



Technical Memorandum

Page 1 of 4

Date:	October 29, 2015	From:	Jon N. Sondergaard, L.G., L.E.G.
To:	Pacific Topsoils, Inc. 805 80 th Street SW Everett, Washington 98203	Project Manager:	Jon N. Sondergaard, L.G., L.E.G.
		Principal in Charge:	Jon N. Sondergaard, L.G., L.E.G. <i>JS</i>
		Project Name:	Mill E Site
Attn:	Mr. Januz Bajsarowicz	Project No:	KV050654A
Subject:	Mill E 2015 Ground Water Monitoring Summary		

GROUND WATER MONITORING

Associated Earth Sciences, Inc. (AESI) performed annual ground water monitoring at the Mill E site on September 28, 2015, consistent with the Mill E's "Performance and Compliance Monitoring Plan" (PCMP) dated October 1998. During the September 2015 monitoring event, depth to water measurements were made in all of the site's six piezometers (PZ-1A, PZ-1B, PZ-2A, PZ-2B, PZ-3A, and PZ-3B). The depth to water measurements are summarized in Table 1. A site plan showing the approximate well locations is presented on Figure 1.

Table 1
Depth to Ground Water⁽¹⁾

Piezometer	Date	Reference Elevation (feet) Top of PVC ⁽¹⁾	Depth to Water (feet) ⁽²⁾	Ground Water Elevation (feet) ⁽³⁾
PZ-1A	9/28/2015	9.90	6.69	3.21
PZ-1B	9/28/2015	7.93	3.52	4.46
PZ-2A	9/28/2015	9.40	5.96	3.44
PZ-2B	9/28/2015	8.38	4.20	4.18
PZ-3A	9/28/2015	10.31	7.54	2.77
PZ-3B	9/28/2015	7.54	5.49	3.05

⁽¹⁾ Top of casing elevations referenced to mean sea level (Shaw Environmental, Inc., 2003).

⁽²⁾ Measurements collected at outgoing tide.

⁽³⁾ "A" wells are located inside the containment; "B" wells are located outside the containment.

PVC = polyvinyl chloride

Ground water samples were collected from piezometer PZ-3A only. Piezometer PZ-3A was purged and sampled using a disposable bailer, consistent with the facility's PCMP. Field measurements (depth to water, pH, conductivity, and temperature) were recorded at the time of sampling. The field measurements are summarized in Table 2. After purging and recording of field measurements, ground water samples were obtained for off-site analytical testing. The ground water samples were collected in laboratory-prepared bottles. The samples were placed in a cooler packed with ice and delivered under chain-of-custody (COC) procedures to Aquatic Research, Inc. in Seattle, Washington. The COC form outlining the requested analyses is attached. The results of the September 28, 2015 sample are presented below.

Table 2
Field Monitoring Parameters
September 2015

Sample Location	Sample Date	Depth to Water (ft-BTOC)	Gallons Removed	pH (S.U.)	Specific Conductance ($\mu\text{S}/\text{cm}$)	Temperature ($^{\circ}\text{C}$)
PZ-3A	9/28/14	7.54	2	6.24	707	18.11

ft-BTOC = feet below top of polyvinyl chloride (PVC) casing.

S.U. = standard pH units.

$\mu\text{S}/\text{cm}$ = microSiemens per centimeter.

$^{\circ}\text{C}$ = degrees Celsius.

ASPHALT CAP AND SOIL COVER

An asphalt cap and soil cover inspection was performed on October 27, 2015 by a professional engineer from AESI. A copy of the field report from that visit is attached. All of the cap was visible at the time of our visit as no operations were occurring at the site. Where observed, the asphalt cap exhibited little evidence of deterioration and no signs of excessive settlement. Small shallow depressions in the cover were observed in some places. Photos taken at the time of our visit are included in the attached field report.

The areas to the south of the asphalt cap are covered with a 1-foot-thick soil cover with grass and some scattered brush. The soil cap appeared intact and was performing as intended, in our opinion.

