

# ADEM

## ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT GROUNDWATER BRANCH

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### ARBCA FOR USTs TIER 1 REPORT FORMS (Revision 1.0, November 2001)

<b>SITE NAME:</b>	ALARNG OMS 28 Pit # 2
<b>FACILITY I.D.:</b>	14587-097-012257
<b>UST INCIDENT NO.:</b>	#93-02-15
<b>SUBMITTAL DATE:</b>	1 September 2005

# ARBCA REPORT FORMS

## TABLE OF CONTENTS (Page 1 of 3)

Indicate the forms used in this ARBCA analysis  Check to select.

### ARBCA REPORT FORMS FOR TIER 1 EVALUATION

1	Executive Summary	<input checked="" type="checkbox"/>
2	Facility Information	<input checked="" type="checkbox"/>
3	UST Site Classification System Checklist	<input checked="" type="checkbox"/>
4	Site Description	<input checked="" type="checkbox"/>
5	Land Use	<input checked="" type="checkbox"/>
6	Chronology of Events	<input checked="" type="checkbox"/>
7	Release Characterization	<input checked="" type="checkbox"/>
8	Free Product	<input checked="" type="checkbox"/>
9	Site Stratigraphy and Hydrogeology	<input checked="" type="checkbox"/>
10	Groundwater Use	<input checked="" type="checkbox"/>
11	Surface Water Use	<input checked="" type="checkbox"/>
12	Ecological Receptors and Habitats	<input checked="" type="checkbox"/>
13	Analytical Data Summary for Surficial Soil	<input type="checkbox"/>
14	Analytical Data Summary for Subsurface Soil	<input checked="" type="checkbox"/>
15	Analytical Data from Groundwater Supply Wells	<input type="checkbox"/>
16	Analytical Data Summary for Groundwater	<input checked="" type="checkbox"/>
17	Site Conceptual Exposure Model	<input checked="" type="checkbox"/>
18	Comparison of Tier 1 RBSLs with Representative Concentrations	<input checked="" type="checkbox"/>
19	Tier 1 Groundwater Resource Protection Target Concentrations	<input checked="" type="checkbox"/>
20	Tier 1 Stream Protection Target Concentrations	<input type="checkbox"/>
21a	Tier 1 On-Site Target Levels for Inhalation and Ingestion	<input checked="" type="checkbox"/>
21b	Tier 1 Off-Site Target Levels for Inhalation and Ingestion	<input checked="" type="checkbox"/>
22	Tier 1 Conclusions and Recommendations	<input checked="" type="checkbox"/>
23	References and Protocol	<input checked="" type="checkbox"/>

### ARBCA REPORT FORMS FOR TIER 2 EVALUATION

24	Tier 2 Fate and Transport Parameters	<input checked="" type="checkbox"/>
25	Justification for Tier 2 Fate and Transport Parameters	<input checked="" type="checkbox"/>
26	Comparison of Tier 2 SSTLs with Representative Concentrations	<input checked="" type="checkbox"/>
27	Tier 2 Groundwater Resource Protection Target Concentrations	<input checked="" type="checkbox"/>
28	Tier 2 Stream Protection Target Concentrations	<input type="checkbox"/>
29a	Tier 2 On-Site Target Levels for Inhalation and Ingestion	<input checked="" type="checkbox"/>
29b	Tier 2 Off-Site Target Levels for Inhalation and Ingestion	<input checked="" type="checkbox"/>
30	Tier 2 Conclusions and Recommendations	<input checked="" type="checkbox"/>

### ARBCA REPORT FORMS FOR TIER 3 EVALUATION

31	Tier 3 Evaluation	<input type="checkbox"/>
32	Tier 3 Fate and Transport Parameters	<input type="checkbox"/>
33	Justification for Tier 3 Fate and Transport Parameters	<input type="checkbox"/>
34	Tier 3 Exposure Factors	<input type="checkbox"/>
35	Justification for Tier 3 Exposure Factors	<input type="checkbox"/>
36	Tier 3 Conclusions and Recommendations	<input type="checkbox"/>

## ARBCA REPORT FORMS

### TABLE OF CONTENTS (Page 2 of 3)

Attachment No.	Indicate the attachments provided in this ARBCA analysis. Check to select. All maps submitted to the ADEM must include a bar scale, legend, north arrow, location of all known soil borings and monitoring wells, and date of map, where appropriate.	
1	Topographic Map	<input checked="" type="checkbox"/>
2	Site Map with Utility Locations	<input checked="" type="checkbox"/>
3	Land Use Map (Radius of 500 feet)	<input checked="" type="checkbox"/>
4	Area Map - with detailed land use in the vicinity of the site (detailed in the downgradient direction and at least one property deep on all other sides including across the street)	<input checked="" type="checkbox"/>
5	Representative Soil Boring Logs and Well Construction Diagram - with monitoring well screen interval, size, and depth (also indicate sample depths, field screening results, and initial water level)	<input checked="" type="checkbox"/>
6	Stratigraphic Cross-Section - showing the stratigraphy of the site	<input checked="" type="checkbox"/>
7	Area Geologic Map	<input checked="" type="checkbox"/>
8	Area Map with Well Locations - within 1000 feet (for private wells) or 1 mile (for public wells) radius of the site (the wells on the map must be labeled). Map must also indicate the location of streams, lakes, etc., within a 500 foot radius of the site.	<input checked="" type="checkbox"/>
9	Groundwater Gradient Map - contoured map with the flow direction from the most recent sampling event	<input checked="" type="checkbox"/>
10	Soil Concentration Maps - for Benzene, MTBE, Total BTEX, and Naphthalene from the most recent sampling event	<input checked="" type="checkbox"/>
11	Groundwater Concentration and Contour Maps - for Benzene, MTBE, Total BTEX, and Naphthalene from the most recent sampling event. Include free product thickness, if present.	<input checked="" type="checkbox"/>
12	Time vs. Concentration Trend Graphs - for Benzene, MTBE, Total BTEX, and Naphthalene if three or more sampling events have occurred per well	<input checked="" type="checkbox"/>
13	Map Identifying all Points of Exposure - for both current and future conditions	<input checked="" type="checkbox"/>
14	Site Map showing the source dimensions (Wa, W, and Y)	<input checked="" type="checkbox"/>
15	Representative Site Concentrations – Calculations	<input checked="" type="checkbox"/>
16	Historical Groundwater Summary Tables	<input checked="" type="checkbox"/>
17	Site map showing polygons developed for off-site and on-site	<input checked="" type="checkbox"/>

	representative concentrations	
18	Dilution Attenuation Factor calculations	<input checked="" type="checkbox"/>
19	Site map showing site-specific parameters equivalent to those indicated on Figure C-1, Appendix C of the guidance document (only for stream protection evaluation.)	<input type="checkbox"/>

**ARBCA REPORT FORMS**

**TABLE OF CONTENTS (Page 3 of 3)**

<i>Attachment No.</i>	<i>Indicate the attachments provided in this ARBCA analysis. Check to select. All maps submitted to the ADEM must include a bar scale, legend, north arrow, location of all known soil borings and monitoring wells, and date of map, where appropriate.</i>
<u>Other Relevant Attachments</u>	
20	<input type="checkbox"/>
21	<input type="checkbox"/>
22	<input type="checkbox"/>
23	<input type="checkbox"/>
24	<input type="checkbox"/>
25	<input type="checkbox"/>
26	<input type="checkbox"/>

Include the above attachments in order and append them to the report forms.

**ARBCA SUMMARY REPORT****FORM NO. 1**

UST Incident No(s): #93-02-15

Facility ID: 14587-097-012257

Date form completed: 1 September 2005

Form completed by: Andrew Weinberg

**EXECUTIVE SUMMARY**

Facility name:	ALARNG OMS 28 Pit #2
Facility address:	1622 South Broad Street, Mobile County Mobile, Alabama
Status of facility:	<input checked="" type="checkbox"/> Active <input type="checkbox"/> Inactive
Ground surface condition:	Recent concrete pavement in excellent condition.
Estimated volume of product released:	Unknown
Is native soil impacted?	<input checked="" type="checkbox"/> On-site <input type="checkbox"/> Off-site
Is groundwater impacted?	<input checked="" type="checkbox"/> On-site <input type="checkbox"/> Off-site
Has the source of release been identified?	Yes - former gas/diesel UST with hole in east end, removed in 1992.
Has free product associated with this release ever been detected?	Yes. Droplets of free product and sheen detected in 2004.
Was free product removed?	Yes, 8-hour vacuum extraction event in Dec. 2004 removed ~ 1 gallon of hydrocarbons.
Was free product detected in the most recent sampling event?	No; sheen only. Additional product removal deemed impractical.
Has surface water been impacted by this release?	No.
Shallowest historical depth to groundwater:	2.19 feet below ground surface.
Average historical depth to groundwater:	4.29 feet below ground surface
Has a water supply well been impacted by this release?	No.

**RECOMMENDATIONS**

## Tier 1

- No Further Action (NFA) under Tier 1
- Remediate and NFA under Tier 1
- Perform compliance/confirmatory monitoring
- Go to Tier 2

## Tier 2

- No Further Action (NFA) under Tier 2
- Remediate and NFA under Tier 2
- Perform compliance/confirmatory monitoring
- Go to Tier 3

## Tier 3

- No Further Action (NFA) under Tier 3
- Remediate and NFA under Tier 3
- Perform compliance/confirmatory monitoring

### **ADDITIONAL NOTES**

Soil and groundwater contamination is restricted to a small area on-site. The site meets Tier 1 RBSLs for all pathways and receptors except for direct ingestion of on-site groundwater from the plume area. Tier 2 evaluation is required because of the shallow depth to groundwater.

**ARBCA SUMMARY REPORT****FORM NO. 2**

UST Incident No(s).: #93-02-15

Facility ID: 14587-097-012257

Date form completed: 1 September 2005

Form completed by: Andrew Weinberg

**FACILITY INFORMATION**

Facility name: ALARNG OMS 28 Pit #2

Facility address: 1622 South Broiad Street

Facility city: Mobile

Facility county: Mobile

Tank owner/Responsible Party (RP): Alabama Army National Guard

Tank owner/RP address: Alabama Army National Guard

Tank owner/RP city/state/zip: PO Box 3711, Montgomery, AL 36109

Tank owner/RP phone no.: Wayne Sartwell, (334) 271-7427

Property owner: Alabama Army National Guard

Property owner's address: PO Box 3711,

Property owner's city/state/zip: PO Box 3711, Montgomery, AL 36109

**CERTIFICATION****Section (a): ARBCA Evaluator:**

*I certify that the ARBCA evaluation as stated in this report was prepared under my supervision. I am experienced in the concepts and procedures of risk assessment and risk management as they relate to the ARBCA evaluation process. I am either an Alabama Registered Professional Engineer or a Geologist.*

\_\_\_\_\_  
ARBCA Evaluator

\_\_\_\_\_  
Date

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Registration Number(s)

\_\_\_\_\_  
Company Name

**Section (b): Tank or Property Owner:**

*By signature below, I certify that I have reviewed this report for completeness.*

\_\_\_\_\_  
Tank or Property Owner Signature

\_\_\_\_\_  
Tank or Property Owner Printed Name

\_\_\_\_\_  
Date

**ADDITIONAL NOTES**

**ARBCA SUMMARY REPORT**
**FORM NO. 3**

UST Incident No(s): #93-02-15

Date form completed: 1 September 2005

Facility ID: 14587-097-012257

Form completed by: Andrew Weinberg

**UST SITE CLASSIFICATION SYSTEM CHECKLIST (Page 1 of 2)**

CLASSIFICATION	DESCRIPTION	YES	NO
CLASS A	IMMEDIATE THREAT TO HUMAN HEALTH, HUMAN SAFETY OR SENSITIVE ENVIRONMENTAL RECEPTOR		
A.1	Vapor concentrations at or approaching explosive levels that could cause health effects, are present in a residence or building.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
A.2	Vapor concentrations at or approaching explosive levels are present in subsurface utility system(s), but no buildings or residences are impacted.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
CLASS B	IMMEDIATE THREAT TO HUMAN HEALTH, HUMAN SAFETY OR SENSITIVE ENVIRONMENTAL RECEPTOR		
B.1	An active public water supply well, public water supply line, or public surface water intake is impacted or immediately threatened.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
B.2	An active domestic water supply well, domestic water supply line or domestic surface water intake is impacted or immediately threatened.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
B.3	The release is located within a designated Source Water Assessment Area I.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
CLASS C	IMMEDIATE THREAT TO HUMAN HEALTH, HUMAN SAFETY OR SENSITIVE ENVIRONMENTAL RECEPTOR		
C.1	Ambient vapor/particulate concentrations exceed concentrations of concern from an acute exposure, or safety viewpoint.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
C.2	Free product is present on the groundwater, at ground surface, on surface water bodies, in utilities other than water supply lines, or in surface water runoff.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
CLASS D	SHORT TERM THREAT TO HUMAN HEALTH, SAFETY, OR SENSITIVE ENVIRONMENTAL RECEPTORS		
D.1	There is a potential for explosive levels, or concentrations of vapors that could cause acute effects, to accumulate in a residence or other building.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
D.2	A non-potable water supply well is impacted or immediately threatened.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
D.3	Shallow contaminated surface soils are open to public access, and dwellings, parks, playgrounds, day care centers, schools or similar use facilities are within 500 feet of those soils.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
CLASS E	SHORT TERM THREAT TO HUMAN HEALTH, SAFETY, OR SENSITIVE ENVIRONMENTAL RECEPTORS		



E.1	A sensitive habitat or a sensitive resource (sport fish, economically important species, threatened and endangered species, etc.) is impacted and affected.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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**ARBCA SUMMARY REPORT**
**FORM NO. 3**

UST Incident No(s): #93-02-15

Facility ID: 14587-097-012257

Date form completed: 1 September 2005

Form completed by: Andrew Weinberg

**UST SITE CLASSIFICATION SYSTEM CHECKLIST (Page 2 of 2)**

<b>CLASSIFICATION</b>	<b>DESCRIPTION</b>	<b>YES</b>	<b>NO</b>
<b>CLASS F</b>	<b>SHORT TERM THREAT TO HUMAN HEALTH, SAFETY, OR SENSITIVE ENVIRONMENTAL RECEPTORS</b>		
F.1	Groundwater is impacted and a public well is located within 1 mile of the site.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
F.2	Groundwater is impacted and a domestic well is located within 1,000 feet of the site.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
F.3	Contaminated soils and/or groundwater are located within designated Source Water Assessment Area II.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<b>CLASS G</b>	<b>SHORT TERM THREAT TO HUMAN HEALTH, SAFETY, OR SENSITIVE ENVIRONMENTAL RECEPTORS</b>		
G.1	Contaminated soils and/or groundwater are located within areas vulnerable to contamination from surface sources.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<b>CLASS H</b>	<b>SHORT TERM THREAT TO HUMAN HEALTH, SAFETY, OR SENSITIVE ENVIRONMENTAL RECEPTORS</b>		
H.1	Impacted surface water, storm water or groundwater discharges within 500 feet of a surface water body used for human drinking water, whole body water-contact sports, or habitat to a protected or listed endangered plant and animal species.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<b>CLASS I</b>	<b>LONG TERM THREAT TO HUMAN HEALTH, SAFETY, OR SENSITIVE ENVIRONMENTAL RECEPTORS</b>		
I.1	Site has contaminated soils and/or groundwater but does not meet any of the above mentioned criteria.	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Complete the classification evaluation questions listed above. Upon completion, determine the highest rank of the site (A.1 is the highest rank) based on the statements answered with an YES.

Determined Site Classification

I.1

**ADDITIONAL NOTES**

No routes of exposure to site contaminants are currently complete. Although the area has a shallow water table and sandy soil, the immediate vicinity of the site is covered with 8 inches of concrete so that vulnerability to continued soil-to-groundwater contaminant migration (Class G) is limited.

**ARBCA SUMMARY REPORT**

**FORM NO. 4**

UST Incident No(s): #93-02-15  
 Date form completed: 1 September 2005

Facility ID: 14587-097-012257  
 Form completed by: Andrew Weinberg

**SITE DESCRIPTION**

**SITE STATUS**

- Operating
- Temporarily out of service from \_\_\_\_\_ to \_\_\_\_\_
- Permanently out of service. Tanks permanently closed in 1992

**GROUND SURFACE CONDITION**

- Unpaved
  - Paved      % area paved 100      Material Reinforced concrete, 8" thick
- Any visible cracks in the pavement?     YES     NO

**SUBSURFACE UTILITIES**

*In the space provided for additional notes, please indicate the locations and distances to the nearest utility access point (manholes).*

Have the utilities been screened for vapor levels?     YES     NO    **Notes:** No utilities are located downgradient of source. Storm water collection system draining to OWS is located 30 ft upgradient (east) of former tank location.

If YES, attach documentation of vapor monitoring results (Include under Other Relevant Attachments).  
 Are the utilities covered?     YES     NO    **Notes:** \_\_\_\_\_

*Indicate which of the following utilities currently act as conduits or are potentially liable to become conduits under the columns "Impacted by Release", and "Potentially Impacted by Release", respectively.*

<u>Utilities Present at the Site</u>	<u>Depth</u> [feet]	<u>Type of Material</u>	<u>Flow Direction</u>	<u>Impacted by Release</u>	<u>Potentially Impacted by Release</u>
<input checked="" type="checkbox"/> Sanitary Sewer	unk	unk	upgradient	no	no
<input checked="" type="checkbox"/> Covered Storm Sewer	unk	unk	uogradient	no	no
<input type="checkbox"/> Open Ditch					
<input checked="" type="checkbox"/> Water Line	unk	unk	upgradient	no	no
<input checked="" type="checkbox"/> Gas Line		unk		no	no
<input checked="" type="checkbox"/> Electric Line		Overhead electric		no	no
<input checked="" type="checkbox"/> Telephone Line		Overhead phone		no	no

**CURRENT STATUS OF EXCAVATED SOIL/SOIL CUTTINGS/PURGE WATER**

*If any USTs or ASTs were over-excavated, discuss the status of excavated soil.*

	<u>Date</u>	<u>Quantity</u>	<u>Location</u>
<input type="checkbox"/> Stockpiled On-site			
<input type="checkbox"/> Disposed Off-site			
<input checked="" type="checkbox"/> Used (as fill material,...) On-site	1992	50 cubic yards	spread in thin layer on-site around pit
<input type="checkbox"/> Used as Road Base			

- Soil Farm
- Stockpiled Off-site
- Purge Water


**ADDITIONAL NOTES**

Utility clearances obtained for the most recent investigation indicate that all utility lines are east (upgradient) of the former tank location and are in unimpacted areas.

**ARBCA SUMMARY REPORT**

**FORM NO. 5**

UST Incident No(s): #93-02-15

Facility ID: 14587-097-012257

Date form completed: 1 September 2005

Form completed by: Andrew Weinberg

**LAND USE**

**Current On-Site Land Use**

**Current**

- Residential
- Commercial
- Sensitive/Special
- Other

**Future On-Site Land Use**

**Future**

- Residential
- Commercial
- Sensitive/Special
- Other

**Comments:** Discuss land use if "Other" option is chosen. Justify the choice for the future land use.

The site is an active vehicle maintenance shop for the Alabama Army National Guard and is expected to remain so for the foreseeable future. The site is not included in the most recent BRAC listing.

**Immediate Off-site Land Use** (within 500 feet - at a minimum, state whether residential or commercial)

- North: Residential, single family homes
- Northeast: Residential, single family homes
- Northwest: Commercial: Union Pacific Railroad and I-10 right of way
- South: Commercial/Industrial
- Southeast: Commercial: ALARNG Fort Whiting
- Southwest: Commercial: ALARNG storage areas
- West: Vacant City of Mobile property and Commercial (Union Pacific and I-10 right of way)
- East: Commercial: ALARNG shops and armory

**ADDITIONAL OFF-SITE RECEPTOR SURVEY**

List the distance and direction (downgradient, upgradient, or crossgradient) to these facilities – up to a maximum distance of 1000 feet.

	<u>Distance [ft]</u>	<u>Direction</u>
Nearest residential site:	300	Cross-gradient
Nearest commercial site:	>1000	Cross-gradient
Nearest industrial site:	200	Upgradient
If site vacant, nearest inhabited building:	200	Upgradient
Environmentally sensitive area within a 1000 foot radius:	>1000	Upgradient

Nearest school, hospital, day care, retirement home, etc.:

>1000

Cross-gradient

### **ADDITIONAL NOTES**

Downgradient land is undeveloped city-owned property. The downgradient land is situated between the ALARNG facility and an active rail line adjacent to I-10. Residential development of this parcel is extremely unlikely.

**ARBCA SUMMARY REPORT**

**FORM NO. 6**

UST Incident No(s): #93-02-15

Date form completed: 1 September 2005

Facility ID: 14587-097-012257

Form completed by: Andrew Weinberg

**CHRONOLOGY OF EVENTS**

<b><u>Date</u></b>	<b><u>Instructions:</u></b> Describe potential sources and spill events, including location, type, and estimated volume of materials stored or released, time and duration of release, and affected media (e.g. soil, groundwater, etc.). Describe monitoring well installation, soil boring activities, and slug tests. Also discuss past corrective action efforts as appropriate.
Oct 1992	P.E. LaMoreaux and Assoc. (PELA) removes 2,000 gallon UST and excavates ~ 50 c.y. of contaminated soil. Composite samples from the excavated soil contain up to 427 ppm TPH. Pit wall/floor samples contain up to 49 ppm TPH. Four monitoring wells installed. Soil samples analyzed for TPH only and groundwater samples are analyzed for BTEX and PAHs.
Dec 1993	Preliminary Investigation Report submitted to ADEM. High levels of benzene reported in MW-1 immediately west of the former UST location. Extent of groundwater contamination not defined
April - Oct 1994	PELA installs one additional borehole and four temporary wells to characterize the extent of soil and groundwater contamination at the site. Two additional permanent wells installed. Groundwater sampled for BTEX, PAHs, and lead; plume extends <100 ft from source. Soil TPH extends ~15 ft west of excavation. Results define area of soil and groundwater contamination.
Dec 1994	Secondary Investigation report submitted to ADEM. Extent of soil and groundwater contamination defined. Only trace concentrations of groundwater contaminants detected except in MW-1.
Feb 1995	Quarterly groundwater monitoring initiated by Analytical Chemical Testing Laboratories, Inc. for BTEX only
Jun 1995	Second quarterly groundwater monitoring by Analytical Chemical Testing Laboratories, Inc. for BTEX only.



Oct 1995	Third quarterly groundwater monitoring by Analytical Chemical Testing Laboratories, Inc. for BTEX only
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**ARBCA SUMMARY REPORT**

**FORM NO. 6**

UST Incident No(s): #93-02-15

Date form completed: 1 September 2005

Facility ID: 14587-097-012257

Form completed by: Andrew Weinberg

**CHRONOLOGY OF EVENTS**

<b><u>Date</u></b>	<b><u>Instructions:</u></b> Describe potential sources and spill events, including location, type, and estimated volume of materials stored or released, time and duration of release, and affected media (e.g. soil, groundwater, etc.). Describe monitoring well installation, soil boring activities, and slug tests. Also discuss past corrective action efforts as appropriate.
Dec 1995	Fourth quarterly groundwater monitoring by Analytical Chemical Testing Laboratories, Inc. for BTEX, PAHs, and lead.
May 1996	PELA conducts groundwater monitoring at site for BTEX only.
Feb 1997	PELA conducts groundwater monitoring at site for BTEX only.
July 1997	PELA conducts groundwater monitoring at site for BTEX and dissolved oxygen
Oct 2001	Groundwater samples collected by unknown persons and analyzed for BTEX and MTBE.
Oct 2002	Site covered in concrete pavement. Monitor well MW-4 removed.

March 2004	Bechtel-S Corp collects groundwater samples for BTEX, MTBE, naphthalene, PAHs, and lead. Results indicate plume migration at least to MW-6. Subsurface soils outside source area sampled for BTEX & MTBE, and upgradient soil sampled for geotechnical properties only. Four monitoring wells slug tested to estimate hydraulic conductivity.
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**ARBCA SUMMARY REPORT**

**FORM NO. 6**

UST Incident No(s): #93-02-15

Date form completed: 1 September 2005

Facility ID: 14587-097-012257

Form completed by: Andrew Weinberg

**CHRONOLOGY OF EVENTS**

<u>Date</u>	<u>Instructions:</u> Describe potential sources and spill events, including location, type, and estimated volume of materials stored or released, time and duration of release, and affected media (e.g. soil, groundwater, etc.). Describe monitoring well installation, soil boring activities, and slug tests. Also discuss past corrective action efforts as appropriate.
Nov 2004	Groundwater grab samples collected downgradient of concrete-paved area by Bechtel-S and analyzed for BTEX to define current extent of plume. New upgradient and downgradient monitoring wells installed. Two piezometers installed to define hydraulic gradients. Results indicate no off-site migration of UST-related contaminants.
Dec 2004	Eight-hour multi-phase vacuum extraction event conducted at MW-1. Approximately 5.6 lbs hydrocarbons and 540 gallons water removed. No measureable impact on neighboring wells.
Mar 2005	Groundwater samples collected from all monitoring wells on site by Bechtel-S. Samples analyzed for BTEX, PAHs, and lead.
May 2005	Draft Secondary Investigation Addendum Report prepared by Bechtel-S, containing complete analytical reports for groundwater samples collected in November 2004 and March 2005 and a report on the December 2004 free product removal event.

**ARBCA SUMMARY REPORT**

**FORM NO. 7**

UST Incident No(s): #93-02-15

Date form completed: 1 September 2005

Facility ID: 14587-097-012257

Form completed by: Andrew Weinberg

**RELEASE CHARACTERIZATION**

- UST Removal
- Failed System Tightness Test
- Inventory Control
- Facility Remodeling/Construction activity
- Closure in Place

- Environmental Assessment
- Citizen Complaint
- Known Spill Incident
- Unknown
- Other (specify)

**SOURCE(S) OF RELEASE**

- Spills/Overfills
- Piping
- Dispenser Islands

- Tanks
- Unknown
- Other (specify)

**SUBSTANCE(S) RELEASED**

- Gasoline
- Diesel
- Used Oil
- AV Gas

- Jet Fuel
- Hydraulic Fluid
- Kerosene
- Other (specify)

**CHEMICALS OF CONCERN**

- Benzene
- Toluene
- Ethylbenzene
- Xylenes (mixed)
- Methyl-tert-Butyl-Ether
- Anthracene
- Benzo(a)anthracene
- Benzo(a)pyrene

- Benzo(b)fluoranthene
- Benzo(k)fluoranthene
- Benzo(g,h,i)perylene
- Chrysene
- Fluoranthene
- Fluorene
- Naphthalene
- Phenanthrene

- Pyrene
- Arsenic
- Barium
- Cadmium
- Chromium (VI)
- Lead
- Zinc

**SUMMARY OF SPILL**

Has the source of release been identified? Yes, 1/2" hole in tank noted on removal

Has the release been eliminated? Yes, tank, piping, and distribution system removed

Is native soil impacted? Yes; 50 cy contaminated soil removed from tank area

Is groundwater impacted? Yes; BTEX plume extends ~120 ft downgradient of former tank site

Is surface water impacted? No; there has been no surface release and no surface water is present in the vicinity of the site.

**DETAILS OF KNOWN SPILLS (if any)**

<u>Date Released</u>	<u>Location</u>	<u>Quantity</u>
Prior to 1992	2000 gallon UST	unknown

**ADDITIONAL NOTES**

Closure Assessment Report documented a 1/2 to 3/4 inch hole in the east end of the UST during the removal process. It is unknown how long this tank was in service and leaking or what volume of product might have leaked from the UST.

**ARBCA SUMMARY REPORT****FORM NO. 8**

UST Incident No(s): #93-02-15

Facility ID: 14587-097-012257

Date form completed: 1 September 2005

Form completed by: Andrew Weinberg

**FREE PRODUCT****SUMMARY OF FREE PRODUCT**

Has free product been found at the site?  YES  NO

Date free product was released (if known): Prior to 1992

Type of free product released: Gasoline and/or diesel

Estimated quantity of free product released: unknown

List the monitoring wells historically containing free product:  
 On-site: MW-1  
 Off-site: None

List the monitoring wells currently at the site:  
 On-site: MW-1, -2, -3, -5, -6, -7, and -8  
 Off-site: None

List the monitoring wells currently containing free product:  
 On-site: None  
 Off-site: None

Denote the greatest thickness (to the nearest 1/100 foot): Sheen (<1/100 ft) feet  
 Well ID: MW-1 Date: 3/10/2004

**FREE PRODUCT REMOVAL**

Has free product removal been initiated?  YES  NO

If YES, what is the method of removal (bailer, pump, etc.)? Dual-phase vacuum extraction

If NO, cite reason:

Frequency of removal (weekly, monthly, etc.): One time

Total number of recovery events to date: 1

Total amount of fluids recovered (purgewater and free product): 540 gallons

Total amount of free product recovered: ~ 1 gallon

Date of latest free product removal event: Dec 10 2004

**ADDITIONAL NOTES**

Trace quantities of free product are present in MW-1, located about 10 ft west of the former tank location. While this well has consistently contained elevated concentrations of BTEX, free product was not noted prior to 2004. This may be because previous sampling was conducted with bailers or some other technique that did not adequately purge the well prior to sampling, or because water levels were generally higher during previous sampling events, limiting product mobility; however no detailed monitoring well sampling log forms are included in any of the previous reports. Only residual amounts of free product are present, trapped in soil pores. The free product is not easily recoverable, even with aggressive methods such as dual-phase extraction. There is no indication that the free product is mobile under natural conditions.



