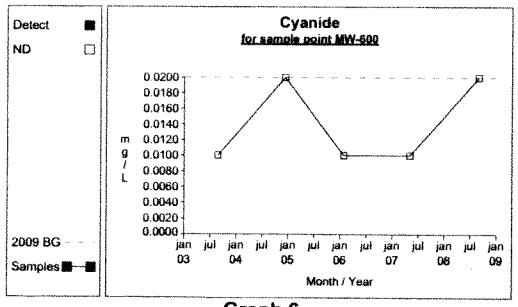


Graph 4

Time Series

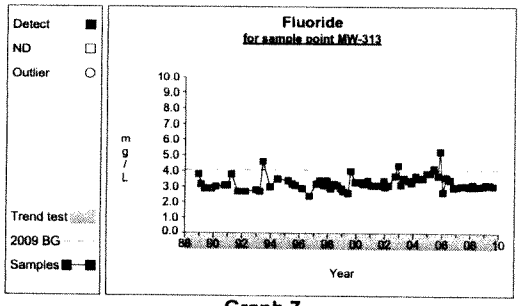


Graph 5

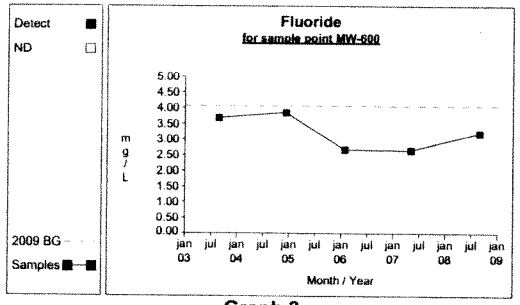


Graph 6

Time Series

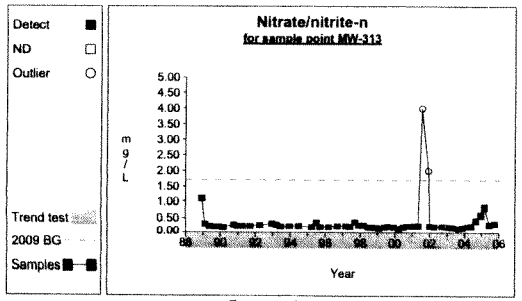


Graph 7

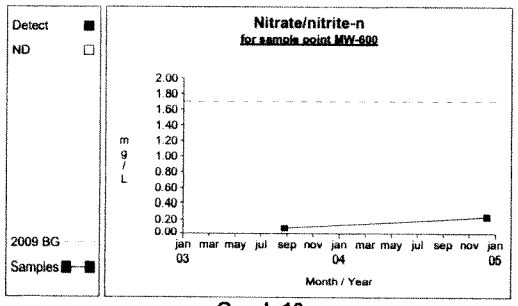


Graph 8

Time Series

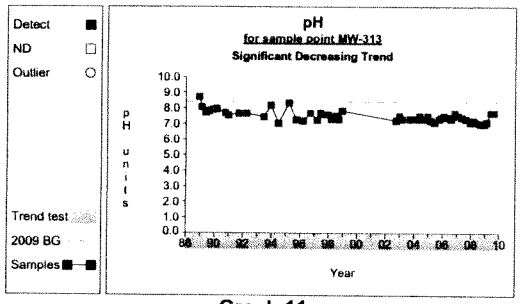


Graph 9

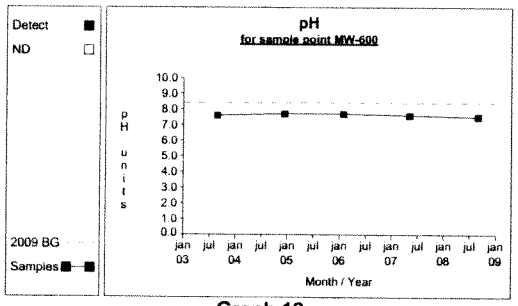


Graph 10

Time Series

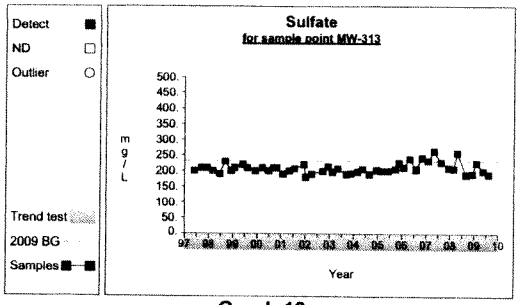


Graph 11

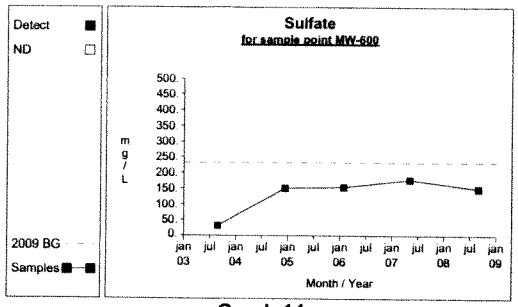


Graph 12

Time Series

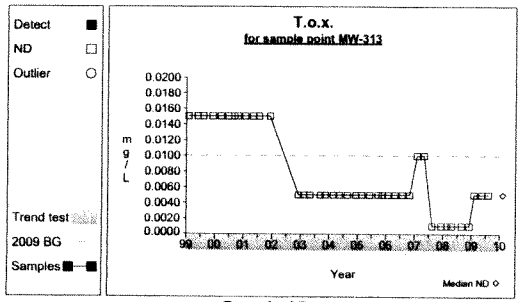


Graph 13

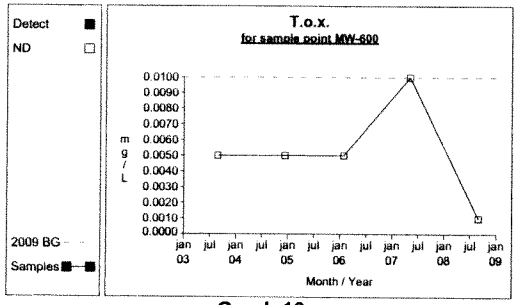


Graph 14

Time Series

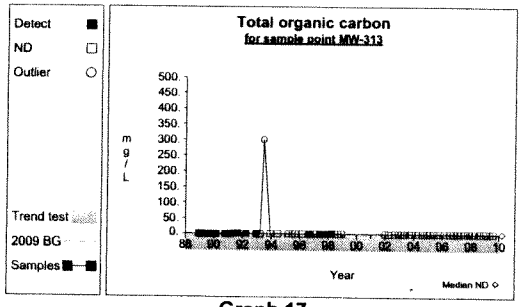


Graph 15

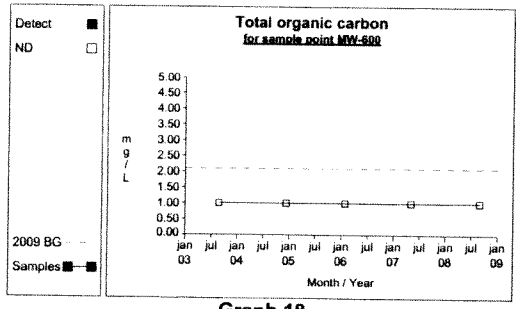


Graph 16

Time Series



Graph 17

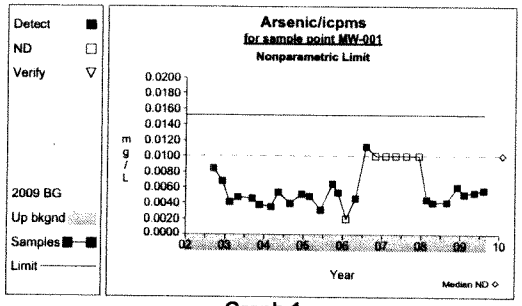


Graph 18

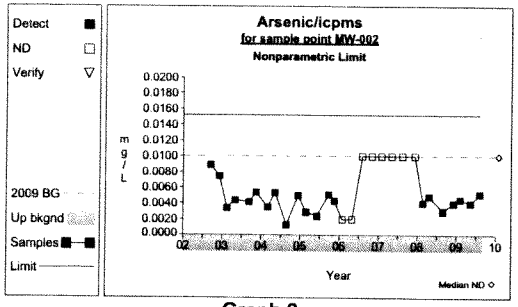
Beatty [mets_al]

Analysis prepared on: 12/30/2009

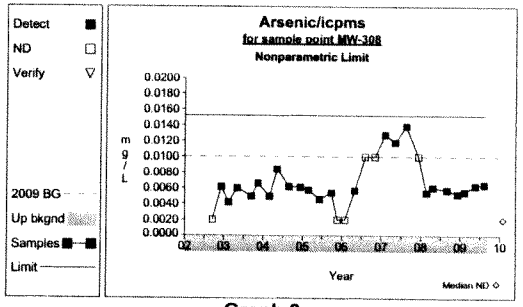
Up vs. Down Prediction Limits



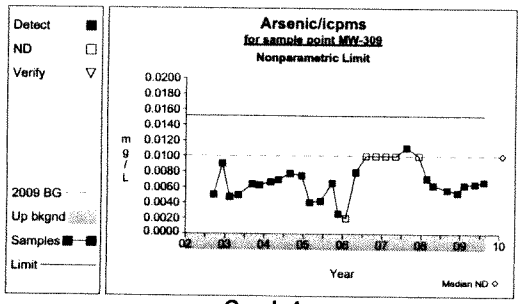
Graph 1



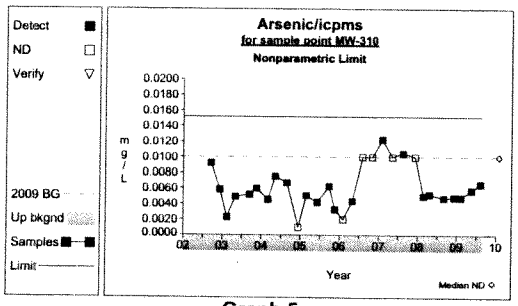
Graph 2



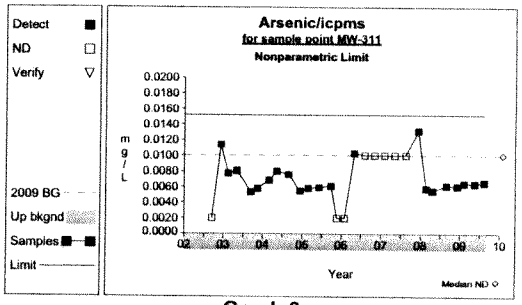
Graph 3



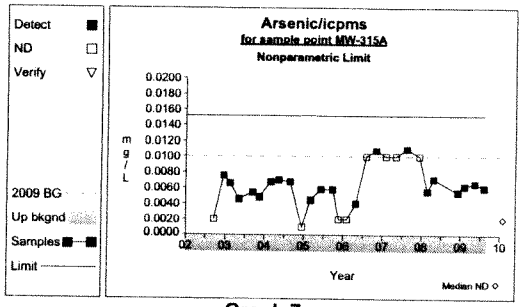
Graph 4



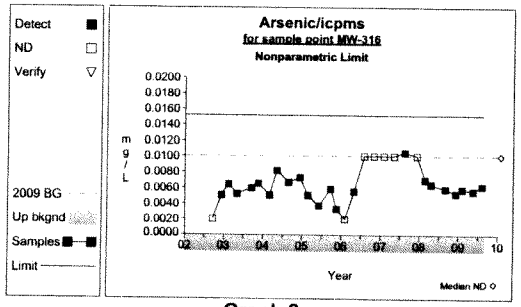
Graph 5



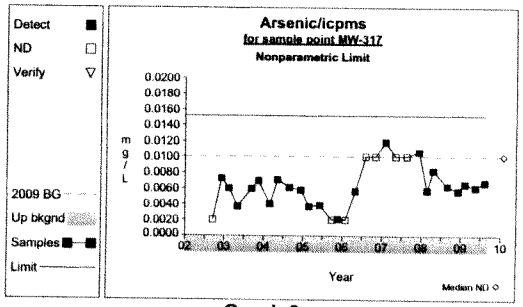
Graph 6



Graph 7



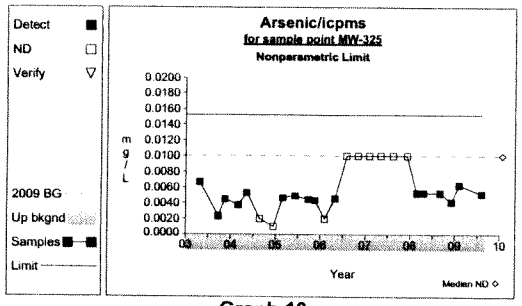
Graph 8



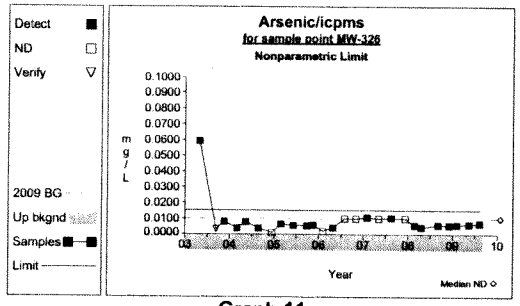
Graph 9

Prepared by: AquAeTer, Inc.

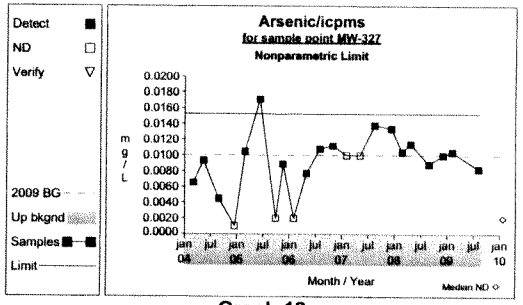
Up vs. Down Prediction Limits



Graph 10



Graph 11

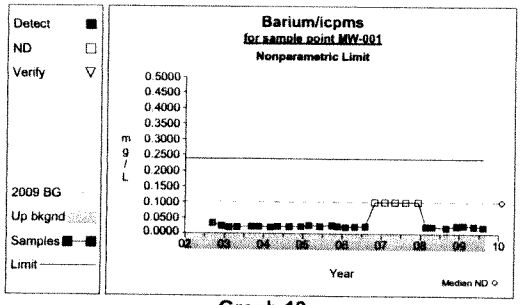


Graph 12

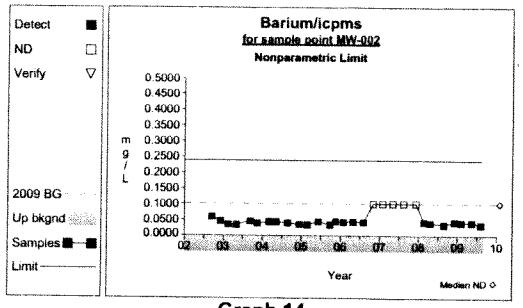
Beatty [mets_al]

Analysis prepared on: 12/30/2009

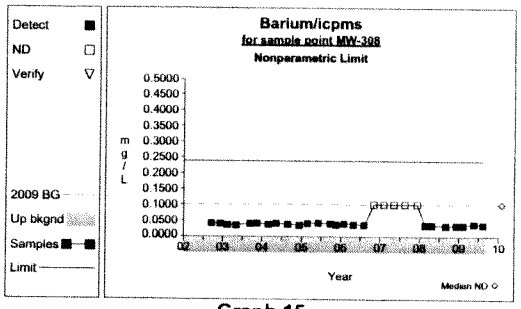
Up vs. Down Prediction Limits



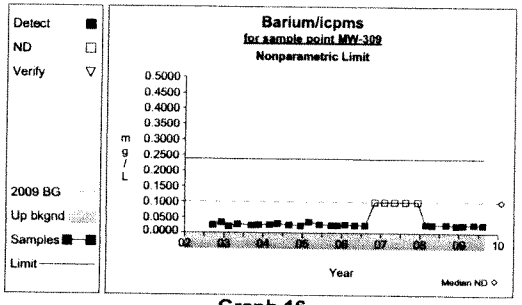
Graph 13



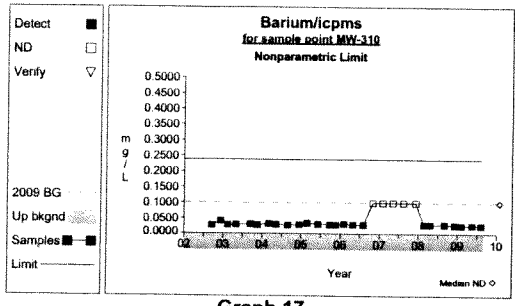
Graph 14



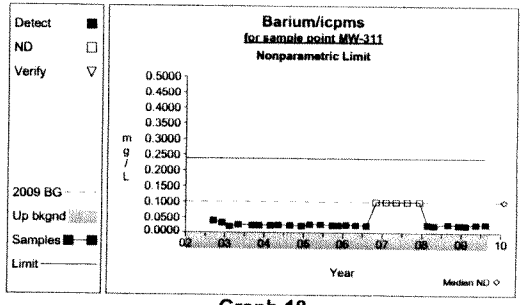
Graph 15



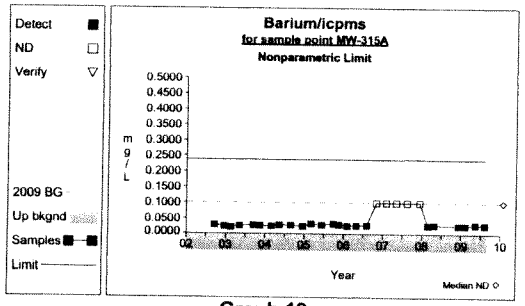
Graph 16



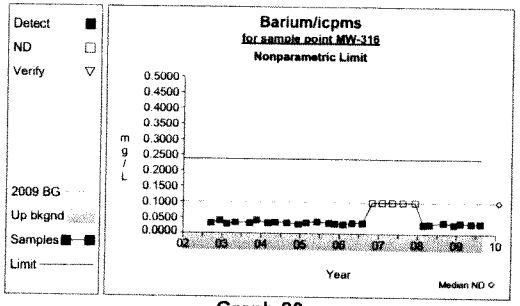
Graph 17



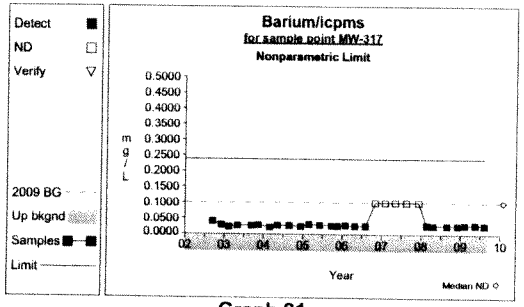
Graph 18



Graph 19



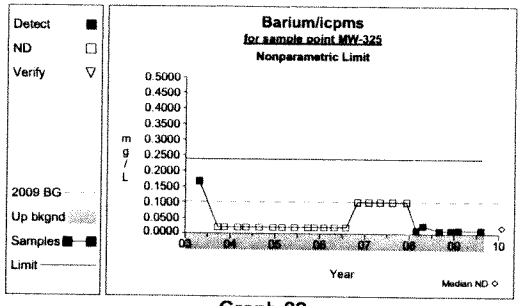
Graph 20



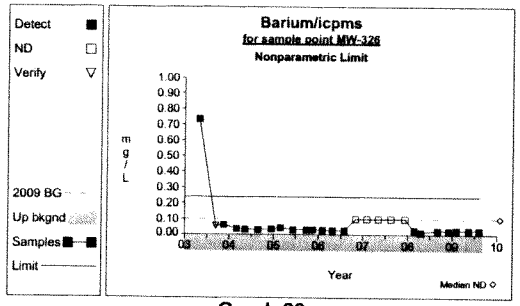
Graph 21

Prepared by: AquAeTer, Inc.

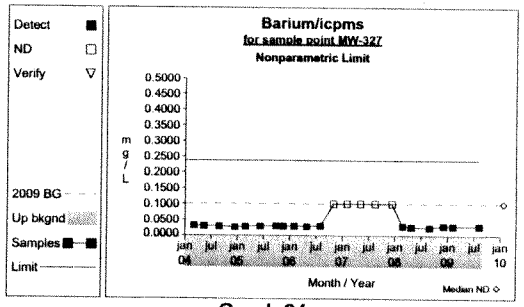
Up vs. Down Prediction Limits



Graph 22

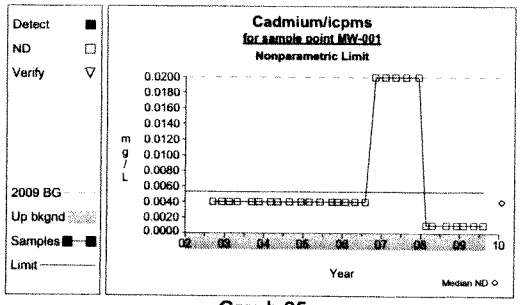


Graph 23

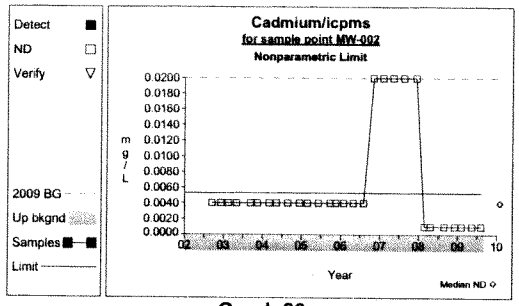


Graph 24

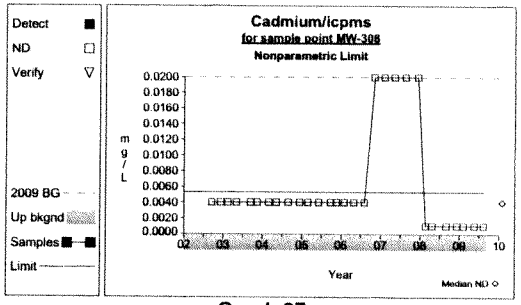
Up vs. Down Prediction Limits



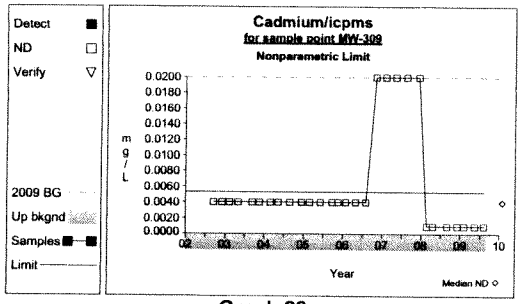
Graph 25



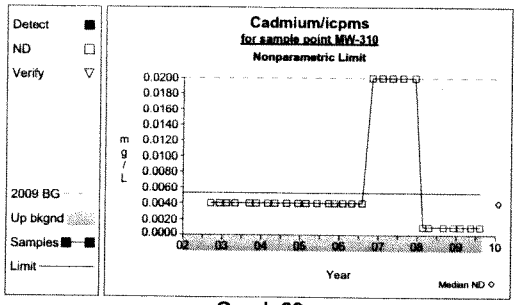
Graph 26



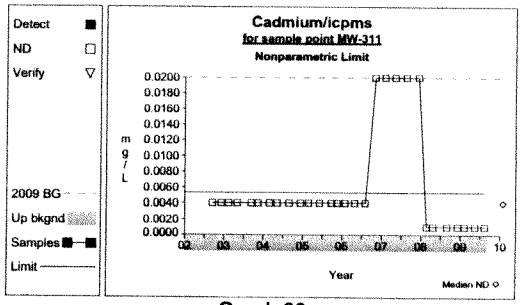
Graph 27



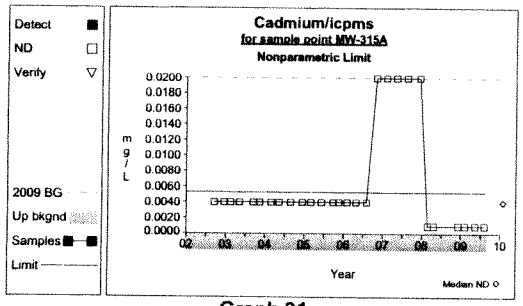
Graph 28



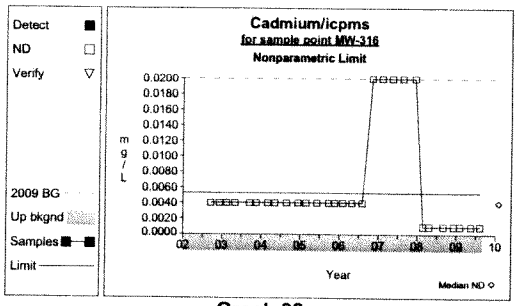
Graph 29



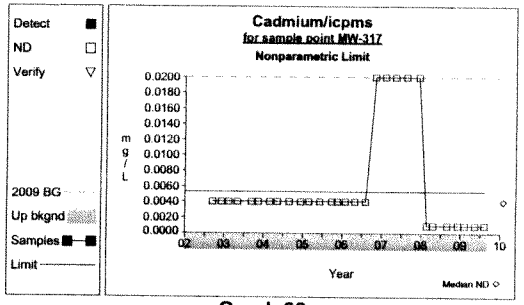
Graph 30



Graph 31

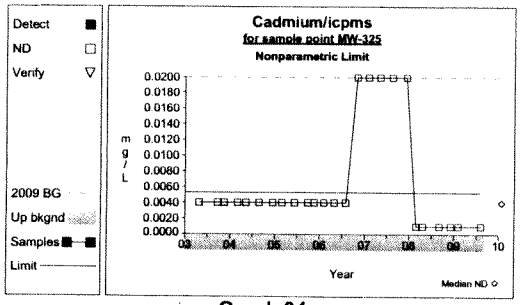


Graph 32

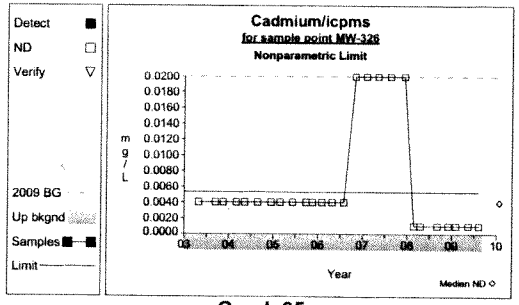


Graph 33

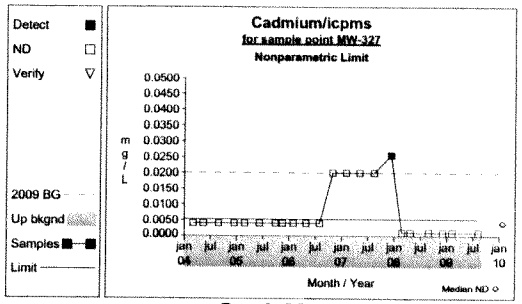
Up vs. Down Prediction Limits



Graph 34

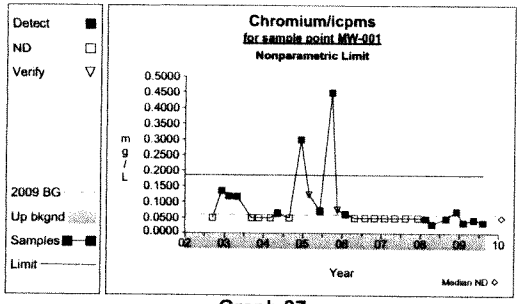


Graph 35

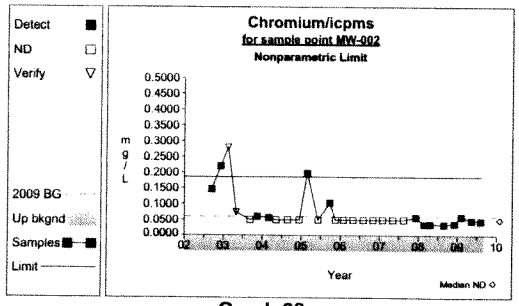


Graph 36

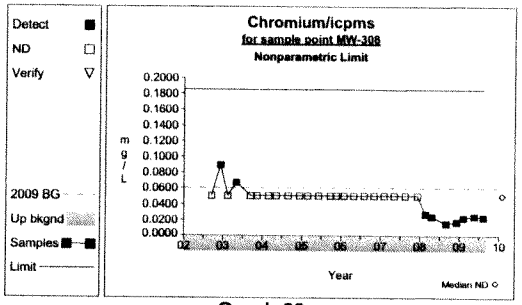
Up vs. Down Prediction Limits



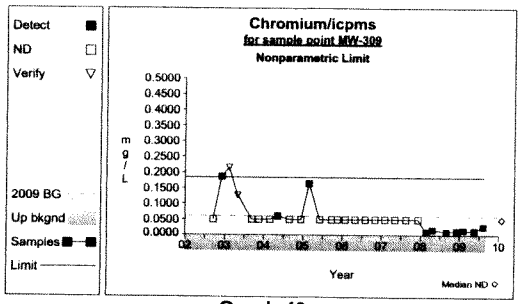
Graph 37



Graph 38



Graph 39



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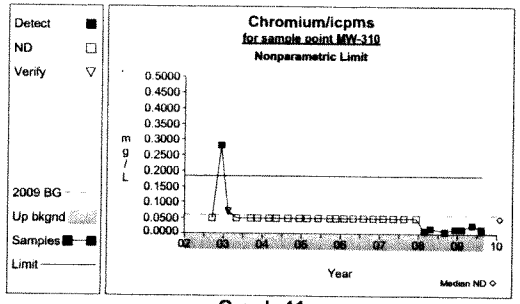
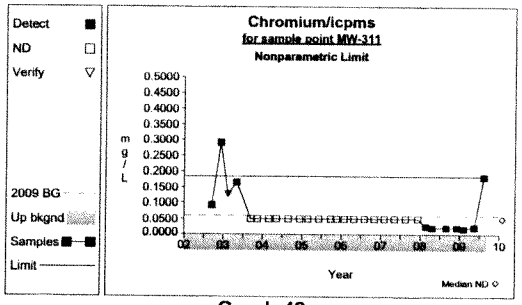
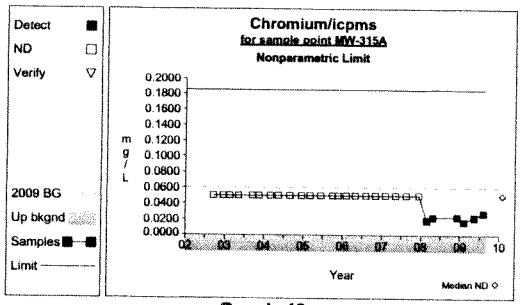


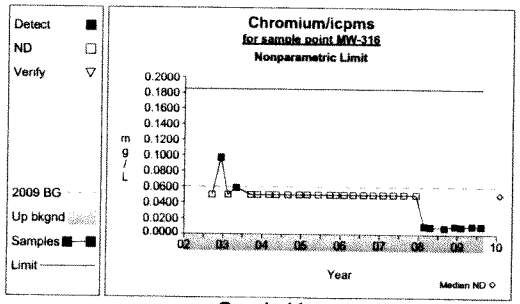
Graph 41



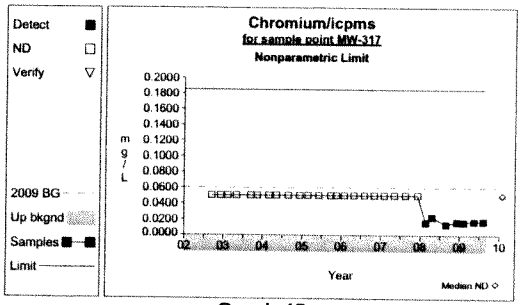
Graph 42



Graph 43

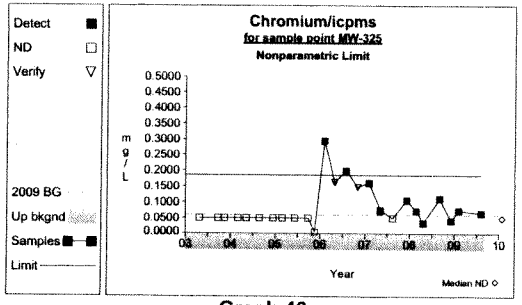


Graph 44

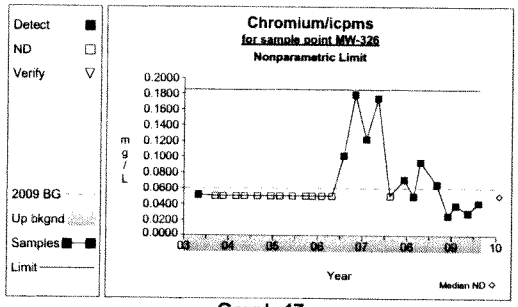


Graph 45

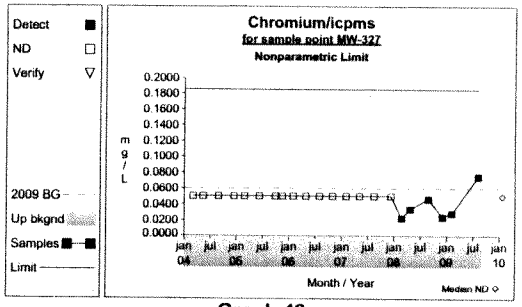
Up vs. Down Prediction Limits



Graph 46

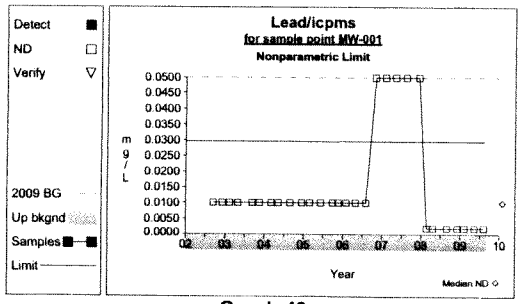


Graph 47

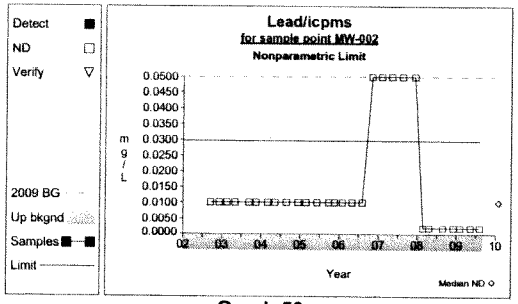


Graph 48

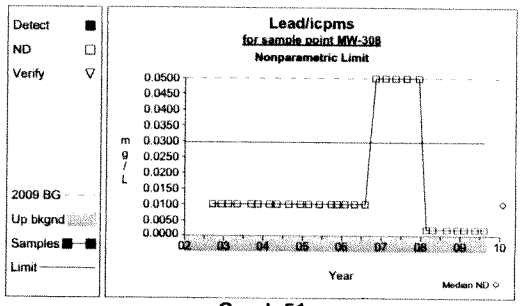
Up vs. Down Prediction Limits



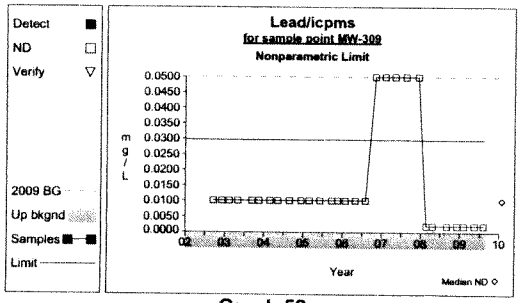
Graph 49



Graph 50



Graph 51



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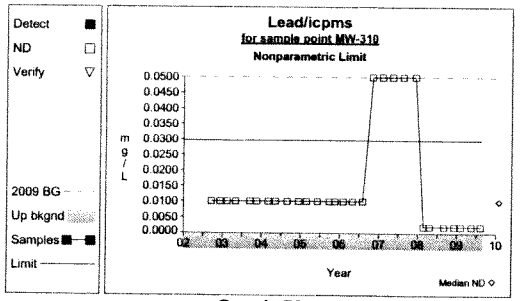
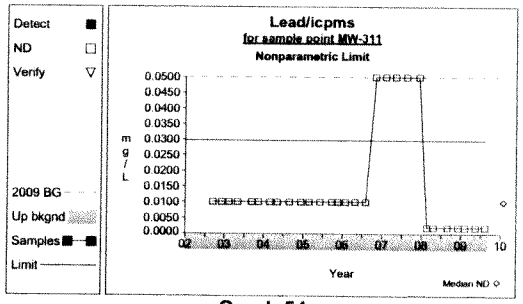
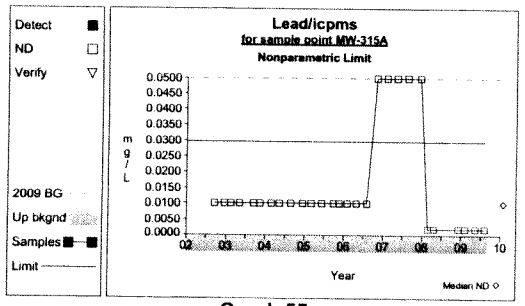