QUALITY ASSURANCE/QUALITY CONTROL

Laboratory quality assurance/quality control (QA/QC) analyses were performed in conjunction with the September 2015 ground water quality monitoring event. Routine laboratory QA procedures included analyzing surrogate spikes, matrix spikes, matrix duplicates, laboratory control samples, and method blanks. The Lab Control Spike percent recovery for both the neutral blank and the samples analyzed are within the quality control limits. All other QA/QC results were judged to be acceptable.

for their intended use. The test results are presented in Table 3 below and the Aquatic Research, Inc. laboratory certificates are attached to this memorandum.

WATER BALANCE

Elevations for the top of the well casings and historic ground water elevations were obtained by reviewing the "2003 Annual Ground Water Compliance Monitoring and Five Year Data Review Report," prepared by Shaw Environmental, Inc. (Shaw) and obtained from the Washington State Department of Ecology (Ecology). Ground water elevations for the year 2005 could not be found. All "A" series wells (PZ-1A, PZ-2A, and PZ-3A) are located inside of the barrier wall and all "B" series wells (PZ-1B, PZ-2B, and PZ-3B) are located outside of the barrier wall. Figures 2, 2A, and 2B show a comparison of historical ground water elevation data obtained for the site. Review of the data indicates that generally after 2001, ground water elevations outside of the barrier wall are higher than inside the barrier, with the exception of the 2007 measurement for well PZ-1A. The higher than expected water level in PZ-1A in 2007 was examined, and was determined to be a result of surface water collecting in the well monument. This problem has been corrected by raising the elevation of the top of the well monument to prevent surface water from seeping into the monument (Technical Memorandum dated December 17, 2009).

The data for wells PZ-1A/1B, PZ-2A/2B, and PZ-3A/3B suggests the barrier wall is generally performing as intended and isolating ground water inside the barrier from that outside the barrier.

RESULTS AND CONCLUSIONS

The September 2015 ground water analytical results for the Mill E site were compared to the Model Toxics Control Act (MTCA) cleanup levels established in the 1998 Consent Decree. The results are presented in Table 3. Concentrations of all analytical parameters detected in the PZ-3A ground water sample were below the established MTCA cleanup standards, except for arsenic and pentachlorophenol (PCP). The September 2015 PZ-3A result of 446 micrograms per liter ($\mu\text{g}/\text{L}$) for arsenic is above the MTCA cleanup standard of 5 $\mu\text{g}/\text{L}$ and 10.3 $\mu\text{g}/\text{L}$ for PCP is above the Consent Decree cleanup level of 7.29 $\mu\text{g}/\text{L}$. Review of historic ground water quality data for the site indicates the 2015 results for total petroleum hydrocarbons (TPH) and PCP are generally higher than 2014, but within the range of past measurements (Figures 3 through 5). The arsenic concentration detected in 2015 is lower than that detected in 2014.

Table 3
 Comparison of Ground Water Analytical Results
 and MTCA Cleanup Standard for Ground Water
 September 2015

Sample Location	Sample Date	TPH-D (µg/L)	TPH-G (µg/L)	TPH-M (µg/L)	PCP (µg/L)	Arsenic (µg/L)
PZ-3A	09/28/15	800	400	460	10.3	446
<i>MTCA⁽¹⁾</i>		<i>10,000</i>	<i>10,000</i>	<i>10,000</i>	<i>7.29</i>	<i>5</i>

TPH-D = total petroleum hydrocarbons-diesel.

TPH-G = total petroleum hydrocarbons-gasoline.

TPH-M = total petroleum hydrocarbons-motor oil.

PCP = pentachlorophenol.

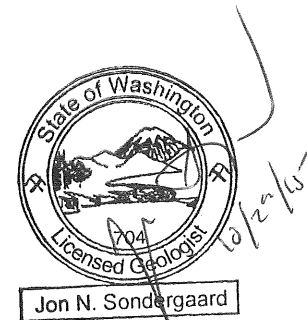
µg/L = micrograms per liter.