**ARBCA SUMMARY REPORT**
**FORM NO. 9**

UST Incident No(s): #93-02-15

Facility ID: 14587-097-012257

Date form completed: 1 September 2005

Form completed by: Andrew Weinberg

**SITE STRATIGRAPHY AND HYDROGEOLOGY**
**STRATIGRAPHY OF THE SITE**

<u>Depth</u> [feet]	<u>Description of Soil</u>
0 - 0.75	Reinforced concrete
0.75 - 1.25	Gravel pavement/fill
1.25 - 15.0	Fine to very fine silty sand and clayey sand with occasional shell fragments and gravel

Predominant Soil Type:

<u>Depth</u> [feet]	<u>Type of Bedrock &amp; Geological Formation</u> (discuss rock properties and features)
unknown	Miocene Series and Citronelle Formation; predominantly nearshore marine deposits

Underlying Predominant Aquifer Name: Citronelle Aquifer

**HYDROGEOLOGY OF THE SATURATED IMPACTED ZONE**

Type of Aquifer?	<input type="checkbox"/> Confined	<input checked="" type="checkbox"/> Unconfined
Historical Range of Groundwater Level Fluctuations [± ft bgs]:	+/- 54 cm (1.76 ft)	
Historical Average Depth to Water Table/Static Water Table:	138 cm (4.52 ft) below ground surface	
Predominant Flow Direction(s) (potentiometric surface):	west-northwest	
Hydraulic Gradient (i) [cm/cm]:	0.0114 cm/cm	
Hydraulic Conductivity (K) [cm/sec]:	7.06E-05 cm/sec	
Hydraulic Conductivity Test Method:	<input type="checkbox"/> Grain size/Sieve analysis <input checked="" type="checkbox"/> Slug test <input type="checkbox"/> Pumping test	
	<input type="checkbox"/> Other (specify and attach literature)	
Darcy Velocity (K <sub>i</sub> ) [cm/year]:	25.27 cm/yr	
Annual Precipitation (average for last 30 years):	61.89 in/yr	

	<u>Value/Range</u>	<u>Estimated</u>	<u>Measured</u>	<u>Method of Analysis</u>
Saturated Zone Dry Soil Bulk Density [g/cm <sup>3</sup> ]:	1.642	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ASTM D2937
Total Porosity in the Saturated Zone [cm <sup>3</sup> /cm <sup>3</sup> ]:	0.392	<input checked="" type="checkbox"/>	<input type="checkbox"/>	est from vadose zone samples
Fractional Organic Carbon Content in the Saturated Zone [g-C/g-Soil]:	0.0280	<input checked="" type="checkbox"/>	<input type="checkbox"/>	est from vadose zone samples

**VADOSE ZONE CHARACTERISTICS**

	<u>Value/Range</u>	<u>Estimated</u>	<u>Measured</u>	<u>Method of Analysis</u>
Unsaturated Zone Dry Soil Bulk Density [g/cm <sup>3</sup> ]:	1.642	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Total Soil Porosity in the Vadose Zone [cm <sup>3</sup> /cm <sup>3</sup> ]:	0.392	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Calc from ASTM D2937 and D854

Volumetric Water Content [cm <sup>3</sup> /cm <sup>3</sup> ]:	0.224	<input type="checkbox"/>	<input checked="" type="checkbox"/>	ASTM D2216
Fractional Organic Carbon Content [g-C/g-Soil]:	0.0280	<input type="checkbox"/>	<input checked="" type="checkbox"/>	ASTM D2974

**ARBCA SUMMARY REPORT**

**FORM NO. 10**

UST Incident No(s): #93-02-15

Facility ID: 14587-097-012257

Date form completed: 1 September 2005

Form completed by: Andrew Weinberg

**GROUNDWATER USE**

<b>ON-SITE USE</b>	<b>Current</b>				<b>Future</b>		<b>NOTES (Justify choice for future use)</b>
	<b>YES</b>	<b>NO</b>	<b>ACTIVE</b>	<b>INACTIVE</b>	<b>YES</b>	<b>NO</b>	
Potable Domestic Supply	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Groundwater is not used on site as the facility has city water connections, which provide water from surface sources. Private water supply wells in the Mobile area typically tap the deeper Miocene/ Pliocene aquifer approximately 100 ft bgs rather than the surficial groundwater. No future development of shallow groundwater on site or nearby off-site is likely because of the availability of public water supplies and the poor production potential of the surficial aquifer.
Non-potable Domestic Supply	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Public/Municipal Supply	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Industrial Supply	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Agriculture	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Other (explain in Notes)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

**DETAILS OF PUBLIC WELLS LOCATED WITHIN 1 MILE RADIUS AND PRIVATE WELLS WITHIN A 1000 FOOT RADIUS OF THE SITE\***

	<b>Well No. 1</b>	<b>Well No. 2</b>	<b>Well No. 3</b>	<b>Well No. 4</b>
Well number/designation:				
Well owner:				
Year constructed:				
Type of well (See choices above):				
Current use** (Active, Inactive, P&A, etc.):				
Total depth (ft):				
Uppermost screened interval (ft):				
Distance from the site (ft):				
Direction (downgradient, upgradient, etc., to the site):				
Within a Source Water Assessment Area I or II?				

**RECEPTOR SURVEY**

Nearest downgradient municipal supply well:	>1 mile
Nearest downgradient domestic supply well:	>1000 ft
Nearest point of exposure (current or potential) for groundwater ingestion:	>1000 ft

**ARBCA SUMMARY REPORT****FORM NO. 11**

UST Incident No(s): #93-02-15

Facility ID: 14587-097-012257

Date form completed: 1 September 2005

Form completed by: Andrew Weinberg

**SURFACE WATER USE WITHIN 500 FOOT RADIUS OF SITE****ON-SITE USE****Current****Future****YES****NO****YES****NO**

Domestic Supply (potable) :

Domestic Supply (non-potable):

Public/Municipal Supply:

Industrial Supply:

Agriculture:

Recreation:

Other (explain in Notes):

**NOTES (JUSTIFY CHOICE FOR FUTURE USE)**

No surface water is present within 500 ft of the site. The nearest surface water is a drainage ditch about 600 ft southwest of the site that flows south and then east into Mobile Bay. This drainage system likely receives input from the surficial aquifer. It is highly unlikely that this drainage will ever be put to beneficial use.

**WATER QUALITY DETERMINATION**

*Refer to Chapter 6.0 and Appendix C of the ARBCA Guidance Document.*

Is the receiving stream designated as intermittent or wetlands on the USGS topographic map or is the drainage area <5 sq. mile. If YES assume 7Q10 = 0; if NO, determine 7Q10.

 Yes No

*In Tier 1, use stream RBSLs listed in Table C-1. In Tier 2, estimate the allowable concentrations using the equations listed in Appendix C and the Computational Software. Complete Form No. 20 for Tier 1 evaluation and Form No. 28 for Tier 2 evaluation after computing the stream RBSLs and SSTLs.*

Is there a public water intake within one mile downstream of the site?

 Yes No**ADDITIONAL NOTES**

**ARBCA SUMMARY REPORT****FORM NO. 12**

UST Incident No(s): #93-02-15

Facility ID: 14587-097-012257

Date form completed: 1 September 2005

Form completed by: Andrew Weinberg

**ECOLOGICAL RECEPTORS AND HABITATS**

Are there visible indications of stressed receptors or habitats on or near the site that may be a result of a chemical release?

YESNO

Is there a complete pathway at the site for an ecological impact beyond what is considered under the stream impacts evaluation?

Other (explain in Notes):

*If the answer to any of the above questions is YES, contact the ADEM before proceeding any further.*

**ADDITIONAL NOTES**

**ARBCA SUMMARY REPORT**

**FORM NO. 14**

**UST Incident No(s): #93-02-15**      **Facility ID: 14587-097-012257**

**Date Form Completed: 01-Sep-05**      **Form Completed By: Andrew Weinberg**

**ANALYTICAL DATA SUMMARY FOR SUBSURFACE SOIL**

	<input checked="" type="radio"/> On-site	<input checked="" type="radio"/> On-site	<input checked="" type="radio"/> On-site	<input checked="" type="radio"/> On-site	<input checked="" type="radio"/> On-site	<input checked="" type="radio"/> On-site	<input checked="" type="radio"/> On-site	<input checked="" type="radio"/> On-site	<input checked="" type="radio"/> On-site	<input checked="" type="radio"/> On-site	<input checked="" type="radio"/> On-site	ON-SITE		OFF-SITE	
	<input type="radio"/> Off-site	<input type="radio"/> Off-site	<input type="radio"/> Off-site	<input type="radio"/> Off-site	<input type="radio"/> Off-site	<input type="radio"/> Off-site	<input type="radio"/> Off-site	<input type="radio"/> Off-site	<input type="radio"/> Off-site	<input type="radio"/> Off-site	<input type="radio"/> Off-site	Arithmetic Average	Maximum	Arithmetic Average	Maximum
<b>MW / SB No.</b>	<i>SB03-01</i>	<i>SB03-01</i>	<i>SB04-01</i>	<i>SB04-01</i>											
<b>Sampling Date</b>	<i>Mar 2004</i>	<i>Mar 2004</i>	<i>Mar 2004</i>	<i>Mar 2004</i>											
<b>Sample Depth* (ft)</b>	<i>2.5 - 3 ft</i>	<i>3 - 3.5</i>	<i>2.5 - 3 ft</i>	<i>3 - 3.5</i>											
<b>ORGANICS (all concentrations must be in mg/kg)</b>												<b>Only for review purposes, not to be used in pathway evaluation. For pathway evaluation, use representative concentrations as per Appendix B of the Guidance Document.</b>			
Benzene	<.005	<.005	<0.007	<.005								0.003	0.004	NA	NA
Toluene	<.005	3.00E-03	0.001	<.005								0.002	0.003	NA	NA
Ethylbenzene	<.005	<.005	<0.007	<.005								0.003	0.004	NA	NA
Xylenes (Total)	<0.014	<0.015	<.021	<.016								0.008	0.011	NA	NA
MTBE	<.005	<.005	<0.007	<.005								0.003	0.004	NA	NA
Anthracene												NA	NA	NA	NA
Benzo(a)anthracene												NA	NA	NA	NA
Benzo(a)pyrene												NA	NA	NA	NA
Benzo(b)fluoranthene												NA	NA	NA	NA
Benzo(g,h,i)perylene												NA	NA	NA	NA
Benzo(k)fluoranthene												NA	NA	NA	NA
Chrysene												NA	NA	NA	NA
Fluoranthene												NA	NA	NA	NA
Fluorene												NA	NA	NA	NA
Naphthalene	4.00E-04	<.005	<0.007	<.005								0.002	0.004	NA	NA
Phenanthrene												NA	NA	NA	NA
Pyrene												NA	NA	NA	NA
<b>METALS (all concentrations must be in mg/kg)</b>															
Arsenic												NA	NA	NA	NA
Barium												NA	NA	NA	NA
Cadmium												NA	NA	NA	NA
Chromium VI												NA	NA	NA	NA
Lead												NA	NA	NA	NA
Zinc												NA	NA	NA	NA

**NOTE:**  
 Provide any laboratory analytical datasheets not previously submitted to the ADEM.  
 Non-detects must be entered as <detection limit (for example, <0.005).  
 Maximum is the greater of (i) the detected values, and (ii) one-half of the detection limit.

\* To avoid entries automatically changing into date format, use a single quote before entering the depths (for example, '1-2)

**ARBCA SUMMARY REPORT**

**FORM NO. 16**

UST Incident No(s): #93-02-15 Facility ID: 14587-097-012257

Date Form Completed: 01-Sep-05 Form Completed By: Andrew Weinberg

**ANALYTICAL DATA SUMMARY FOR GROUNDWATER**

Monitoring Well #	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8				
	<input checked="" type="checkbox"/> On-site <input type="checkbox"/> Off-site	<input checked="" type="checkbox"/> On-site <input type="checkbox"/> Off-site	<input checked="" type="checkbox"/> On-site <input type="checkbox"/> Off-site	<input checked="" type="checkbox"/> On-site <input type="checkbox"/> Off-site	<input checked="" type="checkbox"/> On-site <input type="checkbox"/> Off-site	<input checked="" type="checkbox"/> On-site <input type="checkbox"/> Off-site	<input checked="" type="checkbox"/> On-site <input type="checkbox"/> Off-site	<input checked="" type="checkbox"/> On-site <input type="checkbox"/> Off-site	<input type="checkbox"/> On-site <input type="checkbox"/> Off-site	<input type="checkbox"/> On-site <input type="checkbox"/> Off-site	<input type="checkbox"/> On-site <input type="checkbox"/> Off-site	<input type="checkbox"/> On-site <input type="checkbox"/> Off-site
Screen Interval (ft. below TOC)	3.4-13.4	3.4-13.4	3.3-13.3	3.3-13.3	1.8-11.8	2.3-12.3	5-15	4.8-14.8				
Water Level-recent average (ft. below TOC)	4.02	3.685	3.7775	2.49	4.57	4.8125	2.255	5.825				
Installation Date	Oct 1992	Oct 1992	Oct 1992	Oct 1992	Oct 1992	Oct 1992	Oct 2004	Oct 2004				
Number of Measurements	12	12	12	9	12	12	2	2				
Benzene MCL = 0.005 mg/L	Historic no. of Detects	12 / 12	0 / 12	4 / 12	1	1 / 12	3 / 12	0 / 2	0 / 2			
	Historic Max (mg/L)	1.84	0.0025	0.01	0.00152	0.0014	0.06	0.000125	0.00315			
	Historic Min (mg/L)	0.0294	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00025	<0.005			
	Recent Max (mg/L)	0.2	<0.001	<0.001	NA	<0.001	0.06	<0.00025	<0.005			
	Recent AAverage (mg/L)	0.139	0.000085	0.00025	NA	0.00025	0.041333333	0.000125	0.002825			
	Historic Trend	D	S	D	S	D	I	D	S			
Toluene MCL = 1.0 mg/L	Historic no. of Detects	12-Dec	1 / 12	10 / 12	1	0 / 12	2 / 12	0 / 2	0 / 2			
	Historic Max (mg/L)	19	0.0025	0.0307	0.0019	0.025	0.0007	0.000125	0.00315			
	Historic Min (mg/L)	0.0077	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00025	<0.005			
	Recent Max (mg/L)	0.57	<0.005	0.00021	NA	<0.005	<0.005	<0.00025	<0.005			
	Recent AAverage (mg/L)	0.239	0.000085	0.000181667	NA	0.008416667	0.000461667	0.000125	0.002825			
	Historic Trend	S	S	S	S	S	S	S	S			
Ethylbenzene MCL = 0.7 mg/L	Historic no. of Detects	9 / 12	0 / 12	4 / 12	1	0 / 12	2 / 12	0 / 2	0 / 2			
	Historic Max (mg/L)	3.7	0.025	0.0085	0.00102	0.025	0.0015	0.000125	0.00315			
	Historic Min (mg/L)	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00025	<0.005			
	Recent Max (mg/L)	0.75	<0.05	0.0012	NA	<0.001	0.0015	<0.00025	<0.005			
	Recent AAverage (mg/L)	0.577	0.000085	0.000483333	NA	0.008416667	0.001008333	0.000125	0.002825			
	Historic Trend	S	S	D	S	S	S	S	S			
Xylenes MCL = 10 mg/L	Historic no. of Detects	12 / 12	0 / 12	8 / 12	0	0 / 12	3 / 12	0 / 2	0 / 2			
	Historic Max (mg/L)	11.4	0.05	0.0119	<0.00002	0.05	0.0105	0.0005	0.009			
	Historic Min (mg/L)	0.0191	<0.00002	<0.00002	<0.00001	<0.00002	<0.00002	<0.001	<0.015			
	Recent Max (mg/L)	1.33	<0.01	0.0018	NA	<0.01	0.00071	<0.0005	<0.015			
	Recent AAverage (mg/L)	0.95	0.00036667	0.00136667	NA	0.017	0.006133333	0.0005	0.00825			
	Historic Trend	S	S	S	S	S	S	S	S			

**NOTE:** Provide any laboratory analytical datasheets not previously submitted to the ADEM. Add additional sheets as needed.

**Recent** refers to an approximate 1-2 year period. For the selection of the appropriate time period, refer to Appendix B and Section 6 of the guidance document.

For free product, enter the effective solubility of the COC (refer to Table B-1 in the guidance document) or the highest (historic or recent as the case may be) detected value, whichever is greater. This applies to historical and recent maxima.

**AAverage** = Arithmetic average

**ARBCA SUMMARY REPORT**

**FORM NO. 16**

UST Incident No(s): #93-02-15 Facility ID: 14587-097-012257

Date Form Completed: 01-Sep-05 Form Completed By: Andrew Weinberg

**ANALYTICAL DATA SUMMARY FOR GROUNDWATER**

Monitoring Well #	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8				
	On-site	On-site	On-site	On-site	On-site	On-site	On-site	On-site				
Screen Interval (ft. below TOC)	3.4-13.4	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8				
Water Level-recent average (ft. below TOC)	4.02	3.4-13.4	3.3-13.3	3.3-13.3	1.8-11.8	2.3-12.3	5-15	4.8-14.8				
Installation Date	Oct 1992	Oct 1992	Oct 1992	Oct 1992	Oct 1992	Oct 1992	Oct 2004	Oct 2004				
Number of Measurements	12	12	12	9	12	12	2	2				
MTBE MCL = 0.02 mg/l	Historic no. of Detects	0/5	0/5	0/4	0/4	0/5	0/4	0/2	0/2			
	Historic Max (mg/L)	0.025	0.025	0.025	0.025	0.025	0.025	0.000125	0.00315			
	Historic Min (mg/L)	<0.02	<0.0001	<0.00025	<0.00025	<0.0001	<0.0001	<0.00025	<0.005			
	Recent Max (mg/L)	<0.005	<0.005	<0.005	NA	<0.005	<0.005	<0.005	<0.005			
	Recent AAverage (mg/L)	0.020833333	0.0001	0.00175	NA	0.008416667	0.008416667	0.000125	0.002825			
Historic Trend	S	S	S	S	S	S	S	S	S			
Anthracene MCL = NA	Historic no. of Detects	0/5	0/5	0/5	0/2	0/5	0/5	0/2	0/2			
	Historic Max (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005			
	Historic Min (mg/L)	<0.001	<0.001	<0.001	<0.0019	<0.001	<0.001	<0.001	<0.001			
	Recent Max (mg/L)	<0.001	<0.001	<0.001	NA	<0.001	<0.001	<0.001	<0.001			
	Recent AAverage (mg/L)	<0.001	<0.001	<0.001	NA	<0.001	<0.001	<0.001	<0.001			
Historic Trend	S	S	S	S	S	S	S	S	S			
Benzo(a)anthracene MCL = NA	Historic no. of Detects	0/5	0/5	0/5	0/2	0/5	0/5	0/2	0/2			
	Historic Max (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005			
	Historic Min (mg/L)	<0.0002	<0.0002	<0.0002	<0.0031	<0.0002	<0.0002	<0.0002	<0.0002			
	Recent Max (mg/L)	<0.0002	<0.0002	<0.0002	NA	<0.0002	<0.0002	<0.0002	<0.0002			
	Recent AAverage (mg/L)	<0.0002	<0.0002	<0.0002	NA	<0.0002	<0.0002	<0.0002	<0.0002			
Historic Trend	S	S	S	S	S	S	S	S	S			
Benzo(a)pyrene MCL = 0.0002 mg/l	Historic no. of Detects	0/5	0/5	0/5	0/2	0/5	0/5	0/2	0/2			
	Historic Max (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005			
	Historic Min (mg/L)	<0.0002	<0.0002	<0.0002	<0.0025	<0.0002	<0.0002	<0.0002	<0.0002			
	Recent Max (mg/L)	<0.0002	<0.0002	<0.0002	NA	<0.0002	<0.0002	<0.0002	<0.0002			
	Recent AAverage (mg/L)	<0.0002	<0.0002	<0.0002	NA	<0.0002	<0.0002	<0.0002	<0.0002			
Historic Trend	S	S	S	S	S	S	S	S	S			

**NOTE:** Provide any laboratory analytical datasheets not previously submitted to the ADEM. Add additional sheets as needed.

**Recent** refers to an approximate 1-2 year period. For the selection of the appropriate time period, refer to Appendix B and Section 6 of the guidance document.

For free product, enter the effective solubility of the COC (refer to Table B-1 in the guidance document) or the highest (historic or recent as the case may be) detected value, whichever is greater. This applies to historical and recent maxima.

**AAverage** = Arithmetic average



**ARBCA SUMMARY REPORT**

**FORM NO. 16**

UST Incident No(s): #93-02-15 Facility ID: 14587-097-012257

Date Form Completed: 01-Sep-05 Form Completed By: Andrew Weinberg

**ANALYTICAL DATA SUMMARY FOR GROUNDWATER**

Monitoring Well #	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8				
	On-site	On-site	On-site	On-site	On-site	On-site	On-site	On-site				
Screen Interval (ft. below TOC)	3.4-13.4	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8				
Water Level-recent average (ft. below TOC)	4.02	3.4-13.4	3.3-13.3	3.3-13.3	1.8-11.8	2.3-12.3	5-15	4.8-14.8				
Installation Date	Oct 1992	Oct 1992	Oct 1992	Oct 1992	Oct 1992	Oct 1992	Oct 2004	Oct 2004				
Number of Measurements	12	12	12	9	12	12	2	2				
Benzo(b)fluoranthene MCL = NA	Historic no. of Detects	1/5	0/5	0/5	0/2	0/5	0/5	0/2	0/2			
	Historic Max (mg/L)	0.00019	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002			
	Historic Min (mg/L)	<0.0002	<0.0002	<0.0002	<0.0025	<0.0002	<0.0002	<0.0002	<0.0002			
	Recent Max (mg/L)	0.00019	<0.0002	<0.0002	NA	<0.0002	<0.0002	<0.0002	<0.0002			
	Recent AAverage (mg/L)	0.00013	<0.0002	<0.0002	NA	<0.0002	<0.0002	<0.0002	<0.0002			
Historic Trend	S	S	S	S	S	S	S	S	S			
Benzo(g,h,i)perylene MCL = NA	Historic no. of Detects	0/5	0/5	0/5	0/2	0/5	0/5	0/2	0/2			
	Historic Max (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	<0.001			
	Historic Min (mg/L)	<0.001	<0.001	<0.001	<0.0041	<0.001	<0.001	<0.001	<0.001			
	Recent Max (mg/L)	<0.001	<0.001	<0.001	NA	<0.001	<0.001	<0.001	<0.001			
	Recent AAverage (mg/L)	<0.001	<0.001	<0.001	NA	<0.001	<0.001	<0.001	<0.001			
Historic Trend	S	S	S	S	S	S	S	S	S			
Benzo(k)fluoranthene MCL = NA	Historic no. of Detects	0/5	0/5	0/5	0/2	0/5	0/5	0/2	0/2			
	Historic Max (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0005	<0.0005			
	Historic Min (mg/L)	<0.0005	<0.0005	<0.0005	<0.0025	<0.0005	<0.0005	<0.0005	<0.0005			
	Recent Max (mg/L)	<0.0005	<0.0005	<0.0005	NA	<0.0005	<0.0005	<0.0005	<0.0005			
	Recent AAverage (mg/L)	<0.0005	<0.0005	<0.0005	NA	<0.0005	<0.0005	<0.0005	<0.0005			
Historic Trend	S	S	S	S	S	S	S	S	S			
Chrysene MCL = NA	Historic no. of Detects	0/5	0/5	0/5	0/2	0/5	0/5	0/2	0/2			
	Historic Max (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	<0.001			
	Historic Min (mg/L)	<0.001	<0.001	<0.001	<0.0025	<0.001	<0.001	<0.001	<0.001			
	Recent Max (mg/L)	<0.001	<0.001	<0.001	NA	<0.001	<0.001	<0.001	<0.001			
	Recent AAverage (mg/L)	<0.001	<0.001	<0.001	NA	<0.001	<0.001	<0.001	<0.001			
Historic Trend	S	S	S	S	S	S	S	S	S			

**NOTE:** Provide any laboratory analytical datasheets not previously submitted to the ADEM. Add additional sheets as needed.

**Recent** refers to an approximate 1-2 year period. For the selection of the appropriate time period, refer to Appendix B and Section 6 of the guidance document.

For free product, enter the effective solubility of the COC (refer to Table B-1 in the guidance document) or the highest (historic or recent as the case may be) detected value, whichever is greater. This applies to historical and recent maxima.

**AAverage** = Arithmetic average

**ARBCA SUMMARY REPORT**

**FORM NO. 16**

UST Incident No(s): #93-02-15 Facility ID: 14587-097-012257

Date Form Completed: 01-Sep-05 Form Completed By: Andrew Weinberg

**ANALYTICAL DATA SUMMARY FOR GROUNDWATER**

Monitoring Well #	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8				
	On-site	On-site	On-site	On-site	On-site	On-site	On-site	On-site				
Screen Interval (ft. below TOC)	3.4-13.4	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8				
Water Level-recent average (ft. below TOC)	4.02	3.4-13.4	3.3-13.3	3.3-13.3	1.8-11.8	2.3-12.3	5-15	4.8-14.8				
Installation Date	Oct 1992	Oct 1992	Oct 1992	Oct 1992	Oct 1992	Oct 1992	Oct 2004	Oct 2004				
Number of Measurements	12	12	12	9	12	12	2	2				
Fluoranthene MCL = NA	Historic no. of Detects	1/5	0/5	0/5	0/2	0/5	1/5	0/2	0/2			
	Historic Max (mg/L)	0.0002	<0.005	<0.005	<0.005	<0.005	0.000076	<0.001	<0.001			
	Historic Min (mg/L)	<0.001	<0.001	<0.001	<0.0022	<0.001	<0.001	<0.001	<0.001			
	Recent Max (mg/L)	0.0002	<0.001	<0.001	NA	<0.001	0.000076	<0.001	<0.001			
	Recent AAverage (mg/L)	0.0004	<0.001	<0.001	NA	<0.001	0.000036	<0.001	<0.001			
Historic Trend	S	S	S	S	S	S	S	S	S			
Flourene MCL = NA	Historic no. of Detects	0/5	0/5	0/5	0/2	0/5	0/5	0/2	0/2			
	Historic Max (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	<0.001			
	Historic Min (mg/L)	<0.001	<0.001	<0.001	<0.0022	<0.001	<0.001	<0.001	<0.001			
	Recent Max (mg/L)	<0.001	<0.001	<0.001	NA	<0.001	<0.001	<0.001	<0.001			
	Recent AAverage (mg/L)	<0.001	<0.001	<0.001	NA	<0.001	<0.001	<0.001	<0.001			
Historic Trend	S	S	S	S	S	S	S	S	S			
Naphthalene MCL = 0.02 mg/l	Historic no. of Detects	5/5	0/5	0/5	0/2	0/5	3/5	0/2	0/2			
	Historic Max (mg/L)	0.353	<0.005	<0.005	<0.005	<0.005	0.088	<0.001	<0.001			
	Historic Min (mg/L)	0.0647	<0.001	<0.001	<0.0022	<0.001	<0.0016	<0.001	<0.001			
	Recent Max (mg/L)	0.26	<0.001	<0.001	NA	<0.001	0.088	<0.001	<0.001			
	Recent AAverage (mg/L)	0.2	<0.001	<0.001	NA	<0.001	0.0657	<0.001	<0.001			
Historic Trend	S	S	S	S	S	S	S	S	S			
Phenanthrene MCL = NA	Historic no. of Detects	1/5	0/5	0/5	0/2	0/5	1/5	0/2	0/2			
	Historic Max (mg/L)	0.00038	<0.005	<0.005	<0.005	<0.005	0.0002	<0.001	<0.001			
	Historic Min (mg/L)	<0.001	<0.001	<0.001	<0.0022	<0.001	<0.001	<0.001	<0.001			
	Recent Max (mg/L)	0.00038	<0.001	<0.001	NA	<0.001	0.0002	<0.001	<0.001			
	Recent AAverage (mg/L)	0.00079	<0.001	<0.001	NA	<0.001	0.0004	<0.001	<0.001			
Historic Trend	S	S	S	S	S	S	S	S	S			

**NOTE:** Provide any laboratory analytical datasheets not previously submitted to the ADEM. Add additional sheets as needed.

**Recent** refers to an approximate 1-2 year period. For the selection of the appropriate time period, refer to Appendix B and Section 6 of the guidance document.

For free product, enter the effective solubility of the COC (refer to Table B-1 in the guidance document) or the highest (historic or recent as the case may be) detected value, whichever is greater. This applies to historical and recent maxima.

**AAverage** = Arithmetic average

**ARBCA SUMMARY REPORT**

**FORM NO. 16**

UST Incident No(s): #93-02-15 Facility ID: 14587-097-012257

Date Form Completed: 01-Sep-05 Form Completed By: Andrew Weinberg

**ANALYTICAL DATA SUMMARY FOR GROUNDWATER**

Monitoring Well #	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8				
	On-site	On-site	On-site	On-site	On-site	On-site	On-site	On-site				
Screen Interval (ft. below TOC)	3.4-13.4	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8				
Water Level-recent average (ft. below TOC)	4.02	3.4-13.4	3.3-13.3	3.3-13.3	1.8-11.8	2.3-12.3	5-15	4.8-14.8				
Installation Date	Oct 1992	Oct 1992	Oct 1992	Oct 1992	Oct 1992	Oct 1992	Oct 2004	Oct 2004				
Number of Measurements	12	12	12	9	12	12	2	2				
Pyrene MCL = NA	Historic no. of Detects	0/5	0/5	0/5	0/2	0/5	0/5	0/2	0/2			
	Historic Max (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	<0.001			
	Historic Min (mg/L)	<0.001	<0.001	<0.001	<0.0022	<0.001	<0.001	<0.001	<0.001			
	Recent Max (mg/L)	<0.001	<0.001	<0.001	NA	<0.001	<0.001	<0.001	<0.001			
	Recent AAverage (mg/L)	<0.001	<0.001	<0.001	NA	<0.001	<0.001	<0.001	<0.001			
Historic Trend	S	S	S	S	S	S	S	S				
Arsenic MCL = 0.05 mg/l	Historic no. of Detects											
	Historic Max (mg/L)											
	Historic Min (mg/L)											
	Recent Max (mg/L)											
	Recent AAverage (mg/L)											
Historic Trend												
Barium MCL = 2.0 mg/l	Historic no. of Detects											
	Historic Max (mg/L)											
	Historic Min (mg/L)											
	Recent Max (mg/L)											
	Recent AAverage (mg/L)											
Historic Trend												
Cadmium MCL = 0.005 mg/l	Historic no. of Detects											
	Historic Max (mg/L)											
	Historic Min (mg/L)											
	Recent Max (mg/L)											
	Recent AAverage (mg/L)											
Historic Trend												

**NOTE:** Provide any laboratory analytical datasheets not previously submitted to the ADEM. Add additional sheets as needed.

**Recent** refers to an approximate 1-2 year period. For the selection of the appropriate time period, refer to Appendix B and Section 6 of the guidance document.

For free product, enter the effective solubility of the COC (refer to Table B-1 in the guidance document) or the highest (historic or recent as the case may be) detected value, whichever is greater. This applies to historical and recent maxima.

**AAverage** = Arithmetic average

**ARBCA SUMMARY REPORT**

**FORM NO. 16**

UST Incident No(s): #93-02-15

Facility ID: 14587-097-012257

Date Form Completed: 01-Sep-05

Form Completed By: Andrew Weinberg

**ANALYTICAL DATA SUMMARY FOR GROUNDWATER**

Monitoring Well #	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8				
	On-site	On-site	On-site	On-site	On-site	On-site	On-site	On-site				
Screen Interval (ft. below TOC)	3.4-13.4	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8				
Water Level-recent average (ft. below TOC)	4.02	3.4-13.4	3.3-13.3	3.3-13.3	1.8-11.8	2.3-12.3	5-15	4.8-14.8				
Installation Date	Oct 1992	Oct 1992	Oct 1992	Oct 1992	Oct 1992	Oct 1992	Oct 2004	Oct 2004				
Number of Measurements	12	12	12	9	12	12	2	2				
Chromium VI MCL = 0.1 mg/l	Historic no. of Detects											
	Historic Max (mg/L)											
	Historic Min (mg/L)											
	Recent Max (mg/L)											
	Recent AAverage (mg/L)											
	Historic Trend											
Lead MCL = 0.015 mg/l	Historic no. of Detects	4/5	4/5	5/5	2/2	5/5	5/5	2/2	1/2			
	Historic Max (mg/L)	60	21	30	86	30	30	6	2.2			
	Historic Min (mg/L)	2	<5.0	4	40	2	1.4	3.7	<5.0			
	Recent Max (mg/L)	2.6	3	5.4	NA	4.4	3	6	2.2			
	Recent AAverage (mg/L)	2.5	3	4.8	NA	3.47	2.37	4.85	2.7			
	Historic Trend	S	S	S	D	S	S	S	S			
Zinc MCL = 2.0 mg/l	Historic no. of Detects											
	Historic Max (mg/L)											
	Historic Min (mg/L)											
	Recent Max (mg/L)											
	Recent AAverage (mg/L)											
	Historic Trend											

**NOTE:** Provide any laboratory analytical datasheets not previously submitted to the ADEM. Add additional sheets as needed.