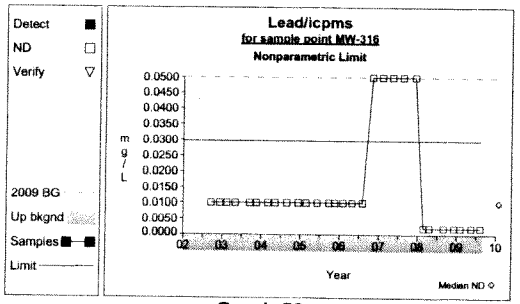
Graph 53



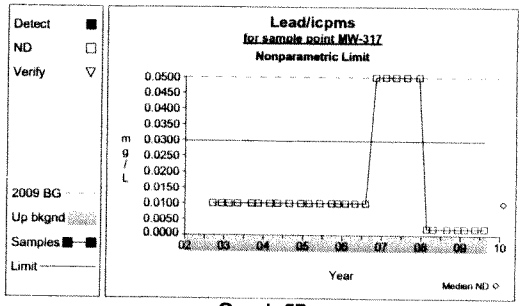
Graph 54



Graph 55

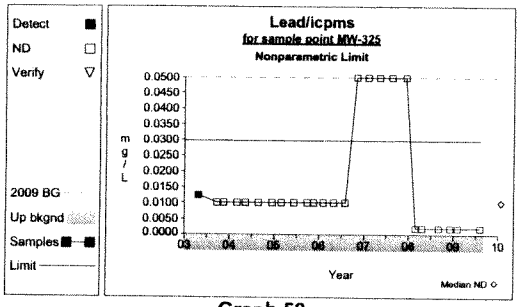


Graph 56

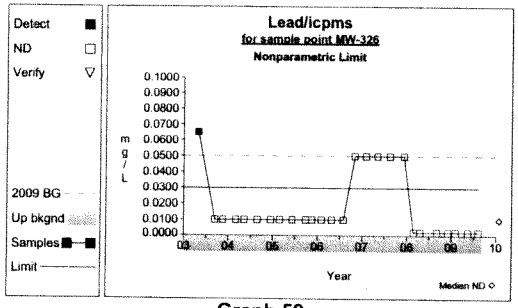


Graph 57

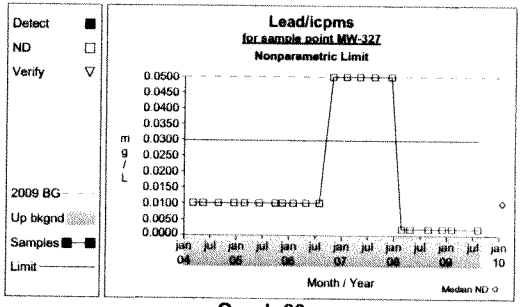
Up vs. Down Prediction Limits



Graph 58

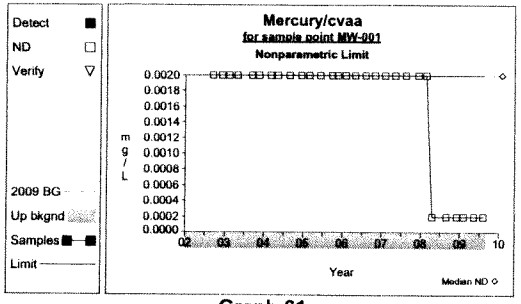


Graph 59

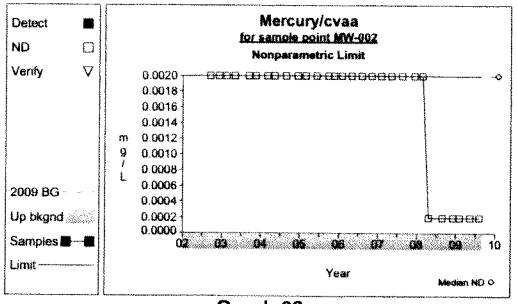


Graph 60

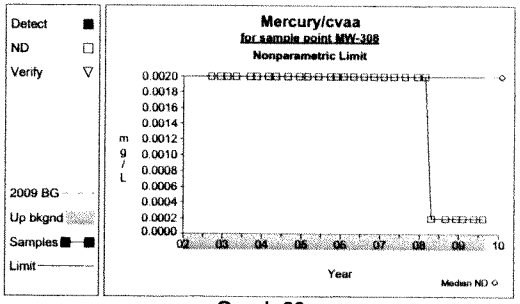
Up vs. Down Prediction Limits



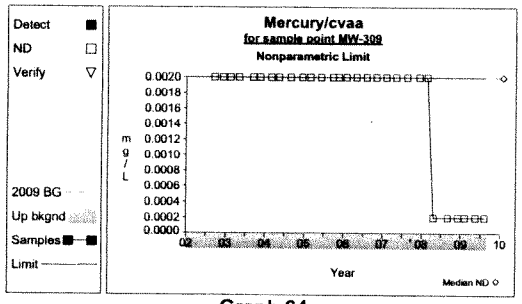
Graph 61



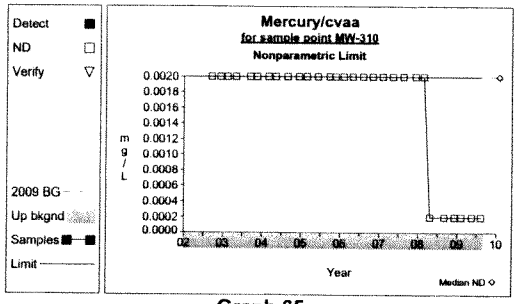
Graph 62



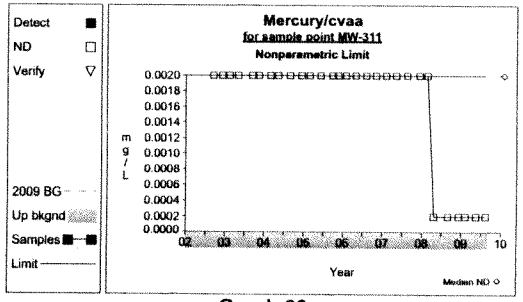
Graph 63



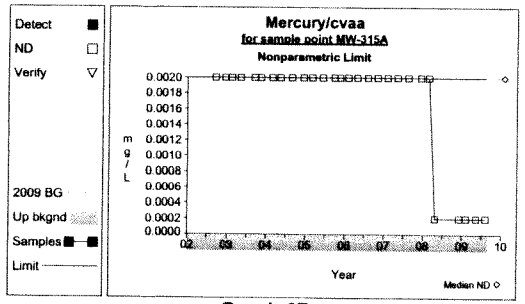
Graph 64



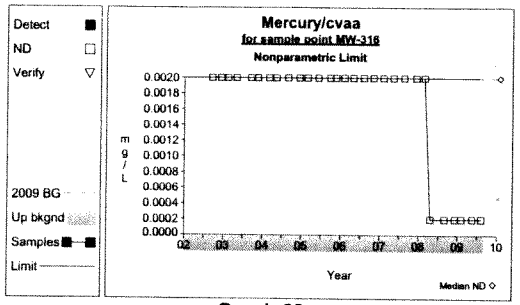
Graph 65



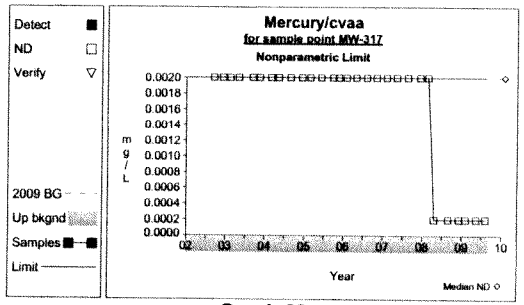
Graph 66



Graph 67

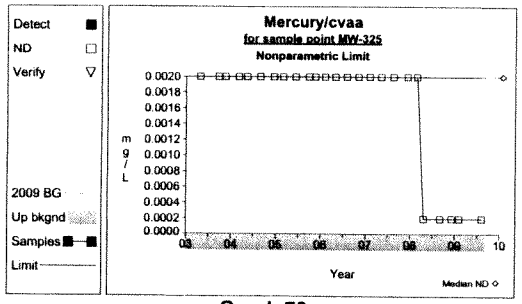


Graph 68

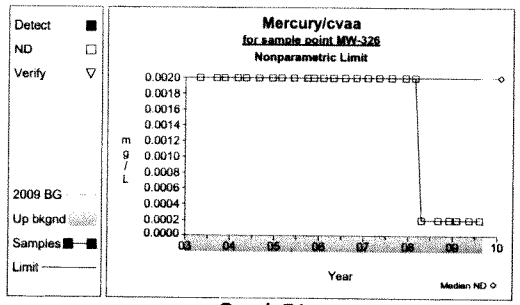


Graph 69

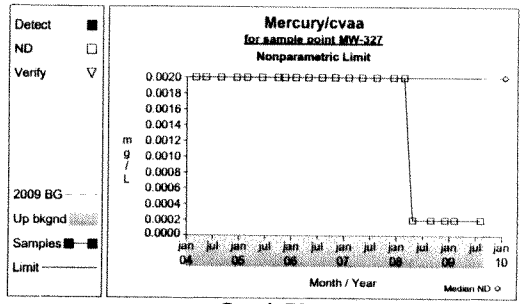
Up vs. Down Prediction Limits



Graph 70

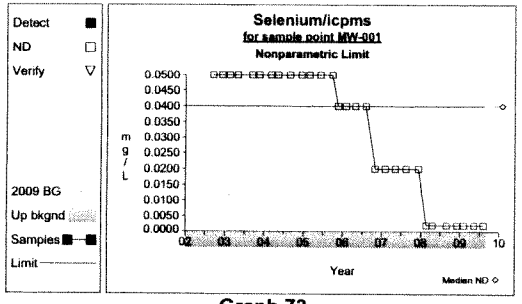


Graph 71

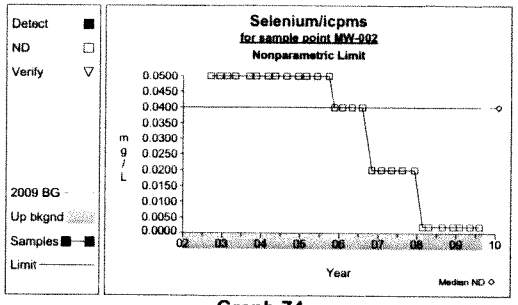


Graph 72

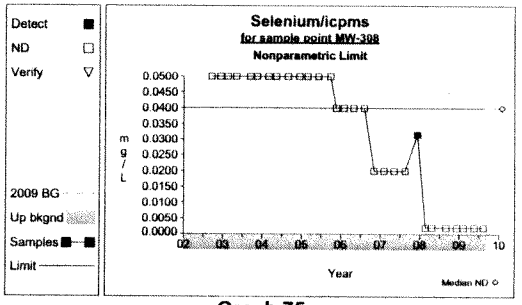
Up vs. Down Prediction Limits



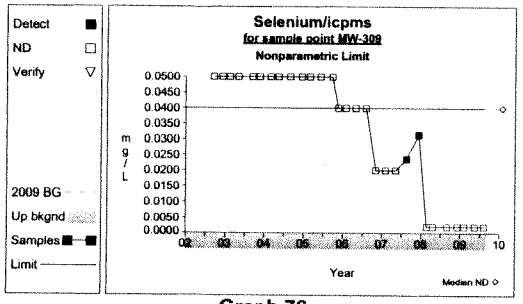
Graph 73



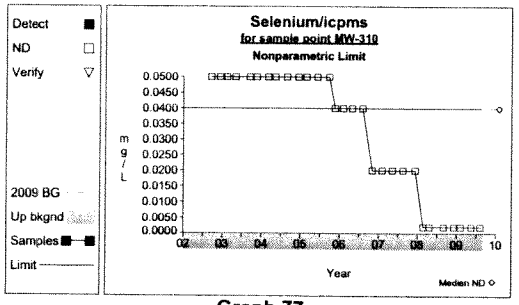
Graph 74



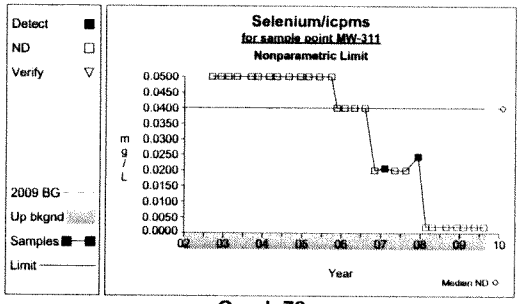
Graph 75



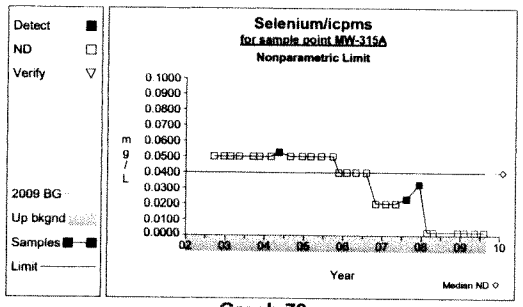
Graph 76



Graph 77



Graph 78



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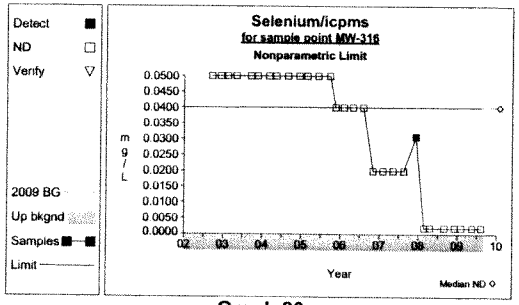
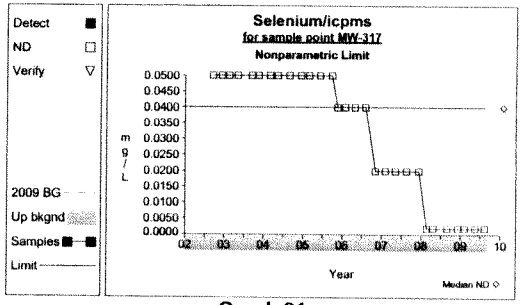
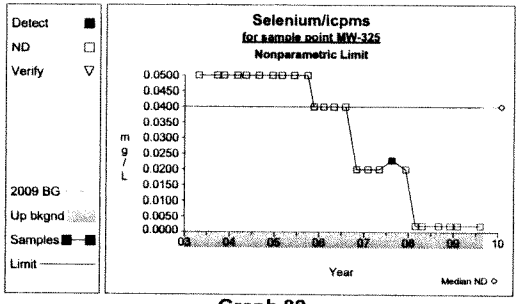


Graph 80

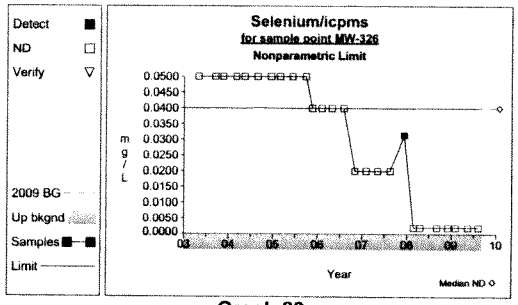


Graph 81

Up vs. Down Prediction Limits



Graph 82



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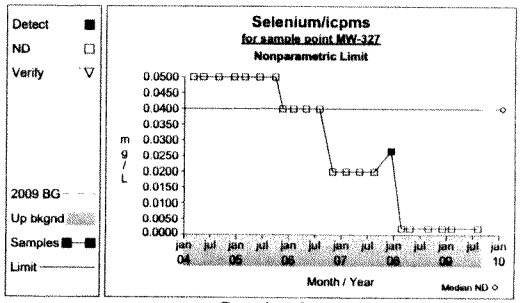
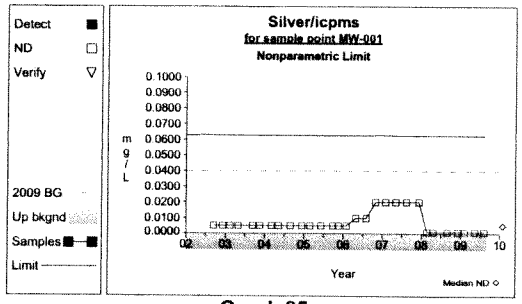
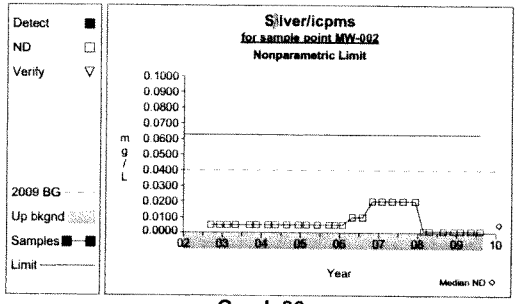


Graph 84

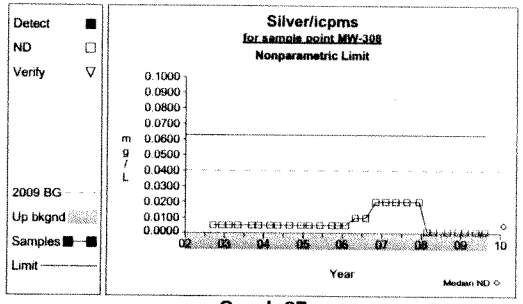
Up vs. Down Prediction Limits



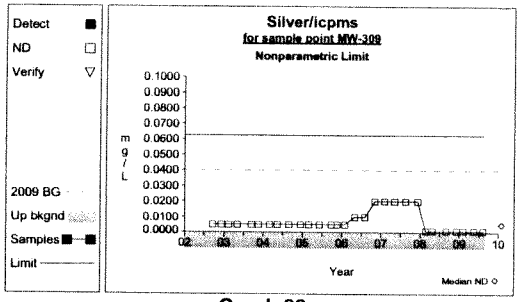
Graph 85



Graph 86



Graph 87



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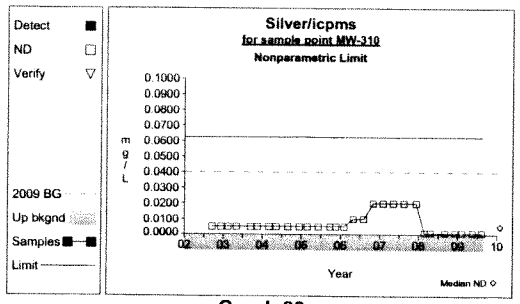

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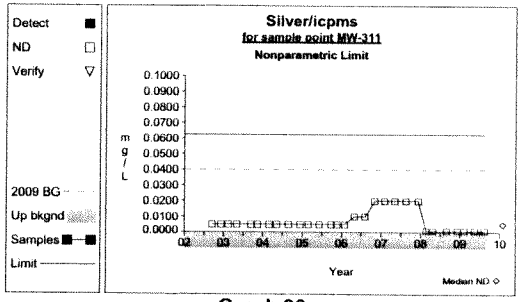
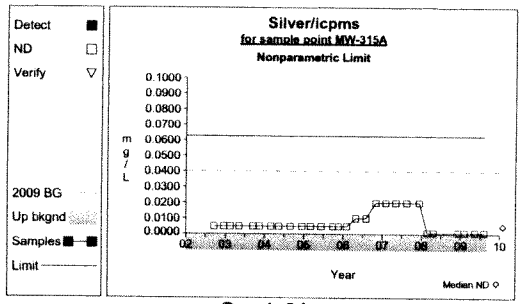
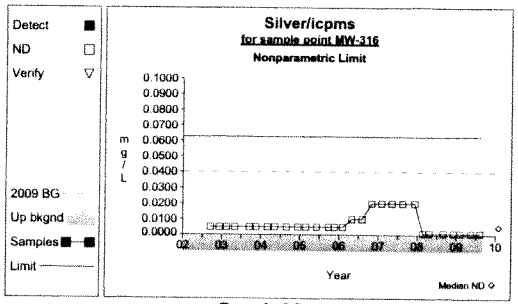


Graph 90



Graph 91



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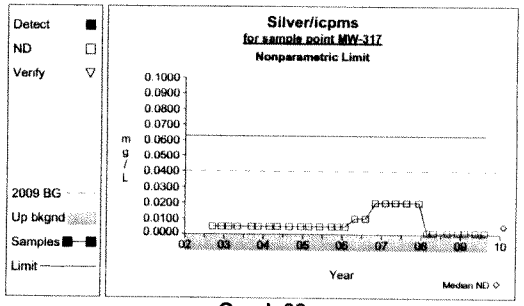
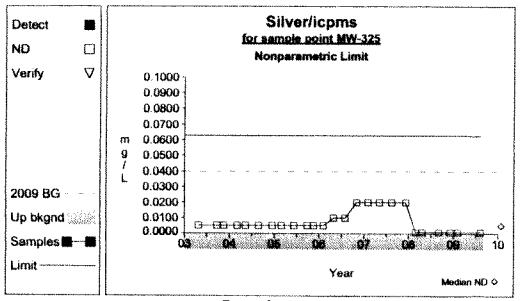
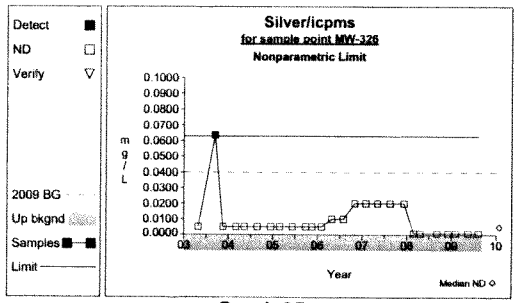


Graph 93

Up vs. Down Prediction Limits



Graph 94



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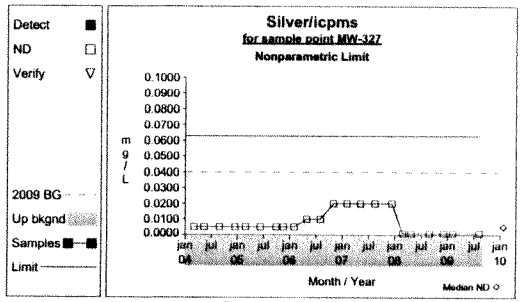
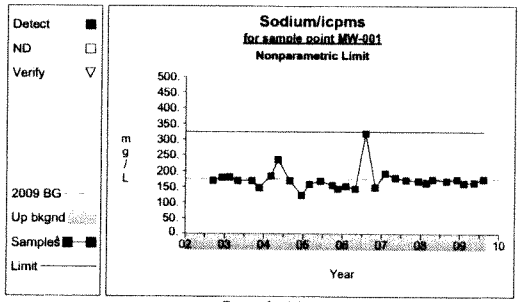
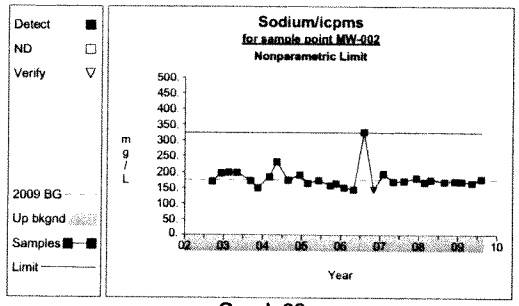


Graph 96

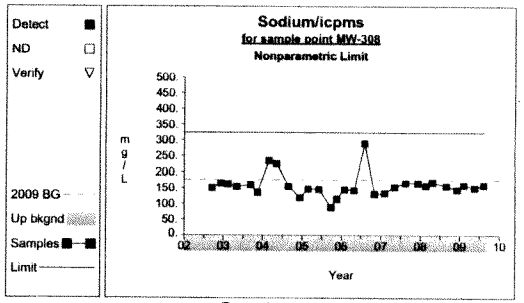
Up vs. Down Prediction Limits



Graph 97



Graph 98



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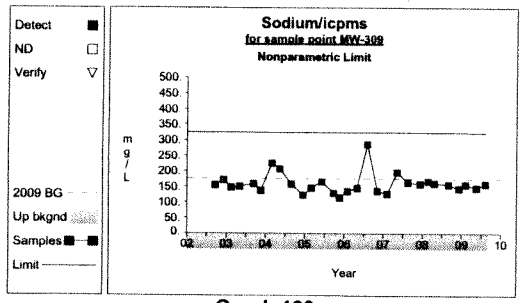
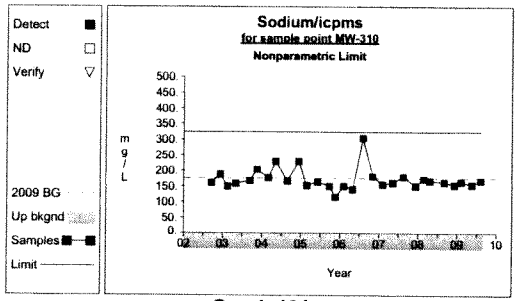
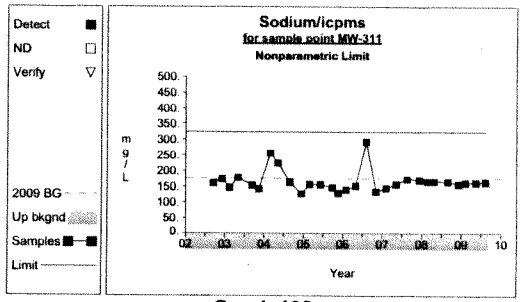


Graph 100



Graph 101



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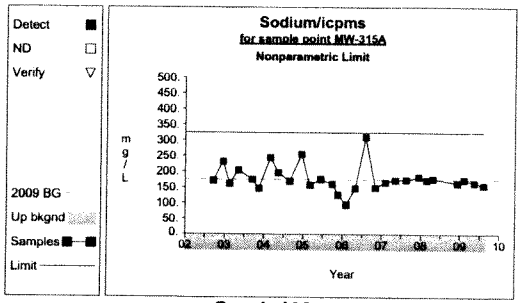

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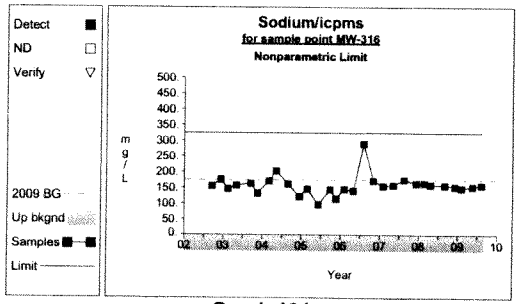
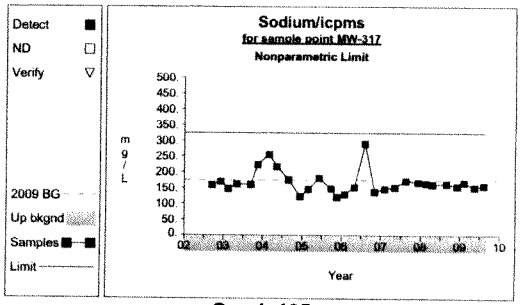
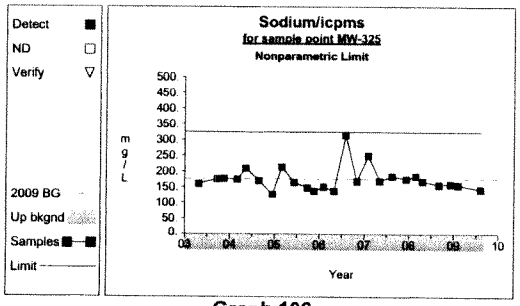


Graph 104

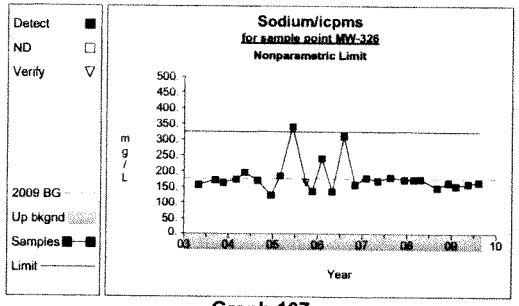


Graph 105

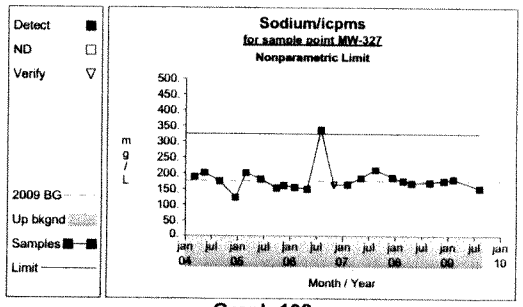
Up vs. Down Prediction Limits



Graph 106



Graph 107

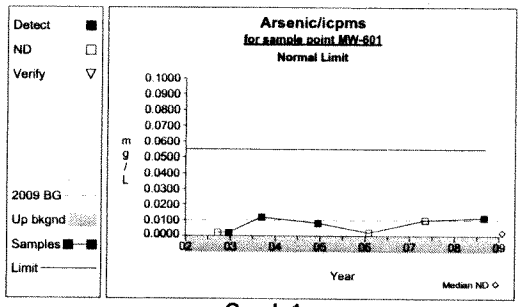


Graph 108

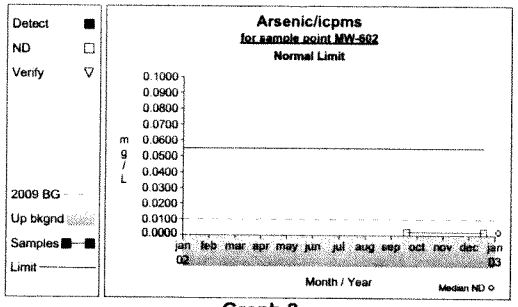
Beatty [mets_ald]

Analysis prepared on: 8/11/2010

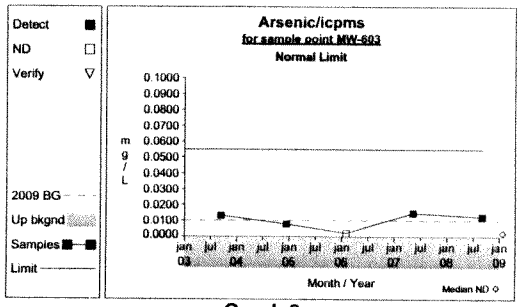
Up vs. Down Prediction Limits



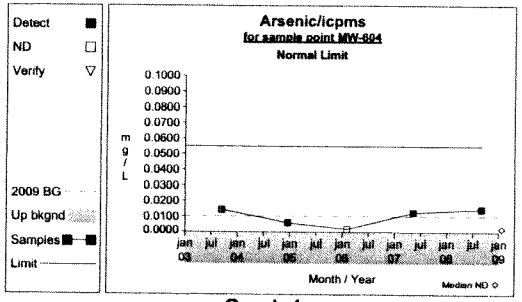
Graph 1



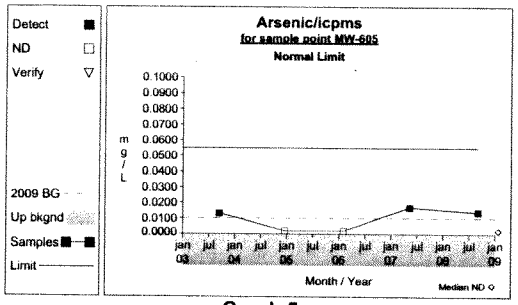
Graph 2



Graph 3



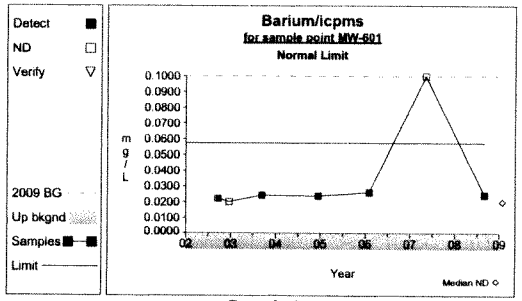
Graph 4



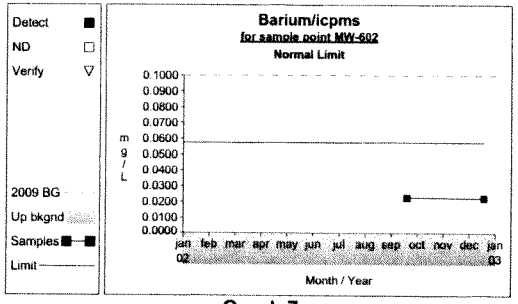
Graph 5

Prepared by: AquAeTer, Inc.