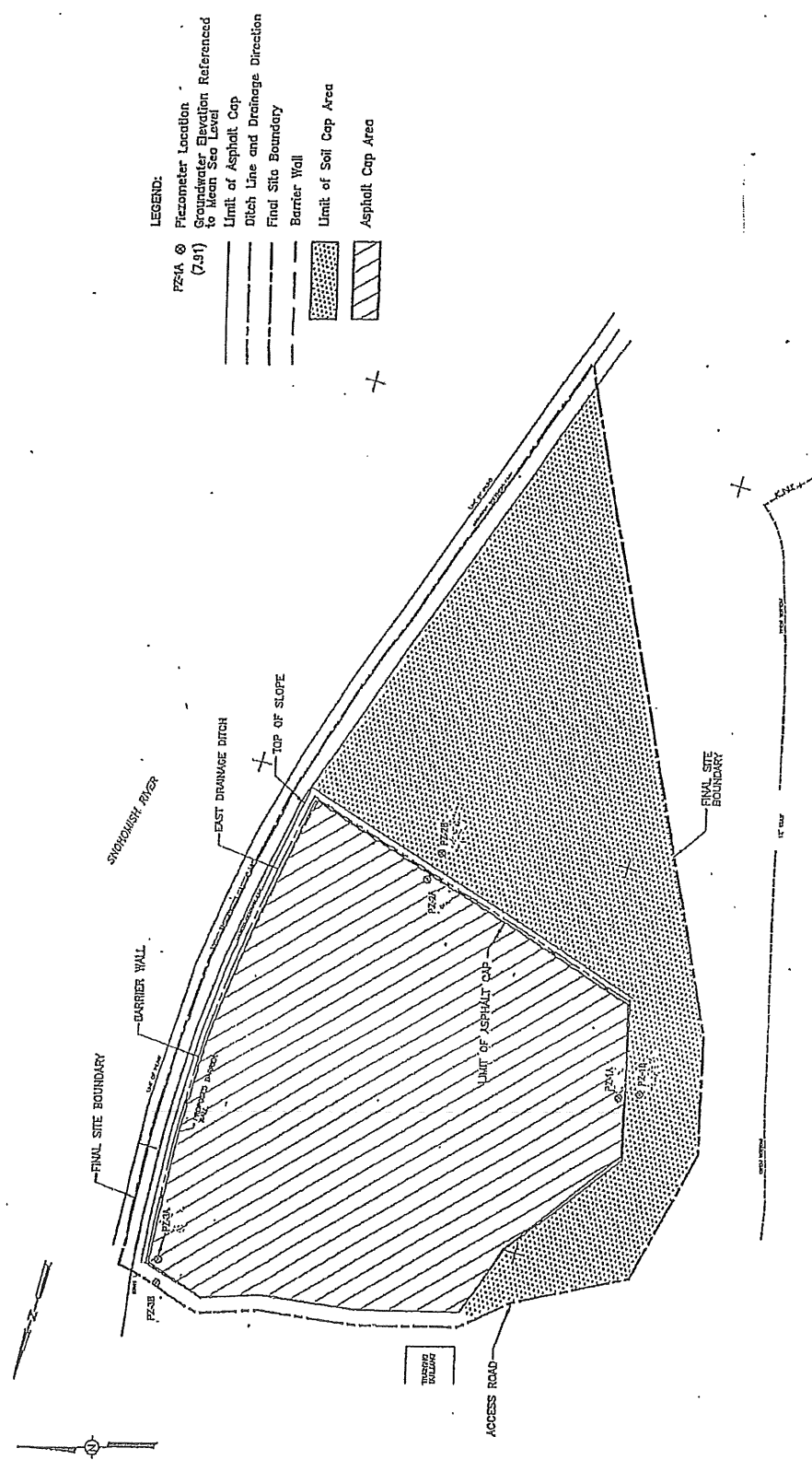
Bold denotes an exceedance of the MTCA cleanup standard for ground water.

⁽¹⁾ MTCA = Model Toxics Control Act cleanup standards for ground water per the 1998 Consent Decree.

We trust the information presented meets your current needs. Please do not hesitate to contact us if you have any questions or require additional information.