**Recent** refers to an approximate 1-2 year period. For the selection of the appropriate time period, refer to Appendix B and Section 6 of the guidance document.

For free product, enter the effective solubility of the COC (refer to Table B-1 in the guidance document) or the highest (historic or recent as the case may be) detected value, whichever is greater. This applies to historical and recent maxima.

**AAverage** = Arithmetic average

<b>ARBCA SUMMARY REPORT</b>	<b>FORM NO. 17 - ON-SITE RESIDENT</b>
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UST Incident No(s): #93-02-15	Facility ID: 14587-097-012257
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Date Form Completed: 01-Sep-05	Form Completed By: Andrew Weinberg
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<b>SITE CONCEPTUAL EXPOSURE MODEL - ON-SITE RESIDENT (CHILD AND ADULT)</b>
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ROUTES OF EXPOSURE	CURRENT CONDITIONS		FUTURE CONDITIONS	
	C/ NC*	JUSTIFICATION	C/ NC*	JUSTIFICATION
<b>SURFICIAL SOIL</b>				
Outdoor inhalation of vapors and particulate matter, ingestion, and dermal contact with surficial soil	NC	Site is covered with 8 inches of reinforced concrete over entire area of contamination. No residences on-site.	NC	Current site use BY ALARNG is expected to continue indefinitely; no residences are planned on site.
<b>SUBSURFACE SOIL</b>				
Indoor inhalation of vapors	NC	No residences on site	NC	Current site use BY ALARNG is expected to continue indefinitely; no residences are planned on site.
Outdoor inhalation of vapors	NC	No residences on site	NC	Current site use BY ALARNG is expected to continue indefinitely; no residences are planned on site.
<b>GROUNDWATER</b>				
Indoor inhalation of vapors	NC	No residences on site	NC	Current site use BY ALARNG is expected to continue indefinitely; no residences are planned on site.
Outdoor inhalation of vapors	NC	No residences on site	NC	Current site use BY ALARNG is expected to continue indefinitely; no residences are planned on site.
Ingestion of groundwater from an on-site water supply well	NC	No residences on site	NC	Current site use BY ALARNG is expected to continue indefinitely; no residences are planned on site.

**NOTE:**  
 \* C : Complete Pathway NC : Not Complete

Recommended Attachment: None

<b>ARBCA SUMMARY REPORT</b>	<b>FORM NO. 17 - ON-SITE COMMERCIAL WORKER</b>
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UST Incident No(s): #93-02-15	Facility ID: 14587-097-012257
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Date Form Completed: 01-Sep-05	Form Completed By: Andrew Weinberg
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<b>SITE CONCEPTUAL EXPOSURE MODEL - ON-SITE COMMERCIAL WORKER</b>
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ROUTES OF EXPOSURE	CURRENT CONDITIONS		FUTURE CONDITIONS	
	C/ NC*	JUSTIFICATION	C/ NC*	JUSTIFICATION
<b>SURFICIAL SOIL</b>				
Outdoor inhalation of vapors and particulate matter, ingestion, and dermal contact with surficial soil	NC	<i>Site is covered with 8 inches of reinforced concrete over entire area of contamination.</i>	NC	<i>Concrete is expected to be maintained in area of heavy equipment traffic.</i>
<b>SUBSURFACE SOIL</b>				
Indoor inhalation of vapors	NC	<i>No structures are present over the area of soil contamination</i>	NC	<i>No structures are likely to be constructed in the middle of the vehicle staging area where soil contamination is located.</i>
Outdoor inhalation of vapors	C	<i>Pathway is considered although concrete provides effective barrier to vapor migration.</i>	C	<i>Pathway is considered although concrete is expected to be maintained in area of heavy equipment traffic.</i>
<b>GROUNDWATER</b>				
Indoor inhalation of vapors	NC	<i>No structures are present over the area of groundwater contamination</i>	NC	<i>No structures are likely to be built in the middle of the vehicle staging area where groundwater contamination is located.</i>
Outdoor inhalation of vapors	C	<i>Pathway is considered although concrete provides effective barrier to vapor migration.</i>	C	<i>Pathway is considered although concrete is expected to be maintained in area of heavy equipment traffic.</i>
Ingestion of groundwater from an on-site water supply well	NC	<i>No water supply wells are present on site.</i>	NC	<i>No water supply wells are likely to be constructed on site; city water supply is in use.</i>

**NOTE:**  
 \* C : Complete Pathway NC : Not Complete

Recommended Attachment: None

<b>ARBCA SUMMARY REPORT</b>	<b>FORM NO. 17 - ON-SITE CONSTRUCTION WORKER</b>
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UST Incident No(s): #93-02-15	Facility ID: 14587-097-012257
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Date Form Completed: 01-Sep-05	Form Completed By: Andrew Weinberg
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<b>SITE CONCEPTUAL EXPOSURE MODEL - ON-SITE CONSTRUCTION WORKER</b>
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ROUTES OF EXPOSURE	CURRENT CONDITIONS		FUTURE CONDITIONS	
	C/ NC*	JUSTIFICATION	C/ NC*	JUSTIFICATION
<b>SURFICIAL SOIL</b>				
Outdoor inhalation of vapors and particulate matter, ingestion, and dermal contact with surficial soil	NC	<i>The source area is covered with 8 inches of reinforced concrete</i>	NC	<i>Concrete is expected to be maintained in area of heavy equipment traffic.</i>
<b>SUBSURFACE SOIL</b>				
Indoor inhalation of vapors	C	<i>No structures are present on site, but construction work in trenches or enclosed spaces could result in exposure.</i>	C	<i>No structures are planned on site, but construction work in trenches or enclosed spaces could result in exposure.</i>
Outdoor inhalation of vapors	C	<i>Potential construction work could result in exposure.</i>	C	<i>Potential construction work could result in exposure.</i>
<b>GROUNDWATER</b>				
Indoor inhalation of vapors	C	<i>No structures are present on site, but construction work in trenches or enclosed spaces could result in exposure.</i>	C	<i>No structures are planned on site, but construction work in trenches or enclosed spaces could result in exposure.</i>
Outdoor inhalation of vapors	C	<i>Potential construction work could result in exposure.</i>	C	<i>Potential construction work could result in exposure.</i>
Ingestion of groundwater from an on-site water supply well	<b><i>NOT APPLICABLE</i></b>			

**NOTE:**  
\* C : Complete Pathway NC : Not Complete

Recommended Attachment: None

UST Incident No(s): #93-02-15	Facility ID: 14587-097-012257
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Date Form Completed: 01-Sep-05	Form Completed By: Andrew Weinberg
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**SITE CONCEPTUAL EXPOSURE MODEL - OFF-SITE RESIDENT (CHILD AND ADULT)**

ROUTES OF EXPOSURE	CURRENT CONDITIONS		FUTURE CONDITIONS	
	C/ NC*	JUSTIFICATION	C/ NC*	JUSTIFICATION
<b>SURFICIAL SOIL</b>				
Outdoor inhalation of vapors and particulate matter, ingestion, and dermal contact with surficial soil	NC	Soil contamination is restricted to a small area on-site.	NC	Soil contamination is restricted to a small area on-site.
<b>SUBSURFACE SOIL</b>				
Indoor inhalation of vapors	NC	Soil contamination is restricted to a small area on-site.	NC	Soil contamination is restricted to a small area on-site.
Outdoor inhalation of vapors	NC	Soil contamination is restricted to a small area on-site.	NC	Soil contamination is restricted to a small area on-site.
<b>GROUNDWATER</b>				
Indoor inhalation of vapors	NC	No contaminants have migrated off-site.	NC	No contaminants are likely to migrate to off-site residences because of rapid natural attenuation in groundwater.
Outdoor inhalation of vapors	NC	No contaminants have migrated off-site.	NC	No contaminants are likely to migrate to off-site residences because of rapid natural attenuation in groundwater.
Ingestion of groundwater from an off-site water supply well	NC	No contaminants have migrated off-site.	NC	No contaminants are likely to migrate to off-site residences because of rapid natural attenuation in groundwater.

**NOTE:**  
\* C : Complete Pathway NC : Not Complete

Recommended Attachment: None



UST Incident No(s): #93-02-15	Facility ID: 14587-097-012257
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Date Form Completed: 01-Sep-05	Form Completed By: Andrew Weinberg
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<b>SITE CONCEPTUAL EXPOSURE MODEL - OFF-SITE COMMERCIAL WORKER</b>
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ROUTES OF EXPOSURE	CURRENT CONDITIONS		FUTURE CONDITIONS	
	C/ NC*	JUSTIFICATION	C/ NC*	JUSTIFICATION
<b>SURFICIAL SOIL</b>				
Outdoor inhalation of vapors and particulate matter, ingestion, and dermal contact with surficial soil	NC	Soil contamination is restricted to a small area on-site.	NC	Soil contamination is restricted to a small area on-site.
<b>SUBSURFACE SOIL</b>				
Indoor inhalation of vapors	NC	Soil contamination is restricted to a small area on-site.	NC	Soil contamination is restricted to a small area on-site.
Outdoor inhalation of vapors	NC	Soil contamination is restricted to a small area on-site.	NC	Soil contamination is restricted to a small area on-site.
<b>GROUNDWATER</b>				
Indoor inhalation of vapors	NC	No contaminants have migrated off-site.	NC	No contaminants are likely to migrate to off-site businesses because of rapid natural attenuation in groundwater.
Outdoor inhalation of vapors	NC	No contaminants have migrated off-site.	NC	No contaminants are likely to migrate to off-site businesses because of rapid natural attenuation in groundwater.
Ingestion of groundwater from an off-site water supply well	NC	No contaminants have migrated off-site.	NC	No contaminants are likely to migrate to off-site wells because of rapid natural attenuation in groundwater.

**NOTE:**  
 \* C : Complete Pathway NC : Not Complete

Recommended Attachment: None

UST Incident No(s): #93-02-15	Facility ID: 14587-097-012257
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Date Form Completed: 01-Sep-05	Form Completed By: Andrew Weinberg
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<b>SITE CONCEPTUAL EXPOSURE MODEL - OFF-SITE CONSTRUCTION WORKER</b>
--

ROUTES OF EXPOSURE	CURRENT CONDITIONS		FUTURE CONDITIONS	
	C/ NC*	JUSTIFICATION	C/ NC*	JUSTIFICATION
<b>SURFICIAL SOIL</b>				
Outdoor inhalation of vapors and particulate matter, ingestion, and dermal contact with surficial soil	C	<i>Soil contamination is restricted to a small area on-site.</i>	C	<i>Soil contamination is restricted to a small area on-site.</i>
<b>SUBSURFACE SOIL</b>				
Indoor inhalation of vapors	C	<i>Soil contamination is restricted to a small area on-site.</i>	C	<i>Soil contamination is restricted to a small area on-site.</i>
Outdoor inhalation of vapors	C	<i>Soil contamination is restricted to a small area on-site.</i>	C	<i>Soil contamination is restricted to a small area on-site.</i>
<b>GROUNDWATER</b>				
Indoor inhalation of vapors	C	<i>No contaminants have migrated off-site.</i>	C	<i>No contaminants are likely to migrate off-site because of rapid natural attenuation in groundwater.</i>
Outdoor inhalation of vapors	C	<i>No contaminants have migrated off-site.</i>	C	<i>No contaminants are likely to migrate off-site because of rapid natural attenuation in groundwater.</i>
Ingestion of groundwater from an off-site water supply well	<b><i>NOT APPLICABLE</i></b>			

**NOTE:**  
 \* C : Complete Pathway NC : Not Complete

Recommended Attachment: None

**ARBCA SUMMARY REPORT**

**FORM NO. 18 - ON-SITE COMMERCIAL WORKER**

<b>UST Incident No(s):</b> #93-02-15	<b>Facility ID:</b> 14587-097-012257
<b>Date Form Completed:</b> 01-Sep-05	<b>Form Completed By:</b> Andrew Weinberg

**COMPARISON OF TIER 1 RBSLs WITH REPRESENTATIVE ON-SITE CONCENTRATIONS**

CHEMICALS OF CONCERN	SURFICIAL SOIL			SUBSURFACE SOIL						GROUNDWATER								
	Outdoor Inhalation, Ingestion, & Dermal Contact		NC	Indoor Inhalation		NC	Outdoor Inhalation		C	Indoor Inhalation		NC	Outdoor Inhalation		C	Ingestion of Water		NC
Select the representative concentration (Rep. Conc.) for each medium.	<input type="checkbox"/> Maximum			<input checked="" type="checkbox"/> Maximum			<input checked="" type="checkbox"/> Maximum			<input type="checkbox"/> Maximum			<input checked="" type="checkbox"/> Maximum			<i>Use the historic maximum concentration from the water use well as the Rep. Conc.</i>		
	<input type="checkbox"/> Arithmetic Average			<input type="checkbox"/> Arithmetic Average			<input type="checkbox"/> Arithmetic Average			<input type="checkbox"/> Arithmetic Average			<input type="checkbox"/> Arithmetic Average					
	<input type="checkbox"/> Area-Weighted Average			<input type="checkbox"/> Area-Weighted Average			<input type="checkbox"/> Area-Weighted Average			<input type="checkbox"/> Area-Weighted Average			<input type="checkbox"/> Area-Weighted Average					
	Rep. Conc.	Target Levels	E/NE	Rep. Conc.	Target Levels	E/NE	Rep. Conc.	Target Levels	E/NE	Rep. Conc.	Target Levels	E/NE	Rep. Conc.	Target Levels	E/NE	Rep. Conc.	Target Levels	E/NE
[mg/kg]	[mg/kg]		[mg/kg]	[mg/kg]		[mg/kg]	[mg/kg]		[mg/L]	[mg/L]		[mg/L]	[mg/L]		[mg/L]	[mg/L]		
<b>ORGANICS</b>																		
Benzene				3.50E-03			3.50E-03	4.29984302	NE				1.84E+00	382.401428	NE			
Toluene				2.45E-03			2.45E-03	781.519111	NE				1.09E+01	526	NE			
Ethylbenzene				3.50E-03			3.50E-03	360.214111	NE				3.70E+00	169	NE			
Xylenes (Total)				1.05E-02			1.05E-02	450.838889	NE				1.14E+01	175	NE			
MTBE				3.50E-03			3.50E-03	7881.2909	NE				2.50E-02	48000	NE			
Anthracene													2.50E-03	0.0434	NE			
Benzo(a)anthracene													2.50E-03	0.0094	NE			
Benzo(a)pyrene													2.50E-03	0.00162	E			
Benzo(b)fluoranthene													2.50E-03	0.0015	E			
Benzo(g,h,i)perylene													2.50E-03	0.0007	E			
Benzo(k)fluoranthene													2.50E-03	0.0008	E			
Chrysene													2.50E-03	0.0016	E			
Fluoranthene													2.50E-03	0.206	NE			
Flourene													2.50E-03	1.98	NE			
Naphthalene				3.50E-03			3.50E-03	370.690422	NE				3.53E-01	31	NE			
Phenanthrene													2.50E-03	1	NE			
Pyrene													2.50E-03	0.135	NE			
<b>METALS</b>																		
Arsenic																		
Barium																		
Cadmium																		
Chromium VI																		
Lead													8.60E-02	N/A		8.60E-02		
Zinc																		

**NOTE:** This comparative evaluation is performed automatically after the user has (i) completed Form Nos. 13 to 17 and (ii) entered the representative concentrations.

**E:** Representative concentration exceeds the calculated allowable concentration.  
**NE:** Representative concentration does not exceed the calculated allowable concentration.

**C:** Complete Pathway  
**NC:** Not a Complete Pathway

**N/A:** Not applicable

**ARBCA SUMMARY REPORT**

**FORM NO. 18 - ON-SITE COMMERCIAL WORKER**

<b>UST Incident No(s):</b> #93-02-15	<b>Facility ID:</b> 14587-097-012257
<b>Date Form Completed:</b> 01-Sep-05	<b>Form Completed By:</b> Andrew Weinberg

**COMPARISON OF TIER 1 RBSLs WITH REPRESENTATIVE ON-SITE CONCENTRATIONS**

CHEMICALS OF CONCERN	SURFICIAL SOIL			SUBSURFACE SOIL						GROUNDWATER								
	Outdoor Inhalation, Ingestion, & Dermal Contact		NC	Indoor Inhalation		NC	Outdoor Inhalation		C	Indoor Inhalation		NC	Outdoor Inhalation		C	Ingestion of Water		NC
Select the representative concentration (Rep. Conc.) for each medium.	<input type="checkbox"/> Maximum			<input checked="" type="checkbox"/> Maximum			<input checked="" type="checkbox"/> Maximum			<input type="checkbox"/> Maximum			<input type="checkbox"/> Maximum			<i>Use the historic maximum concentration from the water use well as the Rep. Conc.</i>		
	<input type="checkbox"/> Arithmetic Average			<input type="checkbox"/> Arithmetic Average			<input type="checkbox"/> Arithmetic Average			<input type="checkbox"/> Arithmetic Average			<input type="checkbox"/> Arithmetic Average					
	<input type="checkbox"/> Area-Weighted Average			<input type="checkbox"/> Area-Weighted Average			<input type="checkbox"/> Area-Weighted Average			<input type="checkbox"/> Area-Weighted Average			<input checked="" type="checkbox"/> Area-Weighted Average					
	Rep. Conc.	Target Levels	E/NE	Rep. Conc.	Target Levels	E/NE	Rep. Conc.	Target Levels	E/NE	Rep. Conc.	Target Levels	E/NE	Rep. Conc.	Target Levels	E/NE	Rep. Conc.	Target Levels	E/NE
[mg/kg]	[mg/kg]		[mg/kg]	[mg/kg]		[mg/kg]	[mg/kg]		[mg/L]	[mg/L]		[mg/L]	[mg/L]		[mg/L]	[mg/L]		
<b>ORGANICS</b>																		
Benzene				3.50E-03			3.50E-03	4.29984302	NE				4.29E-02	382.401428	NE			
Toluene				2.45E-03			2.45E-03	781.519111	NE				2.70E-02	526	NE			
Ethylbenzene				3.50E-03			3.50E-03	360.214111	NE				6.47E-02	169	NE			
Xylenes (Total)				1.05E-02			1.05E-02	450.838889	NE				1.10E-01	175	NE			
MTBE				3.50E-03			3.50E-03	7881.2909	NE				8.05E-03	48000	NE			
Anthracene													5.00E-04	0.0434	NE			
Benzo(a)anthracene													1.00E-04	0.0094	NE			
Benzo(a)pyrene													1.00E-04	0.00162	NE			
Benzo(b)fluoranthene													1.00E-04	0.0015	NE			
Benzo(g,h,i)perylene													5.00E-04	0.0007	NE			
Benzo(k)fluoranthene													2.50E-04	0.0008	NE			
Chrysene													5.00E-04	0.0016	NE			
Fluoranthene													5.00E-04	0.206	NE			
Flourene													5.00E-04	1.98	NE			
Naphthalene				3.50E-03			3.50E-03	370.690422	NE				6.57E-02	31	NE			
Phenanthrene													5.00E-04	1	NE			
Pyrene													5.00E-04	0.135	NE			
<b>METALS</b>																		
Arsenic																		
Barium																		
Cadmium																		
Chromium VI																		
Lead													8.60E-02	N/A		8.60E-02		
Zinc																		

**NOTE:** This comparative evaluation is performed automatically after the user has (i) completed Form Nos. 13 to 17 and (ii) entered the representative concentrations.

**E:** Representative concentration exceeds the calculated allowable concentration.  
**NE:** Representative concentration does not exceed the calculated allowable concentration.

**C:** Complete Pathway  
**NC:** Not a Complete Pathway

**N/A:** Not applicable

**ARBCA SUMMARY REPORT**

**FORM NO. 18 - ON-SITE CONSTRUCTION WORKER**

**UST Incident No(s): #93-02-15**      **Facility ID: 14587-097-012257**

**Date Form Completed: 01-Sep-05**      **Form Completed By: Andrew Weinberg**

**COMPARISON OF TIER 1 RBLSs WITH REPRESENTATIVE ON-SITE CONCENTRATIONS**

CHEMICALS OF CONCERN	SURFICIAL SOIL			SUBSURFACE SOIL						GROUNDWATER					
	Outdoor Inhalation, Ingestion, & Dermal Contact		NC	Indoor Inhalation		C	Outdoor Inhalation		C	Indoor Inhalation		C	Outdoor Inhalation		C
Select the representative concentration (Rep. Conc.) for each medium.	<input type="checkbox"/> Maximum			<input checked="" type="checkbox"/> Maximum			<input checked="" type="checkbox"/> Maximum			<input checked="" type="checkbox"/> Maximum			<input checked="" type="checkbox"/> Maximum		
	<input type="checkbox"/> Arithmetic Average			<input type="checkbox"/> Arithmetic Average			<input type="checkbox"/> Arithmetic Average			<input type="checkbox"/> Arithmetic Average			<input type="checkbox"/> Arithmetic Average		
	<input type="checkbox"/> Area-Weighted Average			<input type="checkbox"/> Area-Weighted Average			<input type="checkbox"/> Area-Weighted Average			<input type="checkbox"/> Area-Weighted Average			<input type="checkbox"/> Area-Weighted Average		
	Rep. Conc.*	Target Levels	E/NE	Rep. Conc.	Target Levels	E/NE	Rep. Conc.	Target Levels	E/NE	Rep. Conc.	Target Levels	E/NE	Rep. Conc.	Target Levels	E/NE
	[mg/kg]	[mg/kg]		[mg/kg]	[mg/kg]		[mg/kg]	[mg/kg]		[mg/L]	[mg/L]		[mg/L]	[mg/L]	
<b>ORGANICS</b>															
Benzene				3.50E-03	0.814075185	NE	3.50E-03	7.04867124	NE	1.84E+00	2.585042492	NE	1.84E+00	626.8651987	NE
Toluene				2.45E-03	95.08464761	NE	2.45E-03	781.5191111	NE	1.09E+01	149.9434409	NE	1.09E+01	526	NE
Ethylbenzene				3.50E-03	351.2848775	NE	3.50E-03	360.2141111	NE	3.70E+00	169	NE	3.70E+00	169	NE
Xylenes (Total)				1.05E-02	141.6857947	NE	1.05E-02	450.8388889	NE	1.14E+01	126.2733182	NE	1.14E+01	175	NE
MTBE				3.50E-03	910.2428762	NE	3.50E-03	7881.290897	NE	2.50E-02	7177.708621	NE	2.50E-02	48000	NE
Anthracene										2.50E-03	0.0434	NE	2.50E-03	0.0434	NE
Benzo(a)anthracene										2.50E-03	0.0094	NE	2.50E-03	0.0094	NE
Benzo(a)pyrene										2.50E-03	0.00162	E	2.50E-03	0.00162	E
Benzo(b)fluoranthene										2.50E-03	0.0015	E	2.50E-03	0.0015	E
Benzo(g,h,i)perylene										2.50E-03	0.0007	E	2.50E-03	0.0007	E
Benzo(k)fluoranthene										2.50E-03	0.0008	E	2.50E-03	0.0008	E
Chrysene										2.50E-03	0.0016	E	2.50E-03	0.0016	E
Fluoranthene										2.50E-03	0.206	NE	2.50E-03	0.206	NE
Flourene										2.50E-03	1.98	NE	2.50E-03	1.98	NE
Naphthalene				3.50E-03	126.7533653	NE	3.50E-03	370.6904222	NE	3.53E-01	14.23263302	NE	3.53E-01	31	NE
Phenanthrene										2.50E-03	1	NE	2.50E-03	1	NE
Pyrene										2.50E-03	0.135	NE	2.50E-03	0.135	NE
<b>METALS</b>															
Arsenic															
Barium															
Cadmium															
Chromium VI															
Lead										2.60E-03	N/A		2.60E-03	N/A	
Zinc															

**NOTE:** This comparative evaluation is performed automatically after the user has (i) completed Form Nos. 13 to 17 and (ii) entered the representative concentrations.

**E:** Representative concentration exceeds the calculated allowable concentration.

**C:** Complete Pathway

**NE:** Representative concentration does not exceed the calculated allowable concentration.

**NC:** Not a Complete Pathway

\* The higher of the representative concentrations for surficial and subsurface soil should be entered in the representative concentration column. The target level is the target level for surficial soil.

**ARBCA SUMMARY REPORT**

**FORM NO. 18 - ON-SITE CONSTRUCTION WORKER**

**UST Incident No(s): #93-02-15**      **Facility ID: 14587-097-012257**

**Date Form Completed: 01-Sep-05**      **Form Completed By: Andrew Weinberg**

**COMPARISON OF TIER 1 RBLSs WITH REPRESENTATIVE ON-SITE CONCENTRATIONS**

CHEMICALS OF CONCERN	SURFICIAL SOIL			SUBSURFACE SOIL						GROUNDWATER					
	Outdoor Inhalation, Ingestion, & Dermal Contact		NC	Indoor Inhalation		C	Outdoor Inhalation		C	Indoor Inhalation		C	Outdoor Inhalation		C
Select the representative concentration (Rep. Conc.) for each medium.	<input type="checkbox"/> Maximum			<input checked="" type="checkbox"/> Maximum			<input checked="" type="checkbox"/> Maximum			<input type="checkbox"/> Maximum			<input type="checkbox"/> Maximum		
	<input type="checkbox"/> Arithmetic Average			<input type="checkbox"/> Arithmetic Average			<input type="checkbox"/> Arithmetic Average			<input type="checkbox"/> Arithmetic Average			<input type="checkbox"/> Arithmetic Average		
	<input type="checkbox"/> Area-Weighted Average			<input type="checkbox"/> Area-Weighted Average			<input type="checkbox"/> Area-Weighted Average			<input checked="" type="checkbox"/> Area-Weighted Average			<input checked="" type="checkbox"/> Area-Weighted Average		
	Rep. Conc.*	Target Levels	E/NE	Rep. Conc.	Target Levels	E/NE	Rep. Conc.	Target Levels	E/NE	Rep. Conc.	Target Levels	E/NE	Rep. Conc.	Target Levels	E/NE
	[mg/kg]	[mg/kg]		[mg/kg]	[mg/kg]		[mg/kg]	[mg/kg]		[mg/L]	[mg/L]		[mg/L]	[mg/L]	
<b>ORGANICS</b>															
Benzene				3.50E-03	0.814075185	NE	3.50E-03	7.04867124	NE	4.29E-02	2.585042492	NE	4.29E-02	626.8651987	NE
Toluene				2.45E-03	95.08464761	NE	2.45E-03	781.5191111	NE	2.70E-02	149.9434409	NE	2.70E-02	526	NE
Ethylbenzene				3.50E-03	351.2848775	NE	3.50E-03	360.2141111	NE	6.47E-02	169	NE	6.47E-02	169	NE
Xylenes (Total)				1.05E-02	141.6857947	NE	1.05E-02	450.8388889	NE	1.10E-01	126.2733182	NE	1.10E-01	175	NE
MTBE				3.50E-03	910.2428762	NE	3.50E-03	7881.290897	NE	8.05E-03	7177.708621	NE	8.05E-03	48000	NE
Anthracene										5.00E-04	0.0434	NE	5.00E-04	0.0434	NE
Benzo(a)anthracene										1.00E-04	0.0094	NE	1.00E-04	0.0094	NE
Benzo(a)pyrene										1.00E-04	0.00162	NE	1.00E-04	0.00162	NE
Benzo(b)fluoranthene										1.00E-04	0.0015	NE	1.00E-04	0.0015	NE
Benzo(g,h,i)perylene										5.00E-04	0.0007	NE	5.00E-04	0.0007	NE
Benzo(k)fluoranthene										2.50E-04	0.0008	NE	2.50E-04	0.0008	NE
Chrysene										5.00E-04	0.0016	NE	5.00E-04	0.0016	NE
Fluoranthene										5.00E-04	0.206	NE	5.00E-04	0.206	NE
Flourene										5.00E-04	1.98	NE	5.00E-04	1.98	NE
Naphthalene				3.50E-03	126.7533653	NE	3.50E-03	370.6904222	NE	6.57E-02	14.23263302	NE	6.57E-02	31	NE
Phenanthrene										5.00E-04	1	NE	5.00E-04	1	NE
Pyrene										5.00E-04	0.135	NE	5.00E-04	0.135	NE
<b>METALS</b>															
Arsenic															
Barium															
Cadmium															
Chromium VI															
Lead										2.60E-03	N/A		2.60E-03	N/A	
Zinc															

**NOTE:** This comparative evaluation is performed automatically after the user has (i) completed Form Nos. 13 to 17 and (ii) entered the representative concentrations.

**E:** Representative concentration exceeds the calculated allowable concentration.

**C:** Complete Pathway

**NE:** Representative concentration does not exceed the calculated allowable concentration.

**NC:** Not a Complete Pathway

\* The higher of the representative concentrations for surficial and subsurface soil should be entered in the representative concentration column. The target level is the target level for surficial soil.

**ARBCA SUMMARY REPORT**

**FORM NO. 19**

**UST Incident No(s): #93-02-15** **Facility ID: 14587-097-012257**

**Date Form Completed: 01-Sep-05** **Form Completed By: Andrew Weinberg**

**TIER 1 GROUNDWATER RESOURCE PROTECTION TARGET CONCENTRATIONS**

Distance from source to the point of exposure (POE):															500		
CHEMICALS OF CONCERN	COMPARISON FOR SOURCE SOIL			COMPARISON FOR SOURCE GROUNDWATER			COMPARISON FOR COMPLIANCE WELLS										
	Soil Source Rep. Conc. <sup>1</sup> [mg/kg]	Allowable Soil Conc. <sup>2</sup> [mg/kg]	E/ NE	GW Source Rep. Conc. <sup>3</sup> [mg/L]	Allowable GW Conc. at a POC <sup>4</sup> [mg/L]	E/ NE	CW Rep. Conc. <sup>5</sup> [mg/L]	Allowable GW Conc. at a POC <sup>6</sup> [mg/L]	E/ NE	CW Rep. Conc. <sup>5</sup> [mg/L]	Allowable GW Conc. at a POC <sup>6</sup> [mg/L]	E/ NE	CW Rep. Conc. <sup>5</sup> [mg/L]	Allowable GW Conc. at a POC <sup>6</sup> [mg/L]	E/ NE		
COMPLIANCE WELL NO.			MW-1			MW-8											
DISTANCE FROM SOURCE			10			200											
RECENT TREND			S			S											

**ORGANICS**

Benzene				0.139	0.317	NE	2.83E-03	0.0298	NE						
Toluene				0.239	63.4	NE	2.83E-03	5.97	NE						
Ethylbenzene				0.577	44.4	NE	2.83E-03	4.18	NE						
Xylenes (Total)				0.884	175	NE	8.25E-03	59.7	NE						
MTBE				0.0025	1.27	NE	2.83E-03	0.119	NE						
Anthracene				5.00E-04	0.0434	NE	5.00E-04	0.0434	NE						
Benzo(a)anthracene				1.00E-04	0.0094	NE	1.00E-04	0.00696	NE						
Benzo(a)pyrene				1.90E-04	0.00162	NE	1.00E-04	0.00119	NE						
Benzo(b)fluoranthene				5.00E-04	0.0015	NE	5.00E-04	0.0015	NE						
Benzo(g,h,i)perylene				2.50E-04	0.0007	NE	2.50E-04	0.0007	NE						
Benzo(k)fluoranthene				5.00E-04	0.0008	NE	5.00E-04	0.0008	NE						
Chrysene				2.00E-04	0.0016	NE	2.00E-04	0.0016	NE						
Fluoranthene				5.00E-04	0.206	NE	5.00E-04	0.206	NE						
Fluorene				3.80E-04	1.98	NE	5.00E-04	1.98	NE						
Naphthalene				0.2	1.27	NE	5.00E-04	0.119	NE						
Phenanthrene				5.00E-04	1	NE	5.00E-04	1	NE						
Pyrene				5.00E-04	0.135	NE	5.00E-04	0.135	NE						

**METALS**

Arsenic															
Barium															
Cadmium															
Chromium VI															
Lead				2.37E-03	0.95	NE	2.35E-03	0.0895	NE						
Zinc															

**NOTE:** Use the *ARBCA Computational Software* to calculate the allowable (i) soil source conc., (ii) GW source conc., and (iii) compliance well conc.