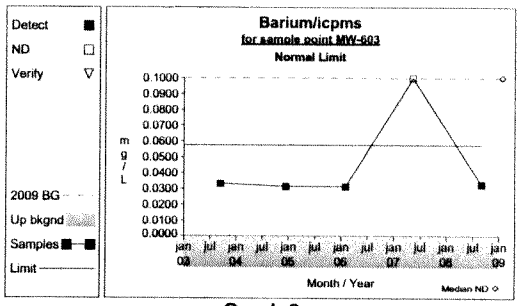
Up vs. Down Prediction Limits



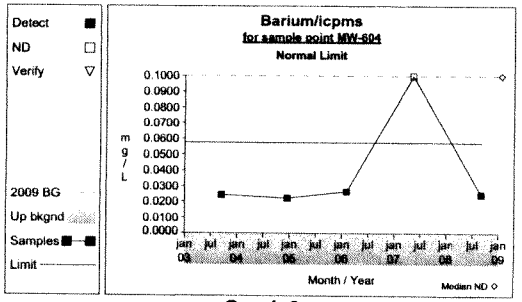
Graph 6



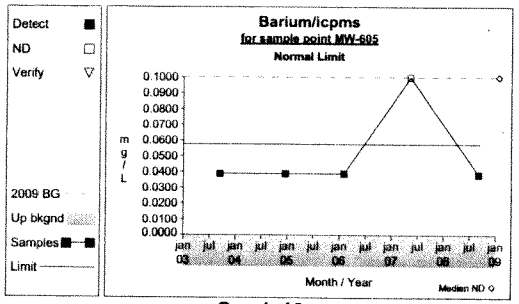
Graph 7



Graph 8

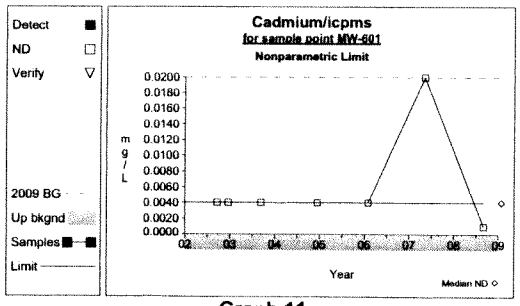


Graph 9

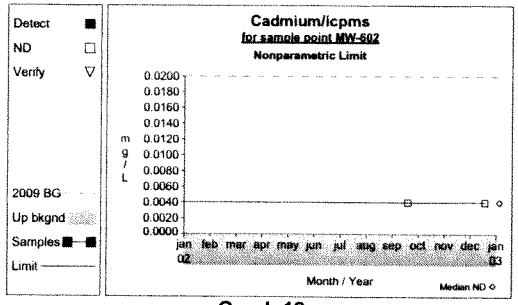


Graph 10

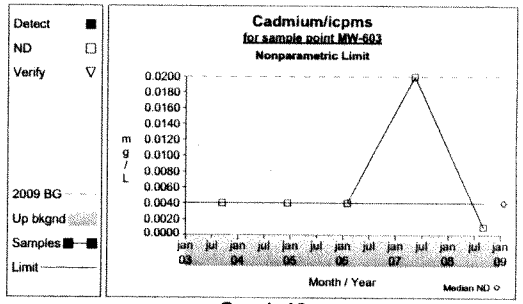
Up vs. Down Prediction Limits



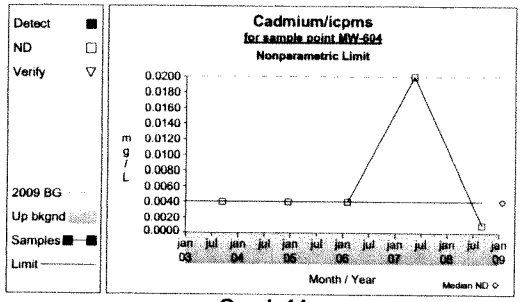
Graph 11



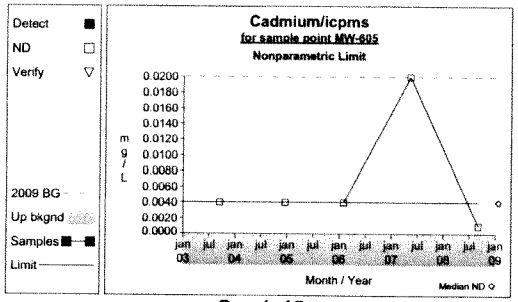
Graph 12



Graph 13

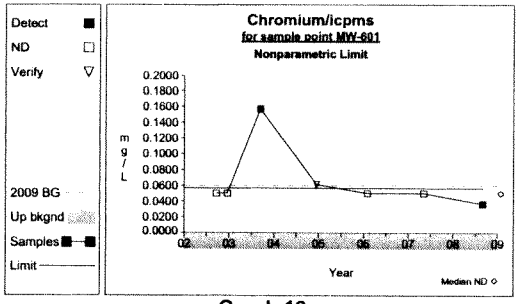


Graph 14

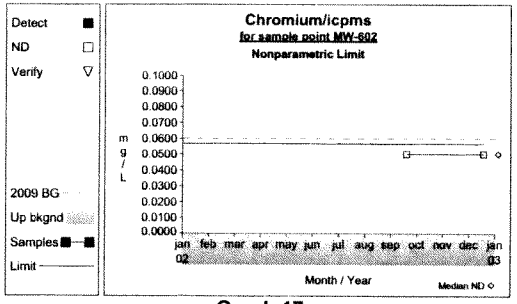


Graph 15

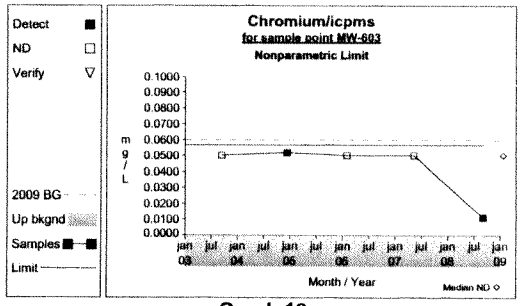
Up vs. Down Prediction Limits



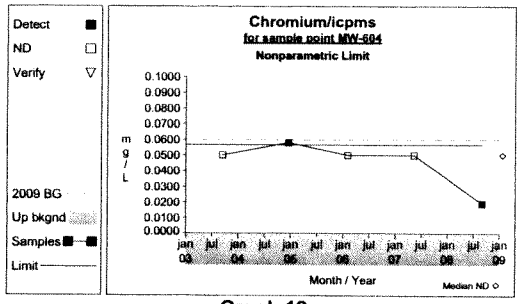
Graph 16



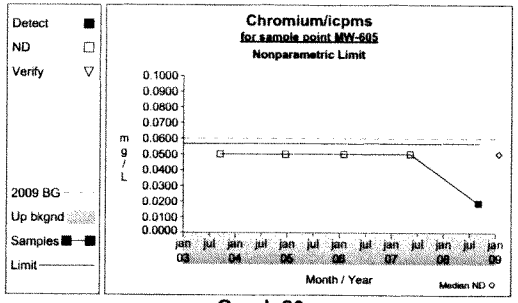
Graph 17



Graph 18

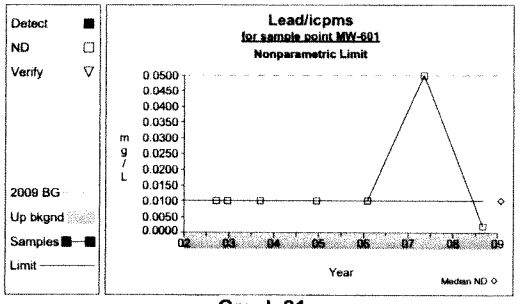


Graph 19

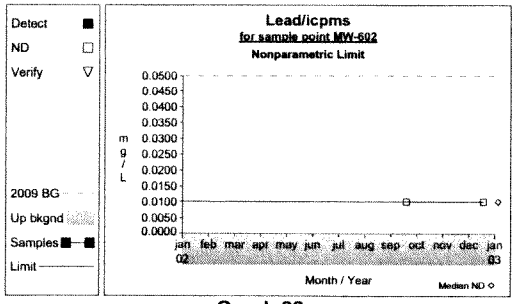


Graph 20

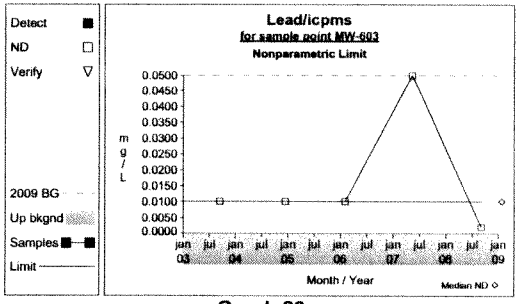
Up vs. Down Prediction Limits



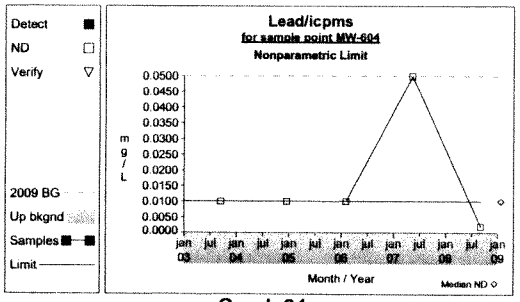
Graph 21



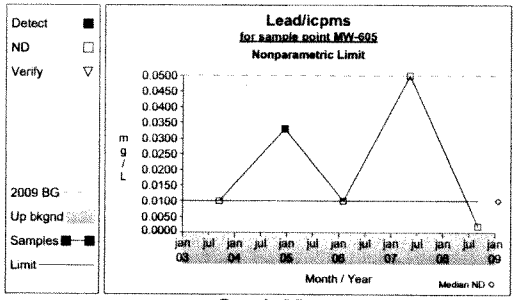
Graph 22



Graph 23

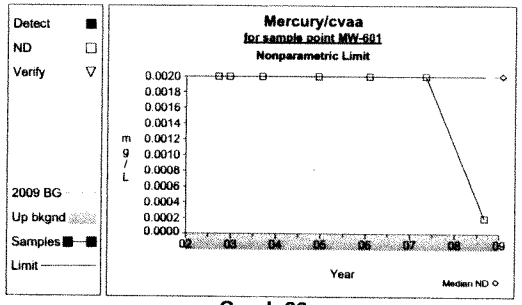


Graph 24

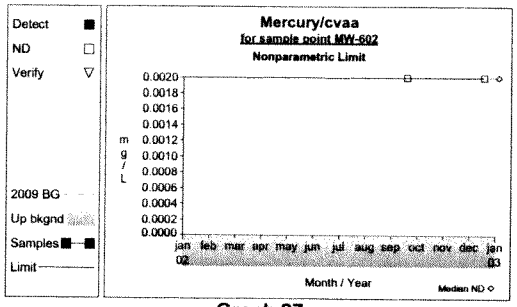


Graph 25

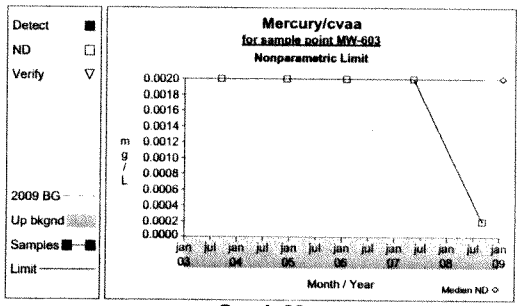
Up vs. Down Prediction Limits



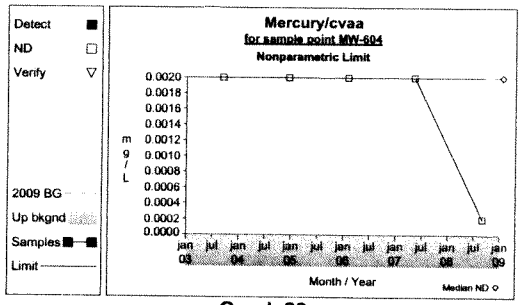
Graph 26



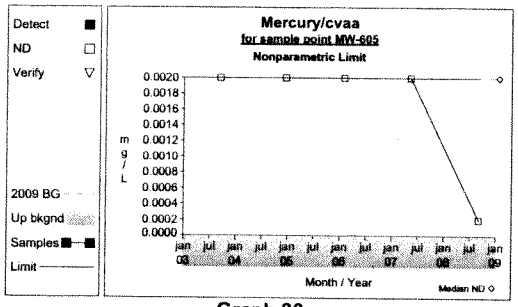
Graph 27



Graph 28

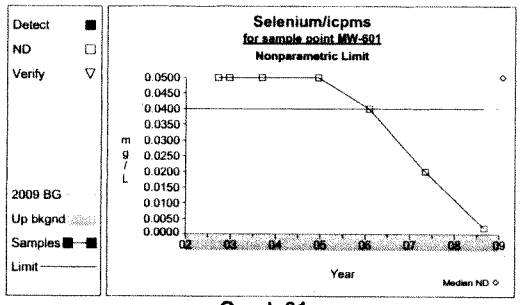


Graph 29

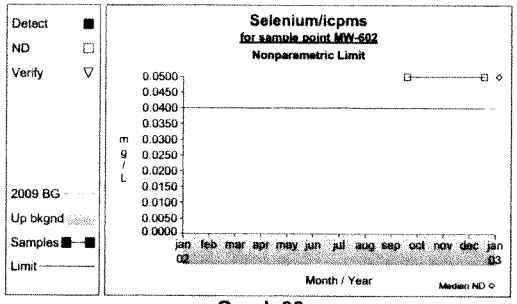


Graph 30

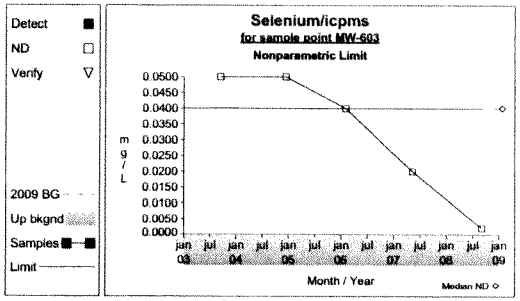
Up vs. Down Prediction Limits



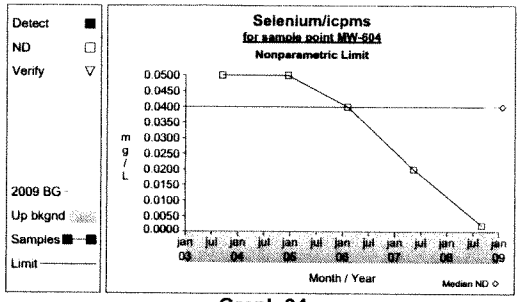
Graph 31



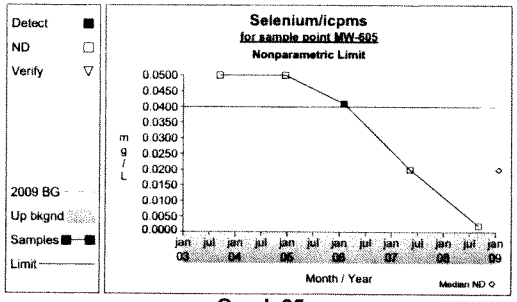
Graph 32



Graph 33

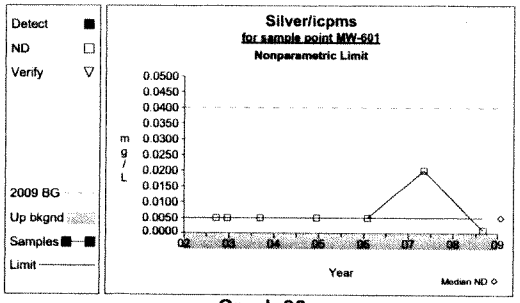


Graph 34

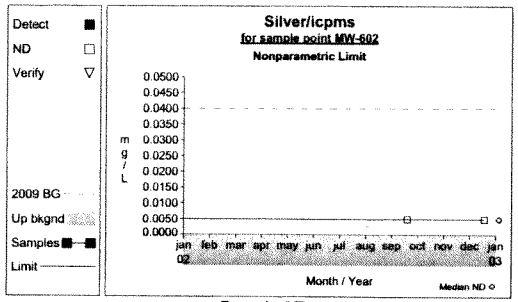


Graph 35

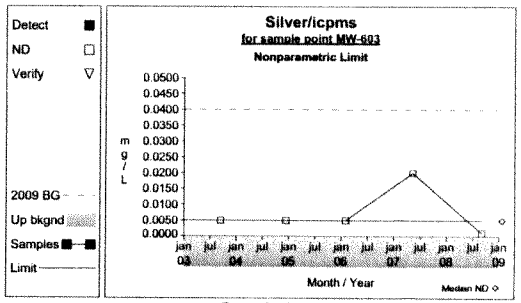
Up vs. Down Prediction Limits



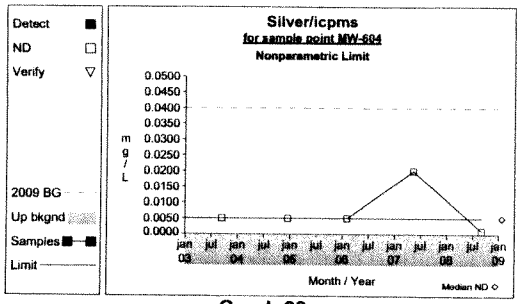
Graph 36



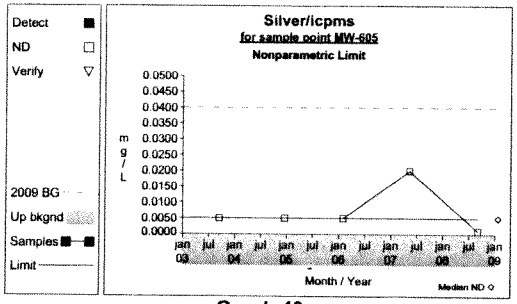
Graph 37



Graph 38

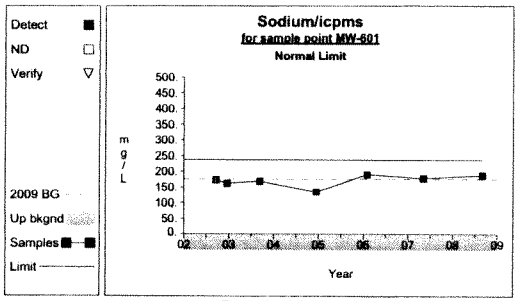


Graph 39

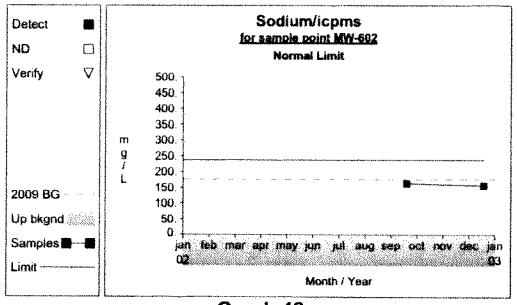


Graph 40

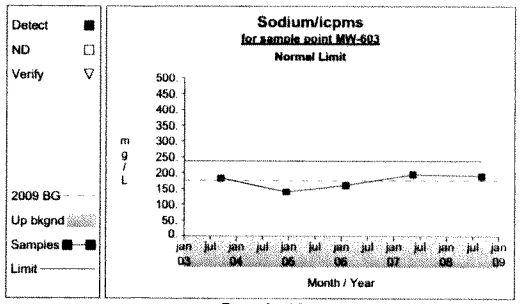
Up vs. Down Prediction Limits



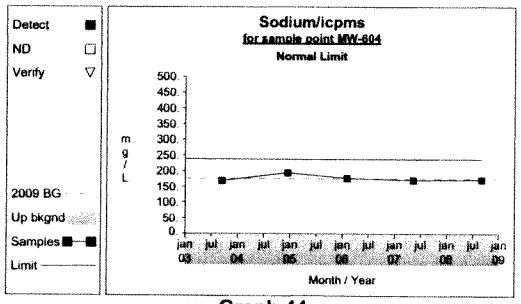
Graph 41



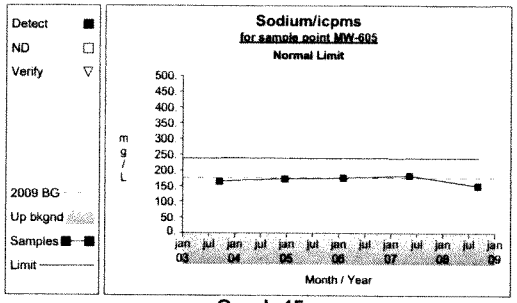
Graph 42



Graph 43

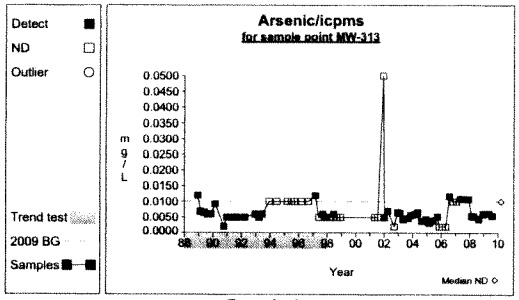


Graph 44

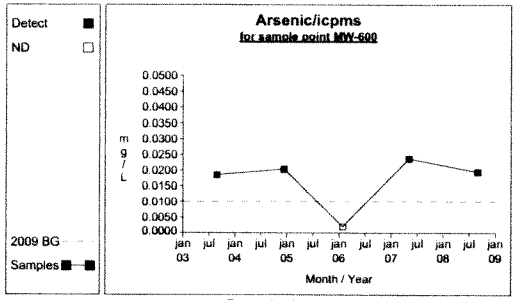


Graph 45

Time Series

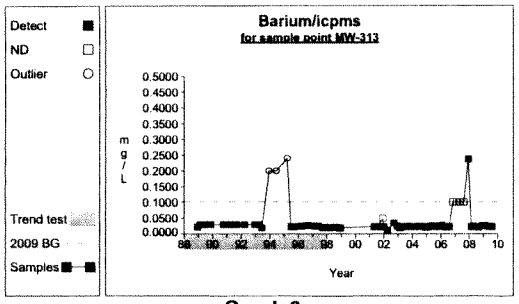


Graph 1

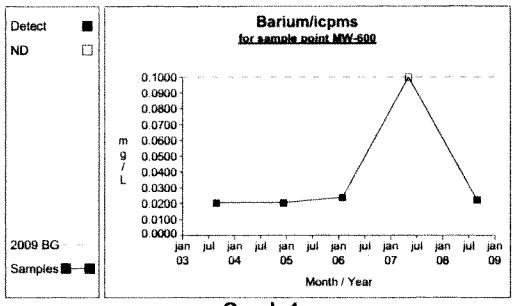


Graph 2

Time Series

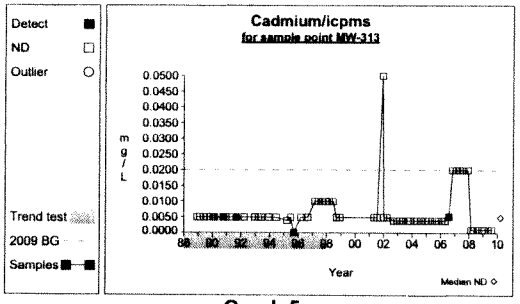


Graph 3

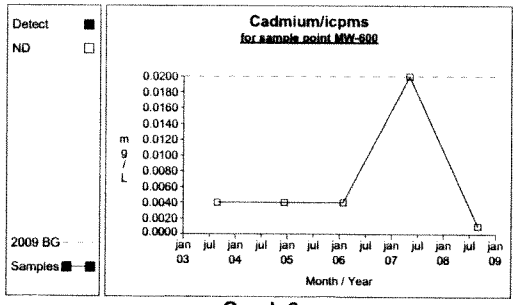


Graph 4

Time Series

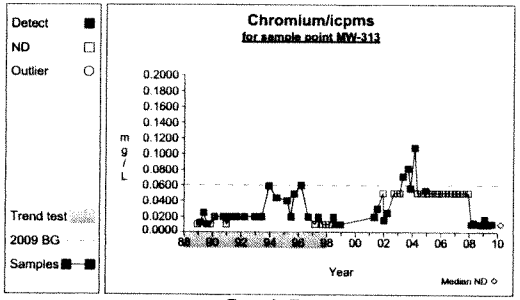


Graph 5

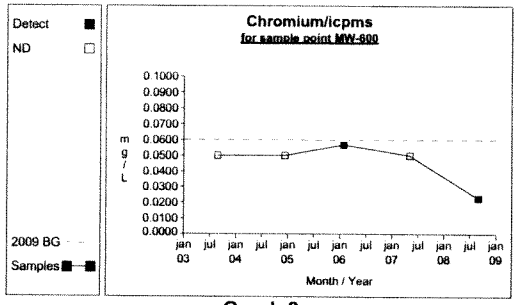


Graph 6

Time Series

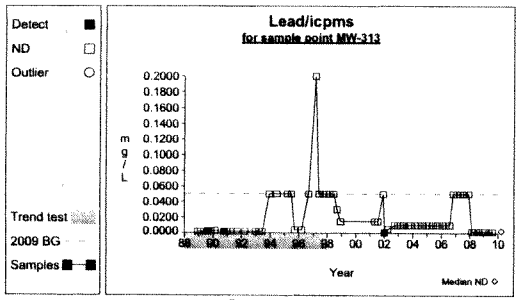


Graph 7

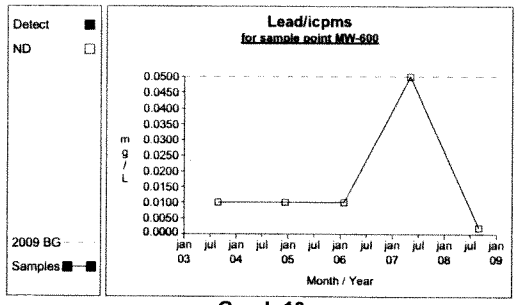


Graph 8

Time Series

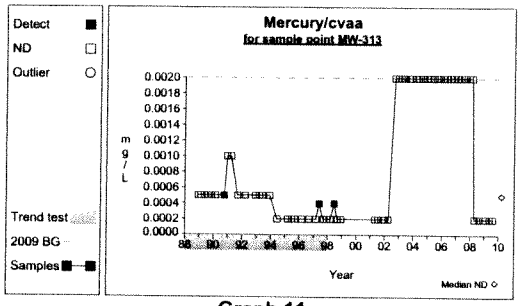


Graph 9

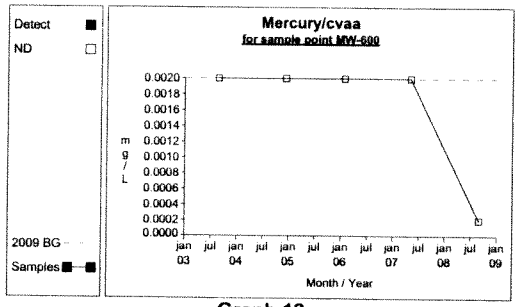


Graph 10

Time Series

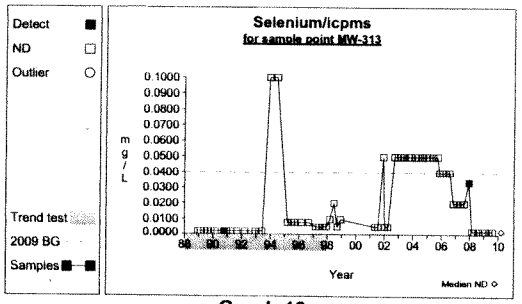


Graph 11

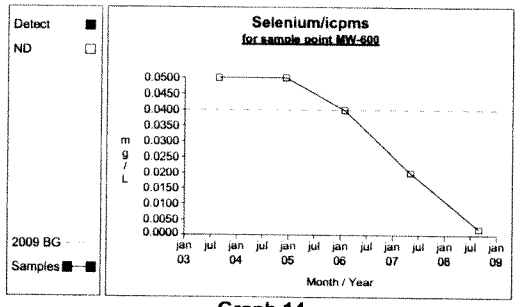


Graph 12

Time Series

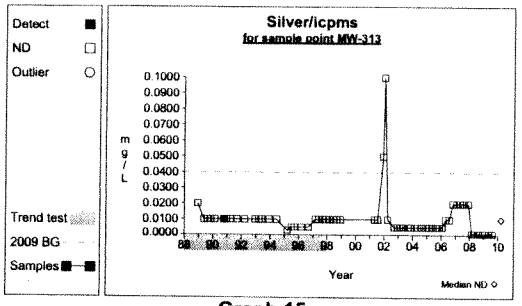


Graph 13

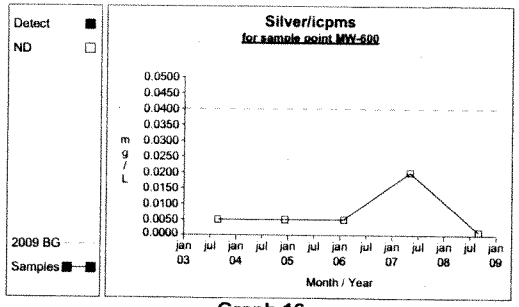


Graph 14

Time Series

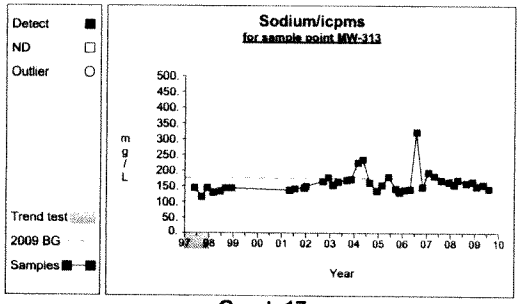


Graph 15

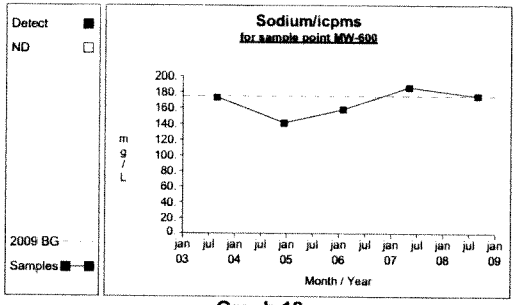


Graph 16

Time Series



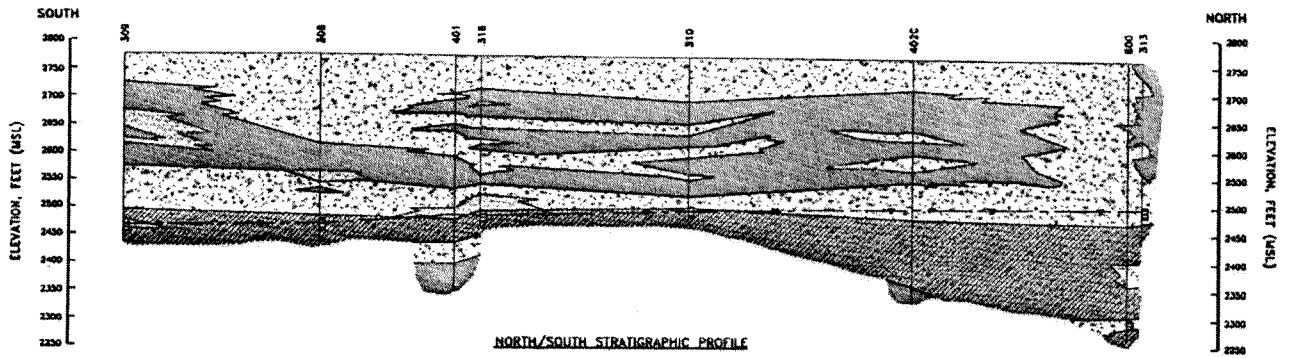
Graph 17



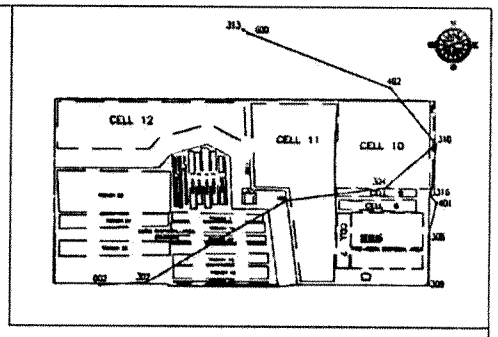
Graph 18

ATTACHMENT 2

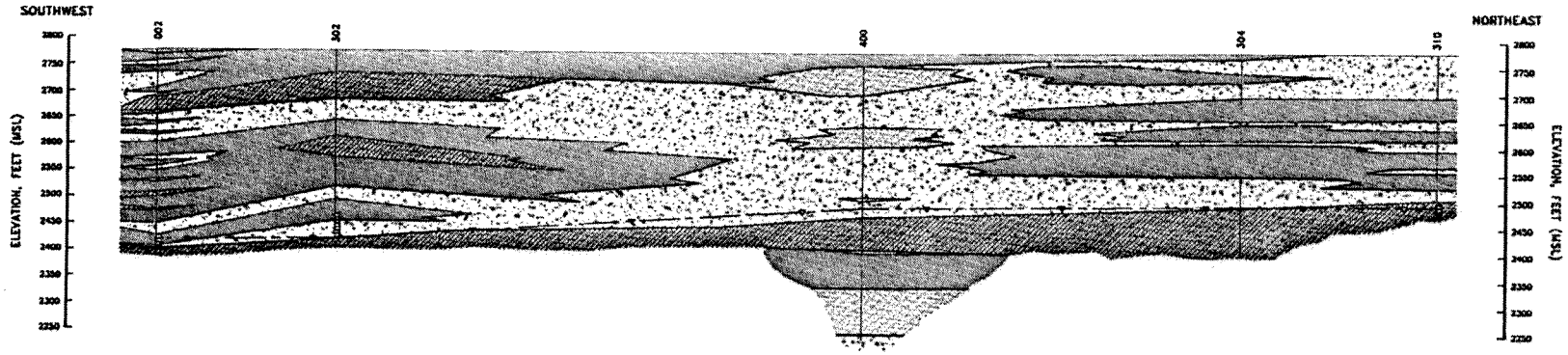
CROSS-SECTIONS



NORTH/SOUTH STRATIGRAPHIC PROFILE



PROFILE LOCATIONS



NORTHEAST/SOUTHWEST STRATIGRAPHIC PROFILE

EXPLAINATION

GRAVEL
SOILS WITH GREATER THAN 50% GRAVEL: SANDY GRAVEL, SILTY GRAVEL AND CLAYEY GRAVEL.

GRAVELLY SAND
SOILS WITH GREATER THAN 50% SAND AND 15% OR MORE GRAVEL.

SAND
SANDS WITH MINIMAL FINE-GRAINED CONTENT (CLEAN SANDS) AND 15% OR LESS GRAVEL.

SILT/CLAY
LOW AND HIGH PLASTICITY SILTS AND CLAYS. ALSO INCORPORATES SAND AND GRAVEL WITH SIGNIFICANT CLAY OR FINE-GRAINED SAND CONTENT, ESPECIALLY WHERE INTERBEDDED OR ASSOCIATED WITH SILTS AND CLAYS.

LEGEND

WATER TABLE

SCREEN INTERVAL

100 50 0 100
SCALE FEET

Rev	Drawn	Check	Appr	Date	Description

REVISIONS

American Ecology
5333 WESTHEIMER
Suite 1000
Houston, Texas 77056

Drawn By: DKK
Checked By: LJRWN
Appr. By:
Date: 11/95
Scale: AS SHOWN
Project No.: NV-163

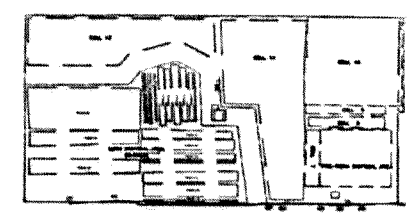
Reference Drawings: NV-153-GMS-003

SITE STRATIGRAPHIC PROFILES

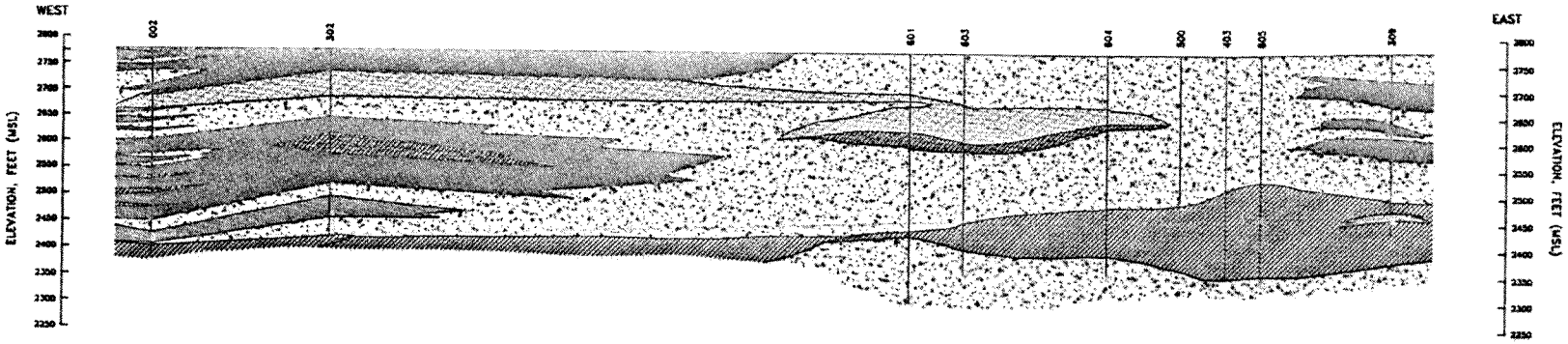
HAZARDOUS WASTE MANAGEMENT FACILITY
U.S. Ecology
BEATTY, NEVADA

Drawing No. NV-163-GMS-004

Figure 1-2



PROFILE LOCATION



EAST/WEST STRATIGRAPHIC PROFILE

EXPLAINATION

GRAVEL
SOILS WITH GREATER THAN 50% GRAVEL; SANDY GRAVEL, SILTY GRAVEL AND CLAYEY GRAVEL.

GRAVELLY SAND
SOILS WITH GREATER THAN 50% SAND AND 15% OR MORE GRAVEL.

SAND
SANDS WITH MINIMAL FINE-GRAINED CONTENT (CLEAN SANDS) AND 15% OR LESS GRAVEL.

SILT/CLAY
LOW AND HIGH PLASTICITY SILTS AND CLAYS. ALSO INCORPORATES SAND AND GRAVEL WITH SIGNIFICANT CLAY OR FINE-GRAINED SAND CONTENT, ESPECIALLY WHERE INTERBEDDED OR ASSOCIATED WITH SILTS AND CLAYS.

LEGEND

WATER TABLE

SCREEN INTERVAL

100 50 0 100
SCALE FEET

Rev	Drawn	Check	App	Date	Description

REVISIONS

American Ecology
5333 WESTHEIMER
Suite 1000
Houston, Texas 77056

Drawn By: DKK
Checked By: L.JIMMIN
Appr. By:
Date: 11/95
Scale: AS SHOWN
Project No.: NV-163

Reference Drawings: NV-153-GMS-004

SITE STRATIGRAPHIC PROFILE

HAZARDOUS WASTE MANAGEMENT FACILITY
U.S. Ecology
BEATTY, NEVADA

Drawing No. NV-163-GMS-005

Figure 1-3

ATTACHMENT 3

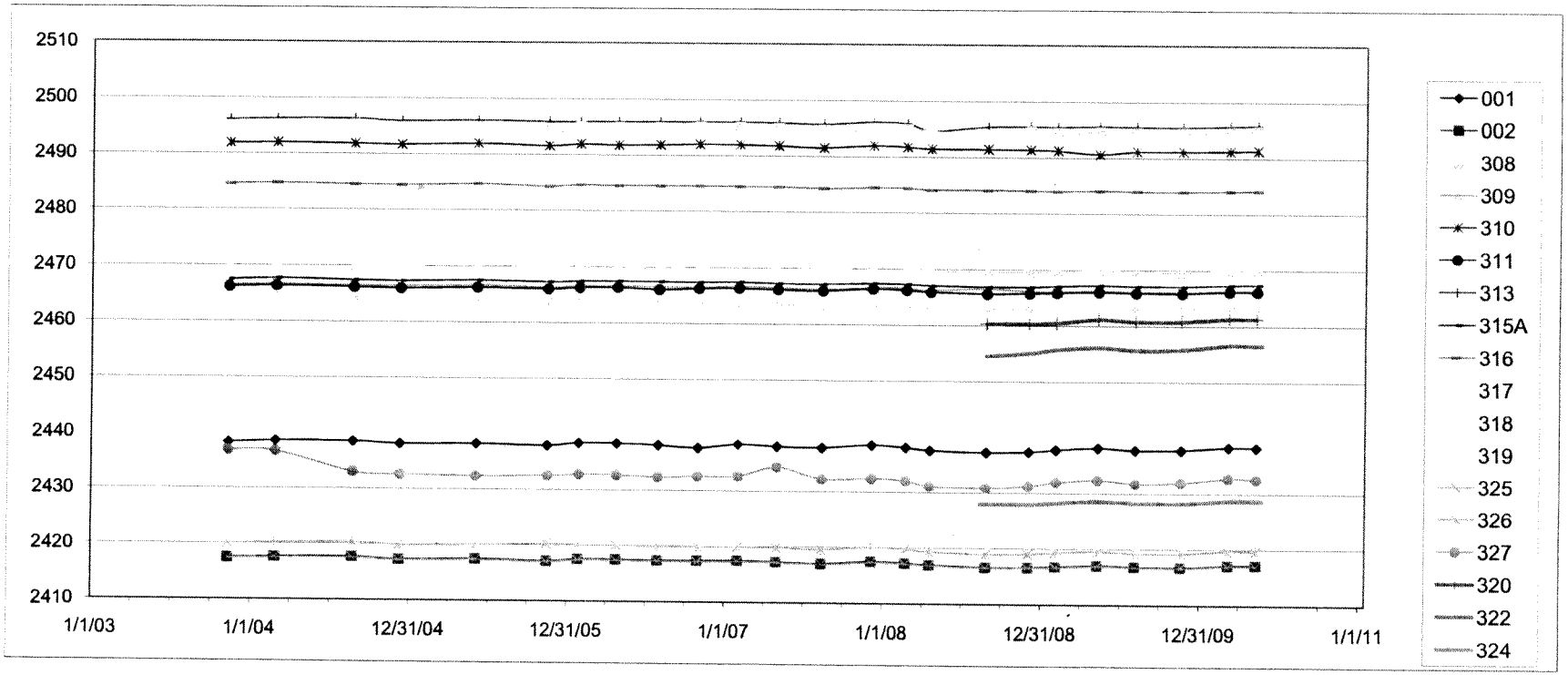
HISTORICAL POTENTIOMETRIC SURFACE MAPS

TABLE 1. MONITOR WELL CONSTRUCTION SUMMARY

WELL ID	WELL TYPE	WELL STATUS	COORDINATES NORTH	COORDINATES EAST	ELEVATION DATUM* (NGVD)	BORING DEPTH (fbgs)	WELL DEPTH (fbgs)	TOP OF SCREEN DEPTH (fbgs)	TOP OF SCREEN ELEVATION (NGVD)	BOTTOM OF SCREEN DEPTH (fbgs)	BOTTOM OF SCREEN ELEVATION (NGVD)	Length of Screen/Slot Size (feet/inch)	Installed By	Date Installed
001	S	ACTIVE	6101.13	4953.73	2783.32	366.0	360.7	340.7	2442.6	360.7	2422.6	20.0/0.010		9/5/1990
002	S	ACTIVE	6165.77	4955.54	2778.15	390.0	374.0	354	2424.2	374	2404.2	20.0/0.010		9/5/1990
308	S	ACTIVE	7541.22	4435.32		338.0	323.0	298.2		318.0		19.8/0.040		9/3/1988
309	S	ACTIVE	7185.59	4927.82		340.0	325.9	301.1		320.9		19.8/0.040		10/20/1988
310	S	ACTIVE	6576.73	4963.54		299.5	299.5	274.7		294.5		19.8/0.040		8/4/1988
311	S	ACTIVE	5500.63	4960.87		330.0	324.4	257.6		299.6		42.0/0.040		10/27/1988
313	S	ACTIVE	5040.72	3680.02		320.0	307.2	282.4		302.2		19.8/0.040		8/12/1988
315A	S	ACTIVE	5557.96	4960.34		313.0	312.5	292.5		312.5		20.0/0.040		3/19/1996
316	S	ACTIVE				314.0	311.9	279.4		299.2		19.8/0.04		10/1/1988
317	S	ACTIVE				340.0	321.4	301.6		321.4		19.8/0.04		10/25/1988
318	S	ACTIVE												
319	S	ACTIVE												
325	S	ACTIVE												
326	S	ACTIVE												
327	S	ACTIVE												
320	S	ACTIVE												
322	S	ACTIVE												
324	S	ACTIVE												
600	D	ACTIVE			2783.52	502.0	471.5	461.3	2322.2	471.5	2312.0	10.2/0.040	G&M	9/7/1990
601	D	ACTIVE			2767.68	420.0	379.5	369.5	2398.2	379.5	2388.2	10.0/0.040	G&M	9/10/1990
603	D	ACTIVE			2767.64	415.0	385.1	375.1	2392.5	385.1	2382.5	10.0/0.040	G&M	9/11/1990
604	D	ACTIVE			2769.95	436.2	425.0	415.0	2355.0	425.0	2345.0	10.0/0.040	G&M	9/12/1990
605	D	ACTIVE			2769.34	441.8	436.8	426.6	2342.7	436.8	2332.5	10.2/0.040	G&M	9/13/1990

Notes:
*Datum is Top of PVC Casing.
All elevations and depths are in feet. Boring depth, bottom of screen, top of screen, and stick up are relative to Datum.
fbgs = feet below ground surface.
NGVD is feet above National Geodetic Vertical Datum.
ABND = Abandoned.
G&M = Geraghty & Miller, Inc.
S = Shallow Zone well; D = Deep Zone well

Last updated: July 2010


2510
2500
2490
2480
2470
2460
2450
2440
2430
2420
2410
1/1/03
1/1/04
12/31/04
12/31/05
1/1/07
1/1/08
12/31/08
12/31/09
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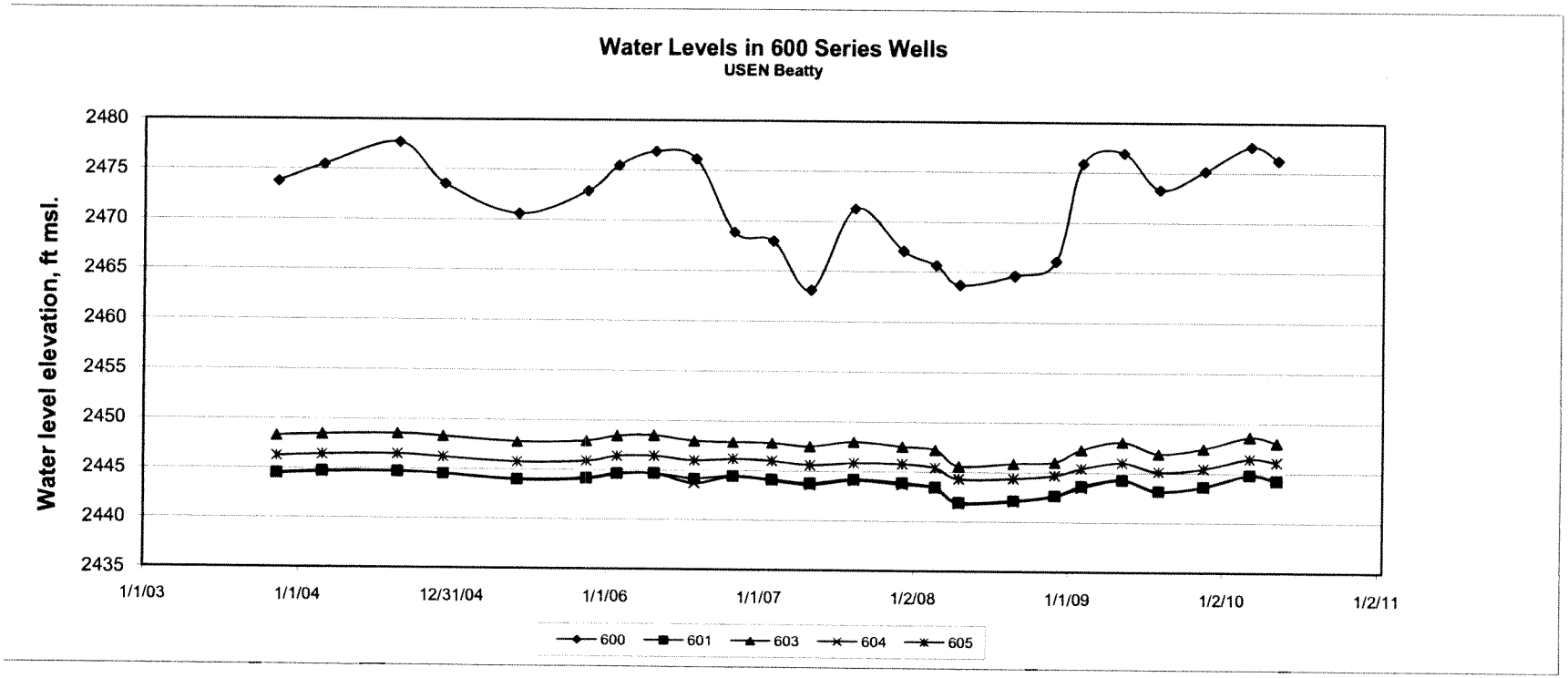
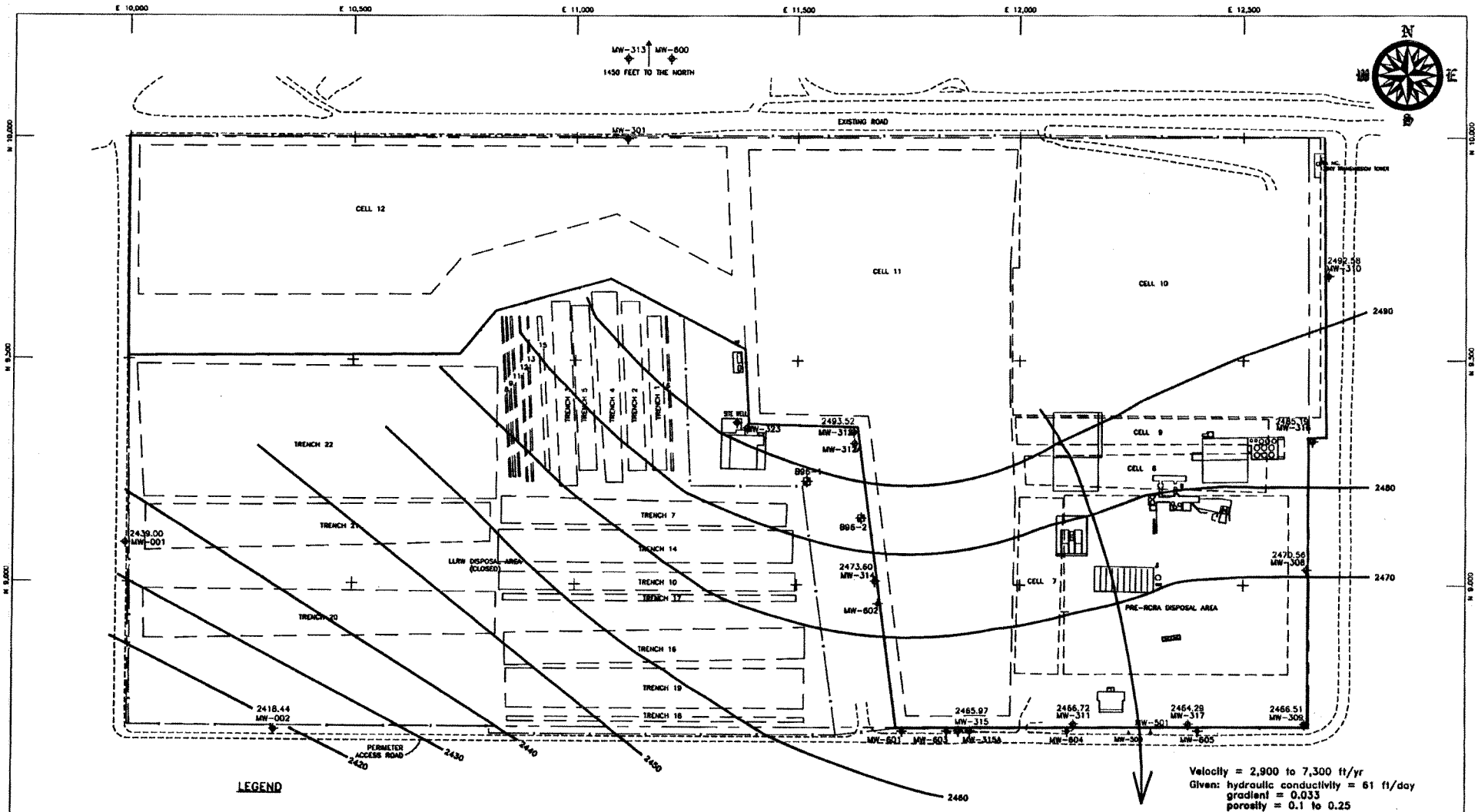
325
326
327
320
322
324


Water Levels in 600 Series Wells
USEN Beatty
Water level elevation, ft msl.
2480
2475
2470
2465
2460
2455
2450
2445
2440
2435
1/1/03
1/1/04
12/31/04
1/1/06
1/1/07
1/2/08
1/1/09
1/2/10
1/2/11
600
601
603
604
605



Rev	Drawn	Check	Appr	Date	Description
2	CBC			3/98	ADDED CONCENTRATIONS
1	DKK			1/98	CHANGED PHASE III TO PHASE IV

REVISIONS

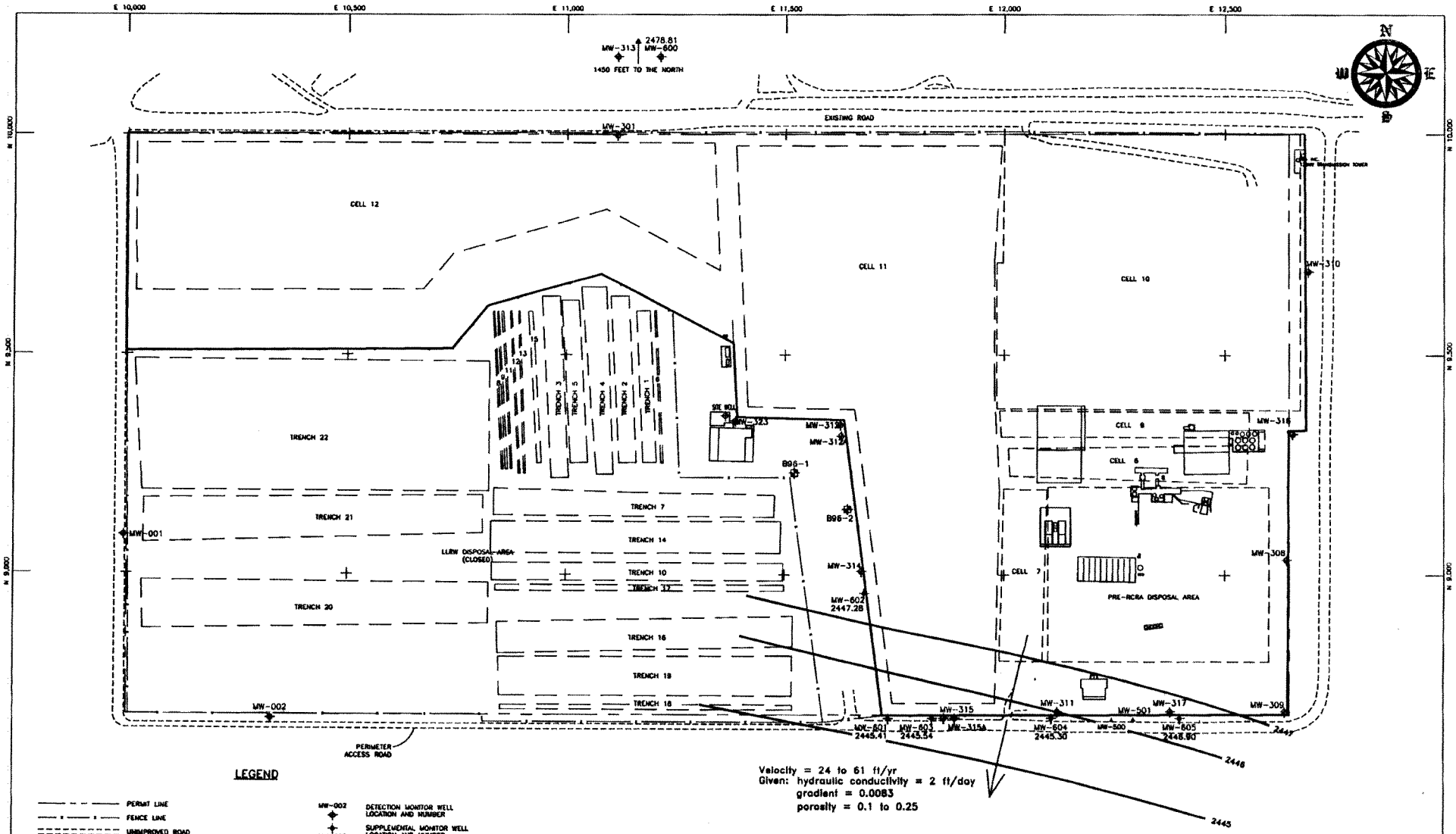
American Ecology
5333 WESTHEIMER
Suite 1000
Houston, Texas 77056

Reference Drawings

Drawn By: DKK
Checked By: L.IRWIN
Appr. By:
Date: 12/95
Scale: AS SHOWN
Project No.: NV-163

POTENTIOMETRIC SURFACE
UPPER WATER BEARING ZONE
MARCH 1998
HAZARDOUS WASTE MANAGEMENT FACILITY
U.S. Ecology
BEATTY, NEVADA

Drawing No.
NV-163-GMS-010


E 10,000
E 10,500
E 11,000
E 11,500
E 12,000
E 12,500
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N 9,500
N 9,000
MW-313
2478.81
MW-600
1450 FEET TO THE NORTH
EXISTING ROAD
MW-301
CELL 12
CELL 11
CELL 10
MW-310
CELL 9
CELL 8
CELL 7
MW-316
MW-308
PRE-RCRA DISPOSAL AREA
TRENCH 22
TRENCH 21
TRENCH 20
TRENCH 7
TRENCH 14
TRENCH 10
TRENCH 17
TRENCH 16
TRENCH 19
TRENCH 18
TRENCH 3
TRENCH 5
TRENCH 4
TRENCH 2
TRENCH 1
LLRW DISPOSAL AREA (CLOSED)
MW-001
MW-002
MW-312
MW-314
MW-602
2447.28
B96-1
B96-2
MW-315
MW-315A
MW-601
2445.41
MW-603
2445.34
MW-604
2445.30
MW-500
MW-501
MW-605
2445.90
MW-311
MW-317
MW-309
2447
2446
2445
PERIMETER ACCESS ROAD
Velocity = 24 to 61 ft/yr
Given: hydraulic conductivity = 2 ft/day
gradient = 0.0083
porosity = 0.1 to 0.25
LEGEND
PERMIT LINE
FENCE LINE
UNIMPROVED ROAD
POINT OF COMPLIANCE
SITE COORDINATE SYSTEM MARKER LOCATION IN NORTHING AND EASTING
MW-002 DETECTION MONITOR WELL LOCATION AND NUMBER
MW-603 SUPPLEMENTAL MONITOR WELL LOCATION AND NUMBER
MW-500 VALDOSE ZONE MONITOR WELL LOCATION AND NUMBER
B96-1 CORRECTIVE ACTION BORING LOCATION AND NUMBER
100 50 0 100
SCALE FEET
2 CBC 3/98 ADDED CONCENTRATIONS
1 DKK 1/98 CHANGED PHASE II TO PHASE IV
Rev Drawn Check Appr Date Description
REVISIONS
American Ecology
5333 WESTHEIMER
Suite 1000
Houston, Texas 77056
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Checked By: L.MWN
Appr. By:
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MARCH 1998
HAZARDOUS WASTE MANAGEMENT FACILITY
U.S. Ecology
BEATTY, NEVADA
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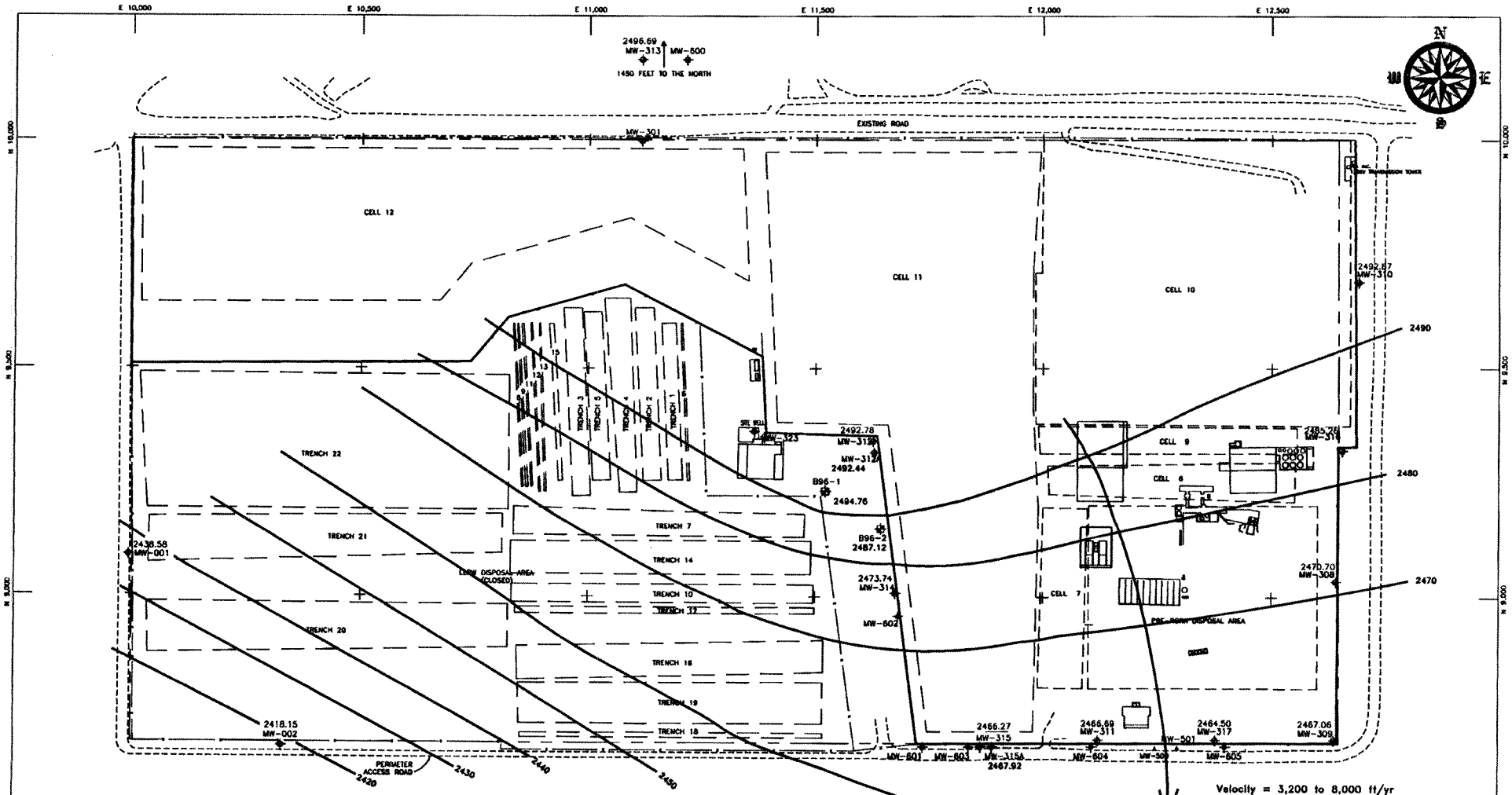