- Attachments:
- Figure 1: Site Plan
 - Figure 2: Ground Water Elevations Wells PZ-1A and PZ-1B
 - Figure 2A: Ground Water Elevations Wells PZ-2A and PZ-2B
 - Figure 2B: Ground Water Elevations Wells PZ-3A and PZ-3B
 - Figure 3: TPH Concentrations in Well PZ-3A
 - Figure 4: PCP Concentrations in Well PZ-3A
 - Figure 5: Arsenic Concentrations in Well PZ-3A
 - Field Report of Cap Inspection
 - Laboratory Test Certificates and Chain of Custody





- LEGEND:
- PZ#1A ⊗ Pizometer Location
(7.91) Groundwater Elevation Referenced to Mean Sea Level
 - Limit of Asphalt Cap
 - Ditch Line and Drainage Direction
 - Final Site Boundary
 - Barrier Wall
 - Limit of Soil Cap Area
 - Asphalt Cap Area

BASE MAP TOPOGRAPHY BASED ON AERIAL PHOTOGRAMMETRIC MAPPING BY RICHARD B. DAVIS CO., WITH CONTROL SURVEY BY CLARK M. LEEHAN SURVEYING, IN DECEMBER, 1997. (SHAW, 2003)

Associated Earth Sciences, Inc.



FORMER MILL E/KOPPERS SITE PLAN

FIGURE 1

DATE 9/2007

PROJ. NO. KE050654A

Projects

Figure 2 Mill E Groundwater Elevations Wells PZ-1A and PZ-1B
 "A" Wells Inside Containment
 "B" Wells Outside Containment