1: The soil source representative concentrations have to be calculated and entered here.

2: Allowable soil concentrations at the source protective of groundwater at the POE.

3: The groundwater source representative concentrations have to be calculated and entered here.

4: Allowable groundwater concentrations at the source protective of groundwater at the POE.

5: The representative concentrations in the compliance well.

6: Allowable groundwater concentrations at a point of compliance (POC) protective of a POE.

E: Representative concentration exceeds the calculated allowable concentration.

NE: Representative concentration does not exceed the calculated allowable concentration.

**Recommended Attachment:** A map showing the location of the soil source, location of POE, and location of POCs.

## ARBCA SUMMARY REPORT

FORM NO. 21a

UST Incident No(s): #93-02-15	Facility ID: 14587-097-012257
Date Form Completed: 01-Sep-05	Form Completed By: Andrew Weinberg

## TIER 1 ON-SITE TARGET LEVELS FOR INHALATION AND INGESTION

NOTE: The RBSLs listed for each route of exposure are the minimum RBSLs for all the receptors for that particular route of exposure. The Tier 1 on-site target levels are the minimum RBSLs of all routes of exposures within each medium.

CHEMICALS OF CONCERN	SURFICIAL SOIL		SUBSURFACE SOIL			GROUNDWATER			
	Outdoor Inhalation, Ingestion, & Dermal Contact [mg/kg]	On-Site Tier 1 Target Levels [mg/kg]	Indoor Inhalation [mg/kg]	Outdoor Inhalation [mg/kg]	On-Site Tier 1 Target Levels [mg/kg]	Indoor Inhalation [mg/L]	Outdoor Inhalation [mg/L]	Ingestion of Water [mg/L]	On-Site Tier 1 Target Levels [mg/L]
<b>ORGANICS</b>									
Benzene	NA	NA	0.814	4.300	<b>0.814075185</b>	2.585	382.401	NA	<b>2.585042492</b>
Toluene	NA	NA	95.085	781.519	<b>95.08464761</b>	149.943	526.000	NA	<b>149.9434409</b>
Ethylbenzene	NA	NA	351.285	360.214	<b>351.2848775</b>	169.000	169.000	NA	<b>169</b>
Xylenes (Total)	NA	NA	141.686	450.839	<b>141.6857947</b>	126.273	175.000	NA	<b>126.2733182</b>
MtBE	NA	NA	910.243	7881.291	<b>910.2428762</b>	7177.709	48000.000	NA	<b>7177.708621</b>
Anthracene	NA	NA	NA	NA	NA	0.043	0.043	NA	<b>0.0434</b>
Benzo(a)anthracene	NA	NA	NA	NA	NA	0.009	0.009	NA	<b>0.0094</b>
Benzo(a)pyrene	NA	NA	NA	NA	NA	0.002	0.002	NA	<b>0.00162</b>
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	0.002	0.002	NA	<b>0.0015</b>
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	0.001	0.001	NA	<b>0.0007</b>
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	0.001	0.001	NA	<b>0.0008</b>
Chrysene	NA	NA	NA	NA	NA	0.002	0.002	NA	<b>0.0016</b>
Fluoranthene	NA	NA	NA	NA	NA	0.206	0.206	NA	<b>0.206</b>
Fluorene	NA	NA	NA	NA	NA	1.980	1.980	NA	<b>1.98</b>
Naphthalene	NA	NA	126.753	370.690	<b>126.7533653</b>	14.233	31.000	NA	<b>14.23263302</b>
Phenanthrene	NA	NA	NA	NA	NA	1.000	1.000	NA	<b>1</b>
Pyrene	NA	NA	NA	NA	NA	0.135	0.135	NA	<b>0.135</b>
<b>METALS</b>									
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium VI	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA

**NOTE:**

NA: Not Available



ARBCA SUMMARY REPORT			FORM No. 22	
UST Incident No:	#93-02-15	Facility ID:	14587-097-012257	
Date Form Completed:	September 1, 2005	Form Completed By:	Andrew Weinberg, P.G.	
<b>TIER 1 CONCLUSIONS AND RECOMMENDATIONS</b>				
<b>1</b>	<b>Has the site been adequately investigated and characterized?</b>			
	<i>Yes. A Preliminary Investigation, a Secondary Investigation and an a Secondary Investigation Addendum have delineated the nature and extent of soil and groundwater contamination at the site.</i>			
<b>2</b>	<b>Has free product been removed?</b>			
	<i>Yes. A dual-phase vacuum extraction pilot test was conducted for an 8-hour period in December 2004, recovering 5.6 lbs of hydrocarbons. This test demonstrated that only residual amounts of free-product were present, that the product was not readily extractable, and is immobile under normal conditions.</i>			
<b>3</b>	<b>Have threats to utilities been mitigated? (if applicable)</b>			
	<i>Not applicable. No utilities are present in the area affected by soil or groundwater contamination.</i>			
<b>4</b>	<b>Have nuisance conditions (i.e.odor, taste, etc) been properly mitigated? (if applicable)</b>			
	<i>Not applicable. No nuisance conditions are present.</i>			
<b>5</b>	<b>Is the groundwater plume stable or shrinking, based on concentration trend plots?</b>			
	<i>Groundwater contaminant concentrations in the source area have been dropping consistently for more than 10 years. No contaminants were detected in downgradient wells until March 2004, after most of the site was paved in concrete. Only three sets of measurements are available for the one downgradient well with detectable contaminant concentrations (MW-6).</i>			
<b>6</b>	<b>Have threats to ecological receptors been addressed? (if applicable)</b>			
	<i>Not applicable. No ecological receptors are threatened or impacted.</i>			
<b>7</b>	<b>Are on-site soil and groundwater concentrations protective of current and reasonable future on-site receptors?</b>			
	<p><i>Tier 1 evaluation using area-weighted average groundwater contaminant concentrations from within the plume area demonstrates that on-site groundwater conditions are protective for all receptors and pathways except direct ingestion of groundwater. There is no current exposure to groundwater ingestion on-site and no future development of on-site groundwater for consumption is likely.</i></p> <p><i>Source area soil concentrations are protective of on-site receptors. Source area soils have only been analyzed for TPH. All TPH concentrations are below the 100 mg/kg corrective action level (CAL). Samples for BTEX &amp; MTBE were collected just south and west of the source area in March 2004; these samples help define the extent of soil contamination. Because no analyses for individual compounds are available from the source area, contaminant transport processes cannot be evaluated directly. However, because the source area is paved with 8 inches of reinforced concrete any vapor migration to on-site receptors is very limited. No buildings are presently located in the plume area and no buildings are likely to be located in this area in the future, as it is an active vehicle storage area for the maintenance shop; consequently outdoor worker exposure is the only potentially complete exposure pathway.</i></p>			

8	<p><b>Are off-site soil and groundwater concentrations protective of current and reasonable future off-site receptors?</b></p> <p><i>Yes. No contaminants have migrated off-site and are not expected to in the future. No receptors are present within 1000 ft downgradient of the site at this time and no receptors are likely to be located downgradient of the site in the future.</i></p>
9	<p><b>Are soil and groundwater concentrations at the source protective of groundwater at a POE?</b></p> <p><i>Yes. Soil and groundwater concentrations at the source are protective of a POE assumed to be 500 ft downgradient of the source, based on Tier 1 dilution and attenuation factors. Although no BTEX data are available for source area soils, the source area soil and groundwater are assumed to be in equilibrium because of the age of the spill (&gt;12 yrs) and the shallow depth to groundwater (&lt; 5 ft). Consequently, the source area groundwater provides a basis for accurate prediction of potential future groundwater effects at the POE.</i></p>
10	<p><b>Are groundwater concentrations at the POC protective of groundwater at a POE?</b></p> <p><i>Site contaminants are currently below detectable concentrations at the POC and are not expected to reach the POC. Natural attenuation of the plume is expected to be rapid downgradient of the paved area, where additional oxygen is carried into the surficial aquifer with recharge.</i></p>
11	<p><b>Are soil and groundwater concentrations at the source protective of a stream?</b></p> <p><i>Yes. There is no stream or surface water within 1000 feet of the source.</i></p>
12	<p><b>Is compliance monitoring of groundwater recommended?</b></p> <p><i>Yes. Continued semi-annual monitoring of upgradient, source area, downgradient, and point of compliance wells is recommended to confirm trends in contaminant concentrations. Monitoring for a minimum of two years is recommended.</i></p>
13	<p><b>Is an interim remediation or Tier 1 reevaluation recommended?</b></p> <p><i>No additional efforts to remove free product from the source area are recommended. Such efforts are not likely to remove a significant mass of hydrocarbon, given the tight formation conditions, the high water table, the low residual hydrocarbon saturation, and the length of time since the release.</i></p> <p><i>A Tier 1 reevaluation may be appropriate if increasing trends continue in downgradient well MW-6 or if contaminants are detected in the POC well.</i></p>
14	<p><b>Is remediation to Tier 1 target levels recommended?</b></p> <p><i>No. Under current and likley future exposures scenarios, site conditions meet Tier 1 target levels without remediation.</i></p>
15	<p><b>Is the site recommended for NFA status?</b></p> <p><i>Yes. This site is recommended for NFA with post-closure monitoring, as described above.</i></p>
16	<p><b>Is a Tier 2 recommended?</b></p> <p><i>Yes. A Tier 2 evaluation is required because the depth to groundwater at this site is significantly less than the Tier 1 default value.</i></p>
17	<p><b>Other relevant information:</b></p>

UST Incident No(s): #93-02-15

Facility ID: 14587-097-012257

Date Form Completed: 01-Sep-05

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REFERENCES AND PROTOCOLS

R1	ADEM, 2001, ARBCA: ALABAMA RISK-BASED CORRECTIVE ACTION FOR UNDERGROUND STORAGE TANKS GUIDANCE MANUAL REVISION 1.0, The Alabama Department of Environmental Management Groundwater Branch, Montgomery, AL.
R2	ADEM. 1998. ARBCA: Alabama Risk-Based Corrective Action For Underground Storage Tanks, Guidance Manual. The Alabama Department of Environmental Management Groundwater Branch, Montgomery, AL.
R3	Analytical Chemical Testing Laboratory, Inc., Jan. 1996., Groundwater Monitoring Report, Fourth Quarter Sampling Event, Alabama National Guard Armory OMS #28 & 29 - Pit #2.
R4	Analytical Chemical Testing Laboratory, Inc., Jan. 1996., Groundwater Monitoring Report, Fourth Quarter Sampling Event, Alabama National Guard Armory OMS #28 & 29 - Pit #2.
R5	Bechtel-S Corp. 2005. Secondary Investigation Addendum, OMS #28, Pit 2. May 2005.
R6	P.E. LaMoreaux & Associates, 1993. Underground Storage Tank Preliminary Investigation Report, Alabama National Guard Armory OMS #28 & 29 - Pit #2.
R7	P.E. LaMoreaux & Associates, 1994. Underground Storage Tank Secondary Investigation Report, Alabama National Guard Armory OMS #28 & 29 - Pit #2.
R8	P.E. LaMoreaux & Associates, Feb. 1997. Letter report on groundwater sampling to Mr. Tim Young, ADEM, RE: OMS 28 and 29, Pit #2.
R9	P.E. LaMoreaux & Associates, July 1996. Letter report on groundwater sampling to Mr. Tim Young, ADEM, RE: OMS 28 and 29, Pit #2.
R 10	P.E. LaMoreaux & Associates, Sept. 1997. Letter report on groundwater sampling to Ms. Stephanie Carter, ADEM, RE: OMS 28 and 29, Pit #2.
R 11	Severn Trent Services, Nov. 2001. Fax laboratory data report to Mr. Craig Holloway, ALARNG, with analytical results for OMS #28 groundwater samples.
P1	PAH and lead results for samples prior to 2004 are suspect. Sampling methods are not documented for these events. Procedures to minimize sample turbidity and remove standing water may not have been followed. Sample detection limits for earlier analyses also trend to be higher than for recent analyses and skew results for non-detected analytes such as PAHs.
P2	Representative concentration calculations reflect one-half the detection limit concentration for non-detected analytes .
P3	Area-weighted average groundwater concentrations are calculated using the area of intersection between each well's polygon area and the area of the groundwater plume above ISLs. Because wells are not located on a grid some polygons are irregularly shaped.
P4	Maximum soil concentrations are used because historical samples were only analyzed for TPH and the soil source area was removed before the recent SI Addendum samples were collected.

**ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT**

**GROUNDWATER BRANCH**

1400 COLISEUM BOULEVARD,  
MONTGOMERY, ALABAMA 36130-1463  
Ph.: (334) 270-5655 Fax: (334) 270-5631

MAILING ADDRESS: P.O. BOX 301463  
MONTGOMERY, ALABAMA 36130

**ARBCA FOR USTs**

**TIER 2 REPORT FORMS**

**(Revision 1.0, July 2001)**

**(These are in addition to ARBCA Report Forms 1-23)**

<b>SITE NAME:</b>	<i>ALARNG OMS 28 Pit # 2</i>
<b>UST INCIDENT NO.:</b>	<i>#93-02-15</i>
<b>FACILITY ID:</b>	<i>14587-097-012257</i>
<b>DATE FORM COMPLETED:</b>	<i>1 September 2005</i>
<b>FORM COMPLETED BY:</b>	<i>Andrew Weinberg</i>



UST Incident No(s): #93-02-15

Facility ID: 14587-097-012257

Date Form Completed: 01-Sep-05

Form Completed By: Andrew Weinberg

## TIER 2 FATE AND TRANSPORT PARAMETERS

Parameter	Symbol	Unit	Tier 1 Default Value	Tier 2 Value	Source
<b>SOIL PARAMETERS:</b>					
Length of Soil Source Area Parallel to Wind Direction	$W_a$	cm	1500	460	Site-specific
Depth to Subsurface Soil Sources	$L_s$	cm	30.48	30.48	Tier 1
Lower Depth of Surficial Soil Zone	d	cm	30.48	30.48	Tier 1
Thickness of Capillary Fringe	$h_{cap}$	cm	5	5	Tier 1
Thickness of Vadose Zone	$h_v$	cm	295	125	Site-specific
Dry Soil Bulk Density in the Vadose Zone	$\rho_s$	g/cm <sup>3</sup>	1.8	1.642	Site-specific
Fractional Organic Carbon Content in the Vadose Zone	foc	g-C/g-soil	0.01	0.028	Site-specific
Total Soil Porosity in the Vadose Zone	$\theta_T$	cm <sup>3</sup> /cm <sup>3</sup> -soil	0.3	0.392	Site-specific
Volumetric Water Content in Vadose Zone	$\theta_{ws}$	cm <sup>3</sup> /cm <sup>3</sup>	0.1	0.224	Site-specific
Volumetric Air Content in Vadose Zone	$\theta_{as}$	cm <sup>3</sup> /cm <sup>3</sup>	0.2	0.168	Site-specific
Volumetric Water Content in Capillary Fringe	$\theta_{wcap}$	cm <sup>3</sup> /cm <sup>3</sup>	0.27	0.27	Tier 1
Volumetric Air Content in Capillary Fringe	$\theta_{acap}$	cm <sup>3</sup> /cm <sup>3</sup>	0.03	0.122	Site-specific
Volumetric Water Content in Foundation or Wall Cracks	$\theta_{wcrack}$	cm <sup>3</sup> /cm <sup>3</sup>	0.1	0.1	Tier 1
Volumetric Air Content in Foundation/Wall Cracks	$\theta_{acrack}$	cm <sup>3</sup> /cm <sup>3</sup>	0.2	0.292	Site-specific
<b>GROUNDWATER PARAMETERS:</b>					
Depth to Groundwater	$L_{gw}$	cm	300	138	Site-specific
Width of GW Source Area Perpendicular to GW Flow Direction	Y	cm	1500	490	Site-specific
Length of GW Source Area Parallel to GW Flow Direction	W	cm	1500	490	Site-specific
Total Soil Porosity in the Saturated Zone	$\theta_{TS}$	cm <sup>3</sup> /cm <sup>3</sup> -soil	0.3	0.392	Site-specific
Dry Soil Bulk Density in the Saturated Zone	$\rho_{ss}$	g/cm <sup>3</sup>	1.8	1.642	Site-specific
Fractional Organic Carbon Content in the Saturated Zone	foc <sub>s</sub>	g-C/g-soil	0.01	0.028	Site-specific
Groundwater Mixing Zone Thickness	$\delta_{gw}$	cm	200	54	Site-specific
Hydraulic Conductivity in the Saturated Zone	K	cm/year	31536	2226	Site-specific
Hydraulic Gradient in the Saturated Zone	i	--	0.005	0.0114	Site-specific
Groundwater Darcy Velocity	$U_{gw}$	cm/year	157.68	25.3764	Calculated
Infiltration Rate	I	cm/year	14.8	14.8	Tier 1
<b>STREAM PARAMETERS:</b>					
Stream Flow Rate (Calculated per Appendix C)	$Q_{sw}$	ft <sup>3</sup> /day	Site-specific	NA	Site-specific
<b>AMBIENT AIR PARAMETERS:</b>					
Breathing Zone Height	$\delta_a$	cm	200	200	Tier 1
Wind Speed within the Breathing Zone	$U_a$	cm/s	225	225	Tier 1

UST Incident No(s): #93-02-15

Facility ID: 14587-097-012257

Date Form Completed: 01-Sep-05

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## TIER 2 FATE AND TRANSPORT PARAMETERS

Parameter	Symbol	Unit	Tier 1 Default Value	Tier 2 Value	Source
<b>ENCLOSED SPACE PARAMETERS:</b>					
Enclosed Space Air Exchange Rate:					
Residential	ER	1/sec	0.00014	0.00014	Tier 1
Commercial/Construction Worker	ER	1/sec	0.00023	0.00023	Tier 1
Enclosed Space Volume/Infiltration Area Ratio:					
Residential	L <sub>B</sub>	cm	200	200	Tier 1
Commercial/Construction Worker	L <sub>B</sub>	cm	300	300	Tier 1
Enclosed Space Foundation or Wall Thickness:					
Residential	L <sub>crack</sub>	cm	15	15	Tier 1
Commercial/Construction Worker	L <sub>crack</sub>	cm	15	15	Tier 1
Areal Fraction of Cracks in Foundation/Walls:					
Residential	η	cm <sup>2</sup> /cm <sup>2</sup>	0.01	0.01	Tier 1
Commercial/Construction Worker	η	cm <sup>2</sup> /cm <sup>2</sup>	0.01	0.01	Tier 1
<b>PARTICULATE EMISSION RATE:</b>					
Residential and Commercial	Pe	g/cm <sup>2</sup> -sec	6.90E-14	6.9E-14	Tier 1
Construction Worker	Pe	g/cm <sup>2</sup> -sec	6.90E-09	6.9E-09	Tier 1
<b>AVERAGING TIME FOR VAPOR FLUX:</b>					
Resident Child	τ	sec	1.89E+08	189000000	Tier 1
Resident Adult	τ	sec	9.46E+08	946000000	Tier 1
Commercial Worker	τ	sec	7.88E+08	788000000	Tier 1
Construction Worker	τ	sec	3.15E+07	31500000	Tier 1
<b>GROUNDWATER RESOURCE PROTECTION PARAMETERS:</b>					
Distance from the Downgradient Edge of the Groundwater Source to the Point of Exposure	X <sub>poe</sub>	ft	variable	500	Site-specific
Distance from the Downgradient Edge of the Groundwater Source to the Point of Compliance	X <sub>poc</sub>	ft	variable	200	Site-specific
<b>STREAM PROTECTION PARAMETERS:</b>					
Distance from the Downgradient Edge of the Groundwater Source to the Stream	X <sub>s</sub>	ft	variable	NA	Site-specific
Distance from the Downgradient Edge of the Groundwater Source to the Point of Compliance	X <sub>spoc</sub>	ft	variable	NA	Site-specific

UST Incident No(s): #93-02-15

Facility ID: 14587-097-012257

Date Form Completed: 01-Sep-05

Form Completed By: Andrew Weinberg

## JUSTIFICATION FOR TIER 2 FATE AND TRANSPORT PARAMETERS

1.	<p><b>Length of soil source area parallel to wind direction (<math>W_s</math>) [cm]</b></p> <p><i>The source width is the width of the UST excavation parallel to the predominant wind direction.</i></p>
2.	<p><b>Depth to subsurface soil sources (<math>L_s</math>) [cm]</b></p> <p><i>The Tier 1 default value of 30.48 cm is used because speciated source area soil data is not available. Because contamination is present in groundwater at a depth of approximately 4 feet, contaminants are assumed to be present in the capillary fringe soil to a depth of about 3 feet.</i></p>
3.	<p><b>Lower depth of surficial soil zone (d) [cm]</b></p> <p><i>Tier 1 Default</i></p>
4.	<p><b>Thickness of capillary fringe (<math>h_{cap}</math>) [cm]</b></p> <p><i>Tier 1 Default</i></p>
5.	<p><b>Thickness of vadose zone (<math>h_v</math>) [cm]</b></p> <p><i>Calculated from measured average depth to groundwater in site wells and default value for capillary fringe thickness.</i></p>
6.	<p><b>Dry soil bulk density in the vadose zone (<math>\rho_s</math>) [g/cm<sup>3</sup>]</b></p> <p><i>Measured average value from subsurface soil samples collected on-site.</i></p>
7.	<p><b>Fractional organic carbon content in the vadose zone (foc) [g-C/g-soil]</b></p> <p><i>Measured average value from subsurface soil samples collected on-site.</i></p>



UST Incident No(s): #93-02-15

Facility ID: 14587-097-012257

Date Form Completed: 01-Sep-05

Form Completed By: Andrew Weinberg

## JUSTIFICATION FOR TIER 2 FATE AND TRANSPORT PARAMETERS

8.	<p>Total soil porosity in the vadose zone (<math>\theta_T</math>) [<math>\text{cm}^3/\text{cm}^3\text{-soil}</math>]</p> <p><i>Measured average value from subsurface soil samples collected on-site.</i></p>
9.	<p>Volumetric water content in the vadose zone (<math>\theta_{ws}</math>) [<math>\text{cm}^3/\text{cm}^3</math>]</p> <p><i>Measured average value from subsurface soil samples collected on-site.</i></p>
10.	<p>Volumetric air content in the vadose zone (<math>\theta_{as}</math>) [<math>\text{cm}^3/\text{cm}^3</math>]</p> <p><i>Calculated from total porosity and moisture content</i></p>
11.	<p>Volumetric water content in the capillary fringe (<math>\theta_{wcap}</math>) [<math>\text{cm}^3/\text{cm}^3</math>]</p> <p><i>Tier 1 default</i></p>
12.	<p>Volumetric air content in the capillary fringe (<math>\theta_{acap}</math>) [<math>\text{cm}^3/\text{cm}^3</math>]</p> <p><i>Calculated from total porosity and moisture content using ARBCA Program</i></p>
13.	<p>Volumetric water content in foundation or wall cracks (<math>\theta_{wcrack}</math>) [<math>\text{cm}^3/\text{cm}^3</math>]</p> <p><i>Tier 1 default</i></p>
14.	<p>Volumetric air content in foundation or wall cracks (<math>\theta_{acrack}</math>) [<math>\text{cm}^3/\text{cm}^3</math>]</p> <p><i>Calculated from total porosity and moisture content using ARBCA Program</i></p>

UST Incident No(s): #93-02-15

Facility ID: 14587-097-012257

Date Form Completed: 01-Sep-05

Form Completed By: Andrew Weinberg

## JUSTIFICATION FOR TIER 2 FATE AND TRANSPORT PARAMETERS

15.	Depth to groundwater ( $L_{gw}$ ) [cm]
	<i>Measured average depth to groundwater in on-site wells.</i>
16.	Width of GW source area perpendicular to GW flow direction (Y) [cm]
	<i>The source width is the width of the UST excavation perpendicular to the groundwater flow direction; the leak was found in the tank itself, not in the associated piping.</i>
17.	Length of GW source area parallel to GW flow direction (W) [cm]
	<i>The source width is the width of the UST excavation parallel to the groundwater flow direction; the leak was found in the tank itself, not in the associated piping.</i>
18.	Total soil porosity in the saturated zone ( $\theta_{TS}$ ) [ $\text{cm}^3/\text{cm}^3\text{-soil}$ ]
	<i>Measured average value from subsurface soil samples collected on-site.</i>
19.	Dry soil bulk density in the saturated zone ( $\rho_{ss}$ ) [ $\text{g}/\text{cm}^3$ ]
	<i>Measured average value from subsurface soil samples collected on-site.</i>
20.	Fractional organic carbon content in the saturated zone ( $foc_s$ ) [ $\text{g-C}/\text{g-soil}$ ]
	<i>Measured average value from subsurface soil samples collected on-site.</i>
21.	Groundwater mixing zone thickness ( $\delta_{gw}$ ) [cm]
	<i>Average of measured variation in water levels in on-site wells.</i>

UST Incident No(s): #93-02-15

Facility ID: 14587-097-012257

Date Form Completed: 01-Sep-05

Form Completed By: Andrew Weinberg

JUSTIFICATION FOR TIER 2 FATE AND TRANSPORT PARAMETERS

22.	<p><b>Hydraulic conductivity in the saturated zone (K) [cm/year]</b></p> <p><i>Average of values calculated from slug tests in four on-site wells.</i></p>
23.	<p><b>Hydraulic gradient in the saturated zone (i) [--]</b></p> <p><i>Average gradient across site from MW-1 (source) to MW-8 (downgradient POC)</i></p>
24.	<p><b>Groundwater Darcy Velocity (<math>U_{gw}</math>) [cm/year]</b></p> <p><i>Calculated from K and I, above.</i></p>
25.	<p><b>Infiltration rate (I) [cm/year]</b></p> <p><i>Tier 1 default.</i></p>
26.	<p><b>Stream flow rate (<math>Q_{sw}</math>) [ft<sup>3</sup>/day]. If calculated using Bingham (1982, Appendix C), show calculations and justify input values used.</b></p> <p><i>NA</i></p>
27.	<p><b>Breathing zone height (<math>\delta_a</math>) [cm]</b></p> <p><i>Tier 1 default.</i></p>
28.	<p><b>Wind speed within the breathing zone (<math>U_a</math>) [cm/s]</b></p> <p><i>Tier 1 default.</i></p>

UST Incident No(s): #93-02-15

Facility ID: 14587-097-012257

Date Form Completed: 01-Sep-05

Form Completed By: Andrew Weinberg

## JUSTIFICATION FOR TIER 2 FATE AND TRANSPORT PARAMETERS

29.	<p>Enclosed space air exchange rate: residential (ER) [1/sec]</p> <p><i>Tier 1 default.</i></p>
30.	<p>Enclosed space air exchange rate: commercial/construction worker (ER) [1/sec]</p> <p><i>Tier 1 default.</i></p>
31.	<p>Enclosed space volume-infiltration area ratio: residential (<math>L_B</math>) [cm]</p> <p><i>Tier 1 default.</i></p>
32.	<p>Enclosed space volume-infiltration area ratio: commercial/construction worker (<math>L_B</math>) [cm]</p> <p><i>Tier 1 default.</i></p>
33.	<p>Enclosed space foundation or wall thickness: residential (<math>L_{crack}</math>) [cm]</p> <p><i>Tier 1 default.</i></p>
34.	<p>Enclosed space foundation or wall thickness: commercial/construction worker (<math>L_{crack}</math>) [cm]</p> <p><i>Tier 1 default.</i></p>
35.	<p>Areal fraction of cracks in foundation/walls: residential (<math>\eta</math>) [cm<sup>2</sup>/cm<sup>2</sup>]</p> <p><i>Tier 1 default.</i></p>

UST Incident No(s): #93-02-15

Facility ID: 14587-097-012257

Date Form Completed: 01-Sep-05

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JUSTIFICATION FOR TIER 2 FATE AND TRANSPORT PARAMETERS

36.	<p>Areal fraction of cracks in foundation/walls: commercial/construction worker (<math>\eta</math>) [<math>\text{cm}^2/\text{cm}^2</math>]</p> <p><i>Tier 1 default.</i></p>
37.	<p>Particulate emission rate: residential and commercial (<math>P_e</math>) [<math>\text{g}/\text{cm}^2\text{-sec}</math>]</p> <p><i>Tier 1 default.</i></p>
38.	<p>Particulate emission rate: construction worker (<math>P_e</math>) [<math>\text{g}/\text{cm}^2\text{-sec}</math>]</p> <p><i>Tier 1 default.</i></p>
39.	<p>Averaging time for vapor flux: resident child (<math>\tau</math>) [sec]</p> <p><i>Tier 1 default.</i></p>
40.	<p>Averaging time for vapor flux: resident adult (<math>\tau</math>) [sec]</p> <p><i>Tier 1 default.</i></p>
41.	<p>Averaging time for vapor flux: commercial worker (<math>\tau</math>) [sec]</p> <p><i>Tier 1 default.</i></p>
42.	<p>Averaging time for vapor flux: construction worker (<math>\tau</math>) [sec]</p> <p><i>Tier 1 default.</i></p>

UST Incident No(s): #93-02-15

Facility ID: 14587-097-012257

Date Form Completed: 01-Sep-05

Form Completed By: Andrew Weinberg

JUSTIFICATION FOR TIER 2 FATE AND TRANSPORT PARAMETERS

43. Distance from the downgradient edge of the groundwater source to the point of exposure (Xpoe) [ft]

*The maximum distance of 500 ft is used because there is no current or likely future POE downgradient of the site.*

44. Distance from the downgradient edge of the groundwater source to the point of compliance for protection of POC (Xpoc) [ft]

*The downgradient POC well, MW-8, is 200 feet downgradient from the source area.*

45. Distance from the downgradient edge of the groundwater source to the stream (Xs) [ft]

*NA. No stream is present.*

46. Distance from the downgradient edge of the groundwater source to the point of compliance for stream protection (Xspoc) [ft]

*NA. No stream is present.*

47.

48.

49.