LEGEND

- 2490 — POTENTIOMETRIC CONTOUR
- PERMIT LINE
- FENCE LINE
- UNIMPROVED ROAD
- POINT OF COMPLIANCE
- SITE COORDINATE SYSTEM MARKER LOCATION IN NORTHING AND EASTING
- MW-002 — DETECTION MONITOR WELL LOCATION AND NUMBER
- MW-603 — SUPPLEMENTAL MONITOR WELL LOCATION AND NUMBER
- MW-500 — VALDOSE ZONE MONITOR WELL LOCATION AND NUMBER
- B96-1 — CORRECTIVE ACTION BORING LOCATION AND NUMBER

POTENTIOMETRIC CONTOUR INTERVAL = 10 FT

REFERENCES:
(1) THE MARK GROUP, 1988
(2) CLEBSCH (1962), GRANT (1993)

SCALE 100 50 0 100 FEET

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American Ecology
5333 WESTHEIMER
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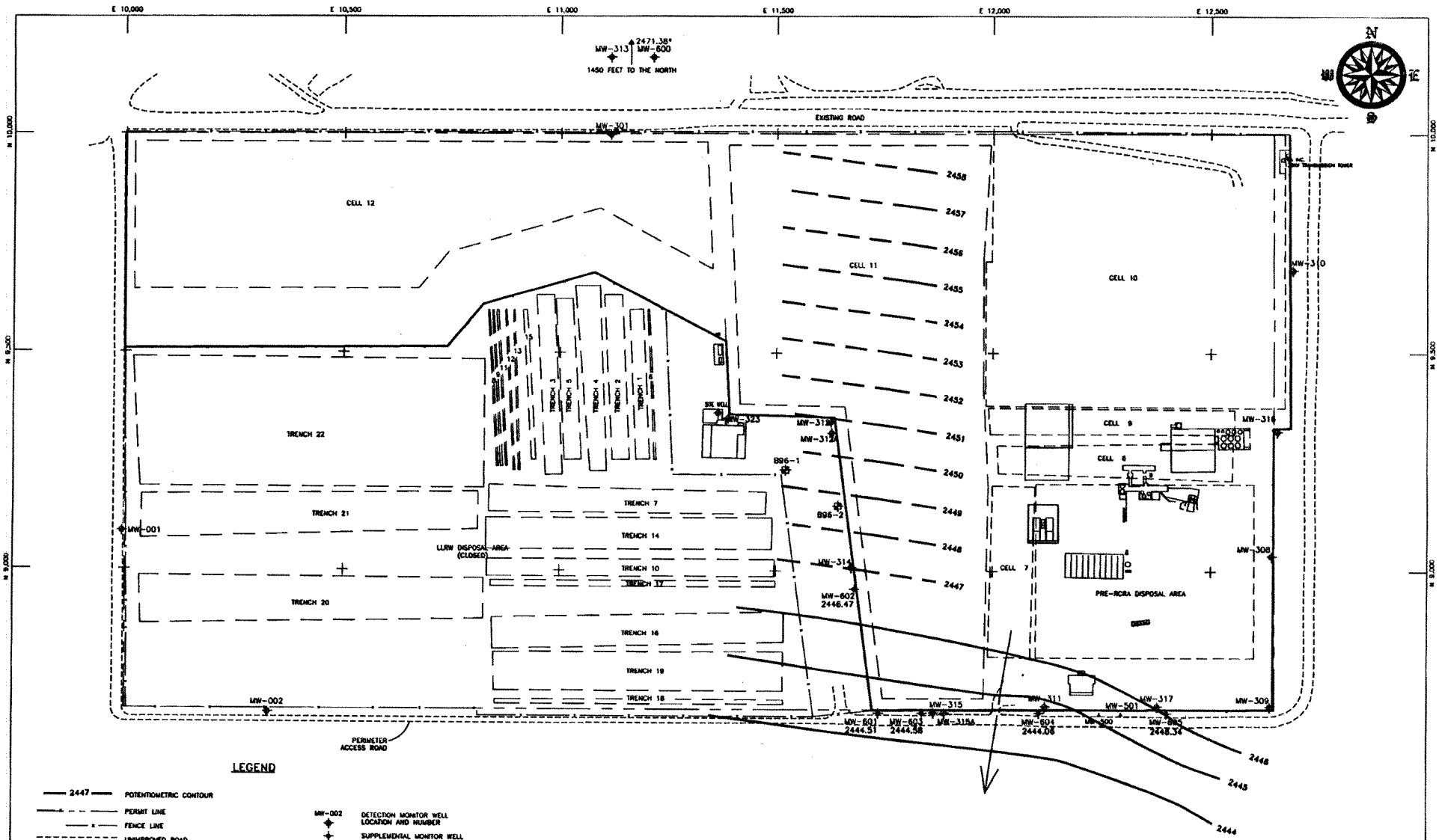
Houston, Texas 77056

Reference Drawings

Drawn By:	LAM
Checked By:	CAB
Appr. By:	PAZ
Date:	3/99
Scale:	AS SHOWN
Project No.:	

POTENTIOMETRIC SURFACE
UPPER WATER BEARING ZONE
AUGUST 1999
HAZARDOUS WASTE MANAGEMENT FACILITY
U.S. Ecology
BEATTY, NEVADA



LEGEND

- 2447 — POTENTIOMETRIC CONTOUR
- PERMIT LINE
- FENCE LINE
- UNIMPROVED ROAD
- POINT OF COMPLIANCE
- SITE COORDINATE SYSTEM MARKER LOCATION IN NORTHING AND EASTING
- POTENTIOMETRIC CONTOUR INTERVAL = 1 FT
- MW-002 — DETECTION MONITOR WELL LOCATION AND NUMBER
- MW-603 — SUPPLEMENTAL MONITOR WELL LOCATION AND NUMBER
- MW-500 — VADOSE ZONE MONITOR WELL LOCATION AND NUMBER
- B96-1 — CORRECTIVE ACTION BORING LOCATION AND NUMBER

* Well reading affected by site well pumping and is not considered in potentiometric contours.

100 50 0 100
SCALE FEET

Rev	Drawn	Check	Appr	Date	Description

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5333 WESTHEIMER
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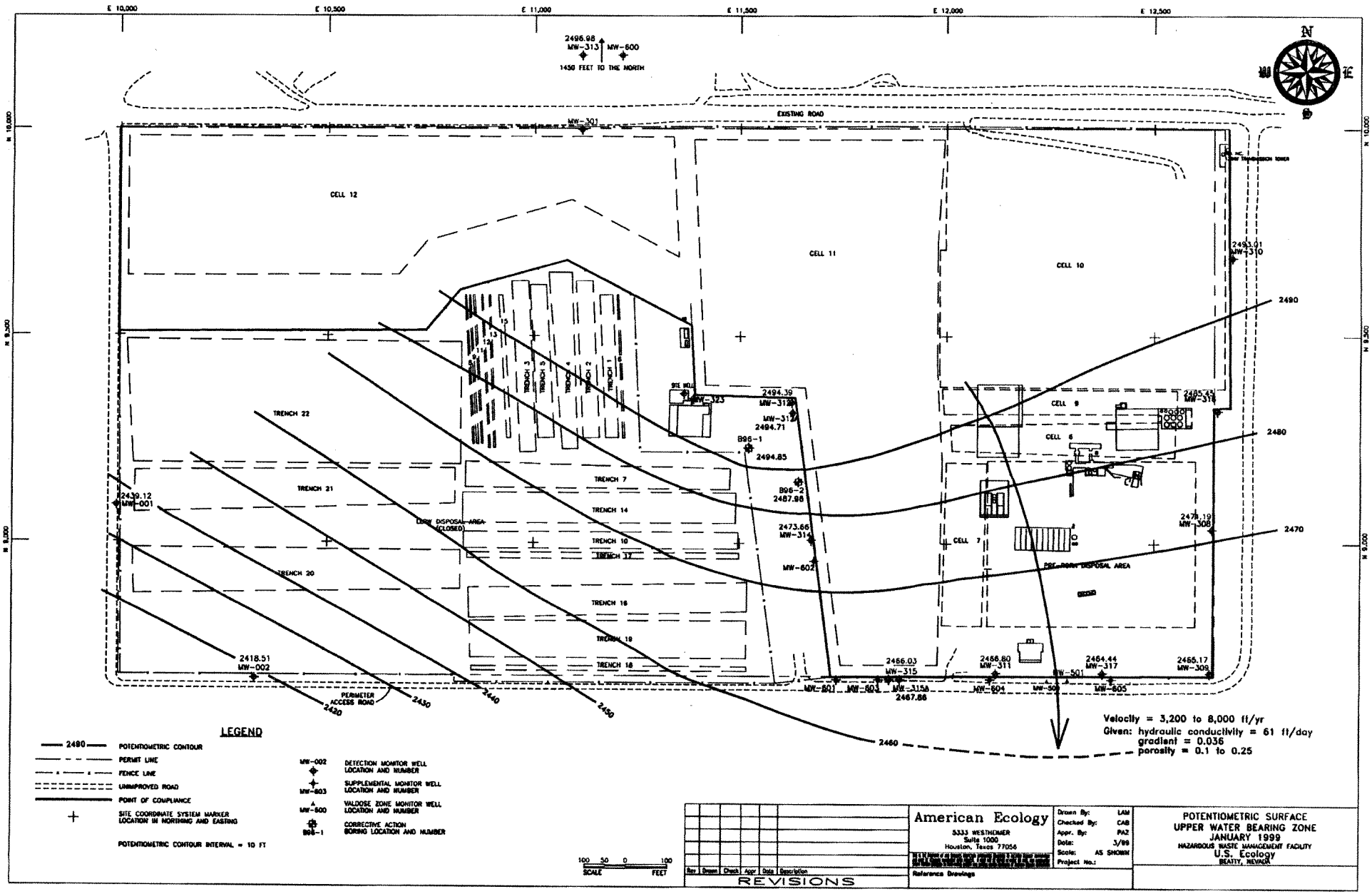
Houston, Texas 77056

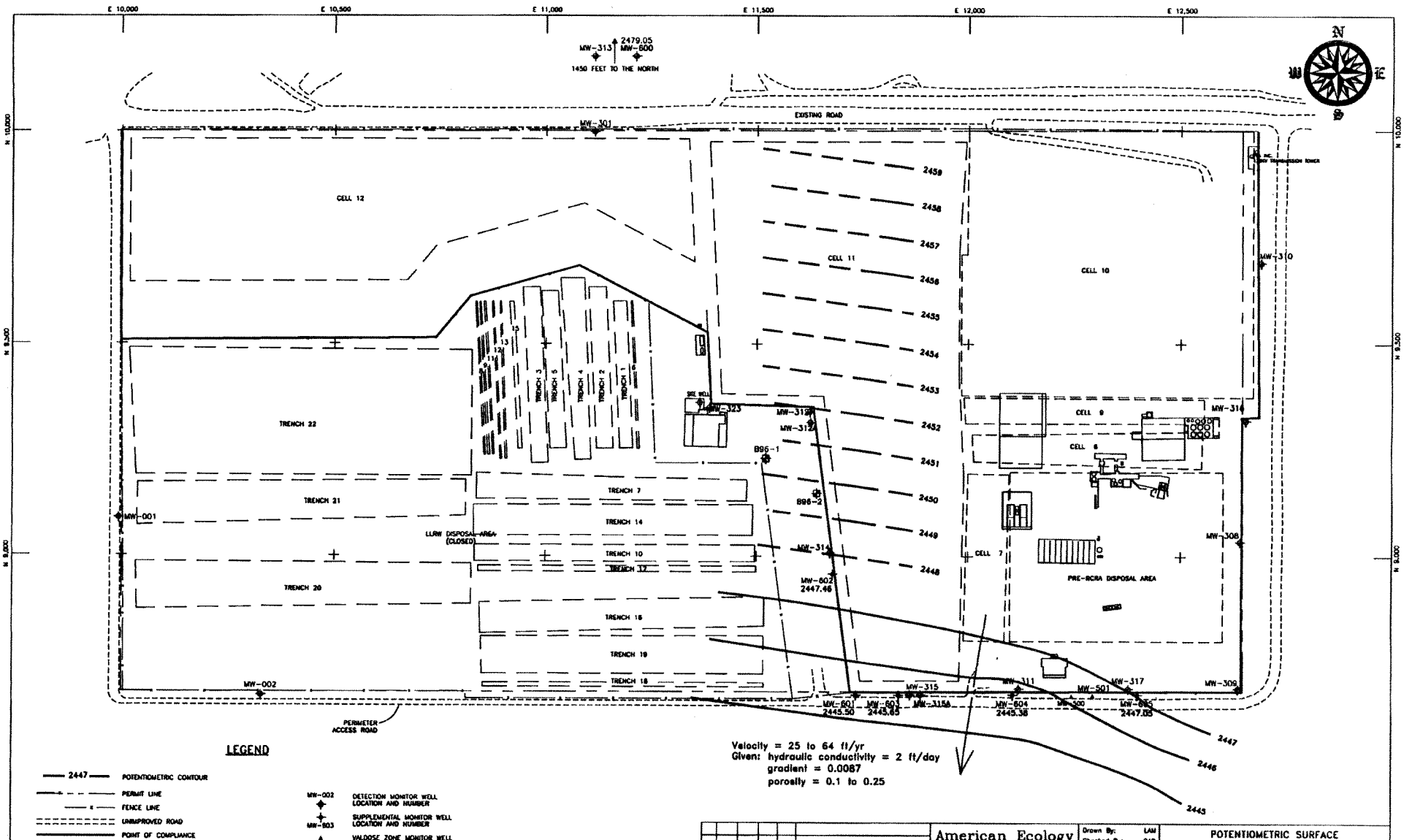
Reference Drawings

Drawn By:	LAM
Checked By:	CAB
Appr. By:	PAZ
Date:	3/99
Scale:	AS SHOWN
Project No.:	

POTENTIOMETRIC SURFACE
LOWER WATER BEARING ZONE
AUGUST 1999
HAZARDOUS WASTE MANAGEMENT FACILITY
U.S. Ecology
BEATTY, NEVADA



E 10,000
E 10,500
E 11,000
E 11,500
E 12,000
E 12,500
N 10,000
N 9,500
N 9,000
2496.98
MW-313
MW-600
1450 FEET TO THE NORTH
EXISTING ROAD
MW-301
CELL 12
CELL 11
CELL 10
CELL 9
CELL 6
CELL 7
TRENCH 22
TRENCH 21
TRENCH 20
TRENCH 7
TRENCH 14
TRENCH 10
TRENCH 17
TRENCH 16
TRENCH 19
TRENCH 18
TRENCH 1
TRENCH 2
TRENCH 3
TRENCH 4
TRENCH 5
LLRW DISPOSAL AREA (CLOSED)
PRE-RCRA DISPOSAL AREA
PERIMETER ACCESS ROAD
2493.01
MW-310
2490
2480
2470
2460
2450
2440
2430
2420
2439.12
MW-001
2418.51
MW-002
2494.39
MW-312
2494.71
B96-1
2494.85
B96-2
2487.98
2473.66
MW-314
MW-602
2466.03
MW-315
2467.86
2466.80
MW-311
2464.44
MW-317
2465.17
MW-309
MW-601
MW-603
MW-315A
MW-604
MW-501
MW-605
Velocity = 3,200 to 8,000 ft/yr
Given: hydraulic conductivity = 61 ft/day
gradient = 0.036
porosity = 0.1 to 0.25
LEGEND
2490 POTENTIOMETRIC CONTOUR
PERMIT LINE
FENCE LINE
UNIMPROVED ROAD
POINT OF COMPLIANCE
SITE COORDINATE SYSTEM MARKER LOCATION IN NORTHING AND EASTING
POTENTIOMETRIC CONTOUR INTERVAL = 10 FT
MW-002 DETECTION MONITOR WELL LOCATION AND NUMBER
MW-603 SUPPLEMENTAL MONITOR WELL LOCATION AND NUMBER
MW-600 VALDOSE ZONE MONITOR WELL LOCATION AND NUMBER
B96-1 CORRECTIVE ACTION BORING LOCATION AND NUMBER
100 50 0 100
SCALE FEET
Rev Drawn Check Appr Date Description
REVISIONS
American Ecology
5333 WESTHEIMER
Suite 1000
Houston, Texas 77056
Reference Drawings
Drawn By: LAM
Checked By: CAB
Appr. By: PAZ
Date: 3/99
Scale: AS SHOWN
Project No.:
POTENTIOMETRIC SURFACE
UPPER WATER BEARING ZONE
JANUARY 1999
HAZARDOUS WASTE MANAGEMENT FACILITY
U.S. Ecology
BEATTY, NEVADA



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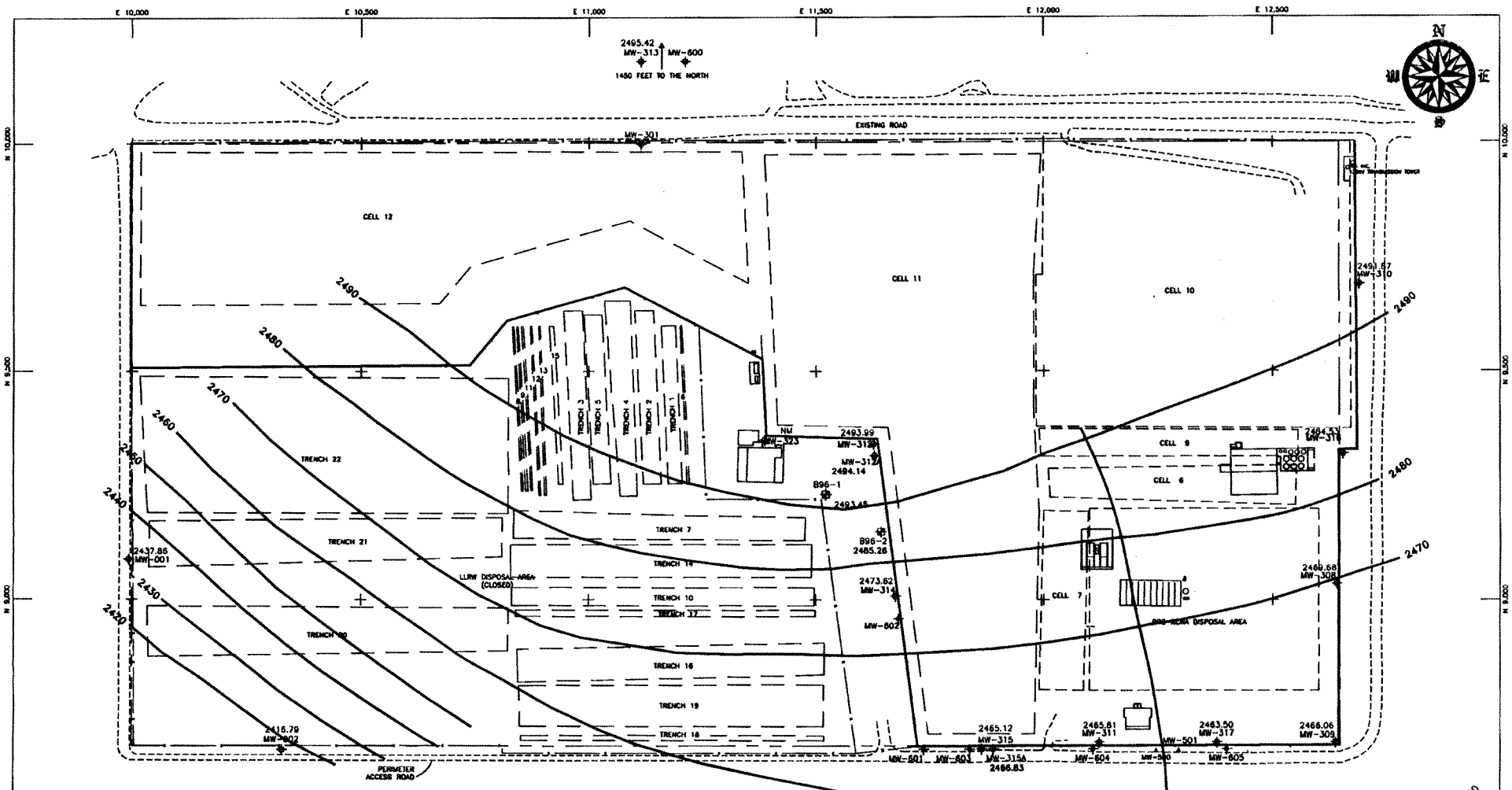
E 10,500
E 11,000
E 11,500
E 12,000
E 12,500
N 10,000
N 9,500
N 9,000
N
S
E
W
MW-313
2479.05
MW-600
1450 FEET TO THE NORTH
EXISTING ROAD
MW-301
CELL 12
CELL 11
CELL 10
CELL 9
CELL 8
CELL 7
TRENCH 22
TRENCH 21
TRENCH 20
TRENCH 7
TRENCH 14
TRENCH 10
TRENCH 17
TRENCH 16
TRENCH 19
TRENCH 18
TRENCH 3
TRENCH 5
TRENCH 4
TRENCH 2
TRENCH 1
SITE WELL
MW-323
MW-312
MW-312A
B96-1
B96-2
MW-314
MW-602
2447.46
MW-001
MW-002
LLRW DISPOSAL AREA (CLOSED)
PRE-RCRA DISPOSAL AREA
MW-310
MW-316
MW-308
MW-309
MW-317
MW-501
MW-311
MW-315
MW-315A
MW-601
2445.50
MW-603
2445.65
MW-604
2445.38
MW-605
2447.05
2459
2458
2457
2456
2455
2454
2453
2452
2451
2450
2449
2448
2447
2446
2445
PERIMETER ACCESS ROAD
Velocity = 25 to 64 ft/yr
Given: hydraulic conductivity = 2 ft/day
gradient = 0.0087
porosity = 0.1 to 0.25
LEGEND
2447 POTENTIOMETRIC CONTOUR
PERMIT LINE
FENCE LINE
UNIMPROVED ROAD
POINT OF COMPLIANCE
SITE COORDINATE SYSTEM MARKER LOCATION IN NORTHING AND EASTING
POTENTIOMETRIC CONTOUR INTERVAL = 1 FT
MW-002 DETECTION MONITOR WELL LOCATION AND NUMBER
MW-603 SUPPLEMENTAL MONITOR WELL LOCATION AND NUMBER
MW-500 VALOOSE ZONE MONITOR WELL LOCATION AND NUMBER
B96-1 CORRECTIVE ACTION BORING LOCATION AND NUMBER
100 50 0 100
SCALE FEET
Rev Drawn Check Appr Date Description
REVISIONS
American Ecology
5333 WESTHEIMER
Suite 1000
Houston, Texas 77056
Reference Drawings
Drawn By: LAM
Checked By: CAB
Appr. By: PAZ
Date: 3/99
Scale: AS SHOWN
Project No.:
POTENTIOMETRIC SURFACE
LOWER WATER BEARING ZONE
JANUARY 1999
HAZARDOUS WASTE MANAGEMENT FACILITY
U.S. Ecology
BEATTY, NEVADA



LEGEND

- 2490 — POTENTIOMETRIC CONTOUR
- PERMIT LINE
- FENCE LINE
- UNIMPROVED ROAD
- POINT OF COMPLIANCE
- SITE COORDINATE SYSTEM MARKER LOCATION IN NORTHING AND EASTING
- POTENTIOMETRIC CONTOUR INTERVAL = 10 FT
- MW-002 — DETECTION MONITOR WELL LOCATION AND NUMBER
- MW-603 — SUPPLEMENTAL MONITOR WELL LOCATION AND NUMBER
- MW-500 — VADOSE ZONE MONITOR WELL LOCATION AND NUMBER
- B96-1 — CORRECTIVE ACTION BORING LOCATION AND NUMBER
- NM — NOT MEASURED

REFERENCES:
(1) THE MARK GROUP, 1988
(2) CLEBSCH (1962), GRANT (1993)

Velocity = 3,100 to 7,900 ft/yr
Given: hydraulic conductivity = 61 ft/day (1)
gradient = 0.035
porosity = 0.1 to 0.25 (2)

100 50 0 100
SCALE FEET

Rev	Drawn	Check	Appr	Date	Description

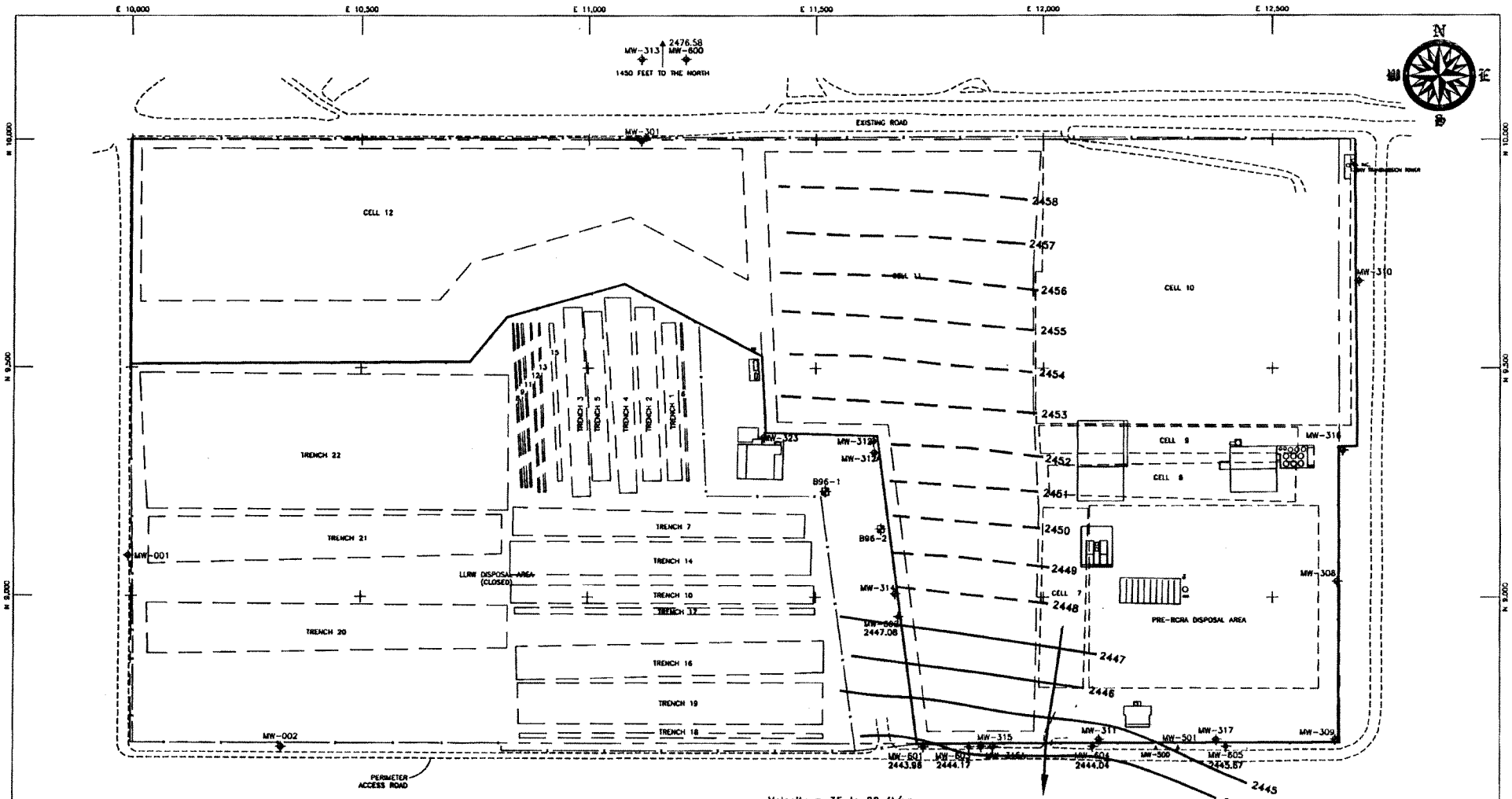
REVISIONS

American Ecology
5333 WESTHEIMER
Suite 1000
Houston, Texas 77056

Reference Drawings

Drawn By:	LAM
Checked By:	CAB
Appr. By:	PAZ
Date:	3/99
Scale:	AS SHOWN
Project No.:	

POTENTIOMETRIC SURFACE
UPPER WATER BEARING ZONE
JANUARY 2001
HAZARDOUS WASTE MANAGEMENT FACILITY
U.S. Ecology
BEATTY, NEVADA



LEGEND

- 2447 — POTENTIOMETRIC CONTOUR
- PERMIT LINE
- FENCE LINE
- UNIMPROVED ROAD
- POINT OF COMPLIANCE
- SITE COORDINATE SYSTEM MARKER LOCATION IN NORTHING AND EASTING
- POTENTIOMETRIC CONTOUR INTERVAL = 1 FT
- MW-002 — DETECTION MONITOR WELL LOCATION AND NUMBER
- MW-503 — SUPPLEMENTAL MONITOR WELL LOCATION AND NUMBER
- MW-500 — VADOSE ZONE MONITOR WELL LOCATION AND NUMBER
- B96-1 — CORRECTIVE ACTION BORING LOCATION AND NUMBER

REFERENCES:

(1) THE MARK GROUP, 1988
(2) CLEBSCH (1962), GRANT (1993)

Velocity = 35 to 88 ft/yr
Given: hydraulic conductivity = 2 ft/day (1)
gradient = 0.012
porosity = 0.1 to 0.25 (2)

100 50 0 100
SCALE FEET

Rev	Drawn	Check	Appr	Date	Description

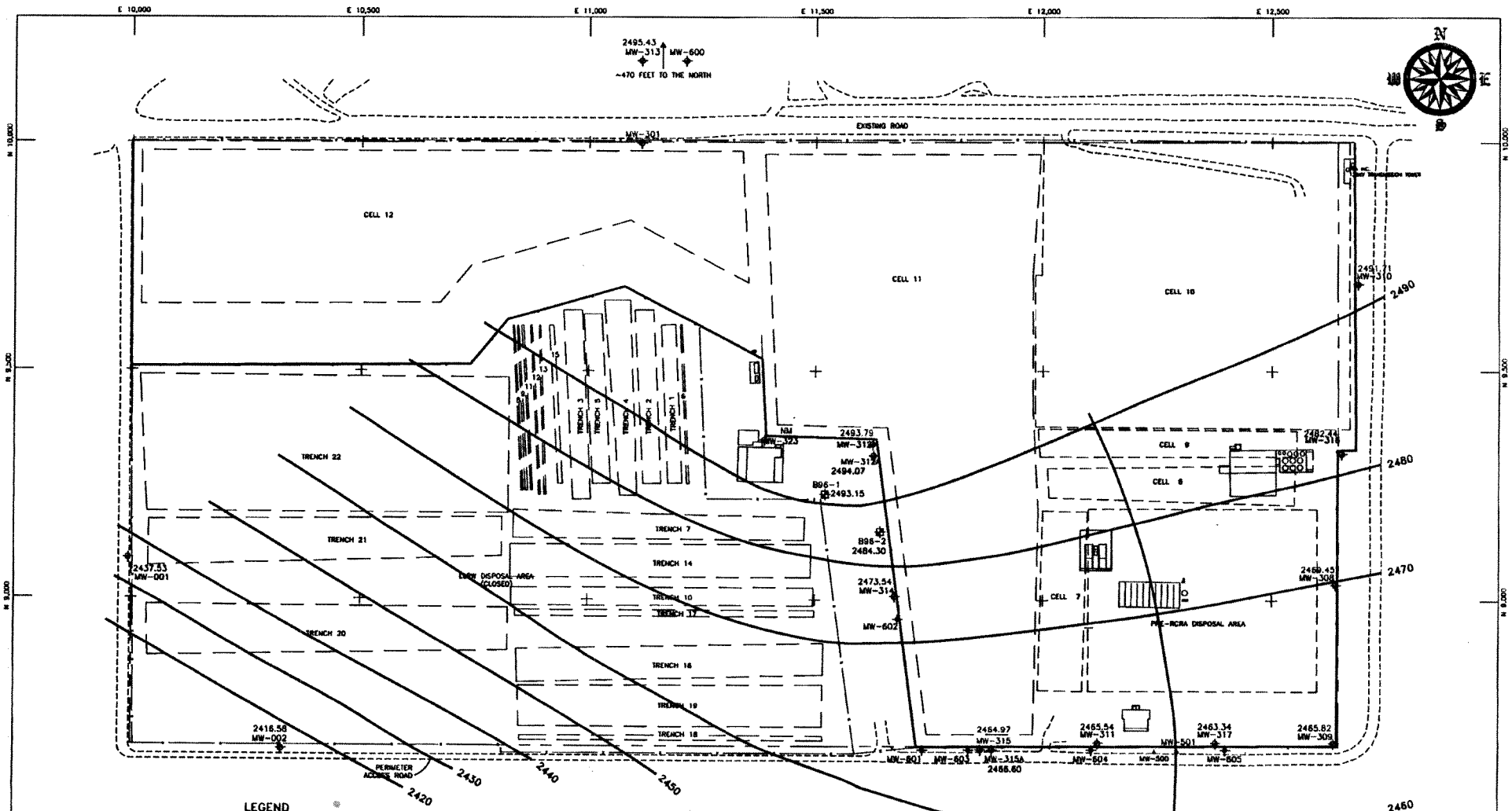
REVISIONS

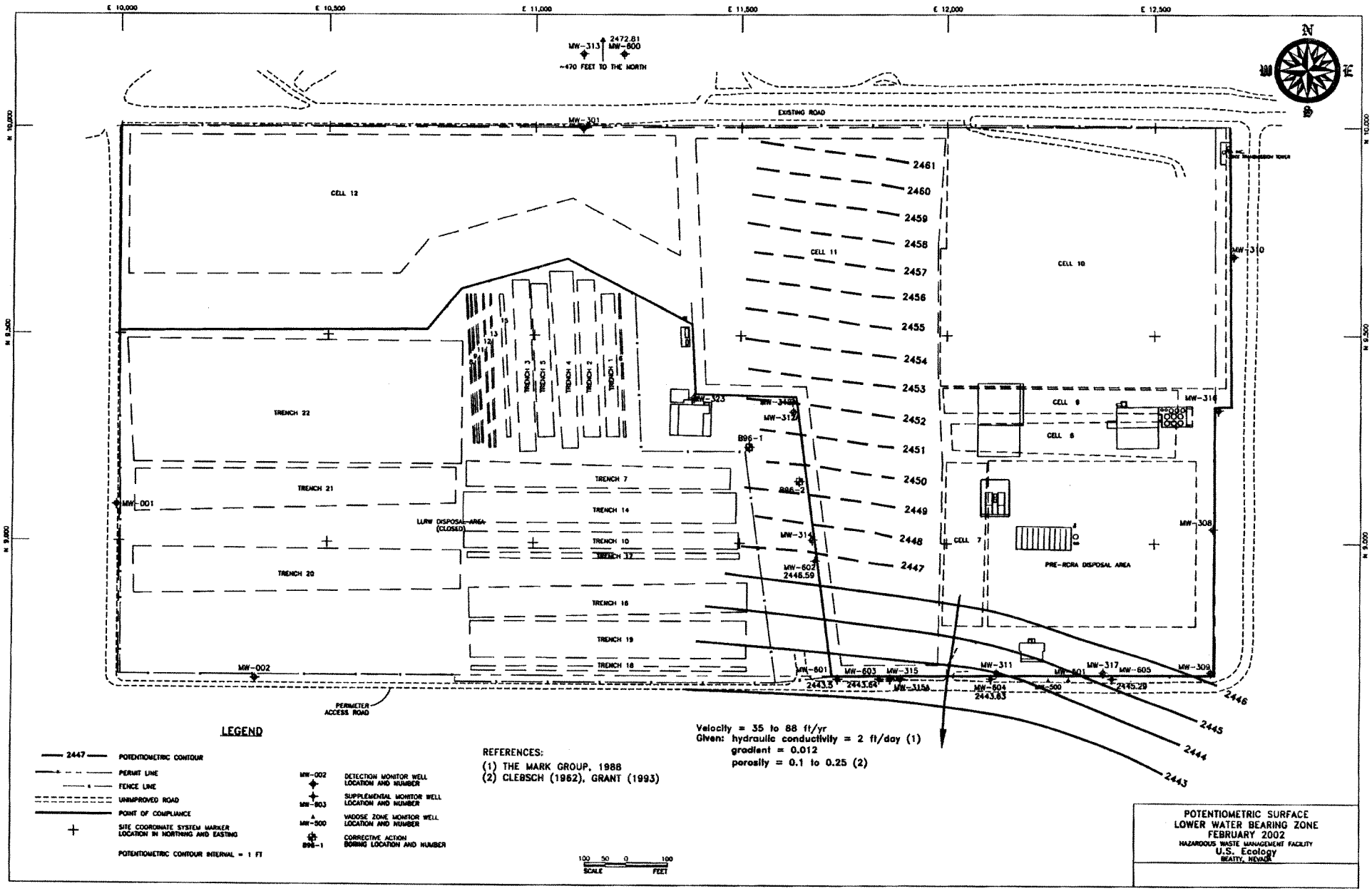
American Ecology
5333 WESTHEIMER
Suite 1000
Houston, Texas 77056

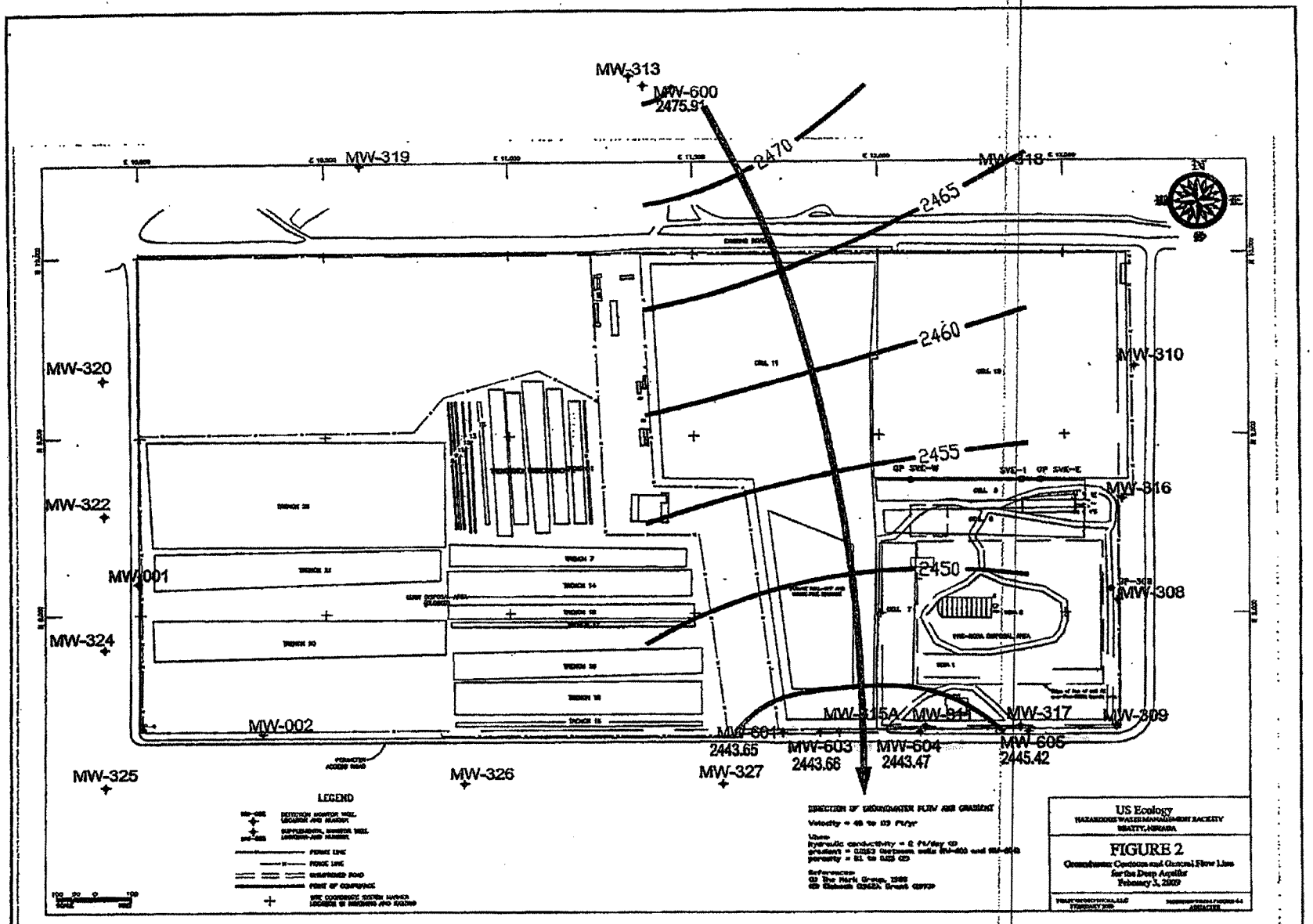
Reference Drawings

Drawn By:	LAM
Checked By:	CAB
Appr. By:	PAZ
Date:	3/99
Scale:	AS SHOWN
Project No.:	

POTENTIOMETRIC SURFACE
LOWER WATER BEARING ZONE
JANUARY 2001
HAZARDOUS WASTE MANAGEMENT FACILITY
U.S. Ecology
BEATTY, NEVADA