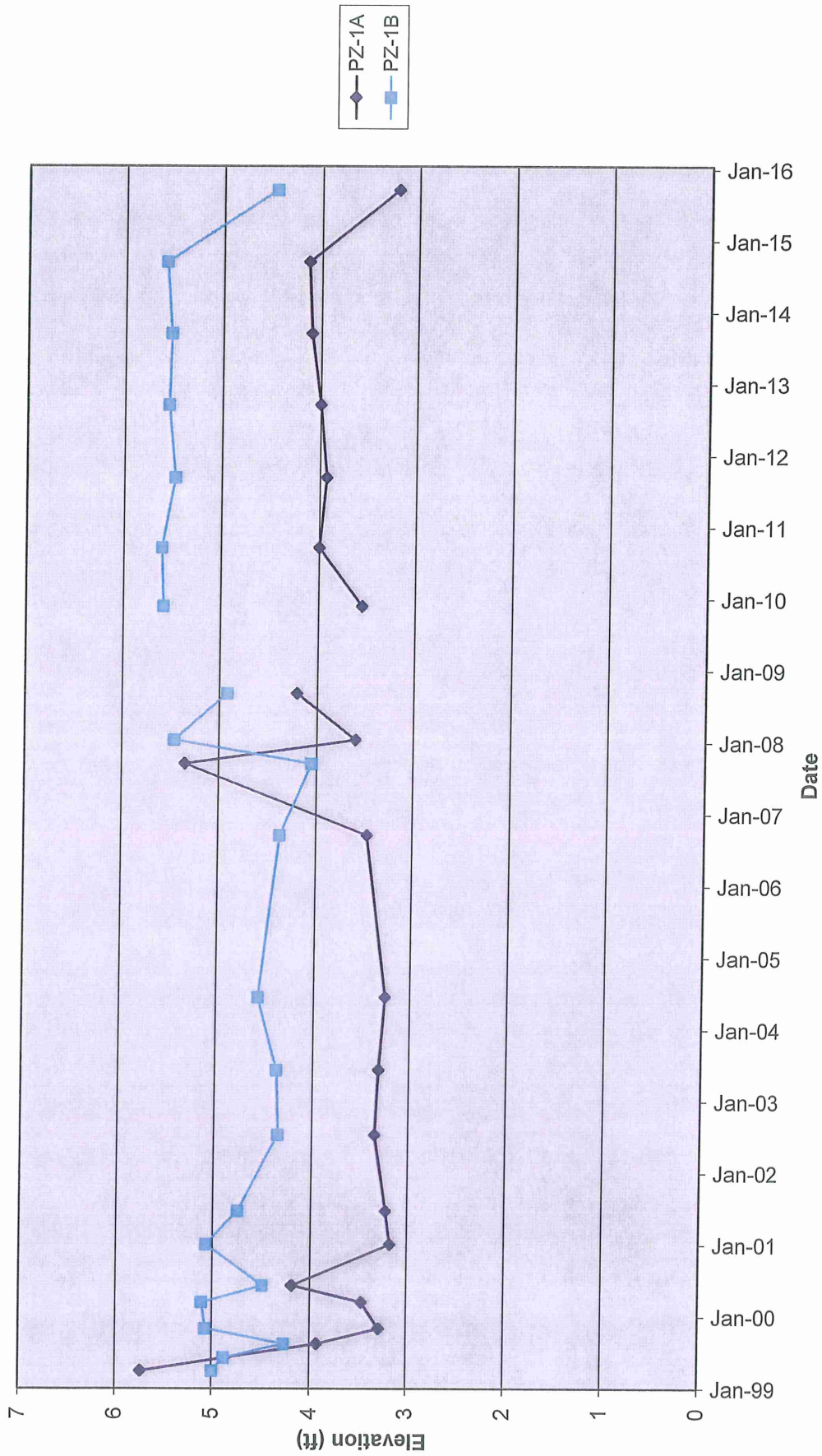


Figure 2A Mill E Ground Water Elevations Wells PZ-2A and PZ-2B
 "A" Wells inside containment
 "B" Wells outside containment