**ARBCA SUMMARY REPORT**

**FORM NO. 26 - ON-SITE COMMERCIAL WORKER**

**UST Incident No(s): #93-02-15** **Facility ID: 14587-097-012257**

**Date Form Completed: 01-Sep-05** **Form Completed By: Andrew Weinberg**

**COMPARISON OF TIER 2 SSTLS WITH REPRESENTATIVE ON-SITE CONCENTRATIONS**

CHEMICALS OF CONCERN	SURFICIAL SOIL			SUBSURFACE SOIL						GROUNDWATER								
	Outdoor Inhalation, Ingestion, & Dermal Contact	NC		Indoor Inhalation	NC		Outdoor Inhalation	C		Indoor Inhalation	NC		Outdoor Inhalation	C		Ingestion of Water	NC	
Select the representative concentration (Rep. Conc.) for each medium.	<input type="checkbox"/> Maximum			<input type="checkbox"/> Maximum			<input checked="" type="checkbox"/> Maximum			<input type="checkbox"/> Maximum			<input type="checkbox"/> Maximum			<i>Use the historic maximum concentration from the water use well as the Rep. Conc.</i>		
	<input type="checkbox"/> Arithmetic Average			<input type="checkbox"/> Arithmetic Average			<input type="checkbox"/> Arithmetic Average			<input type="checkbox"/> Arithmetic Average			<input type="checkbox"/> Arithmetic Average					
	<input type="checkbox"/> Area-Weighted Average			<input type="checkbox"/> Area-Weighted Average			<input type="checkbox"/> Area-Weighted Average			<input type="checkbox"/> Area-Weighted Average			<input checked="" type="checkbox"/> Area-Weighted Average					
	Rep. Conc.	Target Levels	E/NE	Rep. Conc.	Target Levels	E/NE	Rep. Conc.	Target Levels	E/NE	Rep. Conc.	Target Levels	E/NE	Rep. Conc.	Target Levels	E/NE	Rep. Conc.	Target Levels	E/NE
[mg/kg]	[mg/kg]		[mg/kg]	[mg/kg]		[mg/kg]	[mg/kg]		[mg/L]	[mg/L]		[mg/L]	[mg/L]		[mg/L]	[mg/L]		
<b>ORGANICS</b>																		
Benzene						0.0035	35.4376309	NE				0.0429	90.8199679	NE				
Toluene						0.00245	2148.3147	NE				0.027	526	NE				
Ethylbenzene						0.0035	993.967839	NE				0.0647	169	NE				
Xylenes (Total)						0.0105	1248.9151	NE				0.11	175	NE				
MTBE						0.0035	22787.5937	NE				0.00805	48000	NE				
Anthracene							28.5631324					0.0005	0.0434	NE				
Benzo(a)anthracene							94.2268825					0.0001	0.0094	NE				
Benzo(a)pyrene							43.954061					0.0001	0.00162	NE				
Benzo(b)fluoranthene							51.6602053					0.0001	0.0015	NE				
Benzo(g,h,i)perylene							30.9680955					0.0005	0.0007	NE				
Benzo(k)fluoranthene							27.5521091					0.00025	0.0008	NE				
Chrysene							17.8306189					0.0005	0.0016	NE				
Fluoranthene							283.236916					0.0005	0.206	NE				
Fluorene							427.713038					0.0005	1.98	NE				
Naphthalene						0.0035	1037.21179	NE				0.0657	31	NE				
Phenanthrene							394.937095					0.0005	1	NE				
Pyrene							257.058423					0.0005	0.135	NE				
<b>METALS</b>																		
Arsenic																		
Barium																		
Cadmium																		
Chromium VI																		
Lead																		
Zinc																		

**NOTE:** The Rep. Conc. and the target levels are user-inputs. Use the ARBCA Computational Software for calculating the Tier 2 SSTLS.

**E:** Representative concentration exceeds Tier 2 SSTLS  
**NE:** Representative concentration does not exceed Tier 2 SSTLS

**C:** Complete Pathway  
**NC:** Not a Complete Pathway

**NA:** Not available

**ARBCA SUMMARY REPORT**

**FORM NO. 26 - ON-SITE CONSTRUCTION WORKER**

**UST Incident No(s): #93-02-15**

**Facility ID: 14587-097-012257**

**Date Form Completed: 01-Sep-05**

**Form Completed By: Andrew Weinberg**

**COMPARISON OF TIER 2 SSTLs WITH REPRESENTATIVE ON-SITE CONCENTRATIONS**

CHEMICALS OF CONCERN	SURFICIAL SOIL			SUBSURFACE SOIL						GROUNDWATER								
	Outdoor Inhalation, Ingestion, & Dermal Contact		NC	Indoor Inhalation		C	Outdoor Inhalation		C	Indoor Inhalation		C	Outdoor Inhalation		C			
Select the representative concentration (Rep. Conc.) for each medium.	<input checked="" type="checkbox"/> Maximum			<input checked="" type="checkbox"/> Maximum						<input checked="" type="checkbox"/> Maximum						<input type="checkbox"/> Maximum		
	<input type="checkbox"/> Arithmetic Average			<input type="checkbox"/> Arithmetic Average						<input type="checkbox"/> Arithmetic Average						<input type="checkbox"/> Arithmetic Average		
	<input type="checkbox"/> Area-Weighted Average			<input type="checkbox"/> Area-Weighted Average						<input type="checkbox"/> Area-Weighted Average						<input checked="" type="checkbox"/> Area-Weighted Average		
	Rep. Conc.*	Target Levels	E/NE	Rep. Conc.	Target Levels	E/NE	Rep. Conc.	Target Levels	E/NE	Rep. Conc.	Target Levels	E/NE	Rep. Conc.	Target Levels	E/NE			
[mg/kg]	[mg/kg]		[mg/kg]	[mg/kg]		[mg/kg]	[mg/kg]		[mg/L]	[mg/L]		[mg/L]	[mg/L]					
<b>ORGANICS</b>																		
Benzene				0.0035	1.178486908	NE	0.0035	58.09240216	NE	0.0429	0.896044525	NE	0.0429	148.8798759	NE			
Toluene				0.00245	139.9185688	NE	0.00245	2148.314699	NE	0.027	49.16777775	NE	0.027	526	NE			
Ethylbenzene				0.0035	518.8949657	NE	0.0035	993.9678392	NE	0.0647	126.6289002	NE	0.0647	169	NE			
Xylenes (Total)				0.0105	210.106122	NE	0.0105	1248.915104	NE	0.11	42.25142809	NE	0.11	175	NE			
MTBE				0.0035	1297.834867	NE	0.0035	22787.59367	NE	0.00805	3905.76318	NE	0.00805	48000	NE			
Anthracene					28.56313244			28.56313244		0.0005	0.0434	NE	0.0005	0.0434	NE			
Benzo(a)anthracene					94.22688247			94.22688247		0.0001	0.0094	NE	0.0001	0.0094	NE			
Benzo(a)pyrene					43.95406101			43.95406101		0.0001	0.00162	NE	0.0001	0.00162	NE			
Benzo(b)fluoranthene					51.66020533			51.66020533		0.0001	0.0015	NE	0.0001	0.0015	NE			
Benzo(g,h,i)perylene					30.96809549			30.96809549		0.0005	0.0007	NE	0.0005	0.0007	NE			
Benzo(k)fluoranthene					27.55210914			27.55210914		0.00025	0.0008	NE	0.00025	0.0008	NE			
Chrysene					17.83061891			17.83061891		0.0005	0.0016	NE	0.0005	0.0016	NE			
Fluoranthene					283.2369162			283.2369162		0.0005	0.206	NE	0.0005	0.206	NE			
Fluorene					427.7130384			427.7130384		0.0005	1.98	NE	0.0005	1.98	NE			
Naphthalene				0.0035	189.6038676	NE	0.0035	1037.21179	NE	0.0657	8.080424484	NE	0.0657	31	NE			
Phenanthrene					394.9370953			394.9370953		0.0005	1	NE	0.0005	1	NE			
Pyrene					257.0584228			257.0584228		0.0005	0.135	NE	0.0005	0.135	NE			
<b>METALS</b>																		
Arsenic																		
Barium																		
Cadmium																		
Chromium VI																		
Lead																		
Zinc																		

**NOTE:** The Rep. Conc. and the target levels are user-inputs. Use the ARBCA Computational Software for calculating the Tier 2 SSTLs.

**E:** Representative concentration exceeds Tier 2 SSTLs

**C:** Complete Pathway

**NA:** Not available

**NE:** Representative concentration does not exceed Tier 2 SSTLs

**NC:** Not a Complete Pathway

\* The higher of the representative concentrations for surficial and subsurface soil should be entered in the representative concentration column. The target level is the target level for surficial soil.



UST Incident No(s): #93-02-15 Facility ID: 14587-097-012257

Date Form Completed: 01-Sep-05 Form Completed By: Andrew Weinberg

**TIER 2 GROUNDWATER RESOURCE PROTECTION TARGET CONCENTRATIONS**

Distance from source to the point of exposure (POE):															
CHEMICALS OF CONCERN	COMPARISON FOR SOURCE SOIL			COMPARISON FOR SOURCE GROUNDWATER			COMPARISON FOR COMPLIANCE WELLS								
	Soil Source Rep. Conc. <sup>1</sup>	Allowable Soil Conc. <sup>2</sup>	E/NE	GW Source Rep. Conc. <sup>3</sup>	Allowable GW Conc. at a POC <sup>4</sup>	E/NE	CW Rep. Conc. <sup>5</sup>	Allowable GW Conc. at a POC <sup>6</sup>	E/NE	CW Rep. Conc. <sup>5</sup>	Allowable GW Conc. at a POC <sup>6</sup>	E/NE	CW Rep. Conc. <sup>5</sup>	Allowable GW Conc. at a POC <sup>6</sup>	E/NE
	[mg/kg]	[mg/kg]		[mg/L]	[mg/L]		[mg/L]	[mg/L]		[mg/L]	[mg/L]		[mg/L]	[mg/L]	
COMPLIANCE WELL NO.				<i>MW-1</i>			<i>MW-8</i>								
DISTANCE FROM SOURCE				<i>10</i>			<i>200</i>								
RECENT TREND				<i>S</i>			<i>S</i>								

**ORGANICS**

Benzene				0.139	3.56	NE	0.00283	0.0311	NE						
Toluene				0.239	526	NE	0.00283	6.22	NE						
Ethylbenzene				0.577	169	NE	0.00283	4.36	NE						
Xylenes (Total)				0.884	175	NE	0.00825	62.2	NE						
MTBE				0.0025	14.3	NE	0.00283	0.124	NE						
Anthracene				0.0005	0.0434	NE	0.0005	0.0434	NE						
Benzo(a)anthracene				0.0001	0.0094	NE	0.0001	0.00726	NE						
Benzo(a)pyrene				0.00019	0.00162	NE	0.0001	0.00124	NE						
Benzo(b)fluoranthene				0.0005	0.0015	NE	0.0005	0.0015	NE						
Benzo(g,h,i)perylene				0.00025	0.0007	NE	0.00025	0.0007	NE						
Benzo(k)fluoranthene				0.0005	0.0008	NE	0.0005	0.0008	NE						
Chrysene				0.0002	0.0016	NE	0.0002	0.0016	NE						
Fluoranthene				0.0005	0.206	NE	0.0005	0.206	NE						
Fluorene				0.00038	1.98	NE	0.0005	1.98	NE						
Naphthalene				0.2	14.3	NE	0.0005	0.124	NE						
Phenanthrene				0.0005	1	NE	0.0005	1	NE						
Pyrene				0.0005	0.135	NE	0.0005	0.135	NE						

**METALS**

Arsenic															
Barium															
Cadmium															
Chromium VI															
Lead				0.00237	10.7	NE	0.00235	0.0933	NE						
Zinc															

**NOTE:** Use the *ARBCA Computational Software* to calculate the allowable (i) soil source conc., (ii) GW source conc., and (iii) compliance well conc. Page 1 of  

1: The soil source representative concentrations have to be calculated and entered here. 2: Allowable soil concentrations at the source protective of groundwater at the POE.

3: The groundwater source representative concentrations have to be calculated and entered here. 4: Allowable groundwater concentrations at the source protective of groundwater at the POE.

5: Representative concentrations in the compliance well. 6: Allowable groundwater concentrations at a point of compliance (POC) protective of a POE.

E: Representative concentration exceeds allowable concentration. NE: Representative concentration does not exceed allowable concentration.

**Recommended Attachment:** A map showing the location(s) of the soil source(s), location of POE, and location(s) of POC.

## ARBCA SUMMARY REPORT

FORM NO. 29a

UST Incident No(s): #93-02-15	Facility ID: 14587-097-012257
Date Form Completed: 01-Sep-05	Form Completed By: Andrew Weinberg

## TIER 2 ON-SITE TARGET LEVELS FOR INHALATION AND INGESTION

NOTE: The SSTLs listed for each route of exposure are the minimum SSTLs for all the receptors for that particular route of exposure. The Tier 2 on-site target levels are the minimum SSTLs of all routes of exposures within each medium.

CHEMICALS OF CONCERN	SURFICIAL SOIL		SUBSURFACE SOIL			GROUNDWATER			
	Outdoor Inhalation, Ingestion, & Dermal Contact [mg/kg]	On-Site Tier 2 Target Levels [mg/kg]	Indoor Inhalation [mg/kg]	Outdoor Inhalation [mg/kg]	On-Site Tier 2 Target Levels [mg/kg]	Indoor Inhalation [mg/L]	Outdoor Inhalation [mg/L]	Ingestion of Water [mg/L]	On-Site Tier 2 Target Levels [mg/L]
<b>ORGANICS</b>									
Benzene	NA	NA	1.178486908	35.43763095	<b>1.178486908</b>	0.896044525	90.81996789	NA	<b>0.896044525</b>
Toluene	NA	NA	139.9185688	2148.314699	<b>139.9185688</b>	49.16777775	526	NA	<b>49.16777775</b>
Ethylbenzene	NA	NA	518.8949657	993.9678392	<b>518.8949657</b>	126.6289002	169	NA	<b>126.6289002</b>
Xylenes (Total)	NA	NA	210.106122	1248.915104	<b>210.106122</b>	42.25142809	175	NA	<b>42.25142809</b>
MtBE	NA	NA	1297.834867	22787.59367	<b>1297.834867</b>	3905.76318	48000	NA	<b>3905.76318</b>
Anthracene	NA	NA	28.56313244	28.56313244	<b>28.56313244</b>	0.0434	0.0434	NA	<b>0.0434</b>
Benzo(a)anthracene	NA	NA	94.22688247	94.22688247	<b>94.22688247</b>	0.0094	0.0094	NA	<b>0.0094</b>
Benzo(a)pyrene	NA	NA	43.95406101	43.95406101	<b>43.95406101</b>	0.00162	0.00162	NA	<b>0.00162</b>
Benzo(b)fluoranthene	NA	NA	51.66020533	51.66020533	<b>51.66020533</b>	0.0015	0.0015	NA	<b>0.0015</b>
Benzo(g,h,i)perylene	NA	NA	30.96809549	30.96809549	<b>30.96809549</b>	0.0007	0.0007	NA	<b>0.0007</b>
Benzo(k)fluoranthene	NA	NA	27.55210914	27.55210914	<b>27.55210914</b>	0.0008	0.0008	NA	<b>0.0008</b>
Chrysene	NA	NA	17.83061891	17.83061891	<b>17.83061891</b>	0.0016	0.0016	NA	<b>0.0016</b>
Fluoranthene	NA	NA	283.2369162	283.2369162	<b>283.2369162</b>	0.206	0.206	NA	<b>0.206</b>
Fluorene	NA	NA	427.7130384	427.7130384	<b>427.7130384</b>	1.98	1.98	NA	<b>1.98</b>
Naphthalene	NA	NA	189.6038676	1037.21179	<b>189.6038676</b>	8.080424484	31	NA	<b>8.080424484</b>
Phenanthrene	NA	NA	394.9370953	394.9370953	<b>394.9370953</b>	1	1	NA	<b>1</b>
Pyrene	NA	NA	257.0584228	257.0584228	<b>257.0584228</b>	0.135	0.135	NA	<b>0.135</b>
<b>METALS</b>									
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium VI	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA

**NOTE:**

NA: Not Available

ARBCA SUMMARY REPORT		FORM No. 30	
UST Incident No:	#93-02-15	Facility ID:	14587-097-012257
Date Form Completed:	September 1, 2005	Form Completed By:	Andrew Weinberg, P.G.
TIER 2 CONCLUSIONS AND RECOMMENDATIONS			
<b>1</b>	<b>Are on-site soil and groundwater concentrations protective of current and reasonable future on-site receptors?</b>		
	<p>Tier 2 evaluation using area-weighted average groundwater contaminant concentrations from within the plume area demonstrates that on-site groundwater conditions are protective for all receptors and pathways except direct ingestion of groundwater. There is no current exposure to groundwater ingestion on-site and no future development of on-site groundwater for consumption is likely.</p> <p>Source area soil concentrations are protective of on-site receptors. Source area soils have only been analyzed for TPH. All TPH concentrations are below the 100 mg/kg corrective action level (CAL). Samples for BTEX &amp; MTBE were collected just south and west of the source area in March 2004; these samples help define the extent of soil contamination. Because no analyses for individual compounds are available from the source area, contaminant transport processes cannot be evaluated directly. However, because the source area is paved with 8 inches of reinforced concrete any vapor migration to on-site receptors is very limited. No buildings are presently located in the plume area and no buildings are likely to be located in this area in the future, as it is an active vehicle storage area for the maintenance shop; consequently outdoor worker exposure is the only potentially complete exposure pathway.</p>		
<b>2</b>	<b>Has free product been removed?</b>		
	<p>Yes. A dual-phase vacuum extraction pilot test was conducted for an 8-hour period in December 2004, recovering 5.6 lbs of hydrocarbons. This test demonstrated that only residual amounts of free-product were present, that the product was not readily extractable, and is immobile under normal conditions.</p>		
<b>3</b>	<b>Have threats to utilities been mitigated? (if applicable)</b>		
	<p>Not applicable. No utilities are present in the area affected by soil or groundwater contamination.</p>		
<b>4</b>	<b>Have nuisance conditions (i.e. odor, taste, etc) been properly mitigated? (if applicable)</b>		
	<p>Not applicable. No nuisance conditions are present.</p>		
<b>5</b>	<b>Have threats to ecological receptors been addressed? (if applicable)</b>		
	<p>Not applicable. No ecological receptors are threatened or impacted.</p>		
<b>6</b>	<b>Are off-site soil and groundwater concentrations protective of current and reasonable future off-site receptors?</b>		
	<p>Yes. No contaminants have migrated off-site and are not expected to in the future. No receptors are present within 1000 ft downgradient of the site at this time and no receptors are likely to be located downgradient of the site in the future.</p>		
<b>7</b>	<b>Are source soil concentrations protective of groundwater at a POE?</b>		
	<p>Yes. Soil and groundwater concentrations at the source are protective of a POE assumed to be 500 ft downgradient of the source, based on Tier 1 dilution and attenuation factors. Although no BTEX data are available for source area soils, the source area soil and groundwater are assumed to be in equilibrium because of the age of the spill (&gt;12 yrs) and the shallow depth to groundwater (&lt; 5 ft). Consequently, the source area groundwater provides a basis for accurate prediction of potential future groundwater effects at the POE.</p>		
<b>8</b>	<b>Are source groundwater concentrations protective of groundwater at a POE?</b>		
	<p>Yes. groundwater concentrations at the source are protective of a POE assumed to be 500 ft downgradient of the source, based on Tier 2 fate and transport factors. The current plume, more than 12 years after the source removal, extends less than 150 ft from the source. While the extent of the plume has increased slightly since the site was paved it remains on ALARNG property and source area concentrations continue a general decline.</p>		
<b>9</b>	<b>Are source soil and groundwater concentrations protective of a stream?</b>		
	<p>Yes. The nearest surface water is a drainage ditch more than 600 ft west (generally downgradient of the site). No contaminants from this site have impacted or are anticipated to impact this surface water body.</p>		
<b>10</b>	<b>Is the site recommended for NFA status?</b>		
	<p>Yes. This site is recommended for NFA with post-closure monitoring, as described below.</p>		
<b>11</b>	<b>Is compliance monitoring of groundwater recommended?</b>		
	<p>Yes. Continued semi-annual monitoring of upgradient, source area, downgradient, and point of compliance wells is recommended to confirm trends in contaminant concentrations. Monitoring for a minimum of two years is recommended.</p>		
<b>12</b>	<b>Is an interim remediation or reevaluation recommended?</b>		
	<p>No additional efforts to remove free product from the source area are recommended. Such efforts are not likely to remove a significant mass of hydrocarbon, given the tight formation conditions, the high water table, the low residual hydrocarbon saturation, and the length of time since the release.</p> <p>A Tier 2 reevaluation may be appropriate if increasing trends continue in downgradient well MW-6 or if contaminants are detected in the POC well.</p>		

**13 Is remediation to Tier 2 target levels recommended?**

No. Under current and likely future exposures scenarios, site conditions meet Tier 2 target levels without remediation.

**14 Is a Tier 3 evaluation recommended?**

No. All current and likely future exposure pathways meet Tier 2 RBSLs using area-weighted average concentrations from the soil source or groundwater plume area. The only pathway that fails to meet RBSLs is for direct ingestion of on-site groundwater within the plume area. This pathway is not complete for current or reasonable future scenarios for this site.

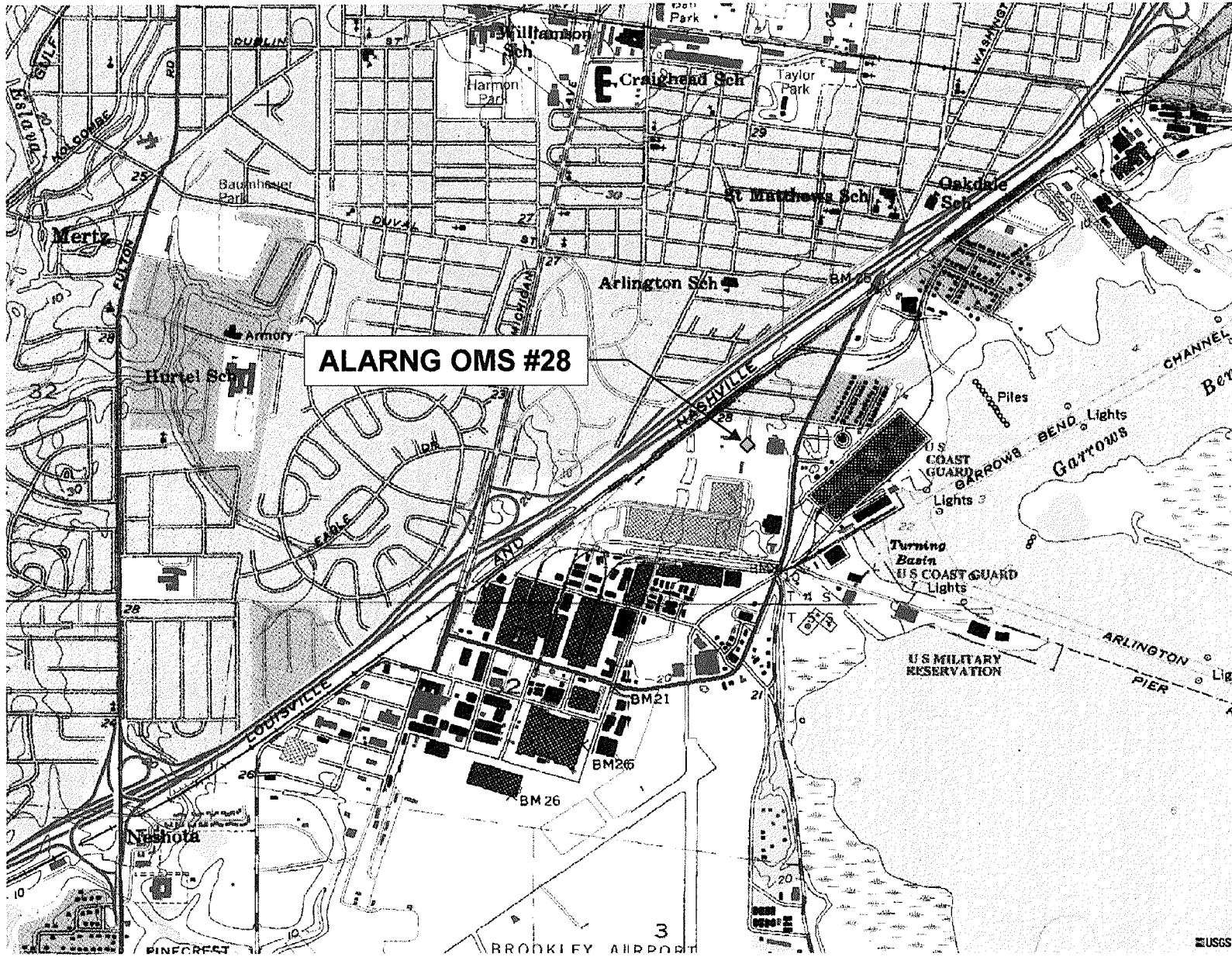
**15 Discussion:**

Tier 2 evaluation of the ALRANG OMS 28 Pit #2 site yields the same conclusions as Tier 1 evaluation of the site - the only exposure pathway that exceeds risk-based screening levels calculated with area-weighted average contaminant concentrations is ingestion of groundwater. Tier 2 SSTLs are actually somewhat higher than Tier 1 levels. Although the depth to groundwater at this site is very shallow, the relatively small source area and the relatively high soil moisture content limit the rate of vapor transfer from the subsurface soil to potential receptors on site.

Forms 26 compare on-site maximum and area-weighted average contaminant concentrations from the plume area to Tier 2 SSTLs. Soil and groundwater are within SSTLs for all complete exposure pathways. Plume area-weighted average concentrations exceed SSTLs for direct ingestion of groundwater for benzene and naphthalene are exceeded, but this pathway is extremely unlikely.

These Tier 2 SSTLs are conservative; the Tier 2 SSTLs are calculated with the Tier 1 default value for foundation crack area; the actual fractional crack area in the concrete paving covering the plume area is substantially less than the Tier 1 default and would further reduce the potential exposure to on-site receptors. Furthermore, no structure is present over the current footprint of the plume, so no current indoor inhalation risk is present. Future construction of any residential or occupational structure over the area of contamination is highly unlikely. No current or future exposure pathways indicate any risk via outdoor inhalation of site contaminants. Direct ingestion of contaminated groundwater is also not considered a reasonable current or future exposure pathway, given the availability of other public water supplies and the lack of off-site contamination.

Consequently, OMS 28 Pit #2 is recommended for closure under Tier 2 with monitored natural attenuation. Continued semi-annual monitoring of upgradient, source area, downgradient, and point of compliance wells is recommended to confirm trends in contaminant concentrations. Monitoring for a minimum of two years is recommended.



Mobile, Alabama, United States 15 Feb 1997



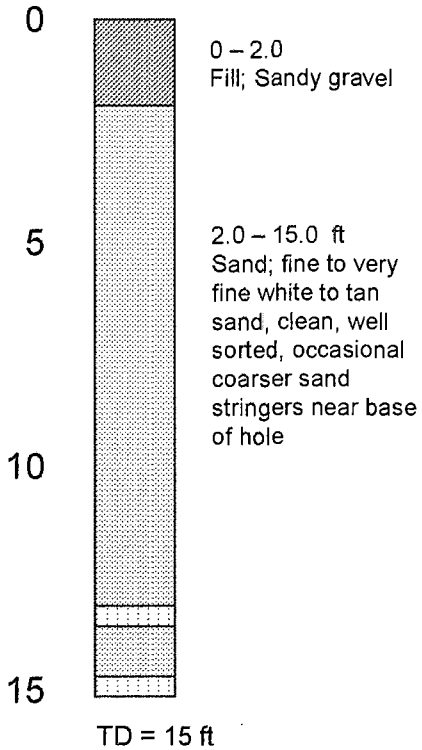
0 100yd

## West

### MW-8

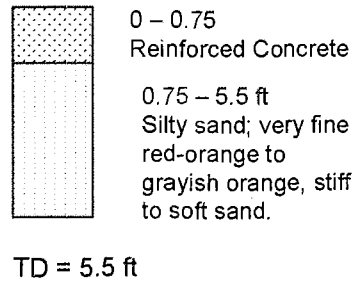
Bechtel-S, 11/11/04

Depth, ft.