E 10,000
E 10,500
E 11,000
E 11,500
E 12,000
E 12,500
N 10,000
N 9,500
N 9,000
N 8,500
2495.43
MW-313
MW-600
~470 FEET TO THE NORTH
EXISTING ROAD
MW-301
CELL 12
CELL 11
CELL 10
CELL 9
CELL 8
CELL 7
TRENCH 22
TRENCH 21
TRENCH 20
TRENCH 7
TRENCH 14
TRENCH 10
TRENCH 17
TRENCH 16
TRENCH 19
TRENCH 18
TRENCH 3
TRENCH 13
TRENCH 4
TRENCH 2
TRENCH 1
LOW DISPOSAL AREA (CLOSED)
PRE-RCRA DISPOSAL AREA
2493.79
MW-312
MW-312
2494.07
B96-1
2493.15
B96-2
2484.30
2473.54
MW-314
MW-602
2437.53
MW-001
2416.58
MW-002
2464.97
MW-315
2465.54
MW-311
2463.34
MW-317
2465.82
MW-309
2469.45
MW-308
2491.71
MW-310
MW-501
MW-601
MW-603
MW-315A
2466.60
MW-604
MW-500
MW-605
PERIMETER ACCESS ROAD
2420
2430
2440
2450
2460
2470
2480
2490
LEGEND
2490 POTENTIOMETRIC CONTOUR
PERMIT LINE
FENCE LINE
UNIMPROVED ROAD
POINT OF COMPLIANCE
SITE COORDINATE SYSTEM MARKER LOCATION IN NORTHING AND EASTING
POTENTIOMETRIC CONTOUR INTERVAL = 10 FT
MW-002 DETECTION MONITOR WELL LOCATION AND NUMBER
MW-603 SUPPLEMENTAL MONITOR WELL LOCATION AND NUMBER
MW-500 VADOSE ZONE MONITOR WELL LOCATION AND NUMBER
B96-1 CORRECTIVE ACTION BORING LOCATION AND NUMBER
NM NOT MEASURED
REFERENCES:
(1) THE MARK GROUP, 1988
(2) CLEBSCH (1962), GRANT (1993)
Velocity = 2,900 to 7,300 ft/yr
Given: hydraulic conductivity = 61 ft/day (1)
gradient = 0.033
porosity = 0.1 to 0.25 (2)
100 50 0 100
SCALE FEET
POTENTIOMETRIC SURFACE
UPPER WATER BEARING ZONE
FEBRUARY 2002
HAZARDOUS WASTE MANAGEMENT FACILITY
U.S. Ecology
BEATTY, NEVADA


E 10,000
E 10,500
E 11,000
E 11,500
E 12,000
E 12,500
N 10,000
N 9,500
N 9,000
N 8,500
MW-313
2472.81
MW-800
~470 FEET TO THE NORTH
EXISTING ROAD
MW-301
CELL 12
CELL 11
CELL 10
CELL 9
CELL 8
CELL 7
TRENCH 22
TRENCH 21
TRENCH 20
TRENCH 7
TRENCH 14
TRENCH 10
TRENCH 17
TRENCH 16
TRENCH 19
TRENCH 18
TRENCH 1
TRENCH 2
TRENCH 3
TRENCH 4
TRENCH 5
LLRW DISPOSAL AREA (CLOSED)
PRE-RCRA DISPOSAL AREA
MW-001
MW-002
MW-308
MW-309
MW-310
MW-311
MW-312
MW-314
MW-315
MW-316
MW-317
MW-323
MW-601
MW-602
2448.59
MW-603
MW-604
2443.83
MW-605
B96-1
B96-2
2461
2460
2459
2458
2457
2456
2455
2454
2453
2452
2451
2450
2449
2448
2447
2446
2445
2444
2443
PERIMETER ACCESS ROAD
LEGEND
2447 POTENTIOMETRIC CONTOUR
PERMIT LINE
FENCE LINE
UNIMPROVED ROAD
POINT OF COMPLIANCE
SITE COORDINATE SYSTEM MARKER LOCATION IN NORTHING AND EASTING
POTENTIOMETRIC CONTOUR INTERVAL = 1 FT
MW-002 DETECTION MONITOR WELL LOCATION AND NUMBER
MW-603 SUPPLEMENTAL MONITOR WELL LOCATION AND NUMBER
MW-500 VADOSE ZONE MONITOR WELL LOCATION AND NUMBER
B96-1 CORRECTIVE ACTION BORING LOCATION AND NUMBER
REFERENCES:
(1) THE MARK GROUP, 1988
(2) CLEBSCH (1962), GRANT (1993)
Velocity = 35 to 88 ft/yr
Given: hydraulic conductivity = 2 ft/day (1)
gradient = 0.012
porosity = 0.1 to 0.25 (2)
100 50 0 100
SCALE FEET
POTENTIOMETRIC SURFACE
LOWER WATER BEARING ZONE
FEBRUARY 2002
HAZARDOUS WASTE MANAGEMENT FACILITY
U.S. Ecology
BEATTY, NEVADA


MW-313
MW-600
2475.91
2470
2465
2460
2455
2450
MW-319
MW-318
MW-320
MW-322
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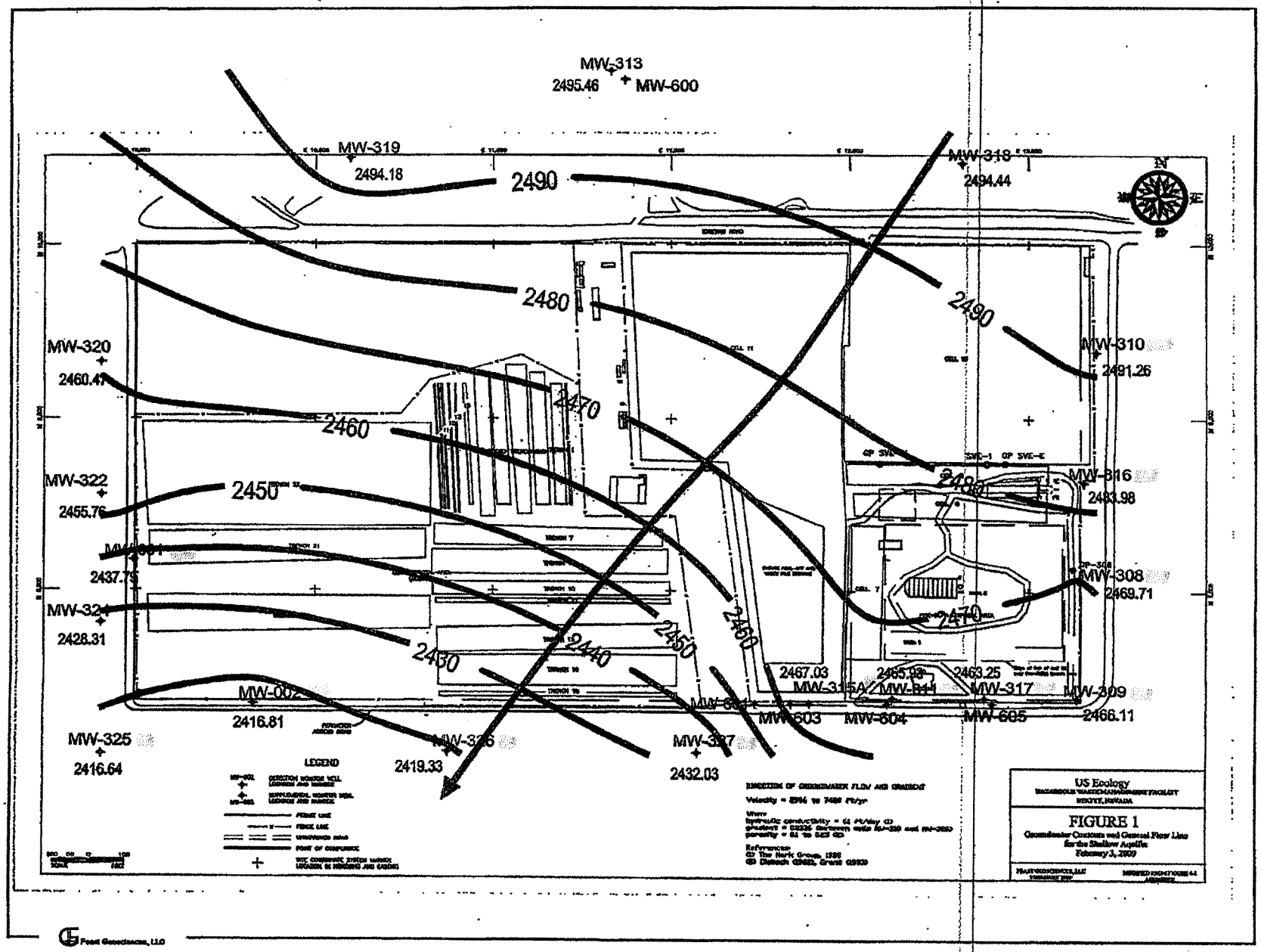
MW-310
MW-316
MW-308
MW-309
MW-317
MW-315A
MW-311
MW-605
2445.42
MW-604
2443.47
MW-603
2443.66
MW-601
2443.65
MW-327
MW-326
MW-325
MW-002
LEGEND
US Ecology
FIGURE 2
Groundwater Contours and General Flow Lines for the Deep Aquifer
February 3, 2009
Fenat Geosciences, LLC


MW-313
2495.46
MW-600
MW-319
2494.18
MW-318
2494.44
2490
2480
2470
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2450
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MW-320
2460.47
MW-322
2455.76
MW-324
2428.31
MW-310
2491.26
MW-316
2483.98
MW-308
2469.71
MW-309
2466.11
MW-317
2463.25
MW-605
MW-604
MW-603
MW-315A
2467.03
MW-325
2416.64
MW-002
2416.81
2419.33
MW-327
2432.03
LEGEND
US Ecology
FIGURE 1
Groundwater Contours and General Flow Line for the Shallow Aquifer
February 3, 2009
Feast Geosciences, LLC

-updated July 2015

SECTION 14

SOLID WASTE MANAGEMENT UNITS AND CORRECTIVE ACTION

US ECOLOGY NEVADA

March 2010

Revision June 2015

SECTION 14

SOLID WASTE MANAGEMENT UNITS AND CORRECTIVE ACTION

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14.1.1 Current status of SWMUs..... 3

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14.3.0 Corrective Action Schedule 4

14.4.0 References 4

LIST OF TABLES

Table 14-1 Status of SWMUs

ATTACHMENTS

Attachment 14 A Letters and documentation of SWMU closures

SECTION 14

SOLID WASTE MANAGEMENT UNITS AND CORRECTIVE ACTION

14.1.0 CORRECTIVE ACTION CHRONOLOGY

A RCRA Facility Investigation (RFI) was started at US Ecology Nevada in 1986 and was completed with the submittal of the Final RFI Report in 1998 (USEN, 1998a). A brief summary of the RFI process is presented below.

In 1986, the U.S. Environmental Protection Agency (EPA) Groundwater Task Force (GWTF) determined that the construction and location of a monitoring well (MW-307) created a potential pathway of increased permeability (USEN, 1987). The GWTF also determined that a number of shallow wells (labeled as 100 series) provided additional vertical conduits for potential liquid or vapor migration.

In 1987, the Jacobs Engineering Group performed a RCRA Facility Assessment (RFA) for the EPA (EPA, 1986). The RFA identified six (6) solid waste management units (SWMUs) associated with the hazardous waste management facility (HWMF). The SWMUs consisted of the following areas:

- Inactive Chemical Disposal Trenches #1-9
- Inactive Waste Pile
- Polychlorinated Biphenyl (PCB) Cell #10
- PCB Draining and Flushing Area
- Truck Washing Pad
- Radioactive Disposal Cells #9-22

In 1988, USEN started the actual RFI work. The company installed additional groundwater monitoring wells in the upper and lower water-bearing zones (Mark Group, 1989).

In 1990, USEN received approval for its RFI Workplan (USEN, 1990) and further RFI work characterized the nature and extent of potential hazardous constituents in the soil, soil vapor, and groundwater. Soils were sampled in the vicinity of the PCB Draining and Flushing Processing Area (EMCON, 1994), wells were installed to characterize the lower water-bearing zone, and vadose zone wells were installed to test for vapors in areas of dry soils. (Geraghty and Miller, Inc., 1990; 1991a, 1991b). An RFI Report was submitted to the Nevada Division of Environmental Protection (NDEP) on April 13, 1992, discussing the findings of the investigation (USEN, 1992). The report evaluated potential releases to air, soil, surface water, subsurface gas and groundwater from the identified SWMUs, and the associated nature, extent and rate of migration.

In 1994, additional soil gas samples were obtained from the vadose zone. Vapor samples were also obtained from the air/water interface in the 300-series wells. The results of the sampling event indicated volatile organics were found in the vapor in all 300-series monitoring wells, including up-gradient well MW-313 (Camp, Dresser, and McKee, 1995).

In 1995, the Interim Measures Plan (IMP) (Camp, Dresser, and McKee, 1996) was developed to deal with hazardous constituents detected in the groundwater above the statistically significant level, at point-of-compliance (POC) wells MW-312 and MW-315. During Phases I and II of the IMP, three (3) wells and two (2) piezometers were installed and sampled: MW-312A, MW-315A, MW-323, B96-1 and B96-2.

In March 1998, a Current Conditions Report (CCR) was prepared and submitted to NDEP. NDEP review comments were incorporated into the Final CCR, Revision 1, submitted September 30, 1998, and the document was approved on December 1, 1998, by NDEP (USEN, 1998b).

The CCR reviewed the site history, and included information on chemical wastes that were disposed in unlined cut-and-fill trenches until 1985. The CCR described existing information pertinent to the HWMF including operations, processes, waste management, geology, hydrogeology, contamination, migration pathways, potential receptor populations, and interim corrective measures, and the CCR included a natural resource damage assessment summary.

In April 1998, the supplemental RFI Workplan, Revision 0, was prepared and submitted to the NDEP. The workplan supplemented data gathered during the 1990 RFI, and met additional data needs identified in the CCR. As required by the facility permit (NDEP, 1998), a Corrective Action Plan (CAP) also was prepared and submitted to the NDEP in July 1998 (USEN, 1998c).

USEN incorporated NDEP comments, and submitted the supplemental 1998 RFI Workplan, Revision 1, in November 1998 (USEN, 1998d). The 1998 RFI Workplan, Revision 1, included a modification to the methods of purging and sampling of groundwater to gather evidence in support of the conceptual contaminant migration model presented in the CCR. Sufficient information was available regarding extent and migration of constituents in the subsurface (vadose zone and groundwater) to complete the RFI process. The resulting report from the implementation of the 1998 RFI Workplan, Revision 1 (USEN, 1998d), was the 1998 RFI Report, Revision 1 (USEN, 1998a), which presented the results of the 1998 RFI and a summary of the 1992 RFI Report (USEN, 1992).

- The RFI process identified two SWMUs as the most probable sources of groundwater and soil gas contamination. This contamination is probably caused by liquids contained in pre-RCRA Chemical Trenches 1-9 and Chemical Trench 10. Observed vadose zone and groundwater contamination is a result of diffusive migration of soil gas, potentially enhanced by man-made, preferential pathways created by exploratory borings and monitoring wells on site. The 1998 RFI Report (USEN, 1998a) concludes that neither the vadose zone nor groundwater contamination represent an immediate hazard to human health or the environment. The four (4) other SWMUs identified in the 1987 RFA (EPA 1986) were determined to not be current contaminant sources and these units are not expected to become sources of contamination in the future. The remaining units are the Inactive Waste Pile, the PCB Draining and Flushing Area, the Truck Washing Pad and the Radioactive Disposal Cells #9-22.

14.1.1 Current Status of SWMUs

USEN closed inactive SWMUs in accordance with Permit requirements. The identification of each SWMU and its current status is listed in Table 1-1. Letters and other documentation of closure are included in Attachment A.

TABLE 14-1 - STATUS OF SWMUS	
SWMUs	**Status**
Inactive Chemical Disposal Trenches #1-9	Closed
Cell #10	Closed
Cell #11	Closed
Cell #12	Active
PCB Draining and Flushing Area (PCB Building)	Active
Truck Washing Pad and Evaporative Tank	Active
Radioactive Disposal Cells #9-22	Closed (December 1997)
Terminator (Waste Stabilization Pug Mill)	Closed (August 2001)
Sodium and Potassium Persulfate Fire SWMU	Closed (December 1996)
Batch Stabilization Tanks 1, 2, 3, 4, and 5	Active
Waste Consolidation and Storage Area 1 and 2	Closed
Dry Hazardous Waste Disposal Areas 1 and 2	1 is closed, 2 is active
Low Temperature Thermal Desorption Unit	Closed (2010)
Dry Hazardous Waste Storage Areas 3 and 4	3 is active, 4 is future
Container Management Storage Building	Active

14.2.0 CORRECTIVE MEASURES STUDY

Corrective Action identifies and evaluates alternatives to mitigate and/or remediate releases of hazardous waste or hazardous constituents that potentially pose a threat to human health and the environment. A Corrective Measures Study (CMS) Report was submitted to the NDEP during April 2003. The CMS considered exposure pathways, future facility use, and technical limitations as site-specific characteristics. A CMS Work Plan (USEN, 1999) was approved and implemented in 1999 to address detection of some volatile organic compounds (VOCs) detected in several groundwater monitoring wells. The CMS Work Plan included a pilot study of a soil vapor extraction (SVE) system and venting of selected groundwater monitoring wells, as well as increased air, soil gas, and groundwater monitoring activities.

Removing vapors from the vadose zone is the recommended corrective measure for the facility. Soil Vapor Extraction (SVE) removes VOCs from the vadose zone and promotes their natural attenuation. The SVE pilot project concluded that operating an SVE well system would reduce soil gas contamination and impacts to groundwater.

As part of the CMS, several monitoring wells were examined and determined to provide a pathway for downward migration of waste constituents. In order to protect groundwater beneath the site from vadose zone contamination, USEN and the NDEP agreed to remove 11 monitoring wells and install nine (9) replacement wells. A three (3) phase well abandonment and installation work plan was approved by the NDEP in October 2002. Phase I of the well abandonment and installation work began in January 2003. Five (5) monitoring wells were installed and nine (9) wells were plugged and abandoned by May 2003. Phase I well installations included two (2) additional background wells. Phase II requires installing four

(4) monitoring wells along the western facility boundary during 2004. Phase III requires plugging and abandoning two (2) additional wells along the western facility boundary for monitoring the LLRW Disposal Facility. Phase III will occur after four (4) quarters of sampling the Phase II wells.

Groundwater continues to be monitored to assess the effectiveness of the pilot study.

14.3.0 CORRECTIVE ACTION SCHEDULE

Corrective action has been on-going at the facility since 1987, starting with the closing of monitoring wells and vadose zone "dry wells," which created a contaminant migration pathway. Since then, interim measures have been in effect with the installation of additional monitoring locations and inspection of monitoring well integrity.

Field activities related to the CMS began in March 1999. As part of the CMS, a pilot study SVE system was installed. The pilot SVE well has been running continuously since installation, and has been effective in removing waste constituents from the soil gas. USEN ended the CMS in 2002, and submitted the results of the study to the NDEP in April 2003.

14.4.0 REFERENCES

Individual reports have been submitted to NvDEP relative to SWMUs. These documents are extensive, and include:

Camp, Dresser, and McKee, 1995. *1994 Vadose Zone Sampling Summary Report.*

Camp, Dresser, and McKee, 1996. *US Ecology, Beatty Facility Interim Measures Plan, Phase I and II.*

EMCON, 1994. *Corrective Measures Study, PCB Draining and Flushing Area, US Ecology Landfill, Beatty, Nevada.*

Geraghty and Miller, Inc., 1990. *Abandonment of Five Groundwater Monitoring Wells at the US Ecology, Inc., Beatty, Nevada Facility Chemical Site.*

Geraghty and Miller, Inc., 1991a. *Drilling and Installation of Six Monitoring Wells at the US Ecology, Inc., Beatty, Nevada Facility Chemical Site.*

Geraghty and Miller, Inc., 1991b. *Drilling, Sampling, and Installation of Two Monitoring Wells at the US Ecology, Inc., Beatty, Nevada Facility Rad Site.*

Mark Group, 1989. *Exploratory Boring and Monitoring Well Installation Program, US Ecology RCRA Facility, Beatty, Nevada.* 2 Volumes. Prepared for US Ecology.

NDEP, 1998. *Beatty, Nevada Hazardous Waste Management Facility Permit.* HW Permit NEV HW0011, Rev. 1, April 1997.

US Ecology, 1987. *Monitoring Well 307 Evaluation.*

US Ecology, 1990. *RCRA Facility Investigation Workplan, US Ecology, Beatty, Nevada Facility, Permit # NEV HW002.*

US Ecology, 1992. *RCRA Facility Investigation Report, US Ecology, Beatty, Nevada Facility, Permit # NEV HW002.*

US Ecology, 1995. *Corrective Action Plan, Beatty, Nevada Facility Permit # NEV-HW002.*

US Ecology, 1998a. *RCRA Facility Investigation Report*, Revision 1, submitted to NDEP December 20, 1998.

US Ecology, 1998b. *Current Conditions Report for US Ecology's Hazardous Waste Management Facility, Located near Beatty, Nevada, HW Permit NEV HW0011.*

US Ecology, 1998c. *Corrective Action Plan, Beatty, Nevada Facility Permit # NEV-HW002.* Submitted to NDEP July 20, 1998.

US Ecology, 1998d. *RCRA Facility Investigation Workplan*, Revision 1. Submitted to NDEP November 20, 1998.

US Ecology, 1999. *Corrective Measures Study.* Submitted to NDEP February 8, 1999.

US Ecology, 2003. *Corrective Measures Study Report.* Submitted to NvDEP April 7, 2003.

U.S. EPA, 1986. *Groundwater Task Force Report*, Beatty, Nevada Facility

ATTACHMENT A

LETTERS AND DOCUMENTATION OF SWMU CLOSURES

ALLEN BIAGGI, *Administrator*

(775) 687-4670

(775) 687-4678

Administration
Facsimile 687-5856

Water Pollution Control
Facsimile 687-4684

Mining Regulation and Reclamation
Facsimile 684-5259

US ECOLOGY
AUG 10 2001
PO BOX 578
BEATTY, NV 89003

STATE OF NEVADA
KENNY C. GUINN
Governor

R. MICHAEL TURNIPSEED, *Director*

Waste Management
Corrective Actions
Federal Facilities

Air Quality
Water Quality Planning

Facsimile 687-6396

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL PROTECTION

333 W. Nye Lane, Room 138
Carson City, Nevada 89706

Mr. Jim Hancock
Facility Manager
US Ecology
PO Box 578
Beatty, Nevada 89003

August 3, 2001

Subject: Class 2 Permit modification to Permit NEVHW0011 (Permit) to include a "Low Temperature Thermal Desorption Unit" (LTTD Unit) and a Class one (1*) modification to include two (2) Dry Hazardous Waste Storage Areas.

Reference(s): Class II Permit Modification Request of 3/8/2000 (Temporary Authorization request 40 CFR 270.42(e)(2)(ii), and related correspondence [7/21, 9/26, 10/31, 11/6/2000, 2/9, 3/30, 6/19/2001] Ltr(s) Taguchi to Denison. And, Class 1* request of 7/13, 2001 for the Dry Hazardous Waste Storage Area.

Dear Mr. Hancock:

The Division approves the Modification request pursuant to §§270.42(b)(6). Please note that the new section replaces the section previously occupied by the "Terminator." Please find enclosed the modified section(s) and revise your copy accordingly. As no comments were submitted in response to the Public Notice of 11/3/2000, the Division has modified accordingly and has included such terms as are protective of human health and the environment. Please note, this Unit is currently undergoing a Performance Assessment phase, and will likely be subject of additional and/or more stringent conditions upon further review. Upon receipt of this letter US Ecology shall provide written notification to the facility mailing list to satisfy the requirement of 40 CFR 270.42(a) for the DHWSAs.

The Division has previously established the regulatory criteria under which this Unit shall be permitted (5/22/01 Ltr Taylor to Taguchi). Please provide a revised Application addressing the items below, minus the documents itemized in Section VI.A.2 of the Permit. Please be aware that no treatment of waste subject to Subpart AA, BB or CC may take place until such time as US Ecology has implemented the monitoring requirements of Section VI.C. Prior to treatment of this waste please notify the Division of the implementation of the monitoring requirements of this section.

As US Ecology has elected to proceed with incorporating the LTTD Unit into the current Part B Application rather the Permit due in October, please provide the following by August 31, 2001.

1. A Complete and Updated Part A Application, particularly with respect to the LTTD Unit. -Please, exclude the wastes that are restricted by Permit Section VI.B, in the X03 Unit description.

2. The Tank Assessment Report and detailed piping diagram, showing monitoring points, installed gauges, instrumentation etc. Also, please include a listing of all monitoring equipment, used to comply with the Permit requirements.

3. A resubmitted Application with respect to the LTTD and DHWSAs, without strikeouts and underlines. US Ecology has also indicated the need to "resize" the waste, and/or use a "cement" mixer in some cases. Please include these items with full descriptions and controls in the application.

4. Please provide plot plans showing all permitted structures for both the LTTD Unit and DHWSAs at a scale of 1" = 10'. Also as discussed with Mr. Hancock and Ms. Taguchi during a Division site visit, an example management plan meeting the examples of 40 CFR § Appendix V for the DHWSA. Example plot plan should explain and show graphically how incompatible wastes would be managed in the DHWSA.

5. Please provide analytical results for the wastes that have been treated in the LTTD to date. This should include all the analytical for both pre and post treatment.

US Ecology has made various reference to "resizing" of waste. The Division has explained that this Unit may not be used (without controls) for any waste over 500 ppm VOC. Please be aware the Division has restricted any pretreatment of waste (Section VI.A.1.c.1) associated with the LTTD, until the pretreatment unit has appropriate controls placed on it.

The Division approves the closure of the "Terminator," as submitted in April of 2000. US Ecology may consider the Unit approved for closure by the Division without comment.

Please direct inquiries to the undersigned at (775) 687-4670 or jtaylor@govmail.state.nv.us, ext. 3005.

Sincerely,

Jon Taylor
Staff Engineer
RCRA Facilities Branch
Bureau of Waste Management

JT:nap
pc: as stated
w/o enc: Charles A. White, Dir. of Reg. Affairs, 915 L St. Ste 1430, Sacramento, CA 95814
Mike Elges NDEP/BAQ
Frank Mabry NDEP/LV
USE file

US Ecology, Inc.
P.O. Box 578
Beatty, Nevada 89002

800/239-3943
702/553-2203
Fax 702/553-2742

USEcology, Inc.

an American Ecology company

March 20, 1998

Mr. Jeffrey Denison
Waste Management Bureau
Nevada Division of Environmental Protection
333 West Nye Lane
Carson City, NV 89706

RE: Permit No. NEV-HW0011; Permit Condition XIV.D.3

Dear Mr. Denison:

Attached is the final PCB Draining and Flushing SWMU Closure Report documenting the remediation activities performed at the PCB Building. US Ecology believes that the corrective action for the PCB Draining and Flushing area has been completed. As the attached report indicates, the cleanup measures have met and exceeded the requirements of the CMS.

Should you have any questions, do not hesitate to contact me or Lori Taguchi at (702) 553-2033.

Sincerely,

Zaki Naser

Zaki Naser
General Manager

Without Attachments:
Joe Nagel, Corporate Office

Recycled Paper

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment, for knowing violations.

Signature: Zabi Nazer Date: 3.20.98

US Ecology, Inc.
P.O. Box 578
Beatty, NV 89003

702/553-2203
Fax: 702/553-2742

USEcology

an American Ecology company

August 8, 1997

Mr. Jeffrey Denison
Waste Management Bureau
Nevada Division of Environmental Protection
333 West Nye Lane
Carson City, NV 89706-0851

RE: Permit NEV HW0011, Part XIII.A, Part XII.E.1.a and Part XIII.E.2

Dear Mr. Denison:

The purpose of this letter is to provide operator/permitee certification of closure for Trench 10 at US Ecology's Beatty Facility in accordance with Permit Condition XIII.E.2.a.

In addition, this is to certify that the requirements in Permit Conditions XIII.E.2.a and b for Trench 10 were recorded at the Nye County Recorder's Office in accordance with Nevada Law. This submittal (Record of Survey, Map 301884, Trench 10) was recorded with Nye County on January 28, 1992. US Ecology has requested that the Nye County Recorder's Office provide the NDEP with a copy of the submittal (see attached letter to Nye County Recorder).

If you have any questions, please do not hesitate to contact me at (800) 239-3943.

Sincerely,

Zaki Naser

Zaki Naser
General Manager

cc: Joe Nagel

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment, for knowing violations.

Signed: Zaki Nazer Date: 8.8.97

Recycled Paper

BOB MILLER
Governor

CHARLOTTE CRAWFORD
Director

STATE OF NEVADA

YVONNE SY
Administra.

VACANT
State Health O.

DEPARTMENT OF HUMAN RESOURCES
HEALTH DIVISION
505 E. King Street, Room 201
Carson City, Nevada 89701-4797
Telephone: (702) 687-4740 • Fax: (702) 687-3859

December 30, 1997

Joe Nagel, CEO
US Ecology, Inc.
American Ecology Corporation
120 Franklin Road
Oak Ridge, TN 37830

Re: Nevada Radioactive Material License No. 13-11-0043-02

Dear Mr. Nagel:

Enclosed is Amendment No. 17 to Nevada Radioactive Material License No. 13-11-0043-02. This amendment transfers the license to the State of Nevada, Department of Human Resources, Health Division, Bureau of Health Protection Services.

The radioactive waste disposal area of U.S. Ecology's Beatty, Nevada facility, including the security fence immediately surrounding the area, is now under Nevada State Health Division authority. All questions or concerns regarding this area are to be directed to the Radiological Health Section, Bureau of Health Protection Services, Nevada State Health Division, 1179 Fairview Drive, Suite 102, Carson City, Nevada, 89701-5405; phone (702) 687-5394 x 276.

A copy of a letter dated December 18, 1997 from the Texas Commerce Bank is also enclosed. The letter concerns transfer of the $842,000 performance bond to the Nevada Division of Environmental Protection in conjunction with this licensing action.

Sincerely,

ASU III FOR:

Yvonne Sylva, Administrator
Nevada State Health Division

Enclosure

cc: Stanley Marshall, Supervisor, Radiological Health Section
Alan Tinney, Chief, Bureau of Health Protection Services

NEVADA STATE HEALTH DIVISION

RADIOACTIVE MATERIAL LICENSE

SUPPLEMENTARY SHEET

License Number 13-11-0043

Amendment No. 17

US Ecology, Inc.
American Ecology Corporation
120 Franklin Road
Oak Ridge, TN 37803

In accordance with letter dated January 13, 1997 signed by Mark Cade, and letter dated Septem 1997 signed by Joe Nagel, Nevada Radioactive Material License No 13-11-0043-02 is transferred to the State of Nevada, Department of Human Resources, Health Division, Bureau of Protection Services.

December 30, 1997

ASD III FOR:

Yvonne Sylva, Administrator
Health Division

PETER C. MORROS, Director
L.H. DODGION, *Administrator*
(702) 687-4670
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STATE OF NEVADA
BOB MILLER
Governor

US ECOLOGY
DEC 16 1996
BEATTY, NV

Waste Management
Corrective Actions
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DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL PROTECTION
Capitol Complex
Carson City, Nevada 89710

December 9, 1996

ZAKI NASER
FACILITY & ENVIRONMENTAL MANAGER
US ECOLOGY
PO BOX 578
BEATTY NV 89003

RE: SODIUM AND POTASSIUM PERSULFATE FIRE SWMU REPORT DATED APRIL 1, 1996

Dear Mr. Naser:

NDEP has reviewed the above document and agrees with the findings contained therein. No further action is required for the affected area due to the release of the chemical stabilization reagents sodium and potassium persulfate.

Please contact me with any questions regarding this letter. I can be reached at (702) 687-4670, ext. 3005.

Sincerely,

Catherine R. Pool

Catherine R. Pool, P.E.
RCRA Permitting Branch
Bureau of Waste Management

CRP:gf

Enclosure

cc: Don Brady, American Ecology, Houston
Jeffrey C. Dension, NDEP

RECEIVED
AUG 2 5 2014
NDEP BWM

SCHEDULED CLOSURE PLAN

US ECOLOGY NEVADA

March 2010

Revised August 2014

SECHULED CLOSURE PLAN

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APPENDIX

Appendix 15 A Closure Cost Estimate

SCHEDULED CLOSURE PLAN

This Scheduled Closure Plan has been prepared by US Ecology Nevada (USEN) to comply with the requirements of (1) 40 CFR §§264.111, 264.112 (a) to (c) and 40 CFR §270.14 (b)(13), as adopted by the Nevada Division of Environmental Protection (NDEP), and (2) the Approval for Commercial Storage and Disposal of Polychlorinated Biphenyls (PCBs) issued by the United States Environmental Protection Agency (US EPA). This plan describes the procedures USEN will follow to perform a scheduled partial and/or final closure at any point during the active life of the facility. Scheduled final closure is a planned activity and is expected to take place as part of normal operation after all the disposal cells are full.

USEN will implement this plan for the following existing units at time of closure:

- Hazardous Waste Land Disposal Trench 12
- Polychlorinated Biphenyl (PCB) Processing Building/ PCB Tank Farm/ Tank Truck Loading Pad
- Batch Stabilization Units
- Truck Parking Storage Area
- Evaporation Pad
- Dry Hazardous Waste Storage Areas 2 and 3
- Container Management/Stabilization Building/ Satellite Laboratory/ Truck Unloading Docks

15.1.0 CLOSURE PERFORMANCE STANDARD

Closure:

- Minimizes the need for further maintenance,
- Minimizes the potential for post-closure escape of hazardous waste or constituents to the surrounding environment, and
- Complies with the closure requirements in 40 CFR Part 264 for each unit.

15.2.0 PARTIAL CLOSURE

Closure of certain hazardous waste management units may be necessary prior to final closure of the entire facility. Circumstances that may prompt partial closure are:

- Modifications to facility operations, such as the completion of filling in Trench 12.
- Replacement of units beyond useful service life
- Unanticipated failure of units/structures

Partial closure of any unit will be completed within 180 days after final receipt of hazardous waste in that unit following the same procedures described for final closure with regards to removal of waste and residues, unit decontamination, dismantling and disposal.

If partial closure is required for the landfill cell, USEN will notify the NDEP Administrator and USEPA Region IX RCRA Facilities Management Office at least 60 days prior to beginning closure.

15.3.0 MAXIMUM WASTE INVENTORY

The maximum inventory of hazardous waste expected to be at the facility at any time over the active life of the facility is identified in Table 15-1. This maximum was derived by reviewing historical inventory records and projecting the historical maximum percentage for permitted and proposed unit inventories. However, waste inventory at a time of scheduled closure should be minimal. As the final disposal cell approaches capacity, waste receipts will decrease to match the remaining volume. The only waste requiring off-site disposal after all units are closed should be that generated during closure.

15.4.0 SCHEDULE FOR CLOSURE

A closure schedule with the projected activities and required closure time are included in Table 15-2.

15.4.1 Time Allowed for Closure

Closure activities are expected to begin no later than 180 days after receiving the final volume of hazardous waste at the facility (or at the individual unit when partial closure is anticipated). Should additional time be necessary, USEN will submit a permit modification requesting a longer period.

Within 90 days after receiving the final volume of hazardous waste, waste inventory in storage or treatment units will be treated on site and disposed of in the landfill, or removed for off-site disposal. The units will be dismantled and disposed of or decontaminated, in accordance with the procedures described in Section 7.5 and 8.0. Remaining portions of the landfill will be backfilled and a final cover placed as described in Section 7.1.

Closure activities will be completed within 180 days from the start of closure activities.

15.4.2 Closure Time Extension

If treatment, removal or disposal of the final volume of hazardous waste and completion of closure activities require a longer time, USEN may request modification of the approved closure plan, or

otherwise petition the NDEP for approval of a closure time extension. The extension request will include a demonstration that:

- Closure activities require longer than the 90 or 180 days allowed,
- The unit has capacity to receive additional waste,
- There is a reasonable likelihood that a party other than US Ecology will commence operation of the facility within one year, or
- Closure will interfere with continued operation.

15.5.0 AMENDMENTS TO SCHEDULED CLOSURE PLAN

USEN will submit a written request to the NDEP and to the Permits Section, Land Division, US EPA Region IX for a modification of the approved Scheduled Closure Plan, as necessary, whenever the following occurs:

- Changes in operating plans or facility design materially affect the Scheduled Closure Plan
- In conducting partial or final closure activities, unexpected events require a modification to the approved Scheduled Closure Plan.

15.6.0 CERTIFICATION OF CLOSURE

USEN will submit a certification of closure to the NDEP Administrator within 60 days of completion of partial closure activities of any of the land disposal cells, or completion of scheduled final closure. USEN will certify that the hazardous waste management unit or facility, as applicable, was closed in accordance with the specifications of the approved Scheduled Closure Plan. The certification will be signed by a company representative and by an independent professional engineer registered in the State of Nevada.

15.7.0 CLOSURE PROCEDURES

15.7.1 Closure of Landfill

Below-grade available space, except for the volume required for disposal of on-site waste and other items will be backfilled with soil from the site's soil stockpile. Any above-grade waste will be contained by constructed dikes and soil backfill, as necessary.

When waste and backfill within the above-grade disposal facility reach an elevation within approximately three feet below the designed top of waste elevation, final waste placement operations will begin. At that time, waste and backfill will be mounded toward the middle of the

above-grade area to the design maximum waste elevations. When the final waste slopes have been established, the final cover will be installed. This cover will consist of a layered soil system.

Once the slopes for waste and backfill are established, a final cover system will be placed over the landfill. It is assumed that the contractor will install the approved cover system, and will follow the specified quality assurance and quality control procedures.

Control of percolation into the closed trench will be provided by constructing a cover that holds infiltrated water in the evaporative zone of the cover until it is returned to the atmosphere. The cover virtually eliminates percolation into the trench.

The final landfill cover for USEN Trench 12 satisfies the regulatory requirements for final closure of a landfill cell and are fully consistent with the provisions of 40 CFR 264.110, the performance standards of 40 CFR 264.111, and the following requirements of 40 CFR 264.310(a) dealing with landfill closure:

- Provide long-term minimization of migration of liquids through the closed landfill;
- Function with minimum maintenance;
- Promote drainage and minimize erosion or abrasion of the cover; and
- Accommodate settling and subsidence so that cover integrity is maintained.

15.7.1.1 Evaporative Cover Characteristics

The cover is appropriate for an arid region, and uses the moisture retention properties of native soils to contain and store infiltrating moisture (precipitation) until the natural processes of evaporation and plant transpiration remove the stored moisture and release it to the atmosphere. The cover is protective of human health and the environment, and offers long-term benefits when compared to conventional landfill cover types that incorporate compacted clay or synthetic materials as low-permeability components. These benefits include, but are not limited to:

- use of easily obtained construction materials,
- relative simplicity of construction,
- reduced complexity of quality assurance/quality control programs, and
- increased long-term cover integrity and stability.

From bottom to top, the components of the arid region cover to be used for Trench 12 are as follows.

Interim Cover Soil Layer. The lower layer of the final cover is a lightly compacted native soil layer at least 12-inches (1.0 foot) thick and extending across the cover to the natural ground surface on all sides of the trenches.

Final Cover Soil Layer. The upper layer of the final cover is a lightly compacted soil layer at least 24-inches (2.0 feet) thick and extending across the cover to the natural ground surface on all sides of the trenches. In conjunction with the Interim Cover Layer, it retards the downward movement of infiltrating water by providing temporary water-storage, and allowing stored water to be returned to the atmosphere by evaporation and plant transpiration.

Mathematical models predicted that a three-feet (36-inch) thick monolithic cover will prevent significant percolation of fluids through the cover and into waste. The results also indicate that nearly all of the precipitation that enters returns to the atmosphere through the combination of evaporation and transpiration rather than infiltrating deeply into the cover and percolating into waste. These results likely are conservative because no vegetation was considered in the models, so the evaluation of "evapotranspiration" (the combined effect of evaporation and plant transpiration) actually was limited to consideration of evaporation only.

15.7.1.2 Evaporative Cover Specifications

Soil materials for final cover construction will consist of natural soil obtained from USEN stockpiles and/or from future trench excavations, supplemented as needed with imported soil materials. Native and imported materials will be screened and mixed, as needed, to obtain material of satisfactory grain size.

The Trench 12 interim soil layer will be a low density layer; this is important to the moisture holding capacity and vegetation establishment properties of the cover. Care must be taken to minimize over-compaction that could lead to reduced cover effectiveness. The interim layer should not be less than 12 inches thick and should be comprised of natural soil materials that contain no grain sizes larger than 6.0 inches. There is no compaction specification for this material, which will be placed as above-grade waste disposal proceeds.

The upper component of the final trench cover will be a lightly compacted soil layer that varies in thickness to allow the cover to be shaped according to the approved design; however, the layer everywhere should be at least 24-inches (2.0 feet) thick, per the RCRA

permit. This layer should extend across the cover to the natural ground surface on all sides of Trench 12.

The gradation specifications for the final cover layer are as follow:

- no materials larger than 3.0 inches,
- 90 percent smaller than 1.0 inch, and
- not less than 5.0 percent passing the #200 sieve.

Based on experience from final cover placement on Trench 11, the final cover specifications were modified. Similar specification modification will be necessary at the closure of Trench 12 as supported by a July 23, 2013 letter from AquAeTer, Inc. (for US Ecology) to NDEP requesting approval to increase the maximum size of rocky materials in the final cover soil layer to 6.0 inches.

The goal of final cover placement is to achieve a minimal in-place density. Experience from final cover placement on Trench 11 indicates that maximum dry density (MDD) by ASTM D 1557 is feasible at approximately 80 percent (plus or minus approximately 5%) and a moisture content between 2.0 and 4.0 percent less than the OMC. The low density compaction requirement of the soil cover is important for the moisture holding capacity of the soil. Over-compaction during initial construction could lead to reduced moisture holding effectiveness and inhibit establishment of vegetation, and should be prevented. Areas of the final cover layer that became overly compacted, such as from repeated vehicle or equipment passage, must be loosened by shallow ripping. Over time, material in the final cover will reach a density similar to those of native materials.

Soil materials for final cover construction shall consist of sand and gravel soils obtained from USEN stockpiles and the Trench 12 excavation area. Natural soil materials present in the Trench 12 excavation, and typical of all previous disposal cell excavations at the facility, are relatively coarse grained, alluvial valley-fill sands and gravels, with variably abundant clay and silt-size particles, common cobble-size particles (i.e., particles larger than 3.0 inches in dimension), and rare boulders (i.e., particles larger than 12 inches in dimension). Sand-size particles (i.e., particles between 0.003 and 0.2 inches in dimension) and gravel-size particles (i.e., particles between 0.2 and 3.0 inches in dimension) comprise the vast majority of almost any sample of soil materials from the uppermost 75 feet of the valley-fill deposits, and thus make up the majority of natural materials determined to be acceptable for final cover construction. It is these materials,

and particularly those ranging in the sand and silt grain sizes, that provide most of the moisture-holding capacity that is needed for the proper long-term functioning of a water-balance type landfill cover. The coarser-grained components – gravels, cobbles, and even rare boulders – do not enhance the moisture holding capacity of the final cover, but do contribute to overall cover stability and capacity to resist erosion by wind and water. Thus, when in proper proportions, all textural components of the final cover soils contribute to the long-term performance of the landfill cover.

Cover soil placement should be done using low-ground pressure equipment, such as a wide-tracked bulldozer, instead of heavy wheeled equipment that could cause linear surface depressions. Over-compaction (i.e., areas exceeding the density specification for cover materials) could reduce the water-holding characteristics of the cover and the ability of the cover to support establishment of vegetation. Once the cover is completed, vehicular traffic on the soil cover should be limited. Also, construction materials and equipment should not be stored on the cover during or after construction. Areas that become over-compacted because of initial cover soil placement or equipment traffic must be loosened by ripping. Ultimately, such ripping to achieve acceptable soil density might be required over the final cover surface.

15.7.1.3 Post Closure Performance Verification

Verification of post-closure performance of the final cover will be provided by the combination of leachate monitoring (quality and quantity), basin lysimeter monitoring, and groundwater monitoring.

Leachate monitoring will use existing Trench 11 and Trench 12 sumps to remove leachate from the landfill units. Records of leachate removal will be tabulated and evaluated to determine whether leachate production rates decline following facility closure.

A drainage lysimeter was constructed during the closure of Trench 11 and provides performance monitoring of the alternate final cover, approved for closure of Trench 12. The drainage lysimeter is used to verify that unacceptable infiltration of moisture does not penetrate the landfill cover.