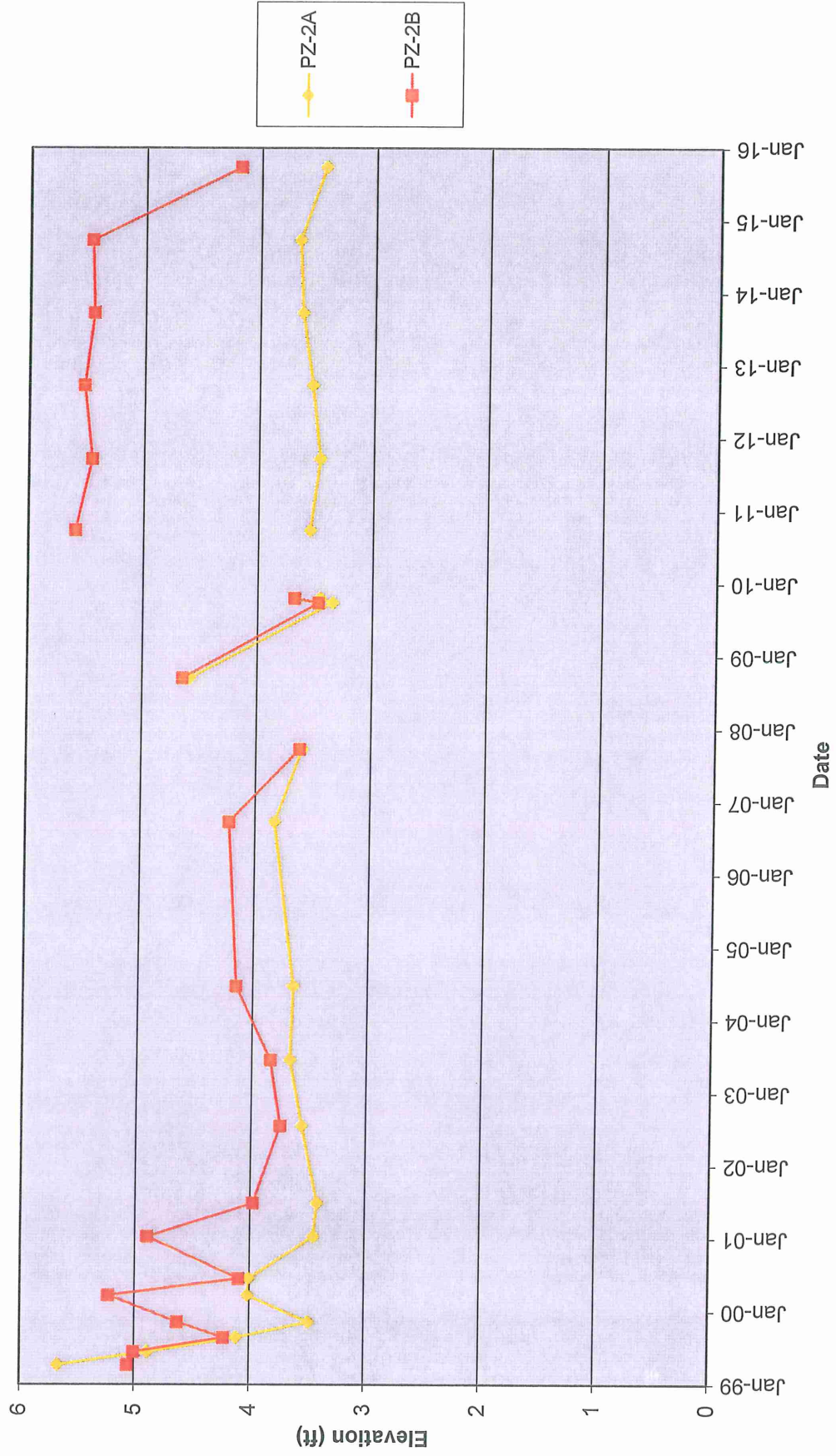


Figure 2B Groundwater Elevations Well PZ-3A and PZ-3B
 "A" Wells Inside Containment
 "B" Wells Outside Containment