### BH-1A

PELA, 4/15/94

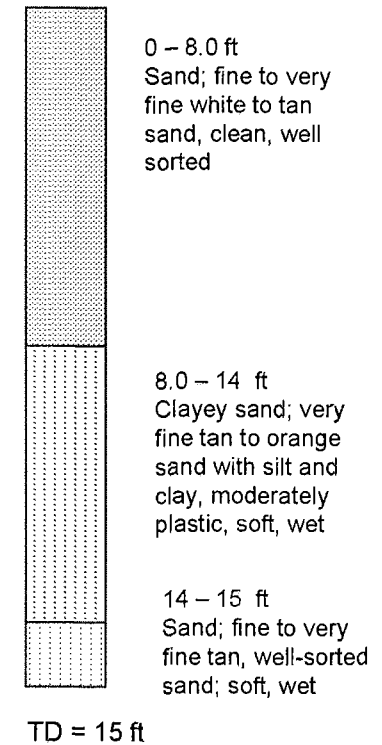


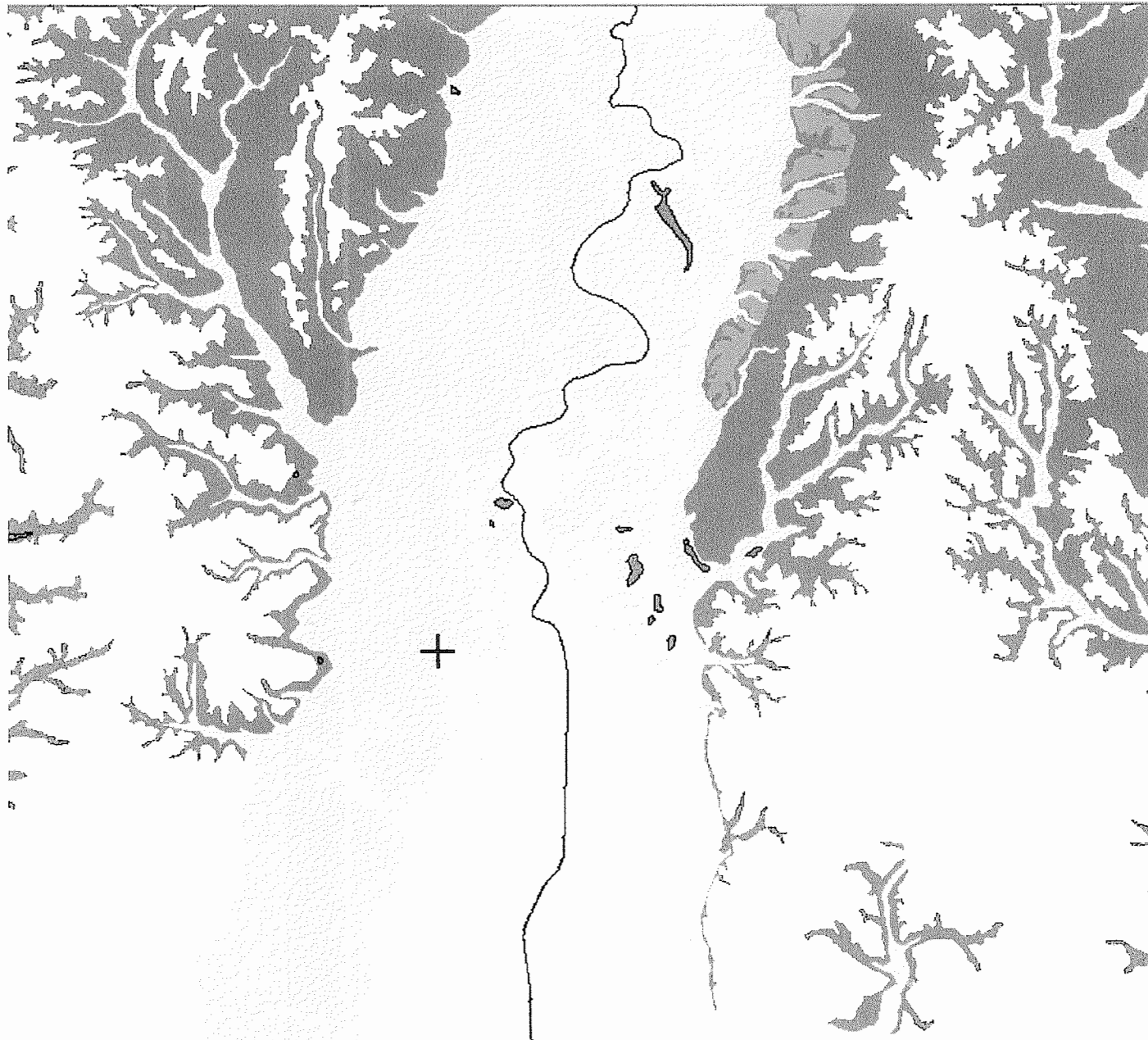
Note: No boring logs for MW-1 or other wells installed during the PI or SI are included with the available documentation

## East

### MW-7

Bechtel-S, 11/11/04





**Legend**

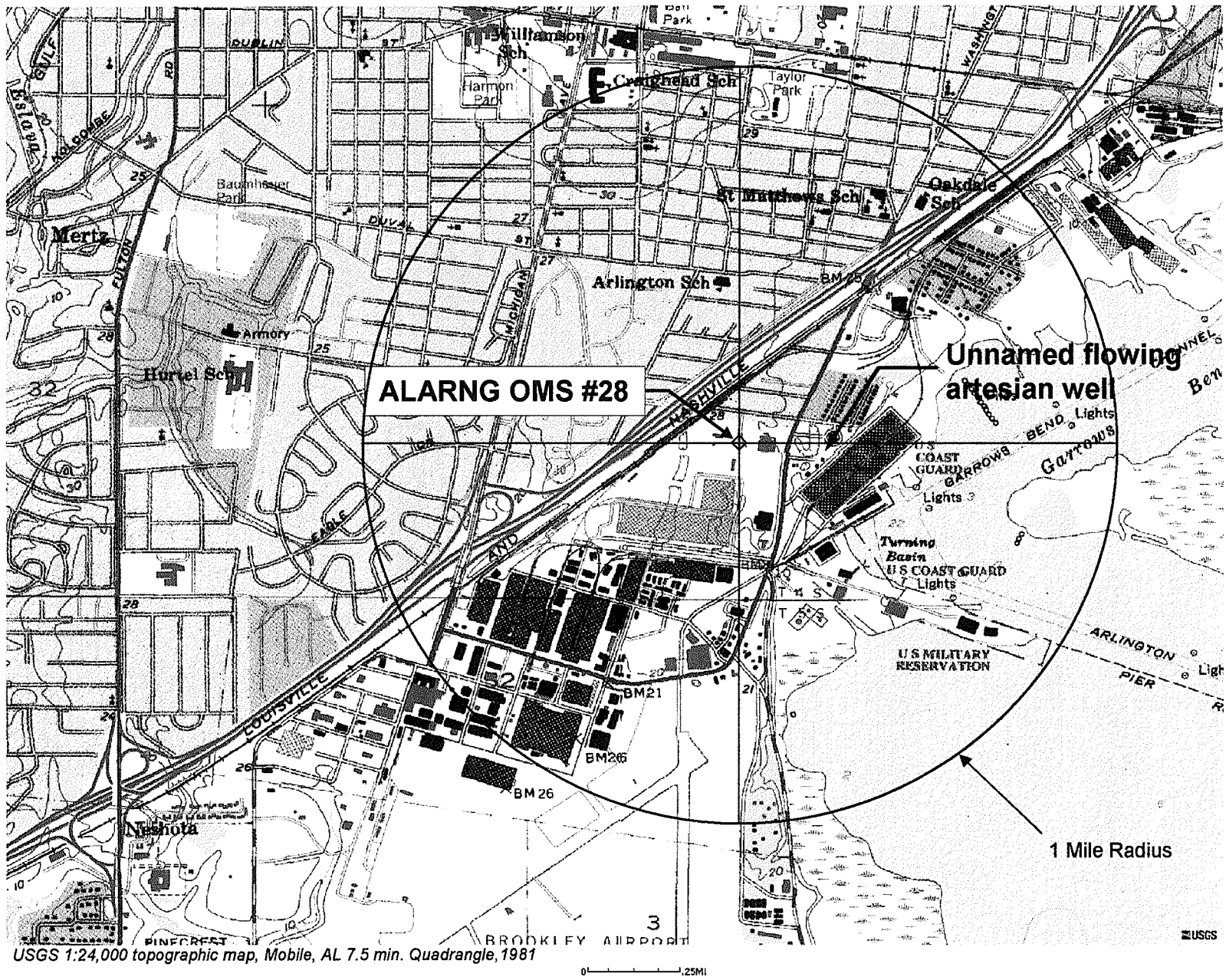
- Alluvial, coastal and low terrace deposits
- High terrace deposits
- Miocene Series, undifferentiated
- Tuscaloosa Sand
- +
- OMS #28 Location

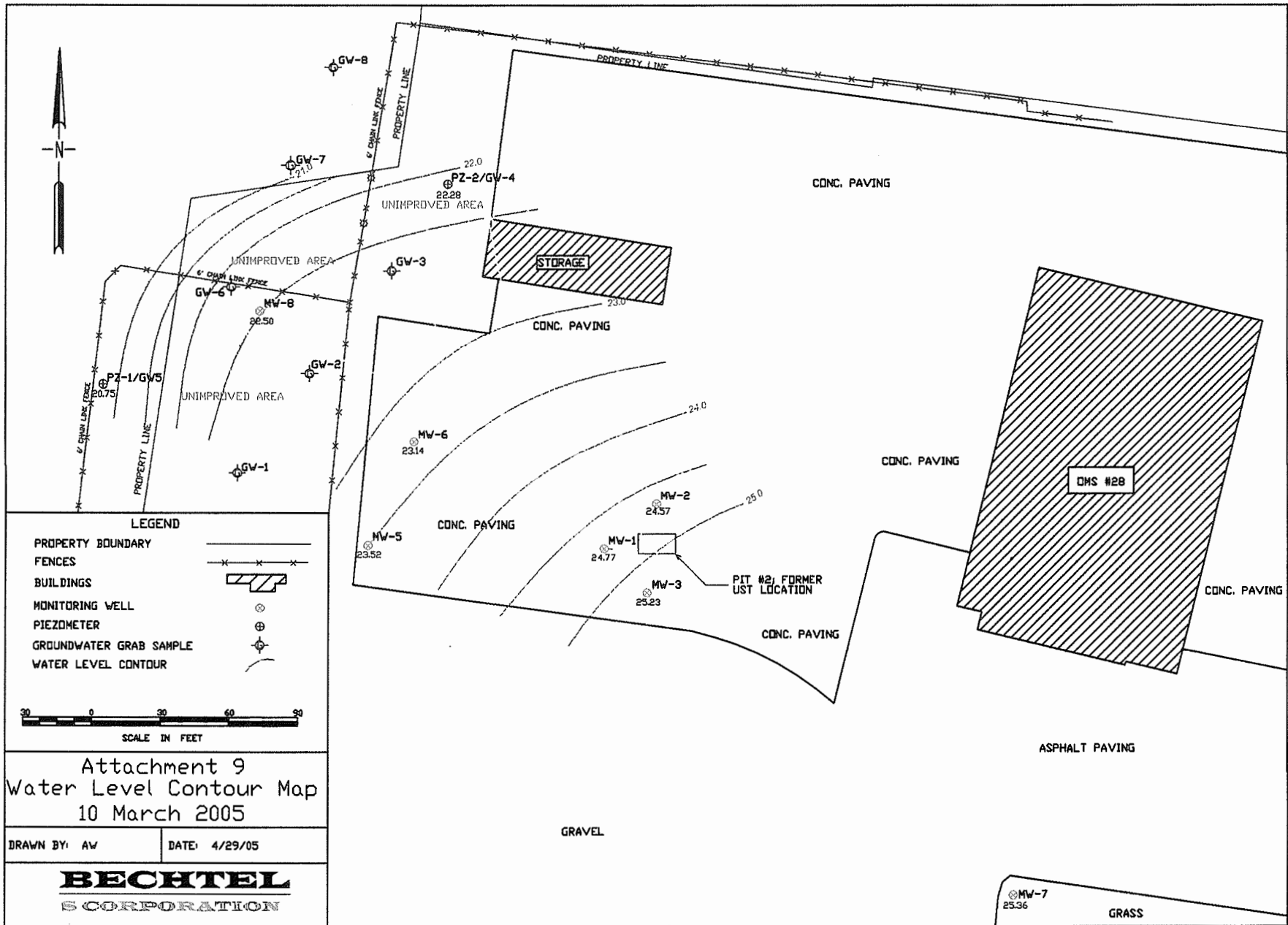
Scale, miles

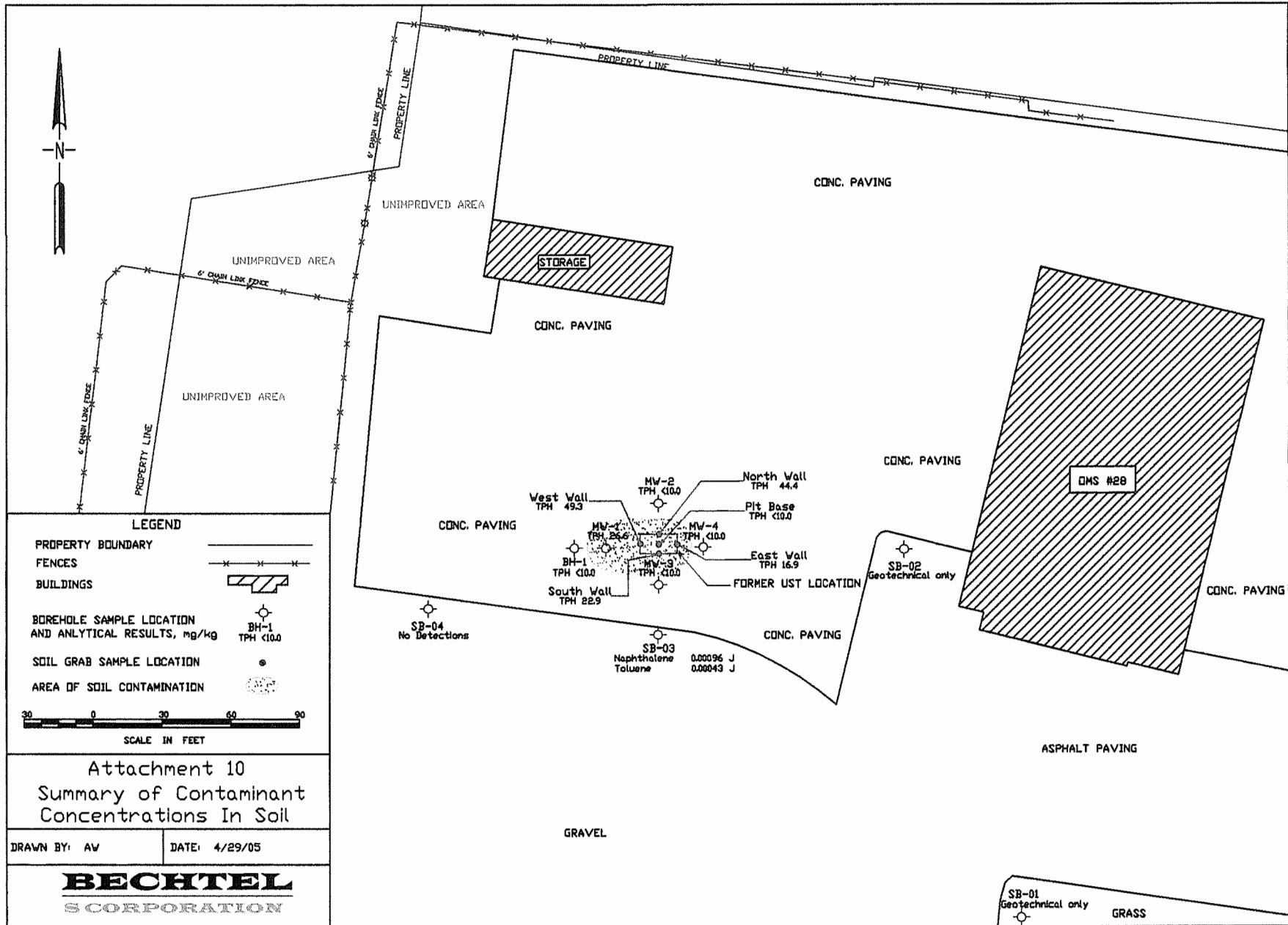
0 5 10

Image courtesy of Alabama Geological Survey <http://www.gsa.state.al.us/gsa/gis/geologydetails.html>



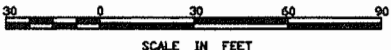






**LEGEND**

- PROPERTY BOUNDARY
- FENCES
- BUILDINGS
- BORHOLE SAMPLE LOCATION AND ANALYTICAL RESULTS, mg/kg BH-1 TPH <10.0
- SOIL GRAB SAMPLE LOCATION
- AREA OF SOIL CONTAMINATION

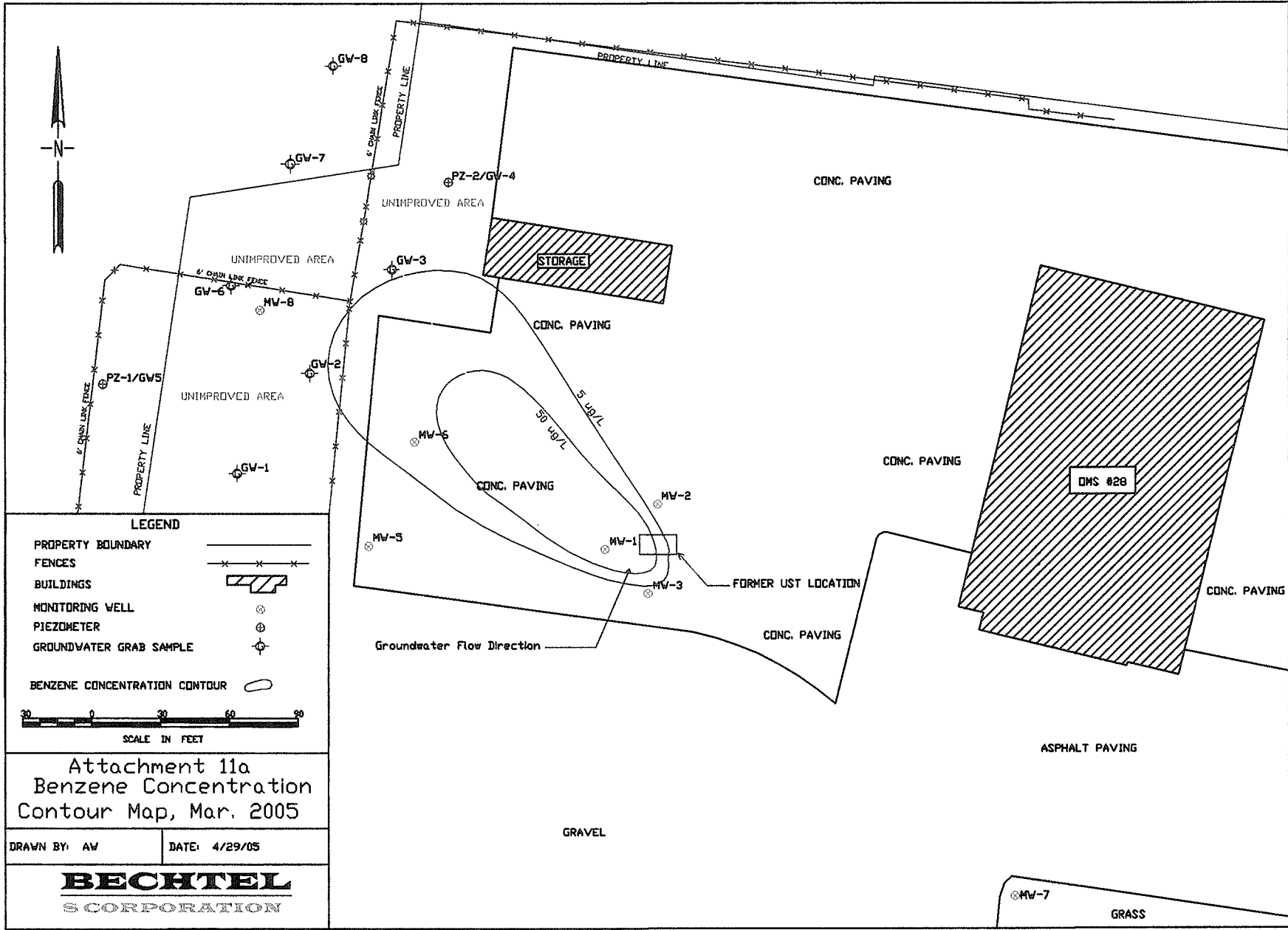


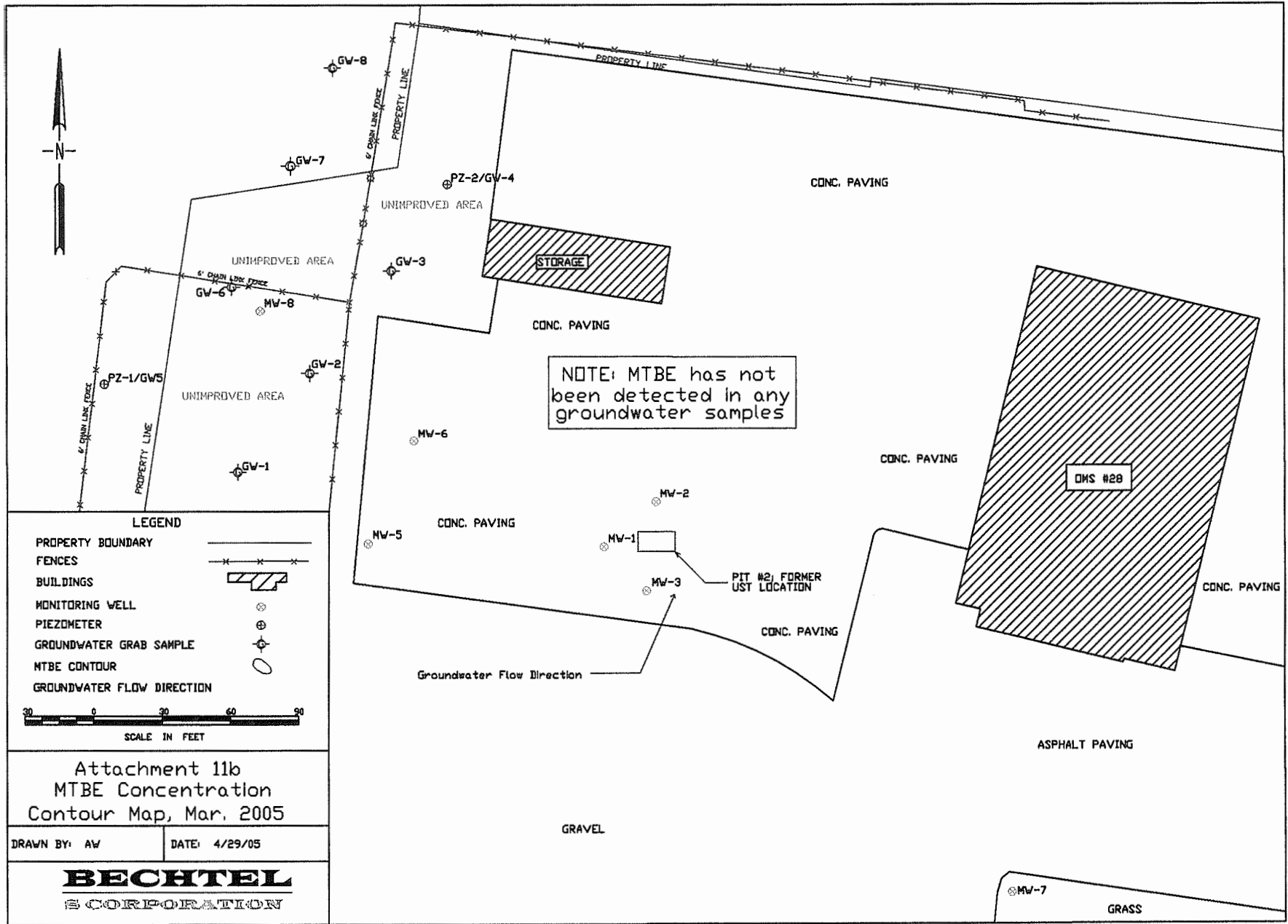
**Attachment 10  
Summary of Contaminant  
Concentrations In Soil**

DRAWN BY: AV      DATE: 4/29/05



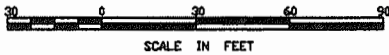
SB-01  
Geotechnical only  
GRASS





**LEGEND**

- PROPERTY BOUNDARY
- FENCES
- BUILDINGS
- MONITORING WELL
- PIEZOMETER
- GROUNDWATER GRAB SAMPLE
- MTBE CONTOUR
- GROUNDWATER FLOW DIRECTION



Attachment 11b  
 MTBE Concentration  
 Contour Map, Mar. 2005

DRAWN BY: AW      DATE: 4/29/05

**BECHTEL**  
 CORPORATION

NOTE: MTBE has not been detected in any groundwater samples

GRAVEL

ASPHALT PAVING

GRASS

DMS #28

PIT #2, FORMER UST LOCATION

Groundwater Flow Direction

CONC. PAVING

CONC. PAVING

CONC. PAVING

CONC. PAVING

CONC. PAVING

UNIMPROVED AREA

UNIMPROVED AREA

UNIMPROVED AREA

PZ-2/GW-4

PZ-1/GW5

GW-1

MW-8

GW-6

GW-7

GW-8

GW-3

MW-6

MW-2

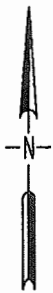
MW-1

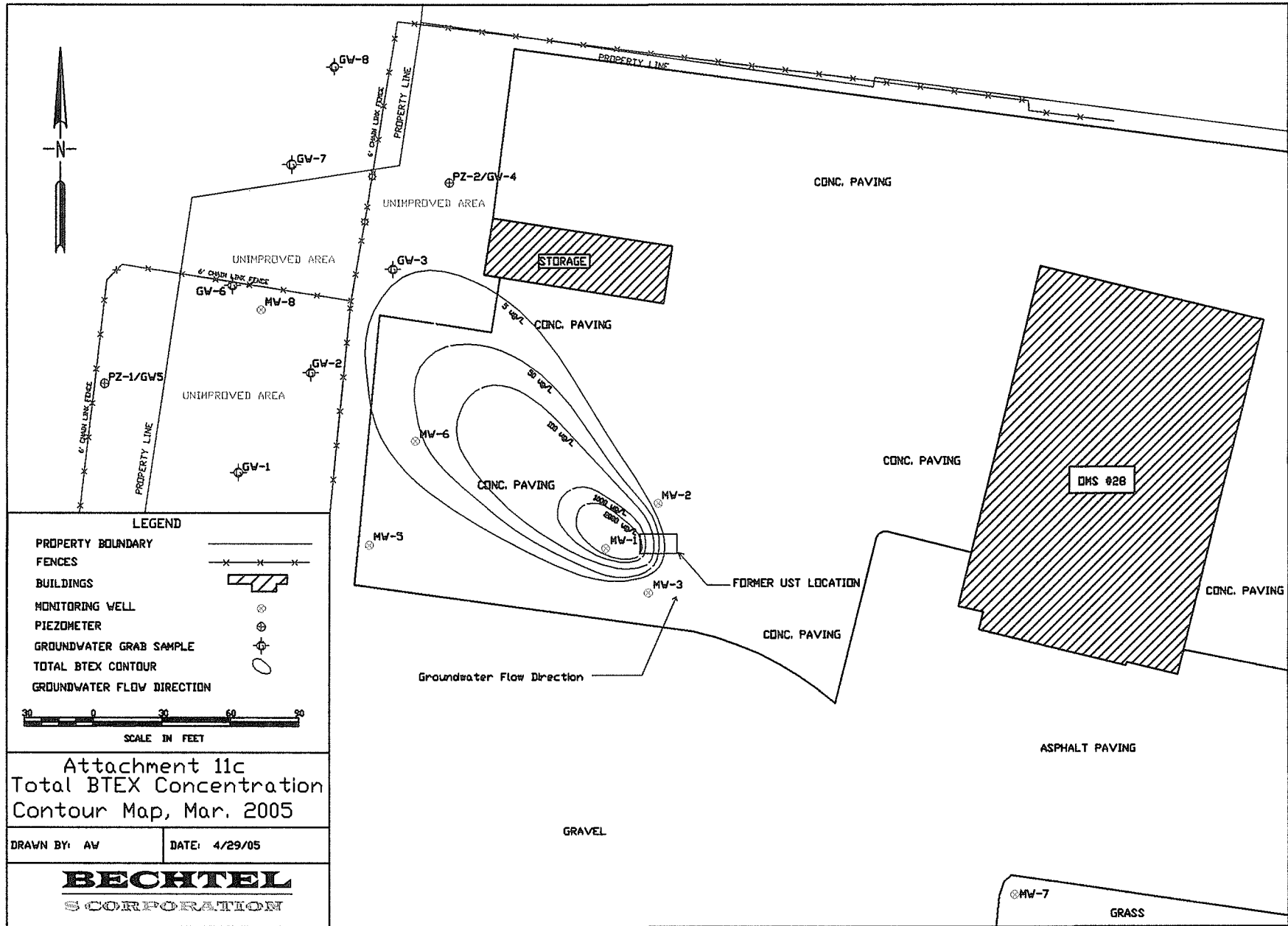
MW-3

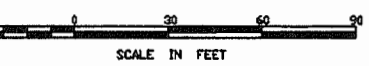
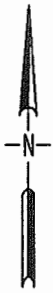
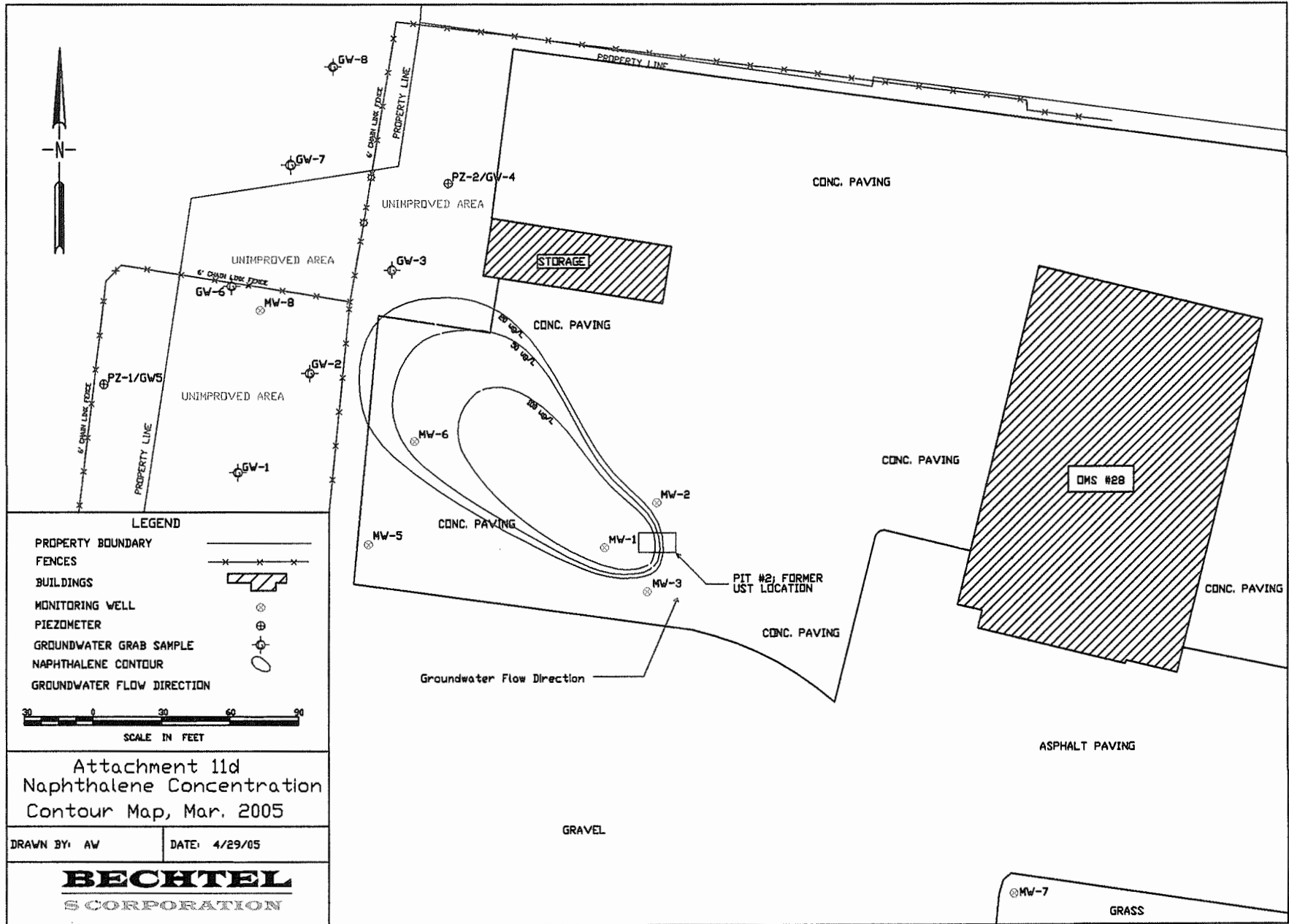
MW-5