Closure of the above-grade disposal facility will be considered complete when the final design slopes have been established on the cover. Post-closure inspection and maintenance will be performed in the same manner as for other closed landfill units at the facility. With the design features presented in this report, it is expected that the above-

grade disposal facility will provide long-term, maintenance-free protection to the environment.

Construction of the final cover will be conducted in accordance with cell specifications included in the Landfill Report of the Permit Renewal Application. A detailed evaluation of the proposed final cover performance is presented in the following reports, which have been previously presented to the NDEP, and are included herein by reference.

- The design of the proposed final cover is described in detail in the *Trench 11 Above-Grade Disposal Facility Design and Construction Quality Assurance Plan*, revised May 6, 1999, by AquAeTer, Inc.
- *Erosion Calculations for Above Grade Disposal Cell*, dated July 28, 1987, prepared by Dr. James L. Grant and Associates.
- *Cell 10 Cap Design Analysis Using Wind Erosion Equation* prepared by US Ecology in March 1991.
- *Supplement – Landfill Report for Trench 12, October 2007,* AquAeTer, Inc.
- *Design Basis and Construction Specifications for Trenches 11 and 12 Final Covers, April 2008,* AquAeTer, Inc.

The soil cover data in the above referenced reports is applicable to the cover design for Trench 12.

15.7.2 Closure of Treatment and Storage Units

For purposes of the closure procedures discussion, treatment and storage units are grouped according to their location, as follows:

- *PCB Processing Building/PCB Tank Farm/ Tank Truck Loading Pad*
- *Truck Parking Storage Area*
- *Batch Stabilization Units*
- *Evaporation Pad*
- *Dry Hazardous Waste Storage Areas 2 and 3*
- *Container Management/Stabilization Building/Satellite Laboratory/Truck Unloading Docks*

15.7.2.1 PCB Processing Building and RCRA Storage Area (CMU #1)/ PCB Tank Farm/ Tank Truck Loading Pad

All liquid PCBs in storage at the time of a scheduled closure will be transported to a Toxic Substance Control Act (TSCA) authorized disposal facility. All RCRA waste inventory in storage will be treated as needed and disposed of on site, or transported to a RCRA-authorized off-site facility for treatment and/or disposal.

The steel building walls and any contaminated equipment will be dismantled and disposed of in the PCB portion of the landfill cell. The entire PCB processing facility, including the building's concrete floor and underlying liner system, PCB Tank Farm secondary containment and Tank Truck Loading Pad, will be excavated and disposed of in the PCB portion of the landfill. The concrete will be broken up into manageable pieces using appropriate equipment. The containment system drainage material will be removed and transferred to the PCB portion of the disposal unit. The underlying liner system will be cut and folded for disposal in the landfill cell.

Sampling will be performed in accordance with 40 CFR 761.283(b). Samples will be obtained from the soil underlying the building containment system, PCB Tank Farm and Tank Truck Loading Pad to demonstrate clean closure. The area to be sampled will be marked out in 1.5 m x 1.5 m grids; PCB samples will be taken from locations within each grid which show signs of visible staining or where inspection of the liner indicates possible deterioration. If no staining/deterioration is evident, simple random location selection should be performed. Metal and VOC samples will be collected from locations with the highest probability for contamination (i.e., areas with visible staining or where visual inspection of the liner indicates possible deterioration). If no staining/deterioration is evident, simple random location selection should be performed. The estimated number of samples required to demonstrate clean closure is identified in Table 3. Samples will be analyzed for the parameters specified in Table 4 following U.S. Environmental Protection Agency (EPA) SW-846 methods. Soil will be removed from the site stockpile and sampled to obtain background levels. Soil samples that have (1) concentrations of metals and VOCs that are statistically at or below background levels, and (2) concentrations of total PCBs below 1 mg/kg will be considered to have met the clean closure performance standard. Because of the presence of a liner system, no soil contamination is anticipated.

Soil removal will be initiated should any of the samples not meet the clean closure performance standards listed above. Soil removal will be conducted in three-inch increments followed by confirmatory testing until clean closure is obtained. Additional testing will be limited to those constituents exceeding background concentrations.

15.7.2.2 Truck Parking Storage Area (CMU #7)

Waste inventory in the Truck Parking Storage area will be treated and disposed of on-site, or transported to a RCRA-authorized hazardous waste management facility. The concrete pad will be decontaminated and left in place, or removed to the disposal cell.

If removal of the pad is determined necessary, the procedures described in Section 7.2.1 will be followed for removal of the concrete pad, removal of contaminated soil (if any) and demonstration of clean closure.

If the decontamination option is selected, decontamination of the unit will follow the procedures described in Section 15.8.0, as applicable.

15.7.2.3 Batch Stabilization Units (T1-T3, T-18 & T-19)

Waste inventory in the stabilization units will be treated and placed in the on-site landfill cell or transported to an authorized off-site facility for treatment and/or disposal.

The stabilization vessels will be decontaminated and left in place, or washed, dismantled and placed in the on-site disposal cell. The concrete silo foundation will be removed for off-site treatment and disposal. The procedures described in Section 7.2.1 will be followed for removal of the foundation, containment system, and any contaminated soil, and demonstration of clean closure.

If the decontamination option is selected, decontamination of the unit will follow the procedures described in Section 15.8.0, as applicable.

15.7.2.4 Evaporation Pad (T-11)

Liquid waste inventory in the unit will be removed and sent off site to an authorized disposal facility. Should partial closure be necessary for this unit, the waste inventory will be removed and solidified/stabilized in the Batch Stabilization Unit.

The concrete pad will be removed for off-site treatment and disposal. The procedure described in Section 7.2.1 will be followed for removal of the liner system, removal of contaminated soil (if any), and demonstration of clean closure.

15.7.2.5 Dry Hazardous Waste Storage Areas 2 and 3 (CMU #6 & CMU #17)

Waste inventory in the Dry Hazardous Waste Storage Area will be treated and disposed of on site, or transported to a RCRA-authorized hazardous waste management facility. The pad area will be excavated and removed to the disposal cell.

Samples will be obtained to demonstrate clean closure. Sample locations will be selected in areas with the highest probability for contamination (i.e., areas where visible staining is present). If no visible staining is present, samples will be chosen at random. The

estimated number of samples required to demonstrate clean closure is identified in Table 3. Samples will be analyzed for the parameters specified in Table 4 following U.S. Environmental Protection Agency SW-846 methods, and the results statistically compared to background concentrations. Samples where background concentrations are obtained within a statistically acceptable margin will be considered to have met the clean closure performance standard. Soil removal will be initiated should any of the samples indicate a statistically significant increase over background values for any constituent. Soil removal will be conducted in three-inch increments followed by confirmatory testing until clean closure is obtained. Additional testing will be limited to those constituents exceeding background concentrations.

15.7.2.6 Container Management Building (CMU #16)/Satellite Laboratory/ Truck Unloading Docks

All wastes in storage at the time of a scheduled closure will be treated and disposed onsite or transported to an appropriately authorized TSDF.

The steel building walls and any contaminated equipment will be decontaminated or dismantled and disposed of in the appropriately permitted landfill cell. If structure removal is required, the entire building including the floor shall be excavated and disposed of as described below. The truck docks and the awning over the west truck dock will also be removed and disposed in the onsite landfill.

Sampling will be performed in accordance with 40 CFR 761.283(b). Samples will be obtained from the soil underlying the building containment system, Satellite Laboratory, and truck docks to demonstrate clean closure. The area to be sampled will be marked out in 1.5 m x 1.5 m grids; PCB samples will be taken from locations within each grid which show signs of visible staining or where inspection of the liner indicates possible deterioration. If no staining/deterioration is evident, simple random location selection should be performed. Metal and VOC samples will be collected from locations with the highest probability for contamination (i.e., areas with visible staining or where visual inspection of the liner indicates possible deterioration). If no staining/deterioration is evident, simple random location selection should be performed. The estimated number of samples required to demonstrate clean closure is specified in Table 3. Samples will be analyzed for the parameters specified in Table 4 following U.S. Environmental Protection Agency (EPA) SW-846 methods. Soil will be removed from the site stockpile and sampled to obtain background levels. Soil samples that have (1) concentrations of metals and VOCs that are statistically at or below background levels, and (2) concentrations of total PCBs below 1 mg/kg will be considered to have met the clean closure performance

standard. Because of the presence of secondary containment, no soil contamination is anticipated.

Soil removal will be initiated should any of the samples not meet the clean closure performance standards listed above. Soil removal will be conducted in three-inch increments followed by confirmatory testing until clean closure is obtained. Additional testing will be limited to those constituents exceeding background concentrations.

If the decontamination option is selected, decontamination of the unit will follow the procedures described in Section 15.8.0, as applicable.

Waste inventory in the stabilization units will be treated and placed in the on-site landfill cell or transported to an authorized off-site facility for treatment and/or disposal.

The stabilization vessels will be decontaminated and left in place, or washed, dismantled and placed in the on-site disposal cell. The procedures described in this section will be followed for removal of the foundation, containment system, and any contaminated soil, and demonstration of clean closure.

All accumulated wastes present in the Satellite Laboratory at the time of scheduled closure will be treated and disposed on site or sent off site to an authorized TSDF. If structure removal is required, the entire building including the floor shall be excavated and disposed of as described above.

Samples will be obtained from the soil underlying the Satellite Laboratory to demonstrate clean closure, as described above. No PCB samples will be collected since the laboratory does not handle PCBs.

15.8.0 DECONTAMINATION OF EQUIPMENT AND STRUCTURES

At the time of closure, US Ecology will evaluate the economic feasibility of conducting clean closure of treatment/storage units and structures. In addition to the economic feasibility of decontamination, US Ecology will evaluate the condition of each unit or structure to determine the presence of significantly deteriorated areas, which could dictate the need for unit removal and disposal. Should the decontamination option be selected, the following steps will be taken.

1. The interior surfaces of piping, valves, pumps and other ancillary equipment associated with tank systems will be cleaned by flushing with a detergent wash and rinsing with tap water. If the facility determines that a detergent wash is not adequate, other appropriate decontamination

methods may be employed (e.g., solvent wash, steam cleaning). Wash waters will be drained to the tank for subsequent removal.

2. Interior tank surfaces will be pressure washed using water and cleaning agents followed by triple rinsing with tap water. Wash waters will be collected from the bottom of the tank and removed using vacuum equipment or by pumping to a tanker truck for off-site disposal.

3. Tank surfaces will be visually inspected to determine whether residues have been completely removed. If residues are visually detected, Step 2 will be repeated.

4. Concrete floors and structures will be cleaned with an industrial floor scrubber. The floors will be pressure washed and triple rinsed. The entire surface will be visually inspected to ensure removal of visually detectable residues. Wash waters generated during decontamination will be removed with vacuum equipment or by pumping to a container or tanker truck for off-site disposal.

5. Following decontamination and visual inspection of all tanks and structures, a final rinse with clean tap water will be performed. Decontamination will be verified by collecting and submitting one rinsate sample from each unit/structure for analysis. Sampling and analysis will be conducted following procedures recommended by the version of EPA SW-846 that is applicable at the time of closure. Decontamination verification samples will be analyzed for the parameters identified in Table 4. For structures handling PCBs, an appropriate number of wipe samples will be collected from the walls, floor, and pans (if applicable) to demonstrate that PCB levels are below 10 µg/100 cm^2. For unsealed concrete surfaces, concrete core samples should be collected instead of wipe samples to demonstrate that PCBs meet the 1 mg/kg closure limit. If core samples are required, contact EPA Region IX for the latest guidance on collecting concrete core samples. Areas to be sampled will be marked out in 1.5m x 1.5m grids, as discussed previously.

6. Heavy equipment and unloading docks used for handling waste shall be cleaned with a high-pressure water cleaner until all visible contamination has been removed. If such cleaning is physically impossible or economically unfeasible, the equipment or applicable parts thereof will be properly disposed of in the landfill cell.

Decontamination rinse water will be statistically compared to a background sample of tap water (metals and VOCs only). If statistically significant parameters are detected in the rinse water, the decontamination steps described above will be repeated until the statistical comparison is met.

15.9.0 GROUNDWATER MONITORING

At least one groundwater monitoring event will take place during the closure period. Groundwater monitoring will be conducted following the same procedures observed during operations just prior to the time of the scheduled closure.

15.10.0 LEACHATE COLLECTION

The leachate generated during the closure period will be transported to an off-site disposal facility.

15.11.0 RUN-ON AND RUN-OFF CONTROLS

The existing perimeter ditches around the facility will continue to provide run-on protection during the closure period. Run-off control mechanisms in place during the active life will remain in place throughout the closure period. Rainfall coming in contact with waste in the active cell will be collected in the cell and treated as leachate. Rainfall contacting capped portions of the cell will be considered clean and allowed to run off into natural drainage courses.

TABLE 15-1 - Estimate Of Maximum Waste Inventory		
UNIT DESCRIPTION	AMOUNT * (Expressed as Percentage of Total Design Capacity)	WASTE TYPE
PCB Tanks (T4 – T7, T10 – T11)	90%	PCB Liquids
Leachate Storage Tank (T-15)	65%	Landfill Leachate (F039)
Truck Parking Pad (CMU #7)	100%	Stabilization Waste
Container Management/Stabilization Building (CMU #16)	100%	Stabilization Waste
Dry Hazardous Waste Storage Area (CMU # 6 and CMU #17)	100%	Stabilization Waste
PCB Building (CMU #1)	90%	RCRA Waste and PCB Materials
Evaporation Pad (T-11)	100%	Wastewater and Sludge
Batch Stabilization Units (T-1, 2, 3, 18 & 19)	100%	RCRA Liquids, Sludges or Solids Amenable to Stabilization
* Based on historical inventory records		

TABLE 15-2 - Estimated Schedule For Closure At Us Ecology Facility	
TASK	ESTIMATED TIME PERIOD
Final Waste Receipt	Day 0
Notification of Intent to Close	Day 30
Begin construction of lysimter in closed landfill.	Day 60
Complete Treatment or Disposal of Waste Inventory	Day 90
Complete Closure of Treatment and Storage Units	
* Truck Parking Area (CMU #7)/Container Management/Stabilization Building (CMU #16)/ Satellite Laboratory/ Truck Unloading Docks	Day 101
* Dry Hazardous Waste Storage Area (CMU #6 and CMU #17)	Day 123
* PCB Building (CMU #1)/PCB Tank Farm/ Tank Truck Loading Pad	Day 134
* Batch Stabilization Units (T-1, 2, 3, 18, 19)	Day 152
* Evaporation Pad (T-11)	Day 170
Complete Installation of Lysimeter	Day 180
Complete Closure of Landfill	Day 180
Final Inspection and Certification of Compliance with Closure	
Plan by Registered Professional Engineer (P.E.)	Day 240
* Note: Schedule only applies to units in existence at time of closure.	

Table 15-3 – Estimated Number of Samples Required to Demonstrate Clean Closure						
			PCB Sampling		VOCs and Metals Sampling	
Unit Name	Dimensions	Approximate Area (ft²)	Initial Sample No.	Re-Sample No.	Initial Sample No.	Re-Sample No.
PCB Processing Building	48'x100'	4800	202	50	10	2
PCB Tank Farm*	45'x48'	2160	91	23	4	1
Tank Truck Loading Pad**	56'x15.5'	868	37	9	2	1
Container Management/ Stabilization Building	175'x146'	24868	1046	262	50	12
Truck Parking Pad	56'x136'	7616	320	80	15	4
Pan 1 (T-1)***	14'x50'	700	29	7	1	1
Pan 2 (T-2)	30'x31'	930	39	10	2	1
Pan 3 (T-3	30'x31'	930	39	10	2	1
Pan 4 (T-18)	22'x15.5'	341	14	4	1	1
Pan 5 (T-19)	22'x15.5'	341	14	4	1	1
Evaporation Pad (T-11)	40'x52'	2080	88	22	4	1
Satellite Laboratory	12'x24'	288	0	0	2	1
DHWSA #2	260'x61.1'	15886	0	0	32	8
DHWSA #3	100'x440'	44000	0	0	88	22
	Totals	**105808**	**1919**	**481**	**214**	**57**

PCB samples scheduled for collection on 1.5m x 1.5m grid

VOC and Metals samples scheduled for collection on 1 per 500 ft² frequency

Re-Samples based on assumption that 25% of samples fail

*Includes 3' wide aisle of packed soil between building and tank farm containment

**Includes soil between building and Tank Truck Loading Pad

***Includes 24' wide process area around outside of pan

TABLE 15-4 - Clean Closure Demonstration Parameters	
UNIT	PARAMETERS
PCB Processing Building (CMU #1)/ PCB Tank Farm/ Tank Truck Loading Pad	PCBs, VOCs and Eight RCRA Metals
Batch Stabilization Units (T-1, 2, 3, 18, 19)	PCB's, VOCs and Eight RCRA Metals
Evaporation Pad (T-11)	PCB's, VOCs and Eight RCRA Metals
Dry Hazardous Waste Storage Areas 2 and 3 (CMU#6 &17)	Eight RCRA Metals
Truck Parking Area (CMU #7)/Container Management/Stabilization Building (CMU #16)/ Truck Unloading Docks	PCB's, VOCs and Eight RCRA Metals
Satellite Laboratory	VOC's and Eight RCRA Metals

-updated 12/2015 Class 1* Mod Rev 14

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APPENDIX 15-A
CLOSURE COST ESTIMATE

Estimate Created in CostPro Financial Assurance Software

Date of Estimate: November 30, 2015

Summary Sheets Provided in the Attached

Additional Support Data Presented in *2015 Updates to USEN's Financial Assurance Closure Estimate – August 24, 2015 (Updated November 30, 2015)*

Yearly Comparison
Financial Assurance Cost Estimate
USEN
Beatty, NV

Unit	2012 Estimate	2013 Estimate	2014 Estimate	2015 Estimate
Containment Buildings	$394,164	$366,663	$548,903	$546,177
Container Storage Area	$2,368,248	$2,365,495	$2,400,194	$2,388,646
Landfills	$1,616,527	$1,590,808	$1,162,111	$631,536
Post Closure Care	$4,810,481	$4,853,484	$4,849,747	$5,136,092
Tank Systems	$326,779	$330,286	$380,750	$336,792
Total Estimated Cost	$9,516,202	$9,506,736	$9,341,705	$9,039,243

USEN Facility
NVT330010000

Address: P.O. Box 578
Beatty
NEVADA
89003

Contact: Bob Marchand
800.239.3943

Comments: Chris Bolin of AquAeTer, Inc. (303-771-9150) prepared this closure cost estimate on behalf of US Ecology to address, and include, issues identified by NDEP with the prior sumbitted closure cost estimates for the Beatty facility.

NOTES:
1. An Engineering Expense factor of 8% and a Contingency factor of 15% have been utilized in this cost estimate, as negotiated at the October 14, 2010 meeting between NDEP and US Ecology.
2. For additional reference and explanation of how specific elements were treated within this cost estimate, see the "Summary Notes-CostPro Modeling" document provided by AquAeTer with this CostPro estimate.
3. This cost estimate will be subject to annual reviews and respective updates at every 5-year RCRA Permit renewal and any interim Permit modifications.

Activity	Units	Closure Cost
Containment Buildings	4	$546,176.71
Container Storage Area	5	$2,388,645.84
Landfills	2	$631,536.35
Post Closure Care	4	$5,136,091.93
Tank Systems	3	$336,791.79
		$9,039,242.62
Additional Costs		$0.00
Total Estimated Cost		**$9,039,242.62**

Facility: USEN Facility **Unit:** CMU 1 PCB/RCRA Storage Building 11/30/2015

Containment Buildings Summary (CB_02-1)

Removal of Waste (CB-03)	$0.00	
Demolition and Removal of Building (CB-04)	$737.37	
Demolition and Removal of Concrete Structures (CB-05)	$19,879.98	
Removal of Containment System Components (CB-06)	$24,756.95	
Removal of Soil (CB-07)	$0.00	
Backfill and Grading (BF-01)	$1,867.75	
Decontamination (DC-01)	$0.00	
Sampling and Analysis (SA-02)	$24,416.76	
Monitoring Well Installation (MW-01)	$0.00	
Transportation (TR-01)	$0.00	
Treatment and Disposal (TD-01)	$0.00	
User Defined Cost (UD-01)	$0.00	
Subtotal of Closure Costs	$71,658.81	
Percentage of Engineering Expenses	8.0	%
Engineering Expenses	$5,732.70	
Certification of Closure (CB-08)	$4,047.99	
Subtotal	$81,439.50	
Percentage of Contingency Allowance	15.0	%
Contingency Allowance	$12,215.92	
Landfill Closure (Cover Installation) (CI-02)	$0.00	
TOTAL COST OF CLOSURE	$93,655.42	

Containment Buildings Summary (CB_02-1)

Removal of Waste (CB-03)	$0.00	
Demolition and Removal of Building (CB-04)	$983.24	
Demolition and Removal of Concrete Structures (CB-05)	$105,169.00	
Removal of Containment System Components (CB-06)	$0.00	
Removal of Soil (CB-07)	$2,821.98	
Backfill and Grading (BF-01)	$3,226.00	
Decontamination (DC-01)	$0.00	
Sampling and Analysis (SA-02)	$126,646.04	
Monitoring Well Installation (MW-01)	$0.00	
Transportation (TR-01)	$0.00	
Treatment and Disposal (TD-01)	$0.00	
User Defined Cost (UD-01)	$0.00	
Subtotal of Closure Costs	$238,846.26	
Percentage of Engineering Expenses	8.0	%
Engineering Expenses	$19,107.70	
Certification of Closure (CB-08)	$4,047.99	
Subtotal	$262,001.95	
Percentage of Contingency Allowance	15.0	%
Contingency Allowance	$39,300.29	
Landfill Closure (Cover Installation) (CI-02)	$0.00	
TOTAL COST OF CLOSURE	$301,302.24	

Containment Buildings Summary (CB_02-1)

Removal of Waste (CB-03)	$0.00	
Demolition and Removal of Building (CB-04)	$0.00	
Demolition and Removal of Concrete Structures (CB-05)	$0.00	
Removal of Containment System Components (CB-06)	$0.00	
Removal of Soil (CB-07)	$0.00	
Backfill and Grading (BF-01)	$0.00	
Decontamination (DC-01)	$0.00	
Sampling and Analysis (SA-02)	$0.00	
Monitoring Well Installation (MW-01)	$0.00	
Transportation (TR-01)	$0.00	
Treatment and Disposal (TD-01)	$0.00	
User Defined Cost (UD-01)	$112,250.00	
Subtotal of Closure Costs	$112,250.00	
Percentage of Engineering Expenses	8.0	%
Engineering Expenses	$8,980.00	
Certification of Closure (CB-08)	$0.00	
Subtotal	$121,230.00	
Percentage of Contingency Allowance	15.0	%
Contingency Allowance	$18,184.50	
Landfill Closure (Cover Installation) (CI-02)	$0.00	
TOTAL COST OF CLOSURE	$139,414.50	

Containment Buildings Summary (CB_02-1)

Removal of Waste (CB-03)	$0.00	
Demolition and Removal of Building (CB-04)	$2,183.66	
Demolition and Removal of Concrete Structures (CB-05)	$1,771.09	
Removal of Containment System Components (CB-06)	$0.00	
Removal of Soil (CB-07)	$0.00	
Backfill and Grading (BF-01)	$519.62	
Decontamination (DC-01)	$0.00	
Sampling and Analysis (SA-02)	$1,281.96	
Monitoring Well Installation (MW-01)	$0.00	
Transportation (TR-01)	$0.00	
Treatment and Disposal (TD-01)	$0.00	
User Defined Cost (UD-01)	$0.00	
Subtotal of Closure Costs	$5,756.33	
Percentage of Engineering Expenses	8.0	%
Engineering Expenses	$460.51	
Certification of Closure (CB-08)	$4,047.99	
Subtotal	$10,264.83	
Percentage of Contingency Allowance	15.0	%
Contingency Allowance	$1,539.72	
Landfill Closure (Cover Installation) (CI-02)	$0.00	
TOTAL COST OF CLOSURE	$11,804.55	

Container Storage Areas Summary (CS_02-1)

Removal of Waste (CS-03)	$6,511.95	
Demolition and Removal of Pads (CS-04)	$0.00	
Removal of Process Equipment (CS-05)	$0.00	
Removal of Soil (CS-06)	$0.00	
Backfill and Grading (BF-01)	$0.00	
Decontamination (DC-01)	$0.00	
Sampling and Analysis (SA-02)	$0.00	
Monitoring Well Installation (MW-01)	$0.00	
Transportation (TR-01)	$29,779.20	
Treatment and Disposal (TD-01)	$113,336.00	
User Defined Cost (UD-01)	$0.00	
Subtotal of Closure Costs	$149,627.15	
Percentage of Engineering Expenses	8.0	%
Engineering Expenses	$11,970.17	
Certification of Closure (CS-07)	$0.00	
Subtotal	$161,597.32	
Percentage of Contingency Allowance	15.0	%
Contingency Allowance	$24,239.60	
Landfill Closure (Cover Installation) (CI-02)	$0.00	
TOTAL COST OF CLOSURE	$185,836.92	

Container Storage Areas Summary (CS_02-1)

Removal of Waste (CS-03)	$7,330.31	
Demolition and Removal of Pads (CS-04)	$29,025.05	
Removal of Process Equipment (CS-05)	$0.00	
Removal of Soil (CS-06)	$1,175.44	
Backfill and Grading (BF-01)	$776.25	
Decontamination (DC-01)	$0.00	
Sampling and Analysis (SA-02)	$38,818.26	
Monitoring Well Installation (MW-01)	$0.00	
Transportation (TR-01)	$32,148.00	
Treatment and Disposal (TD-01)	$132,210.00	
User Defined Cost (UD-01)	$0.00	
Subtotal of Closure Costs	$241,483.31	
Percentage of Engineering Expenses	8.0	%
Engineering Expenses	$19,318.66	
Certification of Closure (CS-07)	$4,047.99	
Subtotal	$264,849.96	
Percentage of Contingency Allowance	15.0	%
Contingency Allowance	$39,727.49	
Landfill Closure (Cover Installation) (CI-02)	$0.00	
TOTAL COST OF CLOSURE	$304,577.45	

Container Storage Areas Summary (CS_02-1)

Removal of Waste (CS-03)	$3,512.03	
Demolition and Removal of Pads (CS-04)	$0.00	
Removal of Process Equipment (CS-05)	$0.00	
Removal of Soil (CS-06)	$7,207.32	
Backfill and Grading (BF-01)	$2,756.25	
Decontamination (DC-01)	$0.00	
Sampling and Analysis (SA-02)	$4,071.96	
Monitoring Well Installation (MW-01)	$0.00	
Transportation (TR-01)	$177,660.00	
Treatment and Disposal (TD-01)	$119,607.58	
User Defined Cost (UD-01)	$0.00	
Subtotal of Closure Costs	$314,815.14	
Percentage of Engineering Expenses	8.0	%
Engineering Expenses	$25,185.21	
Certification of Closure (CS-07)	$4,047.99	
Subtotal	$344,048.34	
Percentage of Contingency Allowance	15.0	%
Contingency Allowance	$51,607.25	
Landfill Closure (Cover Installation) (CI-02)	$0.00	
TOTAL COST OF CLOSURE	$395,655.59	

Container Storage Areas Summary (CS_02-1)

Removal of Waste (CS-03)	$9,729.54	
Demolition and Removal of Pads (CS-04)	$0.00	
Removal of Process Equipment (CS-05)	$0.00	
Removal of Soil (CS-06)	$19,073.63	
Backfill and Grading (BF-01)	$7,690.88	
Decontamination (DC-01)	$0.00	
Sampling and Analysis (SA-02)	$4,071.96	
Monitoring Well Installation (MW-01)	$0.00	
Transportation (TR-01)	$485,040.00	
Treatment and Disposal (TD-01)	$331,354.44	
User Defined Cost (UD-01)	$0.00	
Subtotal of Closure Costs	$856,960.45	
Percentage of Engineering Expenses	8.0	%
Engineering Expenses	$68,556.84	
Certification of Closure (CS-07)	$4,047.99	
Subtotal	$929,565.28	
Percentage of Contingency Allowance	15.0	%
Contingency Allowance	$139,434.79	
Landfill Closure (Cover Installation) (CI-02)	$0.00	
TOTAL COST OF CLOSURE	$1,069,000.07	

Container Storage Areas Summary (CS_02-1)

Removal of Waste (CS-03)	$23,034.85	
Demolition and Removal of Pads (CS-04)	$0.00	
Removal of Process Equipment (CS-05)	$0.00	
Removal of Soil (CS-06)	$0.00	
Backfill and Grading (BF-01)	$0.00	
Decontamination (DC-01)	$0.00	
Sampling and Analysis (SA-02)	$0.00	
Monitoring Well Installation (MW-01)	$0.00	
Transportation (TR-01)	$85,728.00	
Treatment and Disposal (TD-01)	$238,656.00	
User Defined Cost (UD-01)	$1,676.00	
Subtotal of Closure Costs	$349,094.85	
Percentage of Engineering Expenses	8.0	%
Engineering Expenses	$27,927.59	
Certification of Closure (CS-07)	$0.00	
Subtotal	$377,022.44	
Percentage of Contingency Allowance	15.0	%
Contingency Allowance	$56,553.37	
Landfill Closure (Cover Installation) (CI-02)	$0.00	
TOTAL COST OF CLOSURE	$433,575.81	

Post-Closure Care Summary (PC_01-1)

Removal of Leachate (PC-02)	$56,430.00	
Site Security (PC-03)	$66,360.00	
Maintenance of Vegetative Cover (PC-04)	$0.00	
Maintenance and Inspection (PC-05)	$72,392.20	
Groundwater Monitoring(PC-06)	$3,363,023.76	
Deed Notation (PC-07)	$6,684.40	
Maintenance and Inspection of Asphalt Cover (PC-8)	$0.00	
Surface Emission Monitoring (PC-09)	$0.00	
Gas Extraction System and Perimeter Probe Monitoring (PC-10)	$0.00	
User Defined Cost (UD-01)	$379,880.00	
Subtotal of Post-Closure Costs	$3,944,770.36	
Percentage of Engineering Expenses	8.0	%
Engineering Expenses	$315,581.63	
Certification of Post-Closure (PC-11)	$4,875.68	
Subtotal	$4,265,227.67	
Percentage of Contingency Allowance	15.0	%
Contingency Allowance	$639,784.15	
TOTAL COST OF POST-CLOSURE CARE	$4,905,011.82	

Landfills Summary (LF_02-1)

Installation of Undifferentiated Fill (LF-03)	$0.00	
Installation of Clay Layer (LF-04)	$0.00	
Installation of Geomembrane (LF-05)	$0.00	
Installation of Drainage Layer (LF-06)	$0.00	
Installation of Earthen Layer (LF-07)	$462,853.75	
Installation of Topsoil (LF-08)	$0.00	
Establishment of Vegetative Cover (LF-09)	$0.00	
Installation of Colloid Clay Liner (LF-10)	$0.00	
Installation of Asphalt Cover (LF-11)	$0.00	
Installation of a Gas Collection System (LF-12)	$0.00	
Installation of Flares and Support Equipment (LF-13)	$0.00	
Installation of Storm Water Control (LF-14)	$0.00	
Decontamination (DC-01)	$0.00	
Sampling and Analysis (SA-02)	$25,570.96	
Monitoring Well Installation (MW-01)	$0.00	
Transportation (TR-01)	$0.00	
Treatment and Disposal (TD-01)	$0.00	
User Defined Cost (UD-01)	$0.00	
Subtotal of Closure Costs	$488,424.71	
Percentage for Engineering Expenses	8.0	%
Engineering Expenses	$39,073.98	
Survey Plat (LF-15)	$17,615.36	
Certification of Closure (LF-16)	$4,047.99	
Subtotal	$549,162.04	
Percentage for Contingency	15.0	%
Contingency Allowance	$82,374.31	
TOTAL COST OF CLOSURE	$631,536.35	

Landfills Summary (LF_02-1)

Installation of Undifferentiated Fill (LF-03)	$0.00	
Installation of Clay Layer (LF-04)	$0.00	
Installation of Geomembrane (LF-05)	$0.00	
Installation of Drainage Layer (LF-06)	$0.00	
Installation of Earthen Layer (LF-07)	$0.00	
Installation of Topsoil (LF-08)	$0.00	
Establishment of Vegetative Cover (LF-09)	$0.00	
Installation of Colloid Clay Liner (LF-10)	$0.00	
Installation of Asphalt Cover (LF-11)	$0.00	
Installation of a Gas Collection System (LF-12)	$0.00	
Installation of Flares and Support Equipment (LF-13)	$0.00	
Installation of Storm Water Control (LF-14)	$0.00	
Decontamination (DC-01)	$0.00	
Sampling and Analysis (SA-02)	$0.00	
Monitoring Well Installation (MW-01)	$0.00	
Transportation (TR-01)	$0.00	
Treatment and Disposal (TD-01)	$0.00	
User Defined Cost (UD-01)	$0.00	
Subtotal of Closure Costs	$0.00	
Percentage for Engineering Expenses	8.0	%
Engineering Expenses	$0.00	
Survey Plat (LF-15)	$0.00	
Certification of Closure (LF-16)	$0.00	
Subtotal	$0.00	
Percentage for Contingency	15.0	%
Contingency Allowance	$0.00	
TOTAL COST OF CLOSURE	$0.00	

Tank Systems Summary (TS_02-1)

Removal of Waste (TS-03)	$1,812.68	
Tank System Purging (ignitable waste only) (TS-04)	$0.00	
Flushing the Tank and Piping (TS-05)	$0.00	
Excavation, Disassembly, and Loading (TS-06)	$6,864.21	
Demolition and Removal of Containment System (TS-07)	$13,571.97	
Removal of Soil (TS-08)	$673.83	
Backfill and Grading (BF-01)	$800.12	
Decontamination (DC-01)	$0.00	
Sampling and Analysis (SA-02)	$15,620.80	
Monitoring Well Installation (MW-01)	$0.00	
Transportation (TR-01)	$9,926.40	
Treatment and Disposal (TD-01)	$62,500.00	
User Defined Cost (UD-01)	$8,000.00	
Subtotal of Closure Costs	$119,770.01	
Percentage of Engineering Expenses	8.0	%
Engineering Expenses	$9,581.60	
Certification of Closure (TS-09)	$4,047.99	
Subtotal	$133,399.60	
Percentage of Contingency Allowance	15.0	%
Contingency Allowance	$20,009.94	
Landfill Closure (Cover Installation) (CI-02)	$0.00	
TOTAL COST OF CLOSURE	$153,409.54	

Tank Systems Summary (TS_02-1)

Removal of Waste (TS-03)	$725.07	
Tank System Purging (ignitable waste only) (TS-04)	$0.00	
Flushing the Tank and Piping (TS-05)	$0.00	
Excavation, Disassembly, and Loading (TS-06)	$0.00	
Demolition and Removal of Containment System (TS-07)	$11,305.53	
Removal of Soil (TS-08)	$3,262.59	
Backfill and Grading (BF-01)	$1,141.38	
Decontamination (DC-01)	$0.00	
Sampling and Analysis (SA-02)	$10,496.30	
Monitoring Well Installation (MW-01)	$0.00	
Transportation (TR-01)	$20,304.00	
Treatment and Disposal (TD-01)	$13,835.56	
User Defined Cost (UD-01)	$0.00	
Subtotal of Closure Costs	$61,070.43	
Percentage of Engineering Expenses	8.0	%
Engineering Expenses	$4,885.63	
Certification of Closure (TS-09)	$4,047.99	
Subtotal	$70,004.05	
Percentage of Contingency Allowance	15.0	%
Contingency Allowance	$10,500.61	
Landfill Closure (Cover Installation) (CI-02)	$0.00	
TOTAL COST OF CLOSURE	$80,504.66	

Tank Systems Summary (TS_02-1)

Removal of Waste (TS-03)	$0.00	
Tank System Purging (ignitable waste only) (TS-04)	$0.00	
Flushing the Tank and Piping (TS-05)	$0.00	
Excavation, Disassembly, and Loading (TS-06)	$25,845.06	
Demolition and Removal of Containment System (TS-07)	$21,503.20	
Removal of Soil (TS-08)	$658.70	
Backfill and Grading (BF-01)	$3,307.00	
Decontamination (DC-01)	$0.00	
Sampling and Analysis (SA-02)	$17,770.10	
Monitoring Well Installation (MW-01)	$0.00	
Transportation (TR-01)	$0.00	
Treatment and Disposal (TD-01)	$0.00	
User Defined Cost (UD-01)	$10,000.00	
Subtotal of Closure Costs	$79,084.06	
Percentage of Engineering Expenses	8.0	%
Engineering Expenses	$6,326.72	
Certification of Closure (TS-09)	$4,047.99	
Subtotal	$89,458.77	
Percentage of Contingency Allowance	15.0	%
Contingency Allowance	$13,418.82	
Landfill Closure (Cover Installation) (CI-02)	$0.00	
TOTAL COST OF CLOSURE	$102,877.59	

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UNSCHEDULED CLOSURE PLAN

Basis for Closure Cost Estimate

US ECOLOGY NEVADA

March 2010

Revised August 2014

UNSCHEDULED CLOSURE PLAN

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APPENDICES

Appendix 16-A Closure Cost Estimate

UNSCHEDULED CLOSURE PLAN

This Unscheduled Closure Plan was prepared by US Ecology Nevada to comply with the requirements of (1) 40 CFR 264.142 (a), as adopted by the Nevada Division of Environmental Protection (NDEP) and (2) the Approval for Commercial Storage and Disposal of Polychlorinated Biphenyls (PCBs) issued by the United States Environmental Protection Agency (US EPA). This plan describes the activities included in developing the cost estimate for final closure of existing units. In each case, a worst-case closure scenario has been used to develop a conservative cost estimate, and assumes that US Ecology is no longer in control of the facility and that closure must be performed by an outside contractor.

The procedures described in this plan were used to calculate the worst-case closure cost estimates for the following existing units:

- Hazardous Waste Land Disposal Trench 12
- Polychlorinated Biphenyl (PCB) Processing Building/ PCB Tank Farm/ Tank Truck Loading Pad
- Batch Stabilization Units
- Truck Parking Storage Area
- Evaporation Pad
- Dry Hazardous Waste Storage Areas 2 and 3
- Container Management/Stabilization Building/ Satellite Laboratory/Truck Unloading Docks

16.1.0 CLOSURE PERFORMANCE STANDARD

Closure minimizes the need for further maintenance and the potential for post-closure escape of hazardous waste or constituents to the surrounding environment.

16.2.0 MAXIMUM WASTE INVENTORY

The maximum potential inventory of hazardous waste on site at the time of this unscheduled closure is identified in Table 16-1, and is estimated to be the sum of the design capacity for each treatment and storage unit included in this permit application.

For the purpose of developing the cost estimate, most of the facility hazardous waste inventory will be transported to an off-site treatment, storage or disposal facility permitted under RCRA (and/or Toxic Substance Control Act for PCB waste inventory). An outside contractor may elect to bring portable stabilization equipment to the facility to treat waste inventories at the facility prior to on-site disposal if airspace permits. For the worst-case estimate however, all waste that cannot be directly landfilled is

assumed to be sent off site for treatment and disposal. The procedures assumed to be employed for waste removal and final disposition of each unit's waste inventory in the worst-case scenario are further described in Section 16.5.0.

16.3.0 SCHEDULE FOR CLOSURE

A closure schedule with the projected activities and required closure time is included as Table 16-2. Closure activities will be completed within 240 days from receipt of the final volume of waste at the unit or facility.

16.4.0 AMENDMENTS TO UNSCHEDULED CLOSURE PLAN

US Ecology will submit a written request to the NDEP and to the Permits Section, Land Division, US EPA Region IX for a modification of the approved Unscheduled Closure Plan whenever the following occurs:

- Changes in operating plans or facility design materially affect the Unscheduled Closure Plan,
- In conducting partial closure activities, unexpected events require a modification to the approved Unscheduled Closure Plan.

16.5.0 CLOSURE ACTIVITIES

16.5.1 Closure of Landfill

Below-grade available space, except for the volume required for disposal of on-site waste and other items will be backfilled with soil from the site's soil stockpile. Any above-grade waste will be contained by constructed dikes and soil backfill, as necessary.

When waste and backfill within the above-grade disposal facility reach an elevation within approximately three feet below the designed top of waste elevation, final waste placement operations will begin. At that time, waste and backfill will be mounded toward the middle of the above-grade area to the design maximum waste elevations. When the final waste slopes have been established, the final cover will be installed. This cover will consist of a layered soil system.

Once the slopes for waste and backfill are established, a final cover system will be placed over the landfill. It is assumed that the contractor will install the approved cover system, and will follow the specified quality assurance and quality control procedures.

Control of percolation into the closed trench will be provided by constructing a cover that holds infiltrated water in the evaporative zone of the cover until it is returned to the atmosphere. The cover virtually eliminates percolation into the trench.

The final landfill cover for USEN Trench 12 satisfies the regulatory requirements for final closure of a landfill cell and is fully consistent with the provisions of 40 CFR 264.110, the performance standards of 40 CFR 264.111, and the following requirements of 40 CFR 264.310(a) dealing with landfill closure:

- Provide long-term minimization of migration of liquids through the closed landfill;
- Function with minimum maintenance;
- Promote drainage and minimize erosion or abrasion of the cover; and
- Accommodate settling and subsidence so that cover integrity is maintained.

16.5.1.1 Evaporative Cover Characteristics

The cover is appropriate for an arid region, and uses the moisture retention properties of native soils to contain and store infiltrating moisture (precipitation) until the natural processes of evaporation and plant transpiration remove the stored moisture and release it to the atmosphere. The cover is protective of human health and the environment, and offers long-term benefits when compared to conventional landfill cover types that incorporate compacted clay or synthetic materials as low-permeability components. These benefits include, but are not limited to:

- use of easily obtained construction materials,
- relative simplicity of construction,
- reduced complexity of quality assurance/quality control programs, and
- increased long-term cover integrity and stability.

From bottom to top, the components of the arid region cover to be used for Trench 12 are as follows.

Interim Cover Soil Layer. The lower layer of the final cover is a lightly compacted native soil layer at least 12-inches (1.0 foot) thick and extending across the cover to the natural ground surface on all sides of the trenches.

Final Cover Soil Layer. The upper layer of the final cover is a lightly compacted soil layer at least 24-inches (2.0 feet) thick and extending across the cover to the natural ground surface on all sides of the trenches. In conjunction with the Interim Cover Layer, it retards the downward movement of infiltrating water by providing temporary water-

storage, and allowing stored water to be returned to the atmosphere by evaporation and plant transpiration.

Mathematical models predicted that a three-feet (36-inch) thick monolithic cover will prevent significant percolation of fluids through the cover and into waste. The results also indicate that nearly all of the precipitation that enters returns to the atmosphere through the combination of evaporation and transpiration rather than infiltrating deeply into the cover and percolating into waste. These results likely are conservative because no vegetation was considered in the models, so the evaluation of "evapotranspiration" (the combined effect of evaporation and plant transpiration) actually was limited to consideration of evaporation only.

16.5.1.2 Evaporative Cover Specifications

Soil materials for final cover construction will consist of natural soil obtained from USEN stockpiles and/or from future trench excavations, supplemented as needed with imported soil materials. Native and imported materials will be screened and mixed, as needed, to obtain material of satisfactory grain size.

The Trench 12 interim soil layer will be a low density layer; this is important to the moisture holding capacity and vegetation establishment properties of the cover. Care must be taken to minimize over-compaction that could lead to reduced cover effectiveness. The interim layer should not be less than 12 inches thick and should be comprised of natural soil materials that contain no grain sizes larger than 6.0 inches. There is no compaction specification for this material, which will be placed as above-grade waste disposal proceeds.