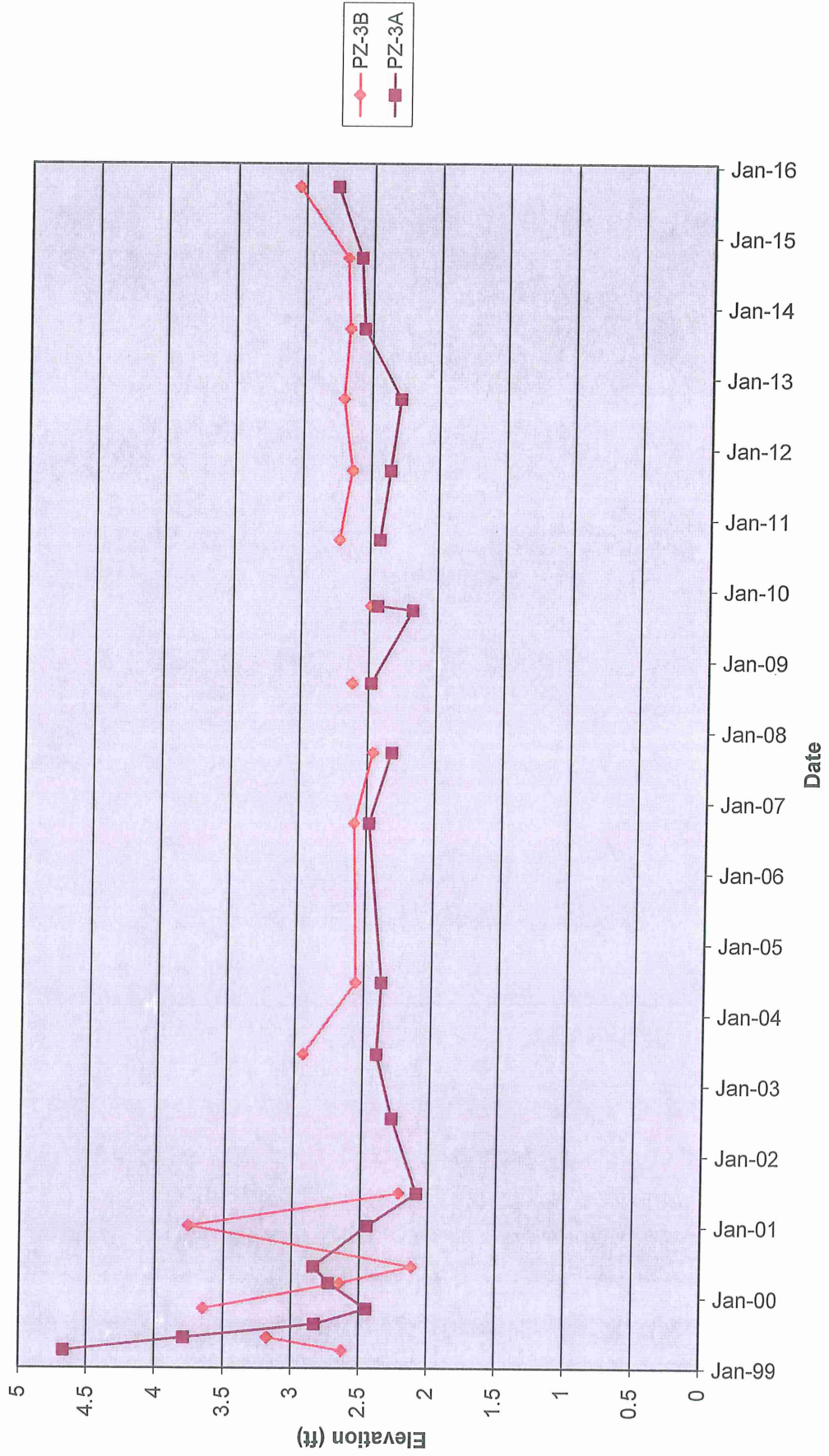


Figure 3 Mill E TPH Concentrations
in Groundwater Well PZ-3A

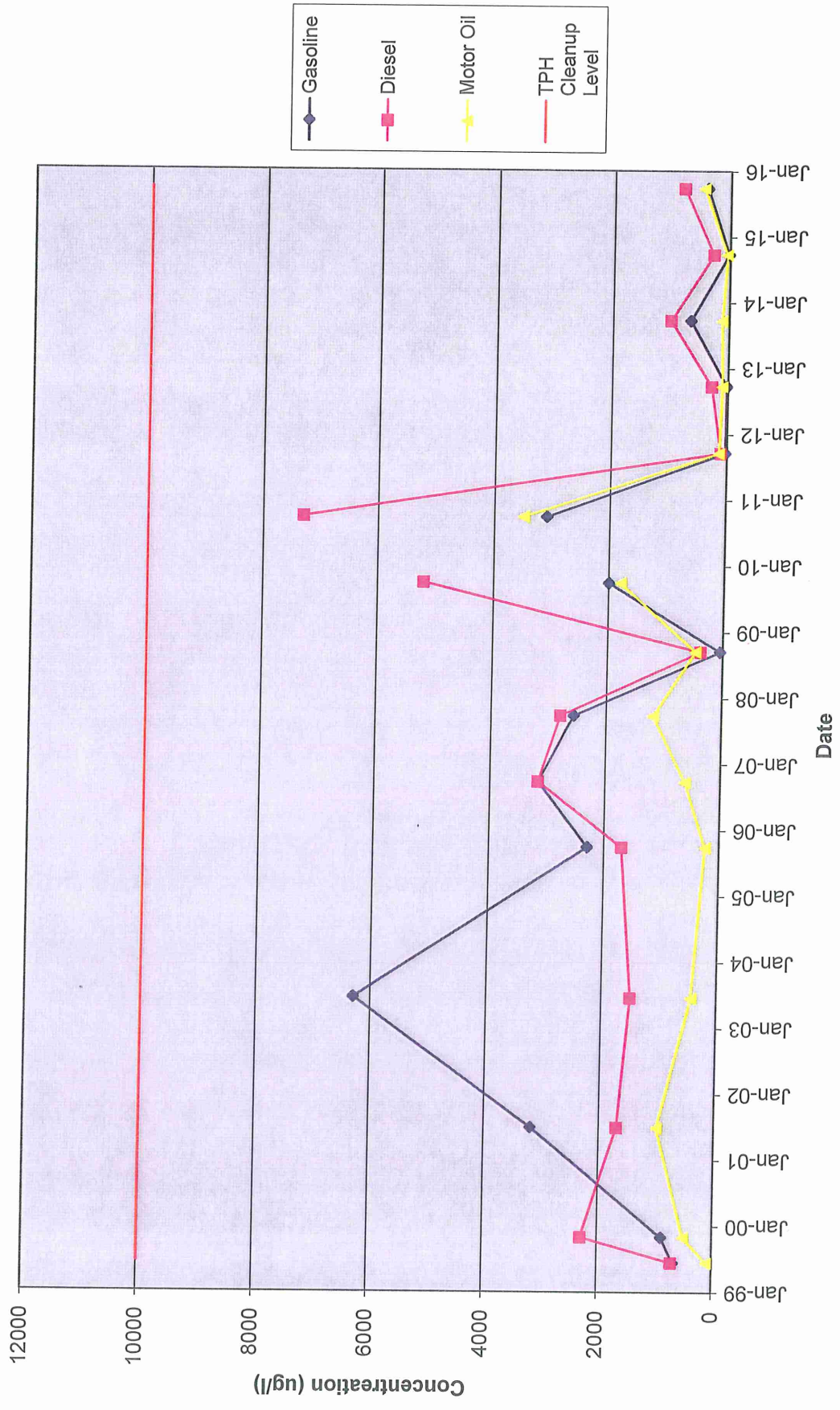


Figure 4 Mill E PCP Concentrations
in Groundwater Well PZ-3A
Non-detects plotted as 1/2 the reporting limit
Maximum concentration of 1,200 ug/l on 11/01/1999