MW-7

STORAGE



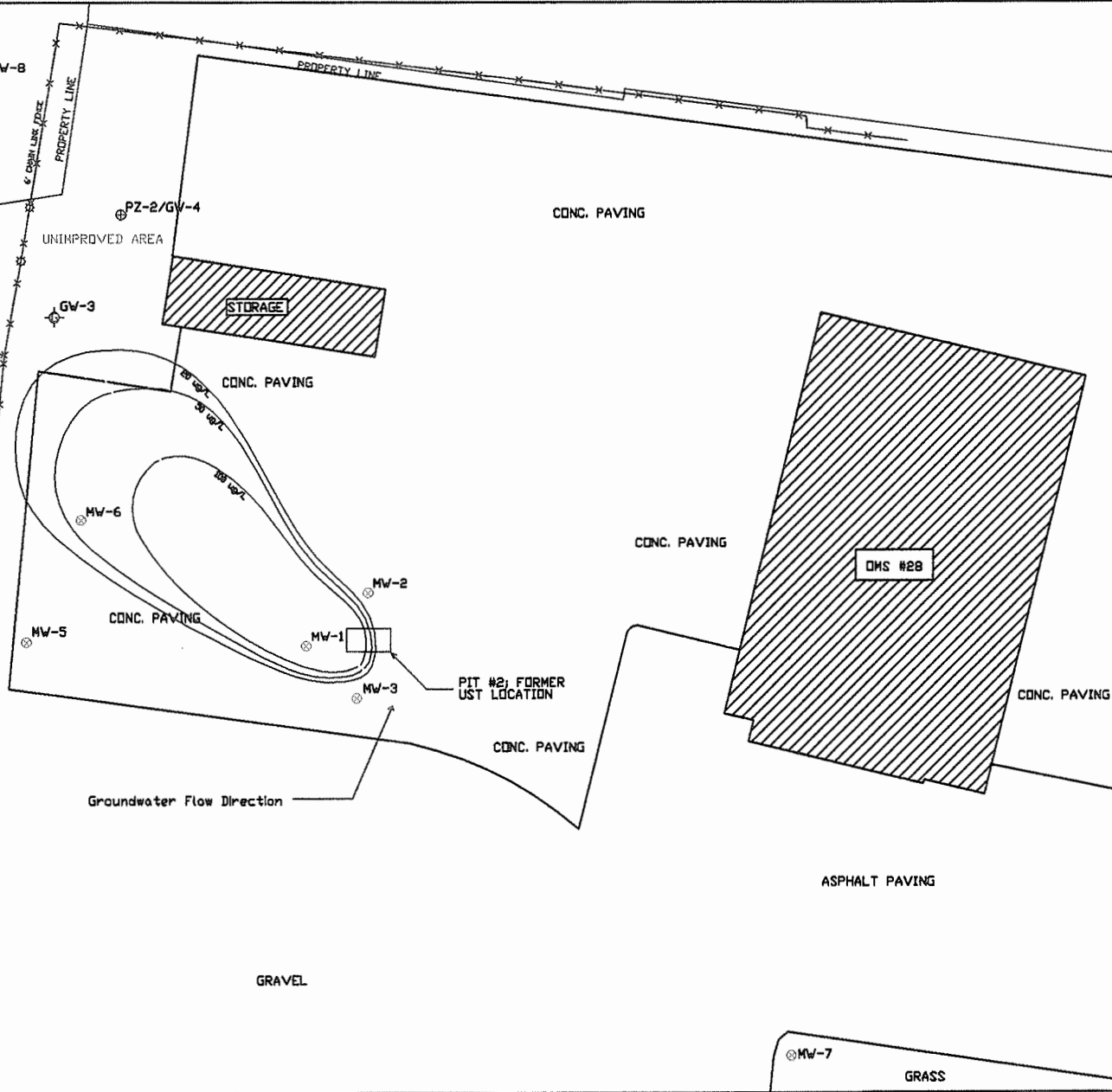




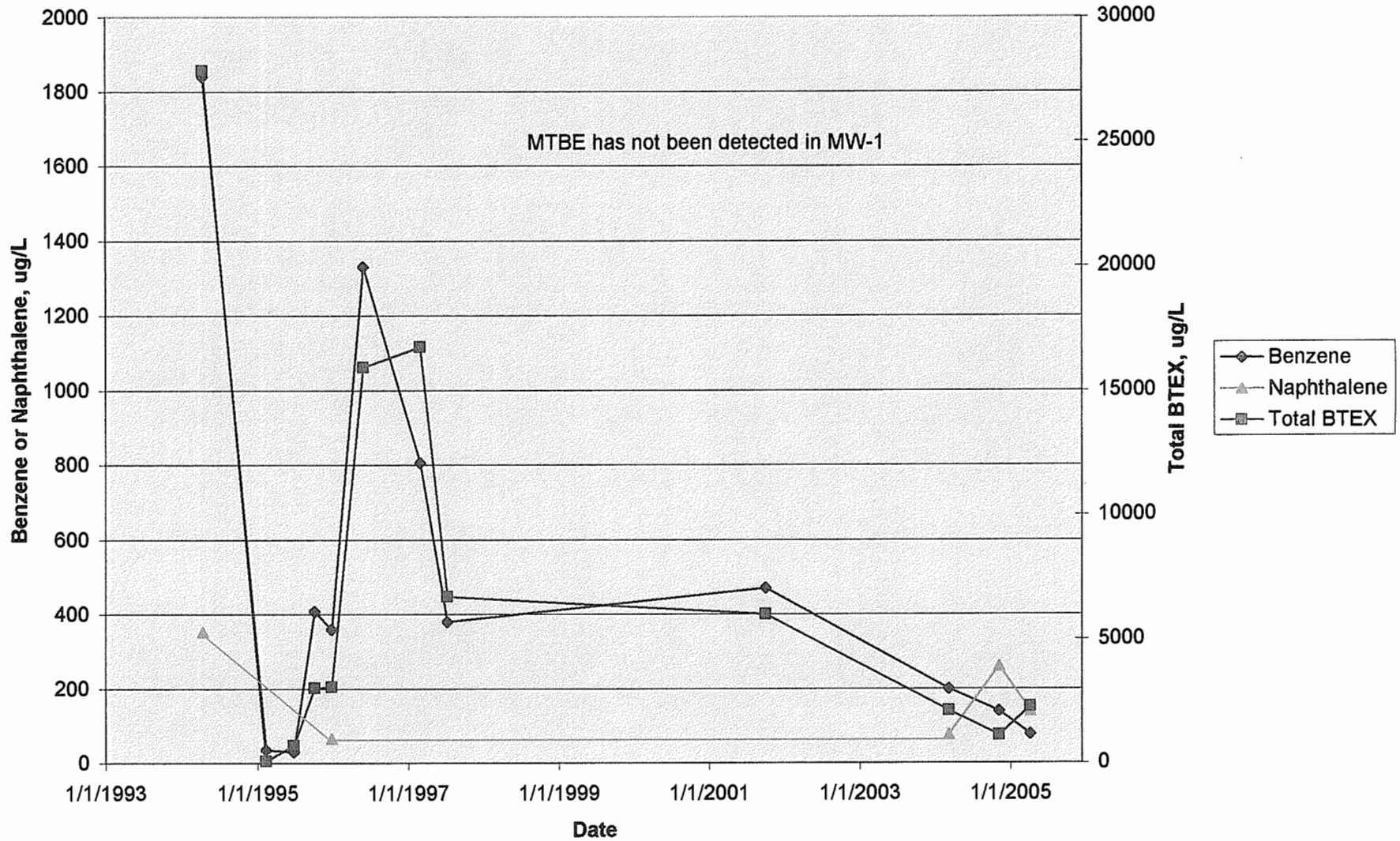
Attachment 11d  
Naphthalene Concentration  
Contour Map, Mar. 2005

DRAWN BY: AW      DATE: 4/29/05

**BECHTEL**  
CORPORATION

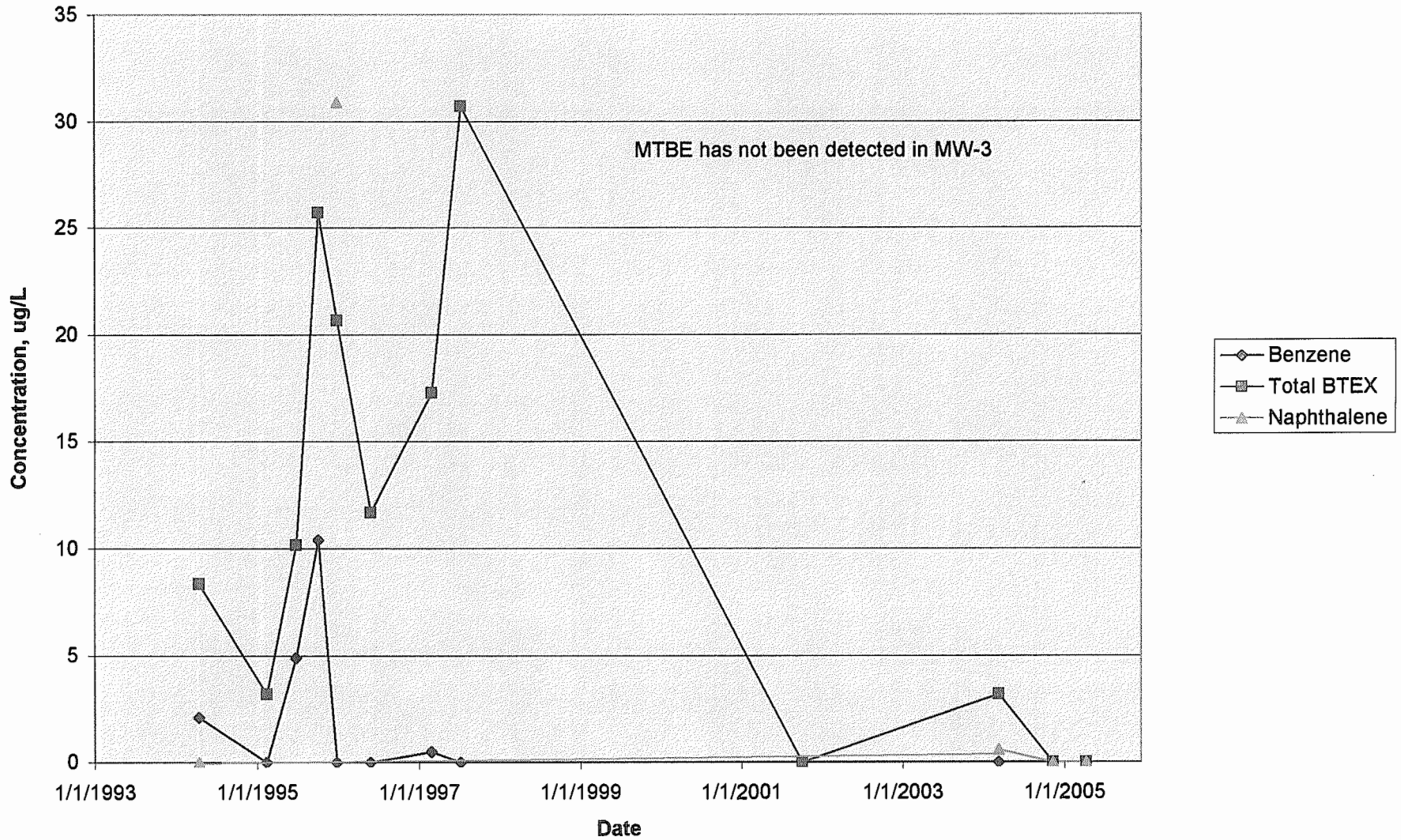


### Time vs Concentration Trends, MW-1

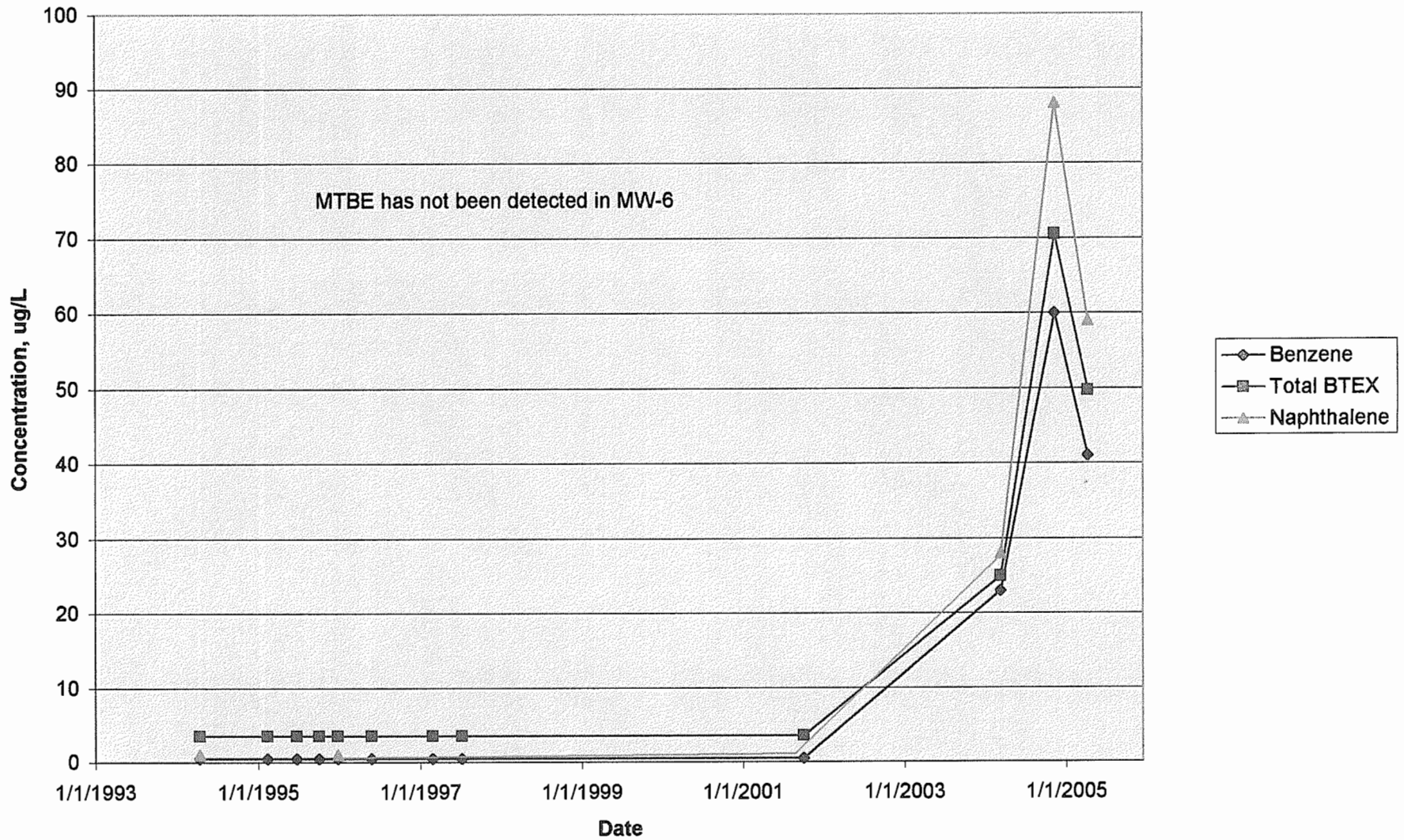




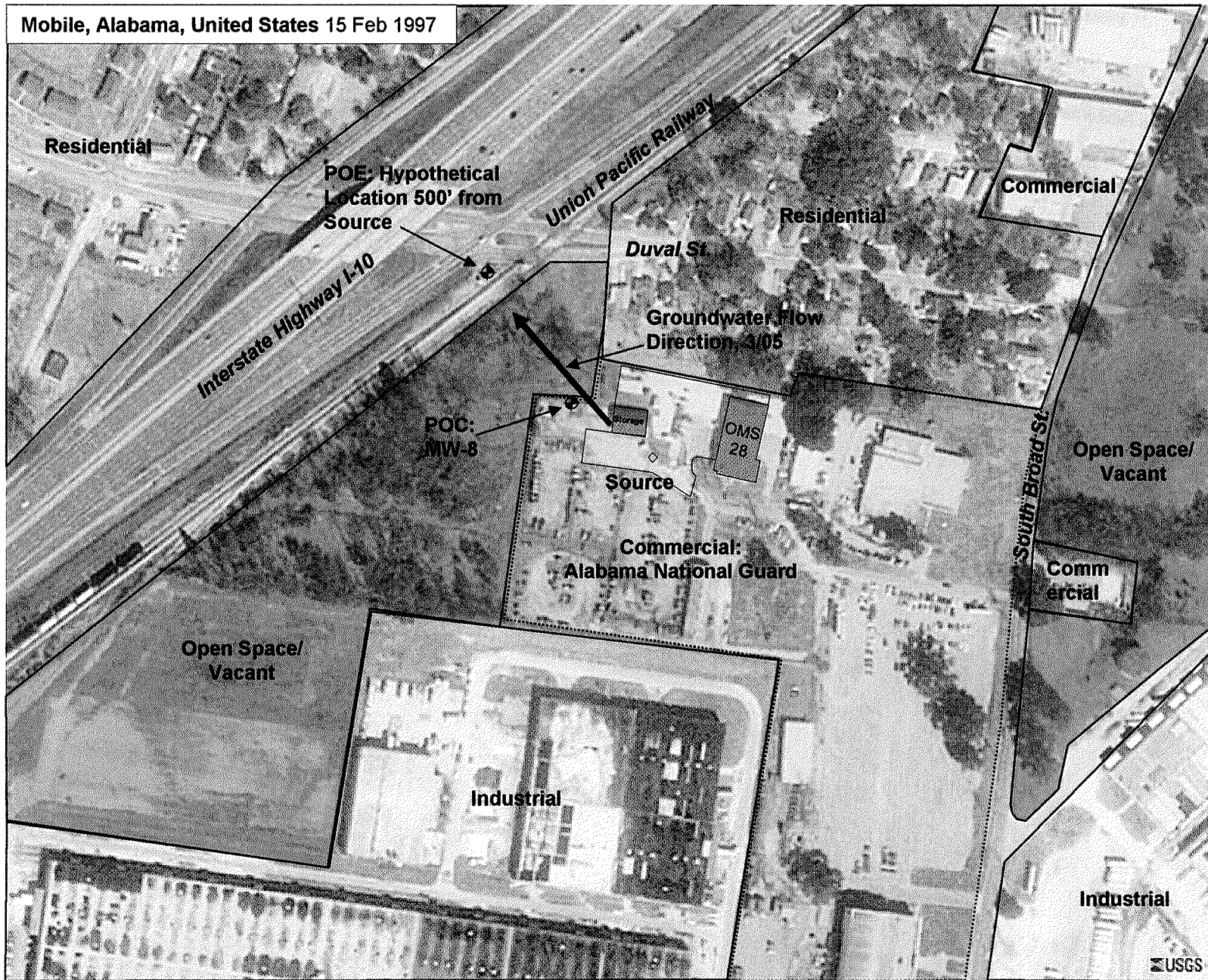
### Time vs Concentration Trends, MW-3



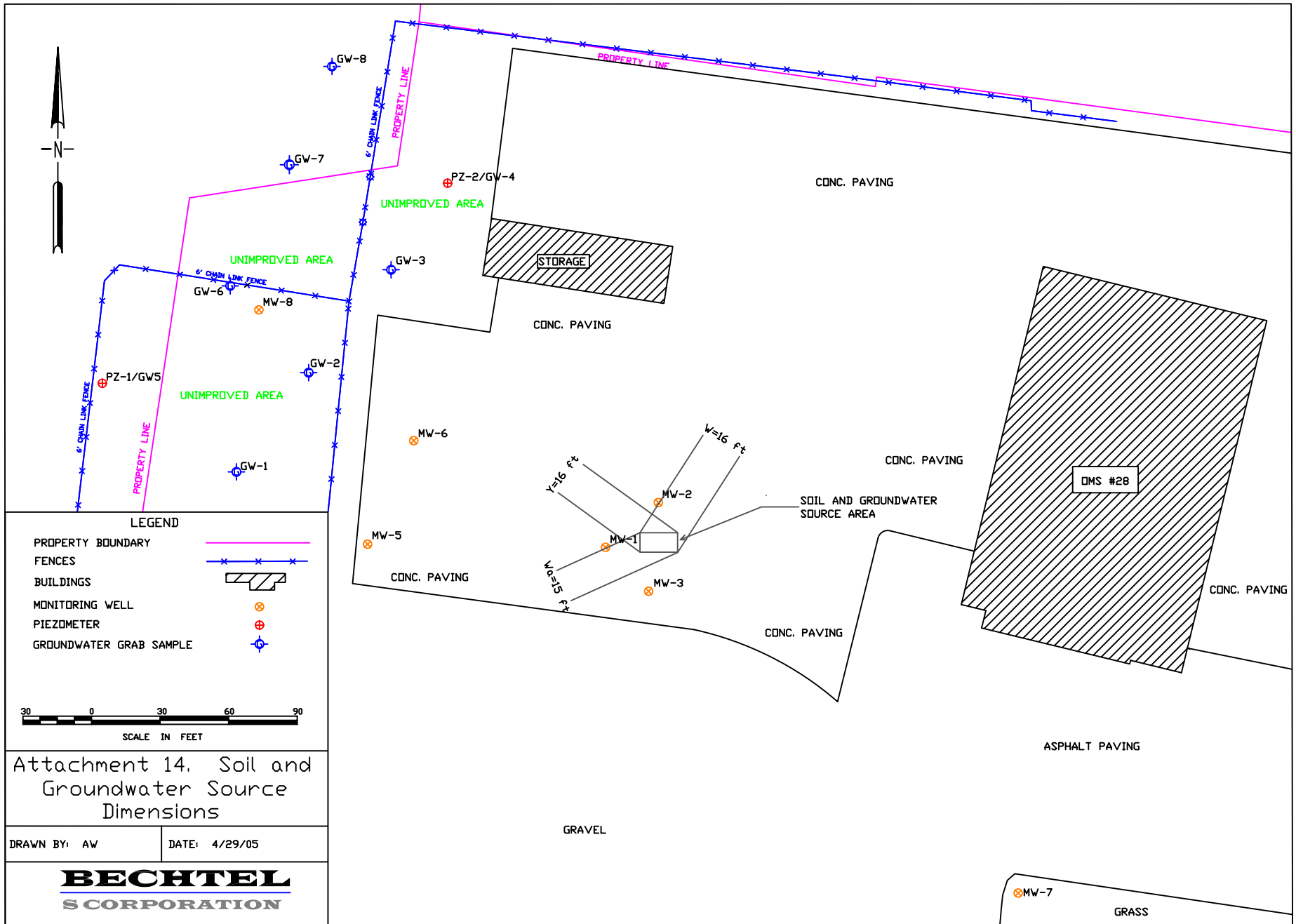
### Time vs Concentration Trends, MW-6



Mobile, Alabama, United States 15 Feb 1997



0 100yd



Attachment 14. Soil and Groundwater Source Dimensions

DRAWN BY: AW

DATE: 4/29/05

**BECHTEL**  
S CORPORATION

SITE REPRESENTATIVE CONCENTRATION CALCULATIONS (Page 1 of 2)

CHEMICALS OF CONCERN	Surficial Soil Concentration			Subsurface Soil Concentration				Groundwater Concentration		
	Maximum Detected	Arithmetic Average	Area-weighted Average (1)	Maximum Detected	Arithmetic Average	Area-weighted Average (1)	Source Area-weighted Average (1)	Maximum Detected	Arithmetic Average	Area-weighted Average (1)
	[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]	[mg/L]	[mg/L]	[mg/L]
Benzene			--	3.50E-03	2.66E-03	2.67E-03	--	1.84E+00	2.63E-02	4.29E-02
Ethylbenzene			--	3.50E-03	2.66E-03	2.67E-03	--	3.70E+00	8.43E-02	6.47E-02
Methyl-Tert-Butyl-Ether (MtBE)			--	3.50E-03	2.66E-03	2.67E-03	--	2.50E-02	6.53E-03	8.12E-03
Naphthalene			--	9.60E-03	3.91E-03	3.91E-03	--	3.53E-01	4.62E-02	6.72E-02
Toluene			--	4.30E-03	2.64E-03	2.64E-03	--	1.09E+01	3.59E-02	2.70E-02
Xylenes (Total)			--	1.05E-02	8.21E-03	8.22E-03	--	1.14E+01	1.41E-01	1.10E-01
TPH			--	4.93E+01	1.28E+01	1.22E+01	2.45E+01	-		
Lead (2)								6.00E-03	3.60E-03	
PAHs (3)										
Anthracene								5.00E-04		
Benzo(a)anthracene								1.00E-04		
Benzo(a)pyrene								1.00E-04		
Benzo(b)fluoranthene								1.90E-04		
Benzo(g,h,i)perylene								5.00E-04		
Benzo(k)fluoranthene								2.50E-04		
Chrysene								5.00E-04		
Fluoranthene								2.00E-04		
Fluorene								5.00E-04		
Phenanthrene								3.80E-04		
Pyrene								5.00E-04		

Notes:

- 1 - Area-weighted averages are used as representative concentrations in this report for VOCs.
- 2 - Lead maximum is for recent samples collected with low-stress sampling procedures; previous investigations do not document sample turbidity or sampling procedures and are not considered reliable for inorganic analytes.
- 3 - Trace PAH detections in groundwater sample are <1/2 the detection limit; maximum values shown are 1/2 detection limit values for recent samples collected using low-stress procedures

Attachment 15 - Representative Site Concentration Calculations

<b>ON-SITE</b>											
<b>Polygon Element</b>	<b>MW-1</b>	<b>MW-2</b>	<b>MW-3</b>	<b>MW-4</b>	<b>MW-5</b>	<b>MW-6</b>	<b>MW-7</b>	<b>MW-8</b>		<b>TOTALS</b>	<b>AWA</b>
Sequential Ref. #	1	2	3	4	5	6	7	8			
On-site Area ft sq	1199	1760	238	0	0	7156	0	467		10820	
On-site Ai Area m sq	111.4	163.5	22.1	0.0	0.0	664.8	0.0	43.4		1005.2	
<b>Benzene</b>											
On-site Ai Area m sq	111.4	163.5	22.1			664.8		43.4		1005.2	
C avg,i Mean Conc.(ppm)	0.1390	0.0001	0.0005	-	0.0003	0.0413	0.0001	0.0028			0.04289
A i * C avg,i Area Mean	15.483	0.014	0.011			27.478		0.123		43.108	
<b>Ethylbenzene</b>											
On-site Ai Area m sq	111.4	163.5	22.1			664.8		43.4		1005.2	
C avg,i Mean Conc.(ppm)	0.5767	0.0001	0.0012	-	0.0084	0.0010	0.0001	0.0028			0.06473
A i * C avg,i Area Mean	64.233	0.014	0.027			0.670		0.123		65.067	
<b>Methyl-Tert-Butyl-Ether (MtBE)</b>											
On-site Ai Area m sq	111.4	163.5	22.1			664.8		43.4		1005.2	
C avg,i Mean Conc.(ppm)	0.0208	0.0001	0.0050	-	0.0084	0.0084	0.0001	0.0028			0.00812
A i * C avg,i Area Mean	2.321	0.016	0.111			5.595		0.123		8.165	
<b>Naphthalene</b>											
On-site Ai Area m sq	111.4	163.5				664.8		43.4		983.1	
C avg,i Mean Conc.(ppm)	0.2000	0.0001	-	-	0.0084	0.0657	0.0001	0.0028			0.06721
A i * C avg,i Area Mean	22.277	0.020				43.655		0.123		66.075	
<b>Toluene</b>											
On-site Ai Area m sq	111.4	163.5	22.1			664.8		43.4		1005.2	
C avg,i Mean Conc.(ppm)	0.2392	0.0001	0.0002	-	0.0084	0.0005	0.0001	0.0028			0.02696
A i * C avg,i Area Mean	26.647	0.014	0.005			0.307		0.123		27.095	
<b>Xylenes (Total)</b>											
On-site Ai Area m sq	111.4	163.5	22.1			664.8		43.4		1005.2	
C avg,i Mean Conc.(ppm)	0.9503	0.0003	0.0018	-	0.0170	0.0061	0.0005	0.0083			0.10982
A i * C avg,i Area Mean	105.855	0.055	0.040			4.077		0.358		110.385	

MW-1	Date Sampled												
	PELA	ACT	ACT	ACT	ACT	PELA	PELA	PELA	UNK	BSC	BSC	BSC	
Sample date	4/15/1994	2/14/1995	6/26/1995	10/5/1995	12/27/1995	5/28/1996	2/27/1997	7/9/1997	10/3/2001	3/11/2004	11/10/2004	4/10/2005	
Water level, ft msl	23.59	24.21			24.09	24.34	25.23	25.92		24.39	23.94	24.77	
Benzene	1840	34.74	29.39	407.9	359.1	1330	805	380	470	200	140	77	
Ethylbenzene	3700	<5.0	3.73	1	<5.0	1570	1600	1170	2400	750	580	400	
MTBE	---	---	---	---	---	<25.0	---	---	<20	<5.0	<5.0	<5.0	
Toluene	10900	16.72	13.12	828.4	792.3	8130	5100	1490	730	140	7.6	570	
Total Xylenes	11400	<5.0	670	1784	1913	4900	9240	3680	2400	1021	400	1230	
Anthracene	<1.9	---	---	---	<5.0	---	---	---	---	<1.0	<1.0	<1.0	
Benzo(a)anthracene	<3.1	---	---	---	<5.0	---	---	---	---	<0.2	<0.2	<0.2	
Benzo(a)pyrene	<2.5	---	---	---	<5.0	---	---	---	---	<0.2	<0.2	<0.2	
Benzo(b)fluoranthene	<2.5	---	---	---	<5.0	---	---	---	---	<0.2	0.19 JP	<0.2	
Benzo(g,h,i)perylene	<4.1	---	---	---	<5.0	---	---	---	---	<1.0	<1.0	<1.0	
Benzo(k)fluoranthene	<2.5	---	---	---	<5.0	---	---	---	---	<0.5	<0.5	<0.5	
Chrysene	<2.5	---	---	---	<5.0	---	---	---	---	<1.0	<1.0	<1.0	
Fluoranthene	<2.2	---	---	---	<5.0	---	---	---	---	<1.0	0.2 JP	<1.0	
Fluorene	<1.9	---	---	---	<5.0	---	---	---	---	<1.0	<1.0	<1.0	
Napthalanene	353	---	---	---	64.7	---	---	---	---	200	260	140	
Phenanthrene	<5.4	---	---	---	<5.0	---	---	---	---	<1.0	0.38 JP	<1.0	
Pyrene	<1.9	---	---	---	<5.0	---	---	---	---	<1.0	<1.0	<1.0	
Lead	35	---	---	---	60	---	---	---	---	2	<5.0	2.6 J	

MW-2	Date Sampled												
	PELA	ACT	ACT	ACT	ACT	PELA	PELA	PELA	UNK	BSC	BSC	BSC	
Sample date	4/15/1994	2/14/1995	6/26/1995	10/5/1995	12/27/1995	5/28/1996	2/27/1997	7/9/1997	10/3/2001	3/11/2004	11/10/2004	4/10/2005	
Water level, ft msl	23.89	24.36			24.29	24.08	25.9	26.14		24.52	24	24.57	
Benzene	<0.01	<5.0	<5.0	<5.0	<5.0	<0.01	<0.01	<0.01	<1.0	<1.0	<0.25	<0.25	
Ethylbenzene	<0.01	<5.0	<5.0	<5.0	<5.0	<0.01	<0.01	<0.01	<1.0	<5.0	<0.25	<0.25	
MTBE	---	---	---	---	---	<0.1	---	---	<10	<5.0	<0.25	<0.25	
Toluene	<0.01	<5.0	<5.0	<5.0	2.51 J	<0.01	<0.01	<0.01	<1.0	<5.0	<0.25	<0.25	
Total Xylenes	<0.02	<5.0	<5.0	<5.0	<5.0	<0.02	<0.02	<0.02	<2.0	<10.0	<0.50	<0.50	
Anthracene	---	---	---	---	<5.0	---	---	---	---	<1.0	<1.0	<1.0	
Benzo(a)anthracene	---	---	---	---	<5.0	---	---	---	---	<0.2	<0.2	<0.2	
Benzo(a)pyrene	---	---	---	---	<5.0	---	---	---	---	<0.2	<0.2	<0.2	
Benzo(b)fluoranthene	---	---	---	---	<5.0	---	---	---	---	<0.2	<0.2	<0.2	
Benzo(g,h,i)perylene	---	---	---	---	<5.0	---	---	---	---	<1.0	<1.0	<1.0	
Benzo(k)fluoranthene	---	---	---	---	<5.0	---	---	---	---	<0.5	<0.5	<0.5	
Chrysene	---	---	---	---	<5.0	---	---	---	---	<1.0	<1.0	<1.0	
Fluoranthene	---	---	---	---	<5.0	---	---	---	---	<1.0	<1.0	<1.0	
Fluorene	---	---	---	---	<5.0	---	---	---	---	<1.0	<1.0	<1.0	
Napthalanene	---	---	---	---	<5.0	---	---	---	---	<1.0	<1.0	<1.0	
Phenanthrene	---	---	---	---	<5.0	---	---	---	---	<1.0	<1.0	<1.0	
Pyrene	---	---	---	---	<5.0	---	---	---	---	<1.0	<1.0	<1.0	
Lead	21	---	---	---	20	---	---	---	---	ND	3.0 JB	3.0 J	