The upper component of the final trench cover will be a lightly compacted soil layer that varies in thickness to allow the cover to be shaped according to the approved design; however, the layer everywhere should be at least 24-inches (2.0 feet) thick, per the RCRA permit. This layer should extend across the cover to the natural ground surface on all sides of Trench 12.

The gradation specifications for the final cover layer are as follow:

- no materials larger than 3.0 inches,
- 90 percent smaller than 1.0 inch, and
- not less than 5.0 percent passing the #200 sieve.

Based on experience from final cover placement on Trench 11, the final cover specifications were modified. Similar specification modification will be necessary at the closure of Trench 12 as supported by a July 23, 2013 letter from AquAeTer, Inc. (for US Ecology) to NDEP requesting approval to increase the maximum size of rocky materials in the final cover soil layer to 6.0 inches.

The goal of final cover placement is to achieve a minimal in-place density. Experience from final cover placement on Trench 11 indicates that maximum dry density (MDD) by ASTM D 1557 is feasible at approximately 80 percent (plus or minus approximately 5%) and a moisture content between 2.0 and 4.0 percent less than the OMC. The low density compaction requirement of the soil cover is important for the moisture holding capacity of the soil. Over-compaction during initial construction could lead to reduced moisture holding effectiveness and inhibit establishment of vegetation, and should be prevented. Areas of the final cover layer that became overly compacted, such as from repeated vehicle or equipment passage, must be loosened by shallow ripping. Over time, material in the final cover will reach a density similar to those of native materials.

Soil materials for final cover construction shall consist of sand and gravel soils obtained from USEN stockpiles and the Trench 12 excavation area. Natural soil materials present in the Trench 12 excavation, and typical of all previous disposal cell excavations at the facility, are relatively coarse grained, alluvial valley-fill sands and gravels, with variably abundant clay and silt-size particles, common cobble-size particles (i.e., particles larger than 3.0 inches in dimension), and rare boulders (i.e., particles larger than 12 inches in dimension). Sand-size particles (i.e., particles between 0.003 and 0.2 inches in dimension) and gravel-size particles (i.e., particles between 0.2 and 3.0 inches in dimension) comprise the vast majority of almost any sample of soil materials from the uppermost 75 feet of the valley-fill deposits, and thus make up the majority of natural materials determined to be acceptable for final cover construction. It is these materials, and particularly those ranging in the sand and silt grain sizes, that provide most of the moisture-holding capacity that is needed for the proper long-term functioning of a water-balance type landfill cover. The coarser-grained components – gravels, cobbles, and even rare boulders – do not enhance the moisture holding capacity of the final cover, but do contribute to overall cover stability and capacity to resist erosion by wind and water. Thus, when in proper proportions, all textural components of the final cover soils contribute to the long-term performance of the landfill cover.

Cover soil placement should be done using low-ground pressure equipment, such as a wide-tracked bulldozer, instead of heavy wheeled equipment that could cause linear surface depressions. Over-compaction (i.e., areas exceeding the density specification for cover materials) could reduce the water-holding characteristics of the cover and the ability of the cover to support establishment of vegetation. Once the cover is completed, vehicular traffic on the soil cover should be limited. Also, construction materials and equipment should not be stored on the cover during or after construction. Areas that become over-compacted because of initial cover soil placement or equipment traffic must be loosened by ripping. Ultimately, such ripping to achieve acceptable soil density might be required over the final cover surface.

16.5.1.3 Post Closure Performance Verification

Verification of post-closure performance of the final cover will be provided by the combination of leachate monitoring (quality and quantity), basin lysimeter monitoring, and groundwater monitoring.

Leachate monitoring will use existing Trench 11 and Trench 12 sumps to remove leachate from the landfill units. Records of leachate removal will be tabulated and evaluated to determine whether leachate production rates decline following facility closure.

A drainage lysimeter was constructed during the closure of Trench 11 and provides performance monitoring of the alternate final cover, approved for closure of Trench 12. The drainage lysimeter is used to verify that unacceptable infiltration of moisture does not penetrate the landfill cover.

Closure of the above-grade disposal facility will be considered complete when the final design slopes have been established on the cover. Post-closure inspection and maintenance will be performed in the same manner as for other closed landfill units at the facility. With the design features presented in this report, it is expected that the above-grade disposal facility will provide long-term, maintenance-free protection to the environment.

Construction of the final cover will be conducted in accordance with cell specifications included in the Landfill Report of the Permit Renewal Application. A detailed evaluation of the proposed final cover performance is presented in the following reports, which have been previously presented to the NDEP, and are included herein by reference.

- The design of the proposed final cover is described in detail in the *Trench 11 Above-Grade Disposal Facility Design and Construction Quality Assurance Plan*, revised May 6, 1999, by AquAeTer, Inc.
- *Erosion Calculations for Above Grade Disposal Cell*, dated July 28, 1987, prepared by Dr. James L. Grant and Associates.
- *Cell 10 Cap Design Analysis Using Wind Erosion Equation* prepared by US Ecology in March 1991.
- *Supplement – Landfill Report for Trench 12, October 2007,* AquAeTer, Inc.
- *Design Basis and Construction Specifications for Trenches 11 and 12 Final Covers, April 2008,* AquAeTer, Inc.

The soil cover data in the above referenced reports is applicable to the cover design for Trench 12.

16.5.2 Closure of Treatment and Storage Units

For purposes of the closure activity discussion, treatment and storage units are grouped according to their location, as follows:

- PCB Processing Building/ PCB Tank Farm/ Tank Truck Loading Pad
- Truck Parking Storage Area
- Batch Stabilization Units
- Evaporation Pad
- Dry Hazardous Waste Storage Areas 2 and 3
- Container Management/Stabilization Building/ Satellite Laboratory/ Truck Unloading Docks

16.5.2.1 PCB Processing Building (CMU #1)/PCB Tank Farm (T-4 – T-7) / Tank Truck Loading Pad

All liquid PCBs in storage at the time of an unscheduled closure will be transported to a TSCA authorized disposal facility. PCB solid materials will be removed and disposed of in the on-site landfill cell. All RCRA waste inventory in storage will be removed and transported to a RCRA authorized off-site facility for treatment and/or disposal.

The steel building shell will be dismantled and disposed of in the landfill cell. The PCB Tank System will also be removed and disposed of in the landfill cell. Removal of the building's concrete floor and underlying liner system, and the Tank Farm/Truck Loading Pad will proceed as follows:

- Wash the concrete floor of the building and Tank Farm/Truck Loading Pad secondary containment and break into manageable pieces using appropriate equipment.

- Remove the concrete and dispose in landfill cell.

- Remove the containment system drainage material and transfer to the on-site disposal unit.

- Remove, cut and fold the underlying liner system for disposal in the on-site landfill cell.

- Obtain samples from the soil underlying the building containment system, PCB Tank Farm and Tank Truck Loading Pad to demonstrate clean closure. The area to be sampled will be marked out in 1.5 m x 1.5 m grids and PCB samples will be taken from each grid; PCB samples will be collected from locations which show signs of visible staining or where inspection of the liner indicates possible deterioration. If no staining/deterioration is evident, simple random location selection should be performed. Metal and VOC samples will be collected from locations with the highest probability for contamination (i.e., areas with visible staining or where visual inspection of the liner indicates possible deterioration). If no staining/deterioration is evident, simple random location selection should be performed. The estimated number of samples required to demonstrate clean closure is specified in Table 16-3.

- Analyze samples for the parameters specified in Table 16-4 following U.S. Environmental Protection Agency (EPA) SW-846 methods, and compare the results statistically to background concentrations. Soil will be removed from the site stockpile and sampled to obtain background levels. Soil samples that have (1) concentrations of metals and VOCs that are statistically at or below background levels, and (2) concentrations of total PCBs below 1 mg/kg, will be considered to have met the clean closure performance standard. Because of the presence of a liner system, no soil contamination is anticipated. If soil contamination is found, 3 inches of soil will be removed and the area will be resampled. The process will be repeated until clean closure is achieved.

16.5.2.2 Truck Parking Storage Area (CMU #7)

- Transport waste inventory in the Truck Parking Storage Area to a RCRA-authorized hazardous waste management facility.

- Wash the unit's concrete slab prior to on-site disposal.

- Obtain samples from the soil underlying the storage area containment system to demonstrate clean closure. The area to be sampled will be marked out in 1.5 m x 1.5 m grids and PCB samples will be taken from each grid; PCB samples will be collected from locations which show signs of visible staining or where inspection of the liner indicates possible deterioration. If no staining/deterioration is evident, simple random location selection should be performed. Metal and VOC samples will be collected from locations with the highest probability for contamination (i.e., areas with visible staining or where visual inspection of the liner indicates possible deterioration). If no staining/deterioration is evident, simple random location selection should be performed. The estimated number of samples required to demonstrate clean closure is specified in Table 16-3.

- Analyze samples for the parameters specified in Table 16-4 following U.S. Environmental Protection Agency (EPA) SW-846 methods, and compare the results statistically to background concentrations. Soil will be removed from the site stockpile and sampled to obtain background levels. Soil samples that have (1) concentrations of metals and VOCs that are statistically at or below background levels, and (2) concentrations of total PCBs below 1 mg/kg, will be considered to have met the clean closure performance standard. Because of the presence of secondary containment, no soil contamination is anticipated. If soil contamination is found, 3 inches of soil will be removed and the area will be resampled. The process will be repeated until clean closure is achieved.

- Remove three inches of soil and dispose of in the on-site landfill.

16.5.2.3 Batch Stabilization Units (T1, 2, 3, 18, &19)

- Remove the waste inventory in the stabilization units to an authorized off-site facility for treatment and disposal.

- Wash and dismantle the stabilization vessels, and dispose of in landfill cell.

- Remove the concrete silo foundation and send off site for treatment and disposal.

- Follow the procedures described in Section 16.5.2.1 for removal of the containment system, removal of any contaminated soil, and for demonstration of clean closure.

16.5.2.4 Evaporation Pad (T-11)

The Evaporation Pad will be the last unit to undergo closure, because the unit will be used to decontaminate any small equipment (e.g., shovels, hand tools, etc.) remaining after completion of closure of other units.

- Remove the liquid waste inventory in the unit for off-site disposal at an authorized facility.
- Remove the concrete pad and send off-site for treatment and disposal.
- Follow the activities described in Section 16.5.2.1 for removal of the liner system and for demonstration of clean closure.

16.5.2.5 Dry Hazardous Waste Storage Areas 2 and 3 (CMU #6 and #17)

Waste inventory in the Dry Hazardous Waste Storage Area will be treated and disposed of on site, or transported to a RCRA-authorized hazardous waste management facility. The pad area will be excavated and removed to the disposal cell.

Obtain four samples from the soil underlying the storage pad to demonstrate clean closure. Select sample locations in areas with the highest probability for contamination (i.e., any areas where the pad surface has been stained by waste materials). If no staining is evident, simple random location selection should be performed.

Analyze samples for the parameters specified in Table 16-3 following EPA SW-846 methods, and compare the results statistically to background concentrations.

Remove three inches of soil and dispose of in the on-site landfill.

16.5.2.6 Container Management/Stabilization Building (CMU #16)/ Satellite Laboratory/ Truck Unloading Docks

Waste inventory in the Container Management Building and any waste in the satellite accumulation area associated with the Satellite Laboratory will be treated and disposed of on site, or transported to a RCRA-authorized hazardous waste management facility.

The steel building shell and awning over Truck Dock 3/4 will be dismantled and disposed of in the landfill cell. Removal of the building's concrete floor and underlying liner system will proceed as follows:

- Wash the concrete floor, including the Receiving Dock, of the building and break into manageable pieces using appropriate equipment.
- Remove the building's concrete floor, including the Receiving Dock and dispose in landfill cell.
- Obtain samples from the soil underlying the building containment system and receiving dock to demonstrate clean closure. The area to be sampled will be marked out in 1.5 m x 1.5 m grids and PCB samples will be taken from each grid; PCB samples will be collected from locations which show signs of visible staining or where inspection of the liner indicates possible deterioration. If no staining/deterioration is evident, simple random location selection should be performed. Metal and VOC samples will be collected from locations with the highest probability for contamination (i.e., areas with visible staining or where visual inspection of the liner indicates possible deterioration). If no staining/deterioration is evident, simple random location selection should be performed. The estimated number of samples required to demonstrate clean closure is specified in Table 16-3.
- Analyze samples for the parameters specified in Table 16-4 following U.S. Environmental Protection Agency (EPA) SW-846 methods, and compare the results statistically to background concentrations. Soil will be removed from the site stockpile and sampled to obtain background levels. Soil samples that have (1) concentrations of metals and VOCs that are statistically at or below background levels, and (2) concentrations of total PCBs below 1 mg/kg, will be considered to have met the clean closure performance standard. If soil contamination is found, 3 inches of soil will be removed and the area will be resampled. The process will be repeated until clean closure is achieved.
- The Satellite Laboratory will be dismantled and disposed using the method described above. No PCB sampling will be required for the laboratory since PCB materials will not be handled in the laboratory.

16.6.0 CLEANING AND DECONTAMINATION OF EQUIPMENT

In developing the cost estimate for decontaminating any equipment or structures at the facility, the following was assumed:

- High pressure/steam clean all accessible surfaces of piping, valves, pumps and other ancillary equipment associated with tank systems.
- Drain all wash waters for subsequent removal. Pressure wash accessible tank surfaces.
- Collect wash waters from the bottom of the tank and remove for off-site disposal.
- Pressure wash the concrete floors and structures.
- Visually inspect the entire surface to ensure removal of visually detectable residues.
- Remove wash waters generated during decontamination for off-site disposal.
- Clean heavy equipment used for handling waste with a high pressure steam cleaner until all visible contamination has been removed. Cleaning may be supplemented with detergents and/or solvents, as necessary. Perform a final rinse with clean tap water following decontamination and visual inspection of all equipment.
- Collect and submit one rinsate sample from each piece of equipment for analysis of metals and VOCs, to verify decontamination. Conduct sampling and analysis following procedures recommended by the current version of EPA SW-846 at the time of closure. Analyze decontamination verification samples for the parameters identified in Table 16-3.
- Collect and submit PCB wipe samples from equipment used in PCB areas where the decontamination option is chosen.

NOTE: Decontamination verification is only required for clean closure of equipment. If decontamination is intended to comply with the Land Disposal Restriction (LDR) treatment standards for debris, no verification will be performed.

16.7.0 GROUNDWATER MONITORING

For purposes of developing the cost estimate it has been assumed that one groundwater monitoring event will take place during the closure period, and be conducted following permitted procedures in place just prior to closure.

16.8.0 LEACHATE COLLECTION

Completion of the activities should take no longer than a three-month period. Estimates for disposal of the leachate generated during the closure period are based on off-site disposal.

16.9.0 RUN-ON AND RUN-OFF CONTROLS

The existing perimeter ditches around the facility will continue to provide run-on protection during the closure period. Run-off control mechanisms in place during the active life will remain in place throughout the closure period. Rainfall coming in contact with waste in the active cell will be collected in the cell and treated as leachate. Rainfall contacting capped portions of the cell is considered clean and allowed to run off into natural drainage courses.

16.10.0 CLOSURE COST ESTIMATE

The cost estimate for the unscheduled closure of the facility is included in Appendix A. This cost estimate considers a worst-case scenario, and is based on the assumption of unexpected closure prompted by company bankruptcy at a point in the facility's operating life when the extent and means of operation would make closure most expensive. The worst-case closure scenario considers that US Ecology is no longer in control of the facility and that closure must be performed by an outside contractor. The cost estimate and cost assumptions are detailed in Appendix A.

In accordance with the requirements of 40 CFR 264.142(c), the closure cost estimate will be modified within 30 days after a revision to the Closure Plan has been authorized which increases the closure cost. The total closure cost estimate will be updated for inflation annually, according to the guidelines in 40 CFR 264.142(b).

TABLE 16-1

ESTIMATE OF MAXIMUM WASTE INVENTORY

UNIT DESCRIPTION	AMOUNT	UNITS	WASTE TYPE
Leachate Tank (T-15)	20,000	gallons	Landfill Leachate (F039)
PCB Tanks (T4 – T10)	25,000	gallons	PCB Liquids
Truck Parking Storage Area (CMU #7)	400	cubic yards	Stabilization Waste
PCB Building (CMU #1)	102,960	gallons	RCRA Waste and PCB Materials
Evaporation Pad (T-11)	10,000	gallons	Wastewater and Sludge
Batch Stabilization Units (T1, 2, 3, 18, & 19)	140	cubic yards	Stabilization Waste
Dry Hazardous Waste Storage Area (CMU #6 & CMU #17)	495 / 100,083	cubic yards / gallons	RCRA and non-RCRA Waste
Container Management Building (CMU #16)	2430 / 481,250	cubic yards / gallons	RCRA and non-RCRA Waste
Satellite Laboratory	425	gallons	Lab Wastewater

TABLE 16-2

ESTIMATED SCHEDULE FOR CLOSURE AT US ECOLOGY NEVADA

TASK	ESTIMATED TIME PERIOD
Contractor and Equipment Arrive at Facility	**Day 0**
Complete Treatment or Disposal of Waste Inventory	Day 90
Complete Closure of Landfill	Day 180 *
Complete Closure of Treatment & Storage Units (all units except the Evaporation Pad)	Day 178 *
Complete Equipment Decontamination and Evaporation Pad Closure	Day 180
Final Inspection and Certification of Compliance with Closure Plan by Registered Professional Engineer (P.E.)	Day 240

* Closure of units, as considered in the cost estimate, will proceed simultaneously because an outside contractor will perform closure. The only unit that is addressed separately is the Evaporation Pad, which will be the last unit to be dismantled to allow the third party performing closure to use it for equipment decontamination.

TABLE 16-3

Estimated Number of Samples Required to Demonstrate Clean Closure

Unit Name	Dimensions	Approximate Area (ft²)	PCB Sampling		VOCs and Metals Sampling	
			Initial Sample No.	Re-Sample No.	Initial Sample No.	Re-Sample No.
PCB Processing Building	48'x100'	4800	202	50	10	2
PCB Tank Farm*	45'x48'	2160	91	23	4	1
Tank Truck Loading Pad**	56'x15.5'	868	37	9	2	1
Container Management/ Stabilization Building	175'x146'	24868	1046	262	50	12
Truck Parking Pad	56'x136'	7616	320	80	15	4
Pan 1 (T-1)***	14'x50'	700	29	7	1	1
Pan 2 (T-2)	30'x31'	930	39	10	2	1
Pan 3 (T-3	30'x31'	930	39	10	2	1
Pan 4 (T-18)	22'x15.5'	341	14	4	1	1
Pan 5 (T-19)	22'x15.5'	341	14	4	1	1
Evaporation Pad (T-11)	40'x52'	2080	88	22	4	1
Satellite Laboratory	12'x24'	288	0	0	2	1
DHWSA #2	260'x61.1'	15886	0	0	32	8
DHWSA #3	100'x440'	44000	0	0	88	22
	Totals	**105808**	**1919**	**481**	**214**	**57**

PCB samples scheduled for collection on 1.5m x 1.5m grid

VOC and Metals samples scheduled for collection on 1 per 500 ft² frequency

Re-Samples based on assumption that 25% of samples fail

*Includes 3' wide aisle of packed soil between building and tank farm containment

**Includes soil between building and Tank Truck Loading Pad

***Includes 24' wide process area around outside of pan

Table 16-4

CLEAN CLOSURE DEMONSTRATION PARAMETERS

UNIT	PARAMETERS
PCB Processing Building (CMU #1)	PCBs, VOCs and Eight RCRA Metals
Batch Stabilization Units (T1, 2, 3, 18, & 19)	PCBs, VOCs and Eight RCRA Metals
Evaporation Pad (T-11)	PCBs, VOCs and Eight RCRA Metals
Dry Hazardous Waste Storage Areas 2 and 3 (CMU #6 & CMU #17)	Eight RCRA Metals
Container Management/Stabilization Building (CMU #16)	PCBs, VOCs and Eight RCRA Metals
Satellite Laboratory	VOCs and Eight RCRA Metals

-updated 12/2015 Class 1* Mod Rev 14

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APPENDIX 16-A
CLOSURE COST ESTIMATE

Estimate Created in CostPro Financial Assurance Software

Date of Estimate: November 30, 2015

Summary Sheets Provided in the Attached

Additional Support Data Presented in *2015 Updates to USEN's Financial Assurance Closure Estimate – August 24, 2015 (Updated November 30, 2015)*

Yearly Comparison
Financial Assurance Cost Estimate
USEN
Beatty, NV

Unit	2012 Estimate	2013 Estimate	2014 Estimate	2015 Estimate
Containment Buildings	$394,164	$366,663	$548,903	$546,177
Container Storage Area	$2,368,248	$2,365,495	$2,400,194	$2,388,646
Landfills	$1,616,527	$1,590,808	$1,162,111	$631,536
Post Closure Care	$4,810,481	$4,853,484	$4,849,747	$5,136,092
Tank Systems	$326,779	$330,286	$380,750	$336,792
Total Estimated Cost	$9,516,202	$9,506,736	$9,341,705	$9,039,243

USEN Facility
NVT330010000

Address: P.O. Box 578
Beatty
NEVADA
89003

Contact: Bob Marchand
800.239.3943

Comments: Chris Bolin of AquAeTer, Inc. (303-771-9150) prepared this closure cost estimate on behalf of US Ecology to address, and include, issues identified by NDEP with the prior sumbitted closure cost estimates for the Beatty facility.

NOTES:
1. An Engineering Expense factor of 8% and a Contingency factor of 15% have been utilized in this cost estimate, as negotiated at the October 14, 2010 meeting between NDEP and US Ecology.
2. For additional reference and explanation of how specific elements were treated within this cost estimate, see the "Summary Notes-CostPro Modeling" document provided by AquAeTer with this CostPro estimate.
3. This cost estimate will be subject to annual reviews and respective updates at every 5-year RCRA Permit renewal and any interim Permit modifications.

Activity	Units	Closure Cost
Containment Buildings	4	$546,176.71
Container Storage Area	5	$2,388,645.84
Landfills	2	$631,536.35
Post Closure Care	4	$5,136,091.93
Tank Systems	3	$336,791.79
		$9,039,242.62
Additional Costs		$0.00
Total Estimated Cost		**$9,039,242.62**

Facility: USEN Facility **Unit:** CMU 1 PCB/RCRA Storage Building 11/30/2015

Containment Buildings Summary (CB_02-1)

Removal of Waste (CB-03)	$0.00	
Demolition and Removal of Building (CB-04)	$737.37	
Demolition and Removal of Concrete Structures (CB-05)	$19,879.98	
Removal of Containment System Components (CB-06)	$24,756.95	
Removal of Soil (CB-07)	$0.00	
Backfill and Grading (BF-01)	$1,867.75	
Decontamination (DC-01)	$0.00	
Sampling and Analysis (SA-02)	$24,416.76	
Monitoring Well Installation (MW-01)	$0.00	
Transportation (TR-01)	$0.00	
Treatment and Disposal (TD-01)	$0.00	
User Defined Cost (UD-01)	$0.00	
Subtotal of Closure Costs	$71,658.81	
Percentage of Engineering Expenses	8.0	%
Engineering Expenses	$5,732.70	
Certification of Closure (CB-08)	$4,047.99	
Subtotal	$81,439.50	
Percentage of Contingency Allowance	15.0	%
Contingency Allowance	$12,215.92	
Landfill Closure (Cover Installation) (CI-02)	$0.00	
TOTAL COST OF CLOSURE	$93,655.42	

Containment Buildings Summary (CB_02-1)

Removal of Waste (CB-03)	$0.00	
Demolition and Removal of Building (CB-04)	$983.24	
Demolition and Removal of Concrete Structures (CB-05)	$105,169.00	
Removal of Containment System Components (CB-06)	$0.00	
Removal of Soil (CB-07)	$2,821.98	
Backfill and Grading (BF-01)	$3,226.00	
Decontamination (DC-01)	$0.00	
Sampling and Analysis (SA-02)	$126,646.04	
Monitoring Well Installation (MW-01)	$0.00	
Transportation (TR-01)	$0.00	
Treatment and Disposal (TD-01)	$0.00	
User Defined Cost (UD-01)	$0.00	
Subtotal of Closure Costs	$238,846.26	
Percentage of Engineering Expenses	8.0	%
Engineering Expenses	$19,107.70	
Certification of Closure (CB-08)	$4,047.99	
Subtotal	$262,001.95	
Percentage of Contingency Allowance	15.0	%
Contingency Allowance	$39,300.29	
Landfill Closure (Cover Installation) (CI-02)	$0.00	
TOTAL COST OF CLOSURE	$301,302.24	

Containment Buildings Summary (CB_02-1)

Removal of Waste (CB-03)	$0.00	
Demolition and Removal of Building (CB-04)	$0.00	
Demolition and Removal of Concrete Structures (CB-05)	$0.00	
Removal of Containment System Components (CB-06)	$0.00	
Removal of Soil (CB-07)	$0.00	
Backfill and Grading (BF-01)	$0.00	
Decontamination (DC-01)	$0.00	
Sampling and Analysis (SA-02)	$0.00	
Monitoring Well Installation (MW-01)	$0.00	
Transportation (TR-01)	$0.00	
Treatment and Disposal (TD-01)	$0.00	
User Defined Cost (UD-01)	$112,250.00	
Subtotal of Closure Costs	$112,250.00	
Percentage of Engineering Expenses	8.0	%
Engineering Expenses	$8,980.00	
Certification of Closure (CB-08)	$0.00	
Subtotal	$121,230.00	
Percentage of Contingency Allowance	15.0	%
Contingency Allowance	$18,184.50	
Landfill Closure (Cover Installation) (CI-02)	$0.00	
TOTAL COST OF CLOSURE	$139,414.50	

Containment Buildings Summary (CB_02-1)

Removal of Waste (CB-03)	$0.00	
Demolition and Removal of Building (CB-04)	$2,183.66	
Demolition and Removal of Concrete Structures (CB-05)	$1,771.09	
Removal of Containment System Components (CB-06)	$0.00	
Removal of Soil (CB-07)	$0.00	
Backfill and Grading (BF-01)	$519.62	
Decontamination (DC-01)	$0.00	
Sampling and Analysis (SA-02)	$1,281.96	
Monitoring Well Installation (MW-01)	$0.00	
Transportation (TR-01)	$0.00	
Treatment and Disposal (TD-01)	$0.00	
User Defined Cost (UD-01)	$0.00	
Subtotal of Closure Costs	$5,756.33	
Percentage of Engineering Expenses	8.0	%
Engineering Expenses	$460.51	
Certification of Closure (CB-08)	$4,047.99	
Subtotal	$10,264.83	
Percentage of Contingency Allowance	15.0	%
Contingency Allowance	$1,539.72	
Landfill Closure (Cover Installation) (CI-02)	$0.00	
TOTAL COST OF CLOSURE	$11,804.55	

Container Storage Areas Summary (CS_02-1)

Removal of Waste (CS-03)	$6,511.95	
Demolition and Removal of Pads (CS-04)	$0.00	
Removal of Process Equipment (CS-05)	$0.00	
Removal of Soil (CS-06)	$0.00	
Backfill and Grading (BF-01)	$0.00	
Decontamination (DC-01)	$0.00	
Sampling and Analysis (SA-02)	$0.00	
Monitoring Well Installation (MW-01)	$0.00	
Transportation (TR-01)	$29,779.20	
Treatment and Disposal (TD-01)	$113,336.00	
User Defined Cost (UD-01)	$0.00	
Subtotal of Closure Costs	$149,627.15	
Percentage of Engineering Expenses	8.0	%
Engineering Expenses	$11,970.17	
Certification of Closure (CS-07)	$0.00	
Subtotal	$161,597.32	
Percentage of Contingency Allowance	15.0	%
Contingency Allowance	$24,239.60	
Landfill Closure (Cover Installation) (CI-02)	$0.00	
TOTAL COST OF CLOSURE	$185,836.92	

Container Storage Areas Summary (CS_02-1)

Removal of Waste (CS-03)	$7,330.31	
Demolition and Removal of Pads (CS-04)	$29,025.05	
Removal of Process Equipment (CS-05)	$0.00	
Removal of Soil (CS-06)	$1,175.44	
Backfill and Grading (BF-01)	$776.25	
Decontamination (DC-01)	$0.00	
Sampling and Analysis (SA-02)	$38,818.26	
Monitoring Well Installation (MW-01)	$0.00	
Transportation (TR-01)	$32,148.00	
Treatment and Disposal (TD-01)	$132,210.00	
User Defined Cost (UD-01)	$0.00	
Subtotal of Closure Costs	$241,483.31	
Percentage of Engineering Expenses	8.0	%
Engineering Expenses	$19,318.66	
Certification of Closure (CS-07)	$4,047.99	
Subtotal	$264,849.96	
Percentage of Contingency Allowance	15.0	%
Contingency Allowance	$39,727.49	
Landfill Closure (Cover Installation) (CI-02)	$0.00	
TOTAL COST OF CLOSURE	$304,577.45	

Container Storage Areas Summary (CS_02-1)

Removal of Waste (CS-03)	$3,512.03	
Demolition and Removal of Pads (CS-04)	$0.00	
Removal of Process Equipment (CS-05)	$0.00	
Removal of Soil (CS-06)	$7,207.32	
Backfill and Grading (BF-01)	$2,756.25	
Decontamination (DC-01)	$0.00	
Sampling and Analysis (SA-02)	$4,071.96	
Monitoring Well Installation (MW-01)	$0.00	
Transportation (TR-01)	$177,660.00	
Treatment and Disposal (TD-01)	$119,607.58	
User Defined Cost (UD-01)	$0.00	
Subtotal of Closure Costs	$314,815.14	
Percentage of Engineering Expenses	8.0	%
Engineering Expenses	$25,185.21	
Certification of Closure (CS-07)	$4,047.99	
Subtotal	$344,048.34	
Percentage of Contingency Allowance	15.0	%
Contingency Allowance	$51,607.25	
Landfill Closure (Cover Installation) (CI-02)	$0.00	
TOTAL COST OF CLOSURE	$395,655.59	

Container Storage Areas Summary (CS_02-1)

Removal of Waste (CS-03)	$9,729.54	
Demolition and Removal of Pads (CS-04)	$0.00	
Removal of Process Equipment (CS-05)	$0.00	
Removal of Soil (CS-06)	$19,073.63	
Backfill and Grading (BF-01)	$7,690.88	
Decontamination (DC-01)	$0.00	
Sampling and Analysis (SA-02)	$4,071.96	
Monitoring Well Installation (MW-01)	$0.00	
Transportation (TR-01)	$485,040.00	
Treatment and Disposal (TD-01)	$331,354.44	
User Defined Cost (UD-01)	$0.00	
Subtotal of Closure Costs	$856,960.45	
Percentage of Engineering Expenses	8.0	%
Engineering Expenses	$68,556.84	
Certification of Closure (CS-07)	$4,047.99	
Subtotal	$929,565.28	
Percentage of Contingency Allowance	15.0	%
Contingency Allowance	$139,434.79	
Landfill Closure (Cover Installation) (CI-02)	$0.00	
TOTAL COST OF CLOSURE	$1,069,000.07	

Container Storage Areas Summary (CS_02-1)

Removal of Waste (CS-03)	$23,034.85	
Demolition and Removal of Pads (CS-04)	$0.00	
Removal of Process Equipment (CS-05)	$0.00	
Removal of Soil (CS-06)	$0.00	
Backfill and Grading (BF-01)	$0.00	
Decontamination (DC-01)	$0.00	
Sampling and Analysis (SA-02)	$0.00	
Monitoring Well Installation (MW-01)	$0.00	
Transportation (TR-01)	$85,728.00	
Treatment and Disposal (TD-01)	$238,656.00	
User Defined Cost (UD-01)	$1,676.00	
Subtotal of Closure Costs	$349,094.85	
Percentage of Engineering Expenses	8.0	%
Engineering Expenses	$27,927.59	
Certification of Closure (CS-07)	$0.00	
Subtotal	$377,022.44	
Percentage of Contingency Allowance	15.0	%
Contingency Allowance	$56,553.37	
Landfill Closure (Cover Installation) (CI-02)	$0.00	
TOTAL COST OF CLOSURE	$433,575.81	

Post-Closure Care Summary (PC_01-1)

Removal of Leachate (PC-02)	$56,430.00	
Site Security (PC-03)	$66,360.00	
Maintenance of Vegetative Cover (PC-04)	$0.00	
Maintenance and Inspection (PC-05)	$72,392.20	
Groundwater Monitoring(PC-06)	$3,363,023.76	
Deed Notation (PC-07)	$6,684.40	
Maintenance and Inspection of Asphalt Cover (PC-8)	$0.00	
Surface Emission Monitoring (PC-09)	$0.00	
Gas Extraction System and Perimeter Probe Monitoring (PC-10)	$0.00	
User Defined Cost (UD-01)	$379,880.00	
Subtotal of Post-Closure Costs	$3,944,770.36	
Percentage of Engineering Expenses	8.0	%
Engineering Expenses	$315,581.63	
Certification of Post-Closure (PC-11)	$4,875.68	
Subtotal	$4,265,227.67	
Percentage of Contingency Allowance	15.0	%
Contingency Allowance	$639,784.15	
TOTAL COST OF POST-CLOSURE CARE	$4,905,011.82	

Landfills Summary (LF_02-1)

Installation of Undifferentiated Fill (LF-03)	$0.00	
Installation of Clay Layer (LF-04)	$0.00	
Installation of Geomembrane (LF-05)	$0.00	
Installation of Drainage Layer (LF-06)	$0.00	
Installation of Earthen Layer (LF-07)	$462,853.75	
Installation of Topsoil (LF-08)	$0.00	
Establishment of Vegetative Cover (LF-09)	$0.00	
Installation of Colloid Clay Liner (LF-10)	$0.00	
Installation of Asphalt Cover (LF-11)	$0.00	
Installation of a Gas Collection System (LF-12)	$0.00	
Installation of Flares and Support Equipment (LF-13)	$0.00	
Installation of Storm Water Control (LF-14)	$0.00	
Decontamination (DC-01)	$0.00	
Sampling and Analysis (SA-02)	$25,570.96	
Monitoring Well Installation (MW-01)	$0.00	
Transportation (TR-01)	$0.00	
Treatment and Disposal (TD-01)	$0.00	
User Defined Cost (UD-01)	$0.00	
Subtotal of Closure Costs	$488,424.71	
Percentage for Engineering Expenses	8.0	%
Engineering Expenses	$39,073.98	
Survey Plat (LF-15)	$17,615.36	
Certification of Closure (LF-16)	$4,047.99	
Subtotal	$549,162.04	
Percentage for Contingency	15.0	%
Contingency Allowance	$82,374.31	
TOTAL COST OF CLOSURE	$631,536.35	

Landfills Summary (LF_02-1)

Installation of Undifferentiated Fill (LF-03)	$0.00	
Installation of Clay Layer (LF-04)	$0.00	
Installation of Geomembrane (LF-05)	$0.00	
Installation of Drainage Layer (LF-06)	$0.00	
Installation of Earthen Layer (LF-07)	$0.00	
Installation of Topsoil (LF-08)	$0.00	
Establishment of Vegetative Cover (LF-09)	$0.00	
Installation of Colloid Clay Liner (LF-10)	$0.00	
Installation of Asphalt Cover (LF-11)	$0.00	
Installation of a Gas Collection System (LF-12)	$0.00	
Installation of Flares and Support Equipment (LF-13)	$0.00	
Installation of Storm Water Control (LF-14)	$0.00	
Decontamination (DC-01)	$0.00	
Sampling and Analysis (SA-02)	$0.00	
Monitoring Well Installation (MW-01)	$0.00	
Transportation (TR-01)	$0.00	
Treatment and Disposal (TD-01)	$0.00	
User Defined Cost (UD-01)	$0.00	
Subtotal of Closure Costs	$0.00	
Percentage for Engineering Expenses	8.0	%
Engineering Expenses	$0.00	
Survey Plat (LF-15)	$0.00	
Certification of Closure (LF-16)	$0.00	
Subtotal	$0.00	
Percentage for Contingency	15.0	%
Contingency Allowance	$0.00	
TOTAL COST OF CLOSURE	$0.00	

Tank Systems Summary (TS_02-1)

Removal of Waste (TS-03)	$1,812.68	
Tank System Purging (ignitable waste only) (TS-04)	$0.00	
Flushing the Tank and Piping (TS-05)	$0.00	
Excavation, Disassembly, and Loading (TS-06)	$6,864.21	
Demolition and Removal of Containment System (TS-07)	$13,571.97	
Removal of Soil (TS-08)	$673.83	
Backfill and Grading (BF-01)	$800.12	
Decontamination (DC-01)	$0.00	
Sampling and Analysis (SA-02)	$15,620.80	
Monitoring Well Installation (MW-01)	$0.00	
Transportation (TR-01)	$9,926.40	
Treatment and Disposal (TD-01)	$62,500.00	
User Defined Cost (UD-01)	$8,000.00	
Subtotal of Closure Costs	$119,770.01	
Percentage of Engineering Expenses	8.0	%
Engineering Expenses	$9,581.60	
Certification of Closure (TS-09)	$4,047.99	
Subtotal	$133,399.60	
Percentage of Contingency Allowance	15.0	%
Contingency Allowance	$20,009.94	
Landfill Closure (Cover Installation) (CI-02)	$0.00	
TOTAL COST OF CLOSURE	$153,409.54	

Tank Systems Summary (TS_02-1)

Removal of Waste (TS-03)	$725.07	
Tank System Purging (ignitable waste only) (TS-04)	$0.00	
Flushing the Tank and Piping (TS-05)	$0.00	
Excavation, Disassembly, and Loading (TS-06)	$0.00	
Demolition and Removal of Containment System (TS-07)	$11,305.53	
Removal of Soil (TS-08)	$3,262.59	
Backfill and Grading (BF-01)	$1,141.38	
Decontamination (DC-01)	$0.00	
Sampling and Analysis (SA-02)	$10,496.30	
Monitoring Well Installation (MW-01)	$0.00	
Transportation (TR-01)	$20,304.00	
Treatment and Disposal (TD-01)	$13,835.56	
User Defined Cost (UD-01)	$0.00	
Subtotal of Closure Costs	$61,070.43	
Percentage of Engineering Expenses	8.0	%
Engineering Expenses	$4,885.63	
Certification of Closure (TS-09)	$4,047.99	
Subtotal	$70,004.05	
Percentage of Contingency Allowance	15.0	%
Contingency Allowance	$10,500.61	
Landfill Closure (Cover Installation) (CI-02)	$0.00	
TOTAL COST OF CLOSURE	$80,504.66	

Tank Systems Summary (TS_02-1)

Removal of Waste (TS-03)	$0.00	
Tank System Purging (ignitable waste only) (TS-04)	$0.00	
Flushing the Tank and Piping (TS-05)	$0.00	
Excavation, Disassembly, and Loading (TS-06)	$25,845.06	
Demolition and Removal of Containment System (TS-07)	$21,503.20	
Removal of Soil (TS-08)	$658.70	
Backfill and Grading (BF-01)	$3,307.00	
Decontamination (DC-01)	$0.00	
Sampling and Analysis (SA-02)	$17,770.10	
Monitoring Well Installation (MW-01)	$0.00	
Transportation (TR-01)	$0.00	
Treatment and Disposal (TD-01)	$0.00	
User Defined Cost (UD-01)	$10,000.00	
Subtotal of Closure Costs	$79,084.06	
Percentage of Engineering Expenses	8.0	%
Engineering Expenses	$6,326.72	
Certification of Closure (TS-09)	$4,047.99	
Subtotal	$89,458.77	
Percentage of Contingency Allowance	15.0	%
Contingency Allowance	$13,418.82	
Landfill Closure (Cover Installation) (CI-02)	$0.00	
TOTAL COST OF CLOSURE	$102,877.59	

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POST-CLOSURE CARE PLAN

(Applies to Scheduled and Unscheduled Closure Plans)

US ECOLOGY NEVADA

March 2010

Revised August 2014

SECTION 17
POST-CLOSURE CARE PLAN
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Appendix 17 A Post-Closure Care Cost Estimate

SECTION 17
POST-CLOSURE CARE PLAN

The post-closure care period begins upon closure of the facility and continues for 30 years. Should US Ecology Nevada determine at any time during the post-closure care period that any of the monitoring or maintenance activities are no longer necessary or that revisions to the approved plan are required, the facility operator will petition the Nevada Division of Environmental Protection (NDEP) Administrator and the Permits Section, Land Division, US EPA Region IX, for a modification to the plan. The modification request will be submitted at least 60 days prior to the proposed change.

A detailed description of the post-closure care activities at the facility is provided in the following sections.

17.1.0 INSPECTION AND MAINTENANCE ACTIVITIES

Because of the infrequency of rainfall events, and the limited amount of damage that sparse rainfall could cause to the surface of the final cover system, the post-closure plan calls for semi-annual inspections of the final cover system and other facility features. Less frequent inspections of other facility features may be appropriate, but for the sake of convenience, they will be performed concurrently with inspections of the final cover.

17.1.1 Maintenance of Final Cover

The surface of the closed landfill cells will be inspected for subsidence, cracking, vegetative stress, burrowing animals or erosion semi-annually. Cracks, depressions, animal burrows and erosion ditches will be filled as necessary with site soils (from excess materials stockpiled on site), and compacted.

After installation of the final cover, there will be no need to control run-off from the disposal unit, since the landfilled waste will be completely isolated.

17.1.2 Maintenance and Protection of Surveyed Benchmarks

The two reference points forming the base of the facility grid system and the benchmark used for vertical control shall be preserved and protected by converting them to permanent markers at the beginning of the post-closure period. The resulting structures shall be visible and outside of any traffic routes.

17.1.3 Installation and Maintenance of Run-On Controls

The facility's run-on control systems will be inspected semi-annually for any condition that could prevent their proper functioning, and repaired as needed.

17.1.4 Maintenance and Inspection of Security Control Devices

Existing fences, gates and signs will remain in place to restrain access to the facility and as points of reference. These will be inspected concurrently with other facility features described in this plan, and repaired or replaced, as necessary.

17.1.5 Maintenance and Inspection of Monitoring Wells System

Because the monitoring wells will not be used for water production, it is unlikely that the well screens will clog to such an extent as to prevent the collection of representative samples. The post-closure plan provides for replacement of one well pump per year. This maintenance would be performed during a regularly scheduled semi- annual sampling event, so no additional man-hours are anticipated. The facility water supply well will be sampled on the same schedule as other monitoring wells at the facility. The water supply well will be maintained as the source of on-site maintenance water. The monitoring wells are provided with locks to minimize the risk of vandalism.

17.1.6 Maintenance and Inspection of Leachate Collection and Removal System

Inspection of the leachate collection sump risers to identify damage and maintenance needs will be conducted semi-annually while inspecting the landfill cap and other site features. Monitoring of the leachate detection system sumps and recording of sump liquid levels initially will be conducted monthly. The monitoring/recording frequency will be reduced to a quarterly if the liquid level in the sump stays below the pump operating level for two consecutive months. After two consecutive quarters of recording sump liquid levels below pump operating level, monitoring/recording frequency will be changed to semi-annual. If, at any time during the post-closure period (while following the quarterly or semi-annual schedules), the sump liquid levels exceed the pump operating level, the unit will be returned to monthly monitoring until the liquid level stays below pump operating level for two consecutive months.

For the purpose of calculating the cost associated with monitoring of liquid detection sumps, it is assumed that monthly monitoring will be required throughout the first year after completion of facility closure. After the first year, the monitoring/recording frequency will be reduced to quarterly, as the presence of leachate in the sumps is expected to diminish significantly, and the liquid level in the sumps is likely to stay below the pump operating level. The sumps will be monitored quarterly during the second year following closure completion. Thereafter, monitoring of the sumps will be conducted semi-annually.