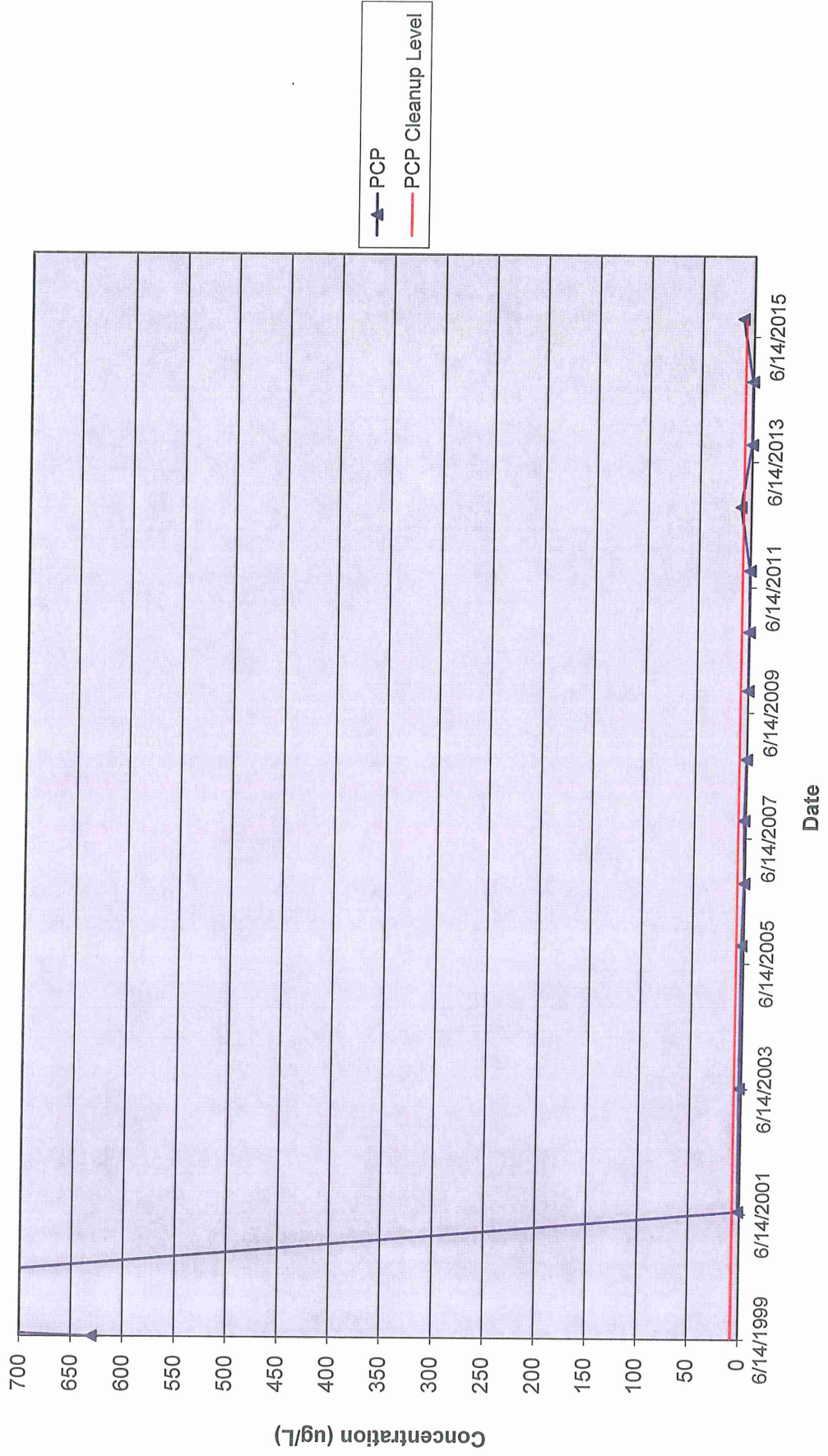