NOTE: All results in ug/L

Values in bold exceed ADEM ISLs or MCL

ND = Not Detected  
--- = Not analyzed  
B = Analyte also present in laboratory blank

J = Estimated result below detection limit  
P = Result not confirmed by second column

MW-3	Date Sampled											
	PELA	ACT	ACT	ACT	ACT	PELA	PELA	PELA	UNK	BSC	BSC	BSC
Sample date	4/15/1994	2/14/1995	6/26/1995	10/5/1995	12/27/1995	5/28/1996	2/27/1997	7/9/1997	10/3/2001	3/11/2004	11/10/2004	4/10/2005
Water level, ft msl	23.71	24.32			24.19	24.24	25.62	26.08		24.84	24.41	25.23
Benzene	2.11	<5.0	4.91	<b>10.4</b>	<5.0	<0.1	0.49	<0.2	<1.0	1.2	<0.25	<0.25
Ethylbenzene	3.39	<5.0	<5.0	8.45	<5.0	<0.1	0.89	<0.2	<1.0	1.2	<0.25	<0.25
MTBE	NA	NA	NA	NA	NA	<1.0	NA	NA	<10	<5.0	<0.25	<0.25
Toluene	1.36	3.21	1.93	2.95	8.75	4.71	6.5	30.7	<1.0	0.21	<0.25	<0.25
Total Xylenes	1.5	ND	3.32	3.92	11.91	6.97	9.4	<0.40	<2.0	1.8	<0.50	<0.50
Anthracene	---	---	---	---	<5.0	---	---	---	---	<1.0	<1.0	<1.0
Benzo(a)anthracene	---	---	---	---	<5.0	---	---	---	---	<0.2	<0.2	<0.2
Benzo(a)pyrene	---	---	---	---	<5.0	---	---	---	---	<0.2	<0.2	<0.2
Benzo(b)fluoranthene	---	---	---	---	<5.0	---	---	---	---	<0.2	<0.2	<0.2
Benzo(g,h,i)perylene	---	---	---	---	<5.0	---	---	---	---	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	---	---	---	---	<5.0	---	---	---	---	<0.5	<0.5	<0.5
Chrysene	---	---	---	---	<5.0	---	---	---	---	<1.0	<1.0	<1.0
Fluoranthene	---	---	---	---	<5.0	---	---	---	---	<1.0	<1.0	<1.0
Fluorene	---	---	---	---	<5.0	---	---	---	---	<1.0	<1.0	<1.0
Napthalanene	---	---	---	---	<b>30.9</b>	---	---	---	---	0.6 JP	<1.0	<1.0
Phenanthrene	---	---	---	---	<5.0	---	---	---	---	<1.0	<1.0	<1.0
Pyrene	---	---	---	---	<5.0	---	---	---	---	<1.0	<1.0	<1.0
Lead	13	---	---	---	<b>30</b>	---	---	---	---	4	5.0 B	5.4

MW-4	Date Sampled											
	PELA	ACT	ACT	ACT	ACT	PELA	PELA	PELA	UNK	BSC	BSC	BSC
Sample date	4/15/1994	2/14/1995	6/26/1995	10/5/1995	12/27/1995	5/28/1996	2/27/1997	7/9/1997	10/3/2001	3/11/2004	11/10/2004	4/10/2005
Water level, ft msl	23.93	24.52			24.41	24.62	26.16	26.23				
Benzene	1.52	<5.0	<5.0	<5.0	<5.0	<0.01	<0.01	<0.01	<1.0			
Ethylbenzene	1.09	<5.0	<5.0	<5.0	<5.0	<0.01	<0.01	<0.01	<1.0			
MTBE	NA	NA	NA	NA	NA	<0.1	NA	NA	<10			
Toluene	1.02	<5.0	<5.0	<5.0	<5.0	<0.01	<0.01	<0.01	<1.0			
Total Xylenes	<0.02	<5.0	<5.0	<5.0	<5.0	<0.02	<0.02	<0.02	<2.0			
Anthracene	<1.9	---	---	---	<5.0	---	---	---	---			
Benzo(a)anthracene	<3.1	---	---	---	<5.0	---	---	---	---			
Benzo(a)pyrene	<2.5	---	---	---	<5.0	---	---	---	---			
Benzo(b)fluoranthene	<2.5	---	---	---	<5.0	---	---	---	---			
Benzo(g,h,i)perylene	<4.1	---	---	---	<5.0	---	---	---	---			
Benzo(k)fluoranthene	<2.5	---	---	---	<5.0	---	---	---	---			
Chrysene	<2.5	---	---	---	<5.0	---	---	---	---			
Fluoranthene	<2.2	---	---	---	<5.0	---	---	---	---			
Fluorene	<1.9	---	---	---	<5.0	---	---	---	---			
Napthalanene	<1.6	---	---	---	<5.0	---	---	---	---			
Phenanthrene	<5.4	---	---	---	<5.0	---	---	---	---			
Pyrene	<1.9	---	---	---	<5.0	---	---	---	---			
Lead	<b>86</b>	---	---	---	<b>40</b>	---	---	---	---			

NOTE: All results in ug/L

Values in bold exceed ADEM ISLs or MCL

ND = Not Detected

--- = Not analyzed

B = Analyte also present in laboratory blank

J = Estimated result below detection limit

P = Result not confirmed by second column



MW-5	Date Sampled												
	PELA	ACT	ACT	ACT	ACT	PELA	PELA	PELA	UNK	BSC	BSC	BSC	
Sample date	11/2/1994	2/14/1995	6/26/1995	10/5/1995	12/27/1995	5/28/1996	2/27/1997	7/9/1997	10/3/2001	3/11/2004	11/10/2004	4/10/2005	
Water level, ft msl	23.02	23.73			23	22.28	23.64	24.48		23.21	22.77	23.52	
Benzene	<0.01	<5.0	<5.0	<5.0	<5.0	<0.01	<0.01	<0.01	1.4	<1.0	<0.25	<0.25	
Ethylbenzene	<0.01	<5.0	<5.0	<5.0	<5.0	<0.01	<0.01	<0.01	<1.0	<5.0	<0.25	<0.25	
MTBE	NA	NA	NA	NA	NA	<0.1	NA	NA	<10	<5.0	<0.25	<0.25	
Toluene	<0.01	<5.0	<5.0	<5.0	<5.0	<0.01	<0.01	<0.01	<1.0	<5.0	<0.25	<0.25	
Total Xylenes	<0.02	<5.0	<5.0	<5.0	<5.0	<0.02	<0.02	<0.02	<2.0	<10.0	<0.50	<0.50	
Anthracene	<1.9	---	---	---	<5.0	---	---	---	---	<1.0	<1.0	<1.0	
Benzo(a)anthracene	<3.1	---	---	---	<5.0	---	---	---	---	<0.2	<0.2	<0.2	
Benzo(a)pyrene	<2.5	---	---	---	<5.0	---	---	---	---	<0.2	<0.2	<0.2	
Benzo(b)fluoranthene	<2.5	---	---	---	<5.0	---	---	---	---	<0.2	<0.2	<0.2	
Benzo(g,h,i)perylene	<4.1	---	---	---	<5.0	---	---	---	---	<1.0	<1.0	<1.0	
Benzo(k)fluoranthene	<2.5	---	---	---	<5.0	---	---	---	---	<0.5	<0.5	<0.5	
Chrysene	<2.5	---	---	---	<5.0	---	---	---	---	<1.0	<1.0	<1.0	
Fluoranthene	<2.2	---	---	---	<5.0	---	---	---	---	<1.0	<1.0	<1.0	
Fluorene	<1.9	---	---	---	<5.0	---	---	---	---	<1.0	<1.0	<1.0	
Napthalanene	<1.6	---	---	---	<5.0	---	---	---	---	0.40 JP	0.20 JP	<0.25	
Phenanthrene	<5.4	---	---	---	<5.0	---	---	---	---	<1.0	<1.0	<1.0	
Pyrene	<1.9	---	---	---	<5.0	---	---	---	---	<1.0	<1.0	<1.0	
Lead	17	---	---	---	30	---	---	---	---	2	0.004	4.4 J	

MW-6	Date Sampled												
	PELA	ACT	ACT	ACT	ACT	PELA	PELA	PELA	UNK	BSC	BSC	BSC	
Sample date	11/2/1994	2/14/1995	6/26/1995	10/5/1995	12/27/1995	5/28/1996	2/27/1997	7/9/1997	10/3/2001	3/11/2004	11/10/2004	4/10/2005	
Water level, ft msl	23.36	24.09			22.86	22.48	23.79	24.61		22.9	22.6	23.14	
Benzene	<0.01	<5.0	<5.0	<5.0	<5.0	<0.01	<0.01	<0.01	<1.0	23	60	41	
Ethylbenzene	<0.01	<5.0	<5.0	<5.0	<5.0	<0.01	<0.01	<0.01	<1.0	1.4	<1.2	1.5	
MTBE	NA	NA	NA	NA	NA	<0.1	NA	NA	<10	<5.0	<1.2	<1.2	
Toluene	<0.01	<5.0	<5.0	<5.0	<5.0	<0.01	<0.01	<0.01	<1.0	<5.0	<1.2	0.71	
Total Xylenes	<0.02	<5.0	<5.0	<5.0	<5.0	<0.02	<0.02	<0.02	<2.0	0.55	10.5	6.5	
Anthracene	<1.9	---	---	---	<5.0	---	---	---	---	<1.0	<1.0	<1.0	
Benzo(a)anthracene	<3.1	---	---	---	<5.0	---	---	---	---	<0.2	<0.2	<0.2	
Benzo(a)pyrene	<2.5	---	---	---	<5.0	---	---	---	---	<0.2	<0.2	<0.2	
Benzo(b)fluoranthene	<2.5	---	---	---	<5.0	---	---	---	---	<0.2	<0.2	<0.2	
Benzo(g,h,i)perylene	<4.1	---	---	---	<5.0	---	---	---	---	<1.0	<1.0	<1.0	
Benzo(k)fluoranthene	<2.5	---	---	---	<5.0	---	---	---	---	<0.5	<0.5	<0.5	
Chrysene	<2.5	---	---	---	<5.0	---	---	---	---	<1.0	<1.0	<1.0	
Fluoranthene	<2.2	---	---	---	<5.0	---	---	---	---	<1.0	0.076 JP	<1.0	
Fluorene	<1.9	---	---	---	<5.0	---	---	---	---	<1.0	<1.0	<1.0	
Napthalanene	<1.6	---	---	---	<5.0	---	---	---	---	50	88	59	
Phenanthrene	<5.4	---	---	---	<5.0	---	---	---	---	<1.0	0.20 JP	<1.0	
Pyrene	<1.9	---	---	---	<5.0	---	---	---	---	<1.0	<1.0	<1.0	
Lead	15	---	---	---	30	---	---	---	---	1.4	3	2.7 J	

NOTE: All results in ug/L

Values in bold exceed ADEM ISLs or MCL

ND = Not Detected

--- = Not analyzed

B = Analyte also present in laboratory blank

J = Estimated result below detection limit

P = Result not confirmed by second column

MW-7	Date Sampled											
	PELA	ACT	ACT	ACT	ACT	PELA	PELA	PELA	UNK	BSC	BSC	BSC
Sample date	4/15/1994	2/14/1995	6/26/1995	10/5/1995	12/27/1995	5/28/1996	2/27/1997	7/9/1997	10/3/2001	3/11/2004	11/10/2004	4/10/2005
Water level, ft msl											25.23	25.36
Benzene	---	---	---	---	---	---	---	---	---	---	<0.25	<0.25
Ethylbenzene	---	---	---	---	---	---	---	---	---	---	<0.25	<0.25
MTBE	---	---	---	---	---	---	---	---	---	---	<0.25	<0.25
Toluene	---	---	---	---	---	---	---	---	---	---	<0.25	<0.25
Total Xylenes	---	---	---	---	---	---	---	---	---	---	<0.50	<0.50
Anthracene	---	---	---	---	---	---	---	---	---	---	<1.0	<1.0
Benzo(a)anthracene	---	---	---	---	---	---	---	---	---	---	<0.2	<0.2
Benzo(a)pyrene	---	---	---	---	---	---	---	---	---	---	<0.2	<0.2
Benzo(b)fluoranthene	---	---	---	---	---	---	---	---	---	---	<0.2	<0.2
Benzo(g,h,i)perylene	---	---	---	---	---	---	---	---	---	---	<1.0	<1.0
Benzo(k)fluoranthene	---	---	---	---	---	---	---	---	---	---	<0.5	<0.5
Chrysene	---	---	---	---	---	---	---	---	---	---	<1.0	<1.0
Fluoranthene	---	---	---	---	---	---	---	---	---	---	<1.0	<1.0
Fluorene	---	---	---	---	---	---	---	---	---	---	<1.0	<1.0
Napthalanene	---	---	---	---	---	---	---	---	---	---	<1.0	<1.0
Phenanthrene	---	---	---	---	---	---	---	---	---	---	<1.0	<1.0
Pyrene	---	---	---	---	---	---	---	---	---	---	<1.0	<1.0
Lead	---	---	---	---	---	---	---	---	---	---	6	3.7 J

MW-8	Date Sampled											
	PELA	ACT	ACT	ACT	ACT	PELA	PELA	PELA	UNK	BSC	BSC	BSC
Sample date	4/15/1994	2/14/1995	6/26/1995	10/5/1995	12/27/1995	5/28/1996	2/27/1997	7/9/1997	10/3/2001	3/11/2004	11/10/2004	4/10/2005
Water level, ft msl											22.19	22.5
Benzene	---	---	---	---	---	---	---	---	---	---	<5.0	<6.3
Ethylbenzene	---	---	---	---	---	---	---	---	---	---	<5.0	<6.3
MTBE	---	---	---	---	---	---	---	---	---	---	<5.0	<6.3
Toluene	---	---	---	---	---	---	---	---	---	---	<5.0	<6.3
Total Xylenes	---	---	---	---	---	---	---	---	---	---	<15.0	<12.6
Anthracene	---	---	---	---	---	---	---	---	---	---	<1.0	<1.0
Benzo(a)anthracene	---	---	---	---	---	---	---	---	---	---	<0.2	<0.2
Benzo(a)pyrene	---	---	---	---	---	---	---	---	---	---	<0.2	<0.2
Benzo(b)fluoranthene	---	---	---	---	---	---	---	---	---	---	<0.2	<0.2
Benzo(g,h,i)perylene	---	---	---	---	---	---	---	---	---	---	<1.0	<1.0
Benzo(k)fluoranthene	---	---	---	---	---	---	---	---	---	---	<0.5	<0.5
Chrysene	---	---	---	---	---	---	---	---	---	---	<1.0	<1.0
Fluoranthene	---	---	---	---	---	---	---	---	---	---	<1.0	<1.0
Fluorene	---	---	---	---	---	---	---	---	---	---	<1.0	<1.0
Napthalanene	---	---	---	---	---	---	---	---	---	---	<1.0	<1.0
Phenanthrene	---	---	---	---	---	---	---	---	---	---	<1.0	<1.0
Pyrene	---	---	---	---	---	---	---	---	---	---	<1.0	<1.0
Lead	---	---	---	---	---	---	---	---	---	---	<5.0	2.2 J

NOTE: All results in ug/L

Values in bold exceed ADEM ISLs or MCL

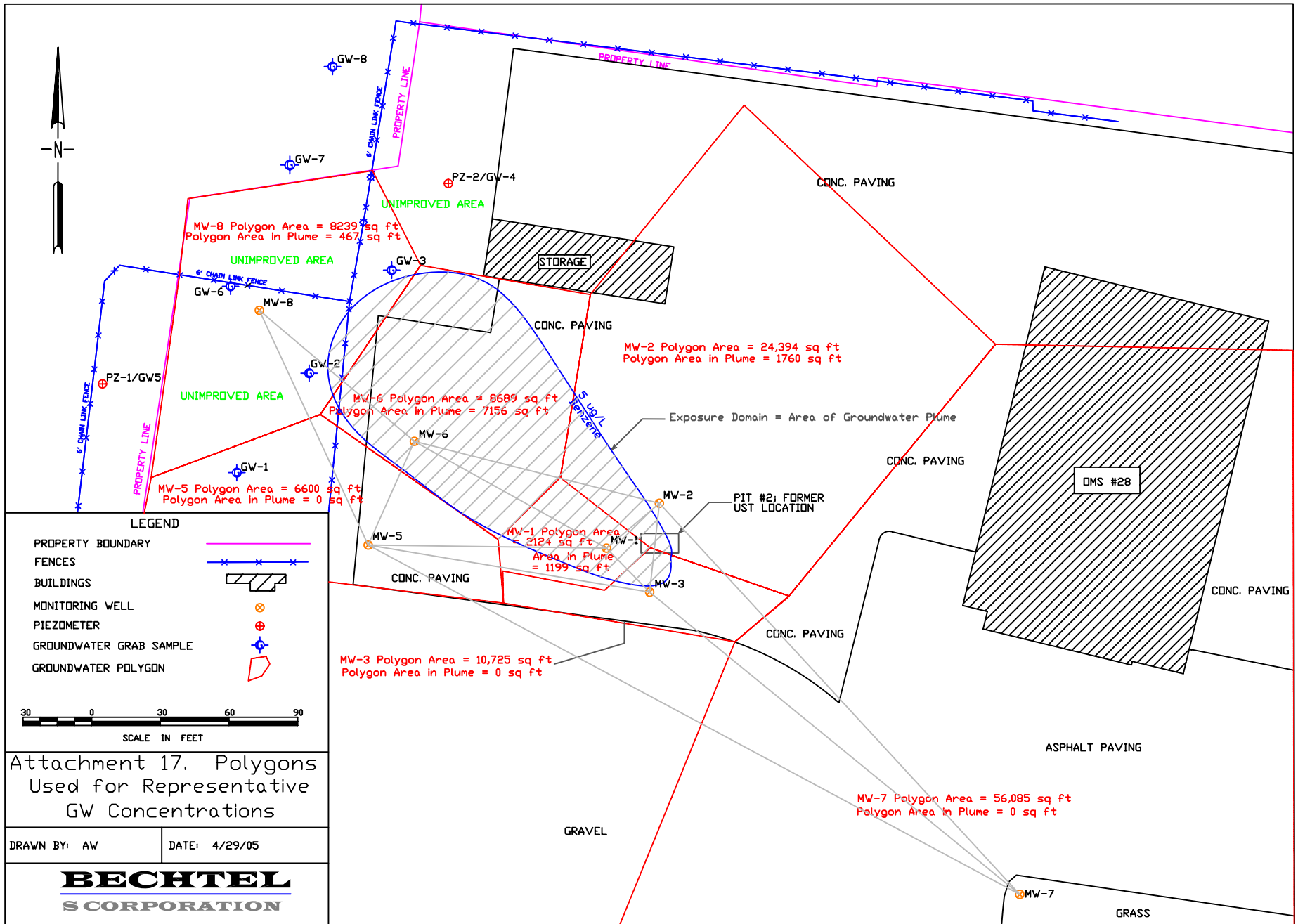
ND = Not Detected

--- = Not analyzed

B = Analyte also present in laboratory blank

J = Estimated result below detection limit

P = Result not confirmed by second column



## FATE AND TRANSPORT PARAMETERS

Parameter	Symbol	Unit	Tier 1 Values	Values Used	Source
<b>SOIL PARAMETERS:</b>					
Width of Source Area Parallel to wind or GW Flow Direction	W	cm	1500	1500	Tier 1
Depth to Subsurface Soil Sources	Ls	cm	30.48	30.48	Tier 1
Lower Depth of Surficial Soil Zone	d	cm	30.48	30.48	Tier 1
Thickness of Capillary Fringe	hcap	cm	5	5	Tier 1
Thickness of Vadose Zone	hv	cm	295	295	Tier 1
Dry Soil Bulk Density	$\rho_s$	g/cm <sup>3</sup>	1.8	1.8	Tier 1
Fractional Organic Carbon Content	foc	g-C/g-soil	0.01	0.01	Tier 1
Total Soil Porosity	$\theta_T$	cm <sup>3</sup> /cm <sup>3</sup> -soil	0.3	0.3	Tier 1
Volumetric Water Content in Capillary Fringe	$\theta_{wcap}$	cm <sup>3</sup> /cm <sup>3</sup>	0.27	0.27	Tier 1
Volumetric Water Content in Vadose Zone	$\theta_{ws}$	cm <sup>3</sup> /cm <sup>3</sup>	0.1	0.1	Tier 1
Volumetric Water Content in Foundation or Wall Cracks	$\theta_{wcrack}$	cm <sup>3</sup> /cm <sup>3</sup>	0.1	0.1	Tier 1
Volumetric Air Content in Capillary Fringe	$\theta_{acap}$	cm <sup>3</sup> /cm <sup>3</sup>	0.03	0.03	Tier 1
Volumetric Air Content in Vadose Zone	$\theta_{as}$	cm <sup>3</sup> /cm <sup>3</sup>	0.2	0.2	Tier 1
Volumetric Air Content in Foundation/Wall Cracks	$\theta_{acrack}$	cm <sup>3</sup> /cm <sup>3</sup>	0.2	0.2	Tier 1
<b>GROUNDWATER PARAMETERS:</b>					
Depth to Groundwater	Lgw	cm	300	300	Tier 1
Groundwater Darcy Velocity	Ugw	cm/year	157.68	157.68	Tier 1
Groundwater Mixing Zone Thickness	$\delta_{gw}$	cm	200	200	Tier 1
Infiltration Rate	I	cm/year	14.8	14.8	Tier 1
<b>AMBIENT AIR PARAMETERS:</b>					
Breathing Zone Height	$\delta_a$	cm	200	200	Tier 1
Wind Speed within the Breathing Zone	Ua	cm/s	225	225	Tier 1
<b>ENCLOSED SPACE PARAMETERS:</b>					
Enclosed Space Air Exchange Rate:					Tier 1
Residential	ER	1/sec	0.00014	0.00014	Tier 1
Commercial/Construction Worker	ER	1/sec	0.00023	0.00023	Tier 1
Enclosed Space Volume/Infiltration Area Ratio:					
Residential	Lb	cm	200	200	Tier 1
Commercial/Construction Worker	Lb	cm	300	300	Tier 1
Enclosed Space Foundation or Wall Thickness					
Residential	Lcrack	cm	15	15	Tier 1
Commercial/Construction Worker	Lcrack	cm	15	15	Tier 1
Areal Fraction of Cracks in Foundation/Walls					
Residential	$\eta$	cm <sup>2</sup> /cm <sup>2</sup>	0.01	0.01	Tier 1
Commercial/Construction Worker	$\eta$	cm <sup>2</sup> /cm <sup>2</sup>	0.01	0.01	Tier 1
<b>PARTICULATE EMISSION RATE</b>					
Residential and Commercial	Pe	g/cm <sup>2</sup> sec	6.90E-14	6.90E-14	Tier 1
Construction Worker	Pe	g/cm <sup>2</sup> sec	6.90E-09	6.90E-09	Tier 1
<b>AVERAGING TIME FOR VAPOR FLUX</b>					
Resident Child	$\tau$	sec	1.89E+08	1.89E+08	Tier 1
Resident Adult	$\tau$	sec	9.46E+08	9.46E+08	Tier 1
Commercial Worker	$\tau$	sec	7.88E+08	7.88E+08	Tier 1
Construction Worker	$\tau$	sec	3.15E+07	3.15E+07	Tier 1

## GROUNDWATER RESOURCE PROTECTION

Parameter	Unit	Tier 1 Values	Values Used	Source
<b>SITE PARAMETERS:</b>				
Distance to the Point of Exposure (Xpoe)	ft	variable	500	
Longitudinal dispersivity	ft	variable	50	
Transverse dispersivity	ft	variable	16.7	
Vertical dispersivity	ft	variable	2.5	
Distance to the Point of Compliance (Xpoc)	ft	variable	200	
Longitudinal dispersivity	ft	variable	20	
Transverse dispersivity	ft	variable	6.7	
Vertical dispersivity	ft	variable	1	

**NOTE: The dispersivities (in red) are calculated, however the user may over-write the values. Additional input parameters required to calculate the allowable soil concentrations protective of groundwater, whose values are input on other screens include:**

**Source Dimensions**

Width of Source Area Parallel to wind or GW Flow Direction (W)

Groundwater Mixing Zone Thickness ( $\delta_{gw}$ )

**Soil and Groundwater Properties**

Dry Soil Bulk Density ( $\rho_s$ )

Total Soil Porosity ( $\theta_T$ )

Groundwater Darcy Velocity ( $U_{gw}$ )

Fractional Organic Carbon Content (foc)

**Chemical Specific Properties**

Organic Carbon Adsorption Co-efficient (Koc)

Soil Water Distribution Co-efficient (Kd)

Soil Water Sorption Co-efficient (Ks)

- For organics,  $K_s = foc \times K_{oc}$

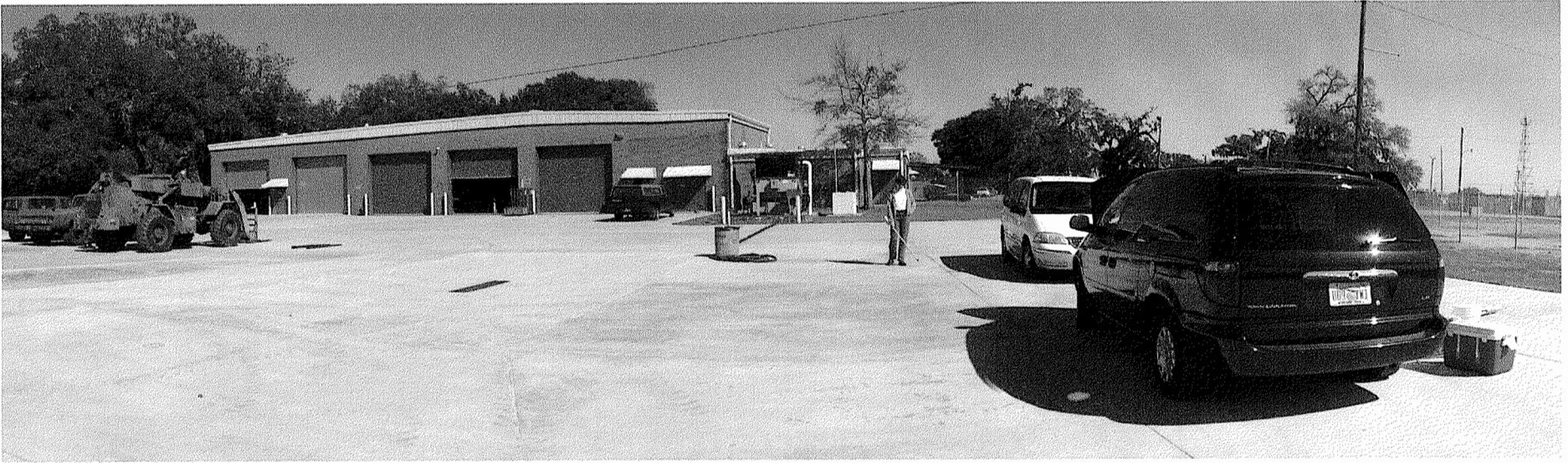
- For metals,  $K_s = K_d$

**GROUNDWATER RESOURCE PROTECTION - WITHOUT DECAY**

CHEMICALS OF CONCERN	Target Groundwater Conc.at POE [mg/L]	Dry Leaching Factor Groundwater (LF <sub>sw</sub> )	User Specified Unsaturated Zone DAF [--]	Saturated Zone DAF		Soil Conc. Protective of Groundwater [mg/kg]	Allowable Groundwater Conc. at POC [mg/L]	Allowable Groundwater Conc. at Source [mg/L]
				at POC [--]	at POE [--]			
<b>ORGANICS</b>								
Benzene	5.00E-03	5.92E-01	1	1.06E+01	6.34E+01	5.35E-01	2.98E-02	3.17E-01
Toluene	1.00E+00	2.78E-01	1	1.06E+01	6.34E+01	2.28E+02	5.97E+00	6.34E+01
Ethylbenzene	7.00E-01	1.94E-01	1	1.06E+01	6.34E+01	2.29E+02	4.18E+00	4.44E+01
Xylenes (mixed)	1.00E+01	1.60E-01	1	1.06E+01	6.34E+01	5.10E+02 *	5.97E+01	1.98E+02 #
Methyl-tert-butyl-ether (MtBE)	2.00E-02	2.32E+00	1	1.06E+01	6.34E+01	5.46E-01	1.19E-01	1.27E+00
Anthracene	4.34E-02	1.76E-03	1	1.06E+01	6.34E+01	1.02E+01 *	4.34E-02 #	4.34E-02 #
Benzo(a)anthracene	1.17E-03	1.15E-04	1	1.06E+01	6.34E+01	3.37E+01 *	6.96E-03	9.40E-03 #
Benzo(a)pyrene	2.00E-04	4.26E-05	1	1.06E+01	6.34E+01	1.16E+01 *	1.19E-03	1.20E-03 #
Benzo(b)fluoranthene	1.17E-03	3.36E-05	1	1.06E+01	6.34E+01	1.85E+01 *	1.50E-03 #	1.50E-03 #
Benzo(g,h,i)perylene	7.00E-04	2.61E-05	1	1.06E+01	6.34E+01	1.11E+01 *	7.00E-04 #	7.00E-04 #
Benzo(k)fluoranthene	8.00E-04	3.36E-05	1	1.06E+01	6.34E+01	9.84E+00 *	8.00E-04 #	8.00E-04 #
Chrysene	1.60E-03	1.04E-04	1	1.06E+01	6.34E+01	6.37E+00 *	1.60E-03 #	1.60E-03 #
Fluoranthene	2.06E-01	8.41E-04	1	1.06E+01	6.34E+01	1.01E+02 *	2.06E-01 #	2.06E-01 #
Fluorene	1.46E+00	5.35E-03	1	1.06E+01	6.34E+01	1.53E+02 *	1.98E+00 #	1.98E+00 #
Naphthalene	2.00E-02	3.45E-02	1	1.06E+01	6.34E+01	3.67E+01	1.19E-01	1.27E+00
Phenanthrene	1.00E+00	2.93E-03	1	1.06E+01	6.34E+01	1.41E+02 *	1.00E+00 #	1.00E+00 #
Pyrene	1.35E-01	6.07E-04	1	1.06E+01	6.34E+01	9.18E+01 *	1.35E-01 #	1.35E-01 #
<b>METALS</b>								
Arsenic	--	6.44E-03	1	1.06E+01	6.34E+01	--	#VALUE!	#VALUE!
Barium	--	1.01E-02	1	1.06E+01	6.34E+01	--	#VALUE!	#VALUE!
Cadmium	--	5.50E-03	1	1.06E+01	6.34E+01	--	#VALUE!	#VALUE!
Chromium VI	--	2.17E-02	1	1.06E+01	6.34E+01	--	#VALUE!	#VALUE!
Lead	1.50E-02	3.38E-03	1	1.06E+01	6.34E+01	2.81E+02	8.95E-02	9.50E-01
Zinc	--	6.66E-03	1	1.06E+01	6.34E+01	--	#VALUE!	#VALUE!

**NOTE:**

- \*: Calculated concentrations exceeded saturated soil concentration and hence saturated soil concentrations are listed soil concentrations protective of groundwater.
  - #: Calculated concentrations exceeded pure component water solubility and hence water solubilities are listed as allowable groundwater concentrations at the POE and/or POE.
- Soil concentrations are presented on a dry weight basis.



View East From MW-1



View North From MW-1



View West From MW-1



View South From MW-1