Records of leachate generation rates will be analyzed in each post closure report to determine whether there is a statistically significant increase in the rates.

All leachate pumped from the collection sumps during the post-closure period will be stored in totes or other approved containers and be transported off-site to a facility authorized to accept F039 waste.

17.2.0 FACILITY MONITORING

Post-closure monitoring is required and is assumed for cost estimating purposes to proceed in the same manner described for the facility's active life (see the Groundwater Monitoring Plan submitted as part of the Renewal Permit Application with regards to the system configuration, parameters to be monitored for, and groundwater sampling and analysis procedures). In addition, Basin Lysimeters constructed within the Trench 11 and Trench 12 final covers will be monitored to determine whether rainwater and snowmelt are infiltrating the cover.

For the purpose of calculating the cost associated with monitoring of Basin Lysimeters, it is assumed that monthly monitoring will be required throughout the first year after completion of facility closure. After the first year, the monitoring/recording frequency will be reduced to quarterly, as the first year's monitoring is expected to demonstrate that no infiltration takes place during any single month. After the second year following closure completion, the Basin Lysimeters will be monitored semi-annually.

17.3.0 POST-CLOSURE CONTACT

The contact for information at any time during the post-closure care period will be:

Director of Environmental Affairs
US Ecology, Inc.
251 East Front Street, Suite 400
Boise, Idaho 83702
(800) 590-5220

17.4.0 SURVEY PLAT

No later than the date when the landfill closure certification is submitted, US Ecology Nevada, will submit to the NDEP Administrator and the Recorder's Office of Nye County, Nevada, a survey plat indicating the location and dimensions of the landfill cell with respect to permanently surveyed benchmarks. The plat will be prepared and certified by a professional land surveyor,

and will contain a note, prominently displayed, stating US Ecology's obligation to restrict disturbance in accordance with the requirements of 40 CFR 264. 117(c).

17.5.0 POST-CLOSURE NOTICES

By contractual agreement with the facility owner (The State of Nevada), the facility will revert to state control at the time of closure and the State will provide post closure care using funds already set aside for this purpose.

No later than 60 days after certification of landfill closure, US Ecology Nevada will submit to the NDEP Administrator, and the Recorder's Office of Nye County, Nevada, a record of the type, location and quantities of hazardous waste disposed of within each cell.

Within 60 days after closure certification, a notation will be recorded on the facility deed, (as recorded in the Recorder's Office of Nye County, Nevada) that will notify potential purchasers that:

- The property has been used for disposal of hazardous waste, and
- The use of the property is restricted under 40 CFR 264. 117(c) (relating to Post- Closure Care and Use of Property), and
- The survey plat and record of the type, location, and quantity of hazardous wastes disposed of within each cell have been filed with the Recorder's Office of Nye County, Nevada, and with the NDEP Administrator.

A certification, signed by a company representative, will be submitted to the Administrator stating that the above notation has been recorded in the facility deed. A copy of the deed will be provided with the certification.

17.6.0 POST-CLOSURE CERTIFICATION

Within 60 days of completion of the post-closure care period, US Ecology, Inc. will submit to the NDEP Administrator and to the Permits Section, Land Division, US EPA Region IX, a certification attesting that the post-closure care period for the hazardous waste disposal unit was performed in accordance with specifications of the approved post-closure plan. The certification will be signed by a facility representative, and by an independent professional engineer, registered in the State of Nevada.

17.7.0 POST-CLOSURE CARE COST ESTIMATE

The cost estimate for post-closure care activities of the disposal units at US Ecology Nevada facility is included as Appendix A.

17.8.0 PLAN MODIFICATIONS

US Ecology will submit a written notification of, or request for a permit modification to authorize a change in the approved Post-Closure Plan if:

- Changes in operating plans or facility design affect the approved plan, or
- There is a change in the expected year of final closure, or
- Events which occur during the active life of the facility affect the plan.

The request for permit modification will be submitted at least 60 days prior to the proposed change in facility design or operation, or no later than 60 days after an unexpected event which requires revisions to the approved plan.

-updated 12/2015 Class 1* Mod Rev 14

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APPENDIX 17-A
POST-CLOSURE CARE COST ESTIMATE

Estimate Created in CostPro Financial Assurance Software

Date of Estimate: November 30, 2015

Summary Sheets Provided in the Attached

Additional Support Data Presented in *2015 Updates to USEN's Financial Assurance Closure Estimate – August 24, 2015 (Updated November 30, 2015)*

Yearly Comparison
Financial Assurance Cost Estimate
USEN
Beatty, NV

Unit	2012 Estimate	2013 Estimate	2014 Estimate	2015 Estimate
Containment Buildings	$394,164	$366,663	$548,903	$546,177
Container Storage Area	$2,368,248	$2,365,495	$2,400,194	$2,388,646
Landfills	$1,616,527	$1,590,808	$1,162,111	$631,536
Post Closure Care	$4,810,481	$4,853,484	$4,849,747	$5,136,092
Tank Systems	$326,779	$330,286	$380,750	$336,792
Total Estimated Cost	$9,516,202	$9,506,736	$9,341,705	$9,039,243

Facility: USEN Facility **Unit:** Trench 11 and Facility 11/30/2015

Post-Closure Care Summary (PC_01-1)

Removal of Leachate (PC-02)	$56,430.00	
Site Security (PC-03)	$66,360.00	
Maintenance of Vegetative Cover (PC-04)	$0.00	
Maintenance and Inspection (PC-05)	$72,392.20	
Groundwater Monitoring(PC-06)	$3,363,023.76	
Deed Notation (PC-07)	$6,684.40	
Maintenance and Inspection of Asphalt Cover (PC-8)	$0.00	
Surface Emission Monitoring (PC-09)	$0.00	
Gas Extraction System and Perimeter Probe Monitoring (PC-10)	$0.00	
User Defined Cost (UD-01)	$379,880.00	
Subtotal of Post-Closure Costs	$3,944,770.36	
Percentage of Engineering Expenses	8.0	%
Engineering Expenses	$315,581.63	
Certification of Post-Closure (PC-11)	$4,875.68	
Subtotal	$4,265,227.67	
Percentage of Contingency Allowance	15.0	%
Contingency Allowance	$639,784.15	
TOTAL COST OF POST-CLOSURE CARE	$4,905,011.82	

Post-Closure Care Rem. of Leachate (PC_02-2)

Volume of leachate to be removed per removal event	1,125.0	gal per Event
Number of leachate removal events per year	4	Events per yr
Volume of leachate to be removed per year	4,500.0	gal per Year
Cost to treat leachate per gallon	$1.14	per Gallon
Cost per year for removal of leachate	$5,130.00	per Year
Number of years in the post-closure care period	1	Years
TOTAL COST OF REMOVAL OF LEACHATE	$5,130.00	

Notes: In Post Closure Year 2 the average leachate generation is estimated at 4500 gallons per year. In Year 2 leachate monitoring and if necessary removal is expected to occur quarterly.

Post-Closure Care Rem. of Leachate (PC_02-3)

Volume of leachate to be removed per removal event	1,500.0	gal per Event
Number of leachate removal events per year	2	Events per yr
Volume of leachate to be removed per year	3,000.0	gal per Year
Cost to treat leachate per gallon	$1.14	per Gallon
Cost per year for removal of leachate	$3,420.00	per Year
Number of years in the post-closure care period	13	Years
TOTAL COST OF REMOVAL OF LEACHATE	$44,460.00	

Notes: See note on PC_02-1. In Post Closure Years 3 to 15 the average leachate generation is estimated at 3000 gallons per year. In Years 3 to 15 leachate monitoring and if necessary removal is expected to occur semi-annually. After Year 15 leachate assumed not to be present in pumpable quantities.

Post-Closure Care Rem. of Leachate (PC_02-1)

Volume of leachate to be removed per removal event	500.0	gal per Event
Number of leachate removal events per year	12	Events per yr
Volume of leachate to be removed per year	6,000.0	gal per Year
Cost to treat leachate per gallon	$1.14	per Gallon
Cost per year for removal of leachate	$6,840.00	per Year
Number of years in the post-closure care period	1	Years
TOTAL COST OF REMOVAL OF LEACHATE	$6,840.00	

Notes: Estimate assumes that average leachate production of 6000 gallons per year will occur in the first year following closure. Year 2 is covered under tab PC_02-2 and Years 3 to 30 are covered under PC_02-3. In Year 1 leachate monitoring and if necessary removal is expected to occur monthly.

Post-Closure Care Site Security (PC_03-1)

FENCING

Length of fencing	3,000.0	ft
Labor, materials, and equipment cost per ft	$22.12	per ft
Cost to Fence Site	$66,360.00	

CORNER POSTS

Number of corner posts required	0	Posts
Cost per corner post	$151.38	per Post
Cost to Erect Corner Posts	$0.00	

GATES

Number of gates required	0	Gates
Labor, materials, and equipment cost per gate	$344.05	per Gate
Cost to Install Gates	$0.00	

REFLECTOR SIGNS

Number of signs required	0	Signs
Labor, materials, and equipment cost per sign	$113.04	per Sign
Cost to Install Signs	$0.00	
TOTAL COST OF SITE SECURITY	$66,360.00	

Notes: Assumed fencing and fence repair during post closure.

Post-Closure Care Rep. and Insp. of Veg. Cover (PC_05-1)

MAINTENANCE AND REPAIR OF FINAL COVER

Cost of installing undifferentiated fill	$0.00	
Cost of installing clay layer	$0.00	
Cost of installing geomembrane	$0.00	
Cost of installing drainage layer	$0.00	
Cost of installing earthen layer	$300,032.00	
Cost of installing topsoil	$0.00	
Cost of installing colloid clay layer	$0.00	
Total cost of installing final cover	$300,032.00	
Maintenance and repair factor	20.0	%
Cost to Maintain and Repair Final Cover	$60,006.40	

POST-CLOSURE CARE INSPECTION

Cost of conducting one inspection	$206.43	per Inspection
Number of inspections per year	2	Inspections per Year
Cost of conducting post-closure care inspections per year	$412.86	per Year
Number of years in post-closure care period	30	Years
Cost to Conduct Inspections Over the Post-Closure Care Period	$12,385.80	
TOTAL COST OF REPAIR AND INSPECTION	$72,392.20	

Notes: Total Cover area = 780350 ft2
Cover Depth = 2 Feet
Slope correction factor (3:1) = 1.16
Total Cover Volume = 67052 CYD
Cover Construction Cost = 67053CYD*(3.25+0.50 dollars/CYD) = 251449 dollars (11/12/15 costs provided by LVP)
Mobilization = 48586 dollars
Total Cover Cost = 300032 dollars

Post-Closure Care Groundwater Monit. (PC_06-3)

COLLECTION OF GROUNDWATER SAMPLES

Number of sampling locations	5	Sample Location
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per work hour	$144.67	per Work Hour
Work rate to collect samples from one sampling location	2.7000	Work hr per Location
Number of hours required to collect all samples	13.5	Work hrs
Cost to Collect Groundwater Samples per Event	$1,953.04	per Event

ANALYSIS OF GROUNDWATER SAMPLES

Cost to Analyze Groundwater Samples per Event	$4,060.00	per Event

TOTAL GROUNDWATER MONITORING FOR POST-CLOSURE CARE PERIOD

Cost of Sampling and Analysis of Groundwater for Post-Closure	$6,013.04	per Event
Number of sampling events per year	1	Events per yr
Number of years of groundwater monitoring during the post-closure care period	15	Years
TOTAL COST OF GROUNDWATER MONITORING	$90,195.60	

Notes: Sampling of Leachate during Post Closure

Assumption that following closure no new waste is being added and leachate production decreases. Assumed that leachate is no longer available to sample after 15 years.

CostPro default assumes four hours per well. Use actual of 2.7 hours per well per USEN experience.

In lieu of CostPro Defaults actual analytical costs estimated (2016 estimated costs) by Asset Laboratories of Las Vegas have been used as. Sampling event total has been entered under acidity as a single cost for the entire event instead of specifying costs for each analytical procedure. See attached Spreadsheet for a breakdown of the individual analytical procedure costs.

Post-Closure Care Groundwater Monit. (PC_06-2)

COLLECTION OF GROUNDWATER SAMPLES

Number of sampling locations	5	Sample Location
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per work hour	$144.67	per Work Hour
Work rate to collect samples from one sampling location	2.7000	Work hr per Location
Number of hours required to collect all samples	13.5	Work hrs
Cost to Collect Groundwater Samples per Event	$1,953.04	per Event

ANALYSIS OF GROUNDWATER SAMPLES

Cost to Analyze Groundwater Samples per Event	$6,560.00	per Event

TOTAL GROUNDWATER MONITORING FOR POST-CLOSURE CARE PERIOD

Cost of Sampling and Analysis of Groundwater for Post-Closure	$8,513.04	per Event
Number of sampling events per year	1	Events per yr
Number of years of groundwater monitoring during the post-closure care period	24	Years
TOTAL COST OF GROUNDWATER MONITORING	$204,312.96	

Notes: CostPro default assumes four hours per well. Use actual of 2.7 hours per well per USEN experience.
5 Supplemental monitoring wells.

In lieu of CostPro Defaults actual analytical costs estimated (2016 estimated costs) by Asset Laboratories of Las Vegas have been used as. Sampling event total has been entered under acidity as a single cost for the entire event instead of specifying costs for each analytical procedure. See attached Spreadsheet for a breakdown of the individual analytical procedure costs.

Sampling for 5 Supplimental wells occurs once every 5 quarters. Once every 5 quarters equals 24 sampling events in 30 years. 24 is entered as number of sampling years.

Post-Closure Care Groundwater Monit. (PC_06-1)

COLLECTION OF GROUNDWATER SAMPLES

Number of sampling locations	18	Sample Location
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per work hour	$144.67	per Work Hour
Work rate to collect samples from one sampling location	2.7000	Work hr per Location
Number of hours required to collect all samples	48.6	Work hrs
Cost to Collect Groundwater Samples per Event	$7,030.96	per Event

ANALYSIS OF GROUNDWATER SAMPLES

Cost to Analyze Groundwater Samples per Event	$18,540.00	per Event

TOTAL GROUNDWATER MONITORING FOR POST-CLOSURE CARE PERIOD

Cost of Sampling and Analysis of Groundwater for Post-Closure	$25,570.96	per Event
Number of sampling events per year	4	Events per yr
Number of years of groundwater monitoring during the post-closure care period	30	Years
TOTAL COST OF GROUNDWATER MONITORING	$3,068,515.20	

Notes: CostPro default assumes four hours per well. Use actual of 2.7 hours per well per USEN experience.
Sample locations include
18 monitoring wells

In lieu of CostPro Defaults actual analytical costs estimated (2016 estimated costs) by Asset Laboratories of Las Vegas have been used as. Sampling event total has been entered under acidity as a single cost for the entire event instead of specifying costs for each analytical procedure. See attached Spreadsheet for a breakdown of the individual analytical procedure costs.

Post-Closure Care Deed Notation (PC_07-1)

Attorney fees	$1,769.40
Clerical and deed filing fees	$4,915.00
TOTAL COST OF DEED NOTATION	$6,684.40

Certification of Completion of Post-Closure Care (PC_11-1)

Number of units requiring certification of completion of post-closure care	1	Units
Cost of certification of completion of post-closure care per unit	$4,875.68	per Unit
TOTAL COST OF CERTIFICATION OF POST-CLOSURE CARE	$4,875.68	

User Defined Activity (UD_01-5)

NAME OF CLOSURE OR POST-CLOSURE ACTIVITY	Leachate Transport	
Number of units of work to be performed	0	
Type of unit	Tons	
Appropriate level of PPE	Protection Level B	
Labor, material, and equipment cost per work hour	$0.00	
Work rate to perform one unit of activity	0.0000	Work hrs per Unit
Number of hours required to perform activity	0.0	Work hrs
Additional cost per unit	$0.00	per Unit
Cost to conduct activity	$0.00	

Other cost(s) associated with this activity

Description of other costs	0
Cost	$25,380.00
Description of other costs	0
Cost	$0.00
Description of other costs	0
Cost	$0.00
Description of other costs	0
Cost	$0.00
Description of other costs	0
Cost	$0.00
TOTAL COST OF USER DEFINED ACTIVITY	$25,380.00

Notes: Leachate Removal
Year 1 = 6000 gallons per year.
Year 2 = 4500 gallons per year
Years 3 to 15 estimated at 3000 gallons per year.
No pumpable leachate after Year 15
Total leachate removal associated with Trench 11 over the 30 year post-closure care period = 49500 gallons.
CostPro default tanker load is 6900 gallons
Assume leachate is removed once a year regardless of full load thus 15 total loads

CostPro default tanker load cost is 5.64 dollars/mile/load.
Assume 300 miles to Siemens Water Treatment in Vernon CA
15 loads x 5.64/load/mile x 300 miles = 25380 dollars over the 30 year post closure care period.

User Defined Activity (UD_01-4)

NAME OF CLOSURE OR POST-CLOSURE ACTIVITY	Lysimeter Monitoring	
Number of units of work to be performed	10	
Type of unit	Tons	
Appropriate level of PPE	Protection Level B	
Labor, material, and equipment cost per work hour	$0.00	
Work rate to perform one unit of activity	0.0000	Work hrs per Unit
Number of hours required to perform activity	0.0	Work hrs
Additional cost per unit	$12,500.00	per Unit
Cost to conduct activity	$125,000.00	

Other cost(s) associated with this activity

Description of other costs	0
Cost	$0.00
Description of other costs	0
Cost	$0.00
Description of other costs	0
Cost	$0.00
Description of other costs	0
Cost	$0.00
Description of other costs	0
Cost	$0.00
TOTAL COST OF USER DEFINED ACTIVITY	$125,000.00

Notes: Lysimeter data evalations are estimated at semi-annual for a period of ten years (3000 per event or 6000 per year)
Lysimeter performance evaluations are extimated at annually for a period of ten years (5000 per year)
Lysimeter inspeciton and maintenance is expected every other year (3000 every other year or 1500 per year)
Costs are annualized at 12500 per year for ten years.
Sufficeint data collection expected to determine performance of alternative final cover in a 10 year period.
No removal necessary. Equipment has value and is not included as a cost to remove.

User Defined Activity (UD_01-3)

NAME OF CLOSURE OR POST-CLOSURE ACTIVITY	SVE-01 Closure	
Number of units of work to be performed	1	
Type of unit	Tons	
Appropriate level of PPE	Protection Level B	
Labor, material, and equipment cost per work hour	$0.00	
Work rate to perform one unit of activity	0.0000	Work hrs per Unit
Number of hours required to perform activity	0.0	Work hrs
Additional cost per unit	$0.00	per Unit
Cost to conduct activity	$0.00	

Other cost(s) associated with this activity

Description of other costs	Mobilization
Cost	$4,000.00
Description of other costs	Abandonment
Cost	$2,500.00
Description of other costs	GAC disposal
Cost	$3,000.00
Description of other costs	0
Cost	$0.00
Description of other costs	0
Cost	$0.00
TOTAL COST OF USER DEFINED ACTIVITY	$9,500.00

Notes: SVE Well Abandonment at 25/ft

User Defined Activity (UD_01-2)

NAME OF CLOSURE OR POST-CLOSURE ACTIVITY	Replacement of Leachate Pumps	
Number of units of work to be performed	4	
Type of unit	Tons	
Appropriate level of PPE	Protection Level B	
Labor, material, and equipment cost per work hour	$0.00	
Work rate to perform one unit of activity	0.0000	Work hrs per Unit
Number of hours required to perform activity	0.0	Work hrs
Additional cost per unit	$10,000.00	per Unit
Cost to conduct activity	$40,000.00	

Other cost(s) associated with this activity

Description of other costs	0
Cost	$0.00
Description of other costs	0
Cost	$0.00
Description of other costs	0
Cost	$0.00
Description of other costs	0
Cost	$0.00
Description of other costs	0
Cost	$0.00
TOTAL COST OF USER DEFINED ACTIVITY	$40,000.00

Notes: Each Leachate pump is assumed to need replacement at least once during Post Closure Care

User Defined Activity (UD_01-1)

NAME OF CLOSURE OR POST-CLOSURE ACTIVITY	Well Pump Replacement	
Number of units of work to be performed	30	
Type of unit	Tons	
Appropriate level of PPE	Protection Level B	
Labor, material, and equipment cost per work hour	$0.00	
Work rate to perform one unit of activity	0.0000	Work hrs per Unit
Number of hours required to perform activity	0.0	Work hrs
Additional cost per unit	$6,000.00	per Unit
Cost to conduct activity	$180,000.00	

Other cost(s) associated with this activity

Description of other costs	0
Cost	$0.00
Description of other costs	0
Cost	$0.00
Description of other costs	0
Cost	$0.00
Description of other costs	0
Cost	$0.00
Description of other costs	0
Cost	$0.00
TOTAL COST OF USER DEFINED ACTIVITY	$180,000.00

Notes: Replacement of a 2 inch low flow pump. Assume each pump will be replaced once during post closure period.

Facility: USEN Facility **Unit:** Trench 12 (Facility covered under T11) 11/30/2015

Post-Closure Care Summary (PC_01-1)

Removal of Leachate (PC-02)	$56,430.00	
Site Security (PC-03)	$0.00	
Maintenance of Vegetative Cover (PC-04)	$0.00	
Maintenance and Inspection (PC-05)	$55,123.20	
Groundwater Monitoring(PC-06)	$0.00	
Deed Notation (PC-07)	$6,684.40	
Maintenance and Inspection of Asphalt Cover (PC-8)	$0.00	
Surface Emission Monitoring (PC-09)	$0.00	
Gas Extraction System and Perimeter Probe Monitoring (PC-10)	$0.00	
User Defined Cost (UD-01)	$25,380.00	
Subtotal of Post-Closure Costs	$143,617.60	
Percentage of Engineering Expenses	8.0	%
Engineering Expenses	$11,489.41	
Certification of Post-Closure (PC-11)	$4,875.68	
Subtotal	$159,982.69	
Percentage of Contingency Allowance	15.0	%
Contingency Allowance	$23,997.40	
TOTAL COST OF POST-CLOSURE CARE	$183,980.09	

Post-Closure Care Rem. of Leachate (PC_02-2)

Volume of leachate to be removed per removal event	1,125.0	gal per Event
Number of leachate removal events per year	4	Events per yr
Volume of leachate to be removed per year	4,500.0	gal per Year
Cost to treat leachate per gallon	$1.14	per Gallon
Cost per year for removal of leachate	$5,130.00	per Year
Number of years in the post-closure care period	1	Years
TOTAL COST OF REMOVAL OF LEACHATE	$5,130.00	

Notes: In Post Closure Year 2 the average leachate generation is estimated at 4500 gallons per year. In Year 2 leachate monitoring and if necessary removal is expected to occur quarterly.

Post-Closure Care Rem. of Leachate (PC_02-3)

Volume of leachate to be removed per removal event	1,500.0	gal per Event
Number of leachate removal events per year	2	Events per yr
Volume of leachate to be removed per year	3,000.0	gal per Year
Cost to treat leachate per gallon	$1.14	per Gallon
Cost per year for removal of leachate	$3,420.00	per Year
Number of years in the post-closure care period	13	Years
TOTAL COST OF REMOVAL OF LEACHATE	$44,460.00	

Notes: See note on PC_02-1. In Post Closure Years 3 to 15 the average leachate generation is estimated at 3000 gallons per year. In Years 3 to 15 leachate monitoring and if necessary removal is expected to occur semi-annually. After Year 15 leachate assumed not to be present in pumpable quantities.

Post-Closure Care Rem. of Leachate (PC_02-1)

Volume of leachate to be removed per removal event	1,500.0	gal per Event
Number of leachate removal events per year	4	Events per yr
Volume of leachate to be removed per year	6,000.0	gal per Year
Cost to treat leachate per gallon	$1.14	per Gallon
Cost per year for removal of leachate	$6,840.00	per Year
Number of years in the post-closure care period	1	Years
TOTAL COST OF REMOVAL OF LEACHATE	$6,840.00	

Notes: Estimate assumes that average leachate production of 6000 gallons per year will occur in the first year following closure. Year 2 is covered under tab PC_02-2 and Years 3 to 30 are covered under PC_02-3. In Year 1 leachate monitoring and if necessary removal is expected to occur monthly.

Facility: USEN Facility **Unit:** Trench 12 (Facility covered under T11) 11/30/2015

Post-Closure Care Rep. and Insp. of Veg. Cover (PC_05-1)

MAINTENANCE AND REPAIR OF FINAL COVER

Cost of installing undifferentiated fill	$0.00	
Cost of installing clay layer	$0.00	
Cost of installing geomembrane	$0.00	
Cost of installing drainage layer	$0.00	
Cost of installing earthen layer	$213,687.00	
Cost of installing topsoil	$0.00	
Cost of installing colloid clay layer	$0.00	
Total cost of installing final cover	$213,687.00	
Maintenance and repair factor	20.0	%
Cost to Maintain and Repair Final Cover	$42,737.40	

POST-CLOSURE CARE INSPECTION

Cost of conducting one inspection	$206.43	per Inspection
Number of inspections per year	2	Inspections per Year
Cost of conducting post-closure care inspections per year	$412.86	per Year
Number of years in post-closure care period	30	Years
Cost to Conduct Inspections Over the Post-Closure Care Period	$12,385.80	
TOTAL COST OF REPAIR AND INSPECTION	$55,123.20	

Notes: Total Cover area = 555775 ft2
Cover Depth = 2 Feet
Slope Correction Factor (3:1) = 1.16
Total Cover Volume = 47755 CYD
Cover Cost = 47755 CYD*(3.25 + 0.50 dollars/CYD) = 179081 dollars (LVP Pricing Updated 11/12/15)
Mobilization = 34604 dollars
Total Cost = 213687 dollars

Post-Closure Care Deed Notation (PC_07-1)

Attorney fees	$1,769.40
Clerical and deed filing fees	$4,915.00
TOTAL COST OF DEED NOTATION	$6,684.40

Certification of Completion of Post-Closure Care (PC_11-1)

Number of units requiring certification of completion of post-closure care	1	Units
Cost of certification of completion of post-closure care per unit	$4,875.68	per Unit
TOTAL COST OF CERTIFICATION OF POST-CLOSURE CARE	$4,875.68	

User Defined Activity (UD_01-1)

NAME OF CLOSURE OR POST-CLOSURE ACTIVITY	Leachate Transportation	
Number of units of work to be performed	0	
Type of unit	Tons	
Appropriate level of PPE	Protection Level B	
Labor, material, and equipment cost per work hour	$0.00	
Work rate to perform one unit of activity	0.0000	Work hrs per Unit
Number of hours required to perform activity	0.0	Work hrs
Additional cost per unit	$0.00	per Unit
Cost to conduct activity	$0.00	

Other cost(s) associated with this activity

Description of other costs	Leachate Transportation
Cost	$25,380.00
Description of other costs	0
Cost	$0.00
Description of other costs	0
Cost	$0.00
Description of other costs	0
Cost	$0.00
Description of other costs	0
Cost	$0.00
TOTAL COST OF USER DEFINED ACTIVITY	$25,380.00

Notes: Leachate Removal
Year 1 = 6000 gallons per year.
Year 2 = 4500 gallons per year
Years 3 to 15 estimated at 3000 gallons per year.
No pumpable leachate after Year 15
Total leachate removal associated with Trench 11 over the 30 year post-closure care period = 49500 gallons.
CostPro default tanker load is 6900 gallons
Assume leachate is removed once a year regardless of full load thus 15 total loads

CostPro default tanker load cost is 5.64 dollars/mile/load.
Assume 300 miles to Siemens Water Treatment in Vernon CA
15 loads x 5.64/load/mile x 300 miles = 25380 dollars over the 30 year post closure care period.

Post-Closure Care Summary (PC_01-1)

Removal of Leachate (PC-02)	$0.00	
Site Security (PC-03)	$0.00	
Maintenance of Vegetative Cover (PC-04)	$0.00	
Maintenance and Inspection (PC-05)	$38,087.80	
Groundwater Monitoring(PC-06)	$0.00	
Deed Notation (PC-07)	$6,684.40	
Maintenance and Inspection of Asphalt Cover (PC-8)	$0.00	
Surface Emission Monitoring (PC-09)	$0.00	
Gas Extraction System and Perimeter Probe Monitoring (PC-10)	$0.00	
User Defined Cost (UD-01)	$0.00	
Subtotal of Post-Closure Costs	$44,772.20	
Percentage of Engineering Expenses	8.0	%
Engineering Expenses	$3,581.78	
Certification of Post-Closure (PC-11)	$4,875.68	
Subtotal	$53,229.66	
Percentage of Contingency Allowance	15.0	%
Contingency Allowance	$7,984.45	
TOTAL COST OF POST-CLOSURE CARE	$61,214.11	

Facility: USEN Facility **Unit:** Trench 10 (Cover Maintenance) 11/30/2015

Post-Closure Care Rep. and Insp. of Veg. Cover (PC_05-1)

MAINTENANCE AND REPAIR OF FINAL COVER

Cost of installing undifferentiated fill	$0.00	
Cost of installing clay layer	$0.00	
Cost of installing geomembrane	$0.00	
Cost of installing drainage layer	$0.00	
Cost of installing earthen layer	$128,510.00	
Cost of installing topsoil	$0.00	
Cost of installing colloid clay layer	$0.00	
Total cost of installing final cover	$128,510.00	
Maintenance and repair factor	20.0	%
Cost to Maintain and Repair Final Cover	$25,702.00	

POST-CLOSURE CARE INSPECTION

Cost of conducting one inspection	$206.43	per Inspection
Number of inspections per year	2	Inspections per Year
Cost of conducting post-closure care inspections per year	$412.86	per Year
Number of years in post-closure care period	30	Years
Cost to Conduct Inspections Over the Post-Closure Care Period	$12,385.80	
TOTAL COST OF REPAIR AND INSPECTION	$38,087.80	

Notes: Total Cover area = 43080 SYD
Assumed Cover Repair Depth = 2 Feet
Total Cover Volume = 28720 CYD
Cover Construction Cost = 28720 CYD*(3.25 + 0.50 dollars/CYD) = 107700 dollars (LVP cost updated 11/12/15)
Mobilization Cost = 20810
Cover Construction Cost = 128510 dollars

Post-Closure Care Deed Notation (PC_07-1)

Attorney fees	$1,769.40
Clerical and deed filing fees	$4,915.00
TOTAL COST OF DEED NOTATION	$6,684.40

Certification of Completion of Post-Closure Care (PC_11-1)

Number of units requiring certification of completion of post-closure care	1	Units
Cost of certification of completion of post-closure care per unit	$4,875.68	per Unit
TOTAL COST OF CERTIFICATION OF POST-CLOSURE CARE	$4,875.68	

Post-Closure Care Summary (PC_01-1)

Removal of Leachate (PC-02)	$0.00	
Site Security (PC-03)	$0.00	
Maintenance of Vegetative Cover (PC-04)	$0.00	
Maintenance and Inspection (PC-05)	$0.00	
Groundwater Monitoring(PC-06)	$0.00	
Deed Notation (PC-07)	$0.00	
Maintenance and Inspection of Asphalt Cover (PC-8)	$0.00	
Surface Emission Monitoring (PC-09)	$0.00	
Gas Extraction System and Perimeter Probe Monitoring (PC-10)	$0.00	
User Defined Cost (UD-01)	$0.00	
Subtotal of Post-Closure Costs	$0.00	
Percentage of Engineering Expenses	8.0	%
Engineering Expenses	$0.00	
Certification of Post-Closure (PC-11)	$0.00	
Subtotal	$0.00	
Percentage of Contingency Allowance	15.0	%
Contingency Allowance	$0.00	
TOTAL COST OF POST-CLOSURE CARE	$0.00	

FINANCIAL ASSURANCE MECHANISM

US ECOLOGY NEVADA

OCTOBER 2009

SECTION 18

FINANCIAL ASSURANCE MECHANISM

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SECTION 18

FINANCIAL ASSURANCE

US Ecology Nevada will establish and maintain, throughout the life of the facility, financial assurance for the calculated cost estimate for closure and post-closure of all facility units. The mechanism will be updated annually to incorporate cost estimate adjustments for inflation, and those changes required by authorized facility modifications.

The State of Nevada collects and maintains funds sufficient to pay for closure and post closure care at the facility. Per agreement between US Ecology Nevada and the State of Nevada, US Ecology will pay for costs of scheduled or unscheduled closure and the State of Nevada will reimburse those costs upon application for reimbursement. The State of Nevada will pay for post closure costs directly.

In addition to State funds, US Ecology Nevada will provide additional proof of financial responsibility as described below in the event that current balance available through State Funds is not adequate to pay for calculated closure and post closure costs.

18.1.0 FINANCIAL ASSURANCE MECHANISM

US Ecology Nevada will comply with the financial assurance requirements of 40 CFR 264.143 and 40 CFR 264.145 as follows:

(a) US Ecology Nevada will satisfy the financial assurance requirements for closure and post-closure of the facility in accordance with 40 CFR 146 by obtaining closure and post-closure insurance (see Appendix A) which conforms to the requirements of 40 CFR Parts 264.143(e) and 264.145(e). US Ecology Nevada will submit a certificate of insurance to the Nevada Division of Environmental Protection (NDEP) Regional Administrator upon issuance of the policy.

(b) The closure and post-closure insurance policy will be issued for a face value amount equal to the current closure and post-closure cost estimate minus the current balance of State of Nevada funds set aside for these purposes.

(c) The closure and post-closure insurance policy will guarantee that funds will be available to close the facility whenever final closure occurs. The policy will also guarantee that once final closure and post-closure begin, the insurer will be responsible for paying out funds,

up to an amount equal to the face amount of the policy, upon the direction of the Administrator, to such party or parties as the Administrator specifies.

(d) The wording of the certificate of insurance will be identical to the wording specified in 40 CFR 264.151(e).

(e) After beginning partial or final closure, US Ecology or another party authorized to conduct partial or final closure or post-closure activities may request reimbursements for allowable expenditures by submitting itemized bills to the Administrator. US Ecology may request reimbursements for partial closure only if the remaining value of the policy and additional State of Nevada funds are sufficient to cover the maximum costs of conducting closure and post-closure activities at the facility over its remaining operating and post-closure life.

Within 60 days after receiving bills for partial or final closure or post-closure activities, the Administrator will instruct the insurer to make reimbursements in those amounts as the Administrator specifies in writing. The Administrator determines whether partial or final closure or post-closure expenditures are in accordance with the approved Closure and Post-Closure Plans, or otherwise justified. If the Administrator does not instruct the insurer to make such reimbursements, he will provide US Ecology with a detailed written statement of reasons.

If the Administrator has reason to believe that the maximum cost of closure and post-closure over the remaining operating or post-closure life of the facility will be significantly greater than the value of the face amount of the policy combined with State of Nevada funds, he may withhold reimbursements of such amounts as he deems prudent until he determines, in accordance with 40 CFR 264.143 (i) or 40 CFR 264.145 (i) that US Ecology is no longer required to maintain financial assurance for closure and post-closure care of the facility.

(f) US Ecology will maintain the policy in full force and effect until the Administrator consents to termination of the policy by US Ecology as specified in (j) of this section. Failure to pay the premium, without substitution of alternate financial assurance will constitute a significant violation. Such violation will be deemed to begin upon receipt by the Administrator of a notice of future cancellation, termination, or failure to renew due to nonpayment of the premium, rather than upon the date of expiration.

(g) Each policy will contain a provision allowing assignment of the policy to a successor owner or operator of the facility. Such assignment may be conditional upon consent of the insurer, provided such consent is not unreasonably refused.

(h) The policy will provide that the insurer may not cancel, terminate, or fail to renew the policy except for failure to pay the premium. The automatic renewal of the policy will, at a minimum, provide the insured with the option of renewal at the face amount of the expiring policy. If there is a failure to pay the premium, the insurer may elect to cancel, terminate, or fail to renew the policy by sending notice by certified mail to US Ecology Nevada and the Administrator. Cancellation, termination, or failure to renew may not occur, however, during the 120 days beginning with the date of receipt of the notice by both the Administrator and US Ecology Nevada, as evidenced by the return receipts. Cancellation, termination, or failure to renew may not occur and the policy will remain in full force and effect in the event that on or before the date of expiration:

i) The Administrator deems the facility abandoned; or
ii) The permit is terminated or revoked or a new permit is denied; or
iii) Closure is ordered by the Administrator or a U.S. district court or other court of competent jurisdiction; or
iv) US Ecology is named as debtor in a voluntary or involuntary proceeding under Title 11 (Bankruptcy), U.S. Code; or
v) The premium due is paid.

(i) Whenever the current closure and post-closure cost estimate increases to an amount greater than the combined State of Nevada funds and the face amount of the policy, the owner or operator, within 60 days after the increase, will either cause the face amount of the policy to be increased to an amount sufficient to fill any deficiency in funds and submit evidence of such increase to the Administrator, or obtain other financial assurance as specified in 40 CFR 264.143 and 40 CFR 264.145 to cover the deficiency. Whenever the current closure and post-closure cost estimate decreases, the face amount of the policy may be reduced to correspond to the decreased cost estimate following written approval by the Administrator.

(j) The Administrator will give written consent to US Ecology that US Ecology may terminate the insurance policy when:

i) Sufficient State funds are available to pay closure and post closure costs, or
ii) US Ecology substitutes alternate financial assurance as specified in

40 CFR 264.143 and 40 CFR 264.145; or

iii) The Administrator releases US Ecology from the requirements of this section in accordance with 40 CFR 264.143(i) and 264.145(i).

18.2.0 INCAPACITY OF FACILITY, GUARANTORS OR FINANCIAL INSTITUTIONS

Within ten days of the commencement of any voluntary or involuntary proceeding under U.S. Code, Title 11 (Bankruptcy) naming the facility as debtor, US Ecology Nevada will notify the NvDEP Administrator by certified mail.

US Ecology will be deemed to be without financial assurance and/or liability coverage in the event of bankruptcy of the trustee or issuing institution, or the suspension or revocation of the trustee institution's authority to act as trustee, or of the issuing institution to issue the financial instrument.

US Ecology Nevada will establish other financial assurance or liability coverage within 60 days after such an event.

-updated July 2015

APPENDIX 18- A

FINANCIAL ASSURANCE MECHANISM

Certificate of Liability Insurance

ACORD®

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY) 03/30/2015

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies)must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER

Willis of Arizona, Inc.
16220 N. Scottsdale Road
Suite 600
Scottsdale, AZ 85254

CONTACT NAME:
PHONE (A/C, NO, EXT): 877-945-7378 FAX (A/C, NO): 888-467-2378
E-MAIL ADDRESS: certificates@willis.com

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A: Greenwich Insurance Company	22322-003
INSURER B: XL Specialty Insurance Company	37885-002
INSURER C: XL Specialty Insurance Company	37885-001
INSURER D: Greenwich Insurance Company	22322-002
INSURER E:	
INSURER F:	

INSURED

US Ecology, Inc.
251 E. Front Street
Suite 400
Boise, ID 83702

COVERAGES **CERTIFICATE NUMBER:** 23003068 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN. THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X COMMERCIAL GENERAL LIABILITY			GEC000173114	3/31/2014	8/1/2015	EACH OCCURRENCE	$ 1,000,000
	CLAIMS-MADE X OCCUR						DAMAGE TO RENTED PREMISES (Ea occurence)	$ 100,000
	X WA Stop Gap						MED EXP (Any one person)	$ 5,000
							PERSONAL & ADV INJURY	$ 1,000,000
	GEN'L AGGREGATE LIMIT APPLIES PER:						GENERAL AGGREGATE	$ 2,000,000
	POLICY PRO-JECT X LOC						PRODUCTS - COMP/OP AGG	$ 2,000,000
	OTHER:						SIR	$ 50,000
B	AUTOMOBILE LIABILITY			AEC000173214	3/31/2014	8/1/2015	COMBINED SINGLE LIMIT (Ea accident)	$ 1,000,000
	X ANY AUTO						BODILY INJURY (Per person)	$
	ALL OWNED AUTOS / SCHEDULED AUTOS						BODILY INJURY (Per accident)	$
	HIRED AUTOS / NON-OWNED AUTOS						PROPERTY DAMAGE (Per accident)	$
	X Includes MCS 90 Endt X @5,000,000							$
C	UMBRELLA LIAB X OCCUR			UEC000173614	3/31/2014	8/1/2015	EACH OCCURRENCE	$ 10,000,000
	X EXCESS LIAB CLAIMS-MADE						AGGREGATE	$ 10,000,000
	DED X RETENTION $ 10,000							$
D	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY			WEC000173715	3/31/2015	3/31/2016	X PER STATUTE / OTH-ER	
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? Y/N N (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	N/A					E.L. EACH ACCIDENT	$ 1,000,000
							E.L. DISEASE - EA EMPLOYEE	$ 1,000,000
							E.L. DISEASE - POLICY LIMIT	$ 1,000,000
D	Contractors Professional Liability			PEC000173412	3/31/2014	8/1/2015	$5,000,000 Ea Wrongful Act $5,000,000 Aggregate $ 100,000 SIR Retro Date: 11/27/89	

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additonal Remarks Schedule, may be attached if more space is required)

See attached:

CERTIFICATE HOLDER

US Ecology, Inc.
300 E. Mallard Drive, Suite 300
Boise, ID 83706-6650

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Belinda M Green

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AGENCY CUSTOMER ID: 22014202

LOC#: _____

ADDITIONAL REMARKS SCHEDULE

AGENCY	NAMED INSURED
Willis of Arizona, Inc.	US Ecology, Inc. 251 E. Front Street Suite 400 Boise, ID 83702
POLICY NUMBER See First Page	
CARRIER: See First Page / NAIC CODE	EFFECTIVE DATE: See First Page

ADDITIONAL REMARKS

THIS ADDITIONAL REMARKS FORM IS A SCHEDULE TO ACORD FORM,
FORM NUMBER: 25 FORM TITLE: CERTIFICATE OF LIABILITY INSURANCE

The terms, conditions and provisions noted below are hereby attached to the captioned certificate as additional description of the coverage afforded by the insurer(s). This attachment does not contain all terms, conditions, coverages or exclusions contained in the policy.

NAMED INSURED ROSTER:
As respects General Liability, Automobile Liability, Workers' Compensation, Excess Liability, Contractor Professional, Pollution/Remediation Legal Liability, the following are Named Insureds:

. US Ecology, Inc.
. US Ecology Texas, Inc.
. US Ecology Idaho, Inc.
. US Ecology Nevada, Inc.
. US Ecology Michigan, Inc. dba Dynecol
. US Ecology Field Services, Inc.
American Ecology Environmental Services Corporation
American Ecology Recycle Center, Inc.
US Ecology Illinois, Inc.

As respects General Liability including Stop Gap Liability, Automobile Liability, Excess Liability, Contractor Professional, Pollution/Remediation Legal Liability, the following is a Named Insured:

. US Ecology Washington, Inc.

As respects General Liability, Automobile Liability, Excess Liability, Contractor Professional, the following is a Named Insured:

. American Ecology, Inc.

As respects General Liability, Automobile Liability, Workers Compensation, excess Liability, the following is a Named Insured:

. Gulf Stream TLC, Inc.

As respects Excess Liability the following is a Named Insured:

. Stablex Canada, Inc.

POLLUTION AND REMEDIATION LEGAL LIABILITY
Carrier: Indian Harbor Insurance Company
Policy Number: PEC000173505
Effective Dates: 03/31/2013 - 03/31/2016
Limits: $20,000,000 Each Condition
$20,000,000 Aggregate
$ 250,000 SIR

Excess Liability applies to General Liability, Auto Liability and Employers Liability.

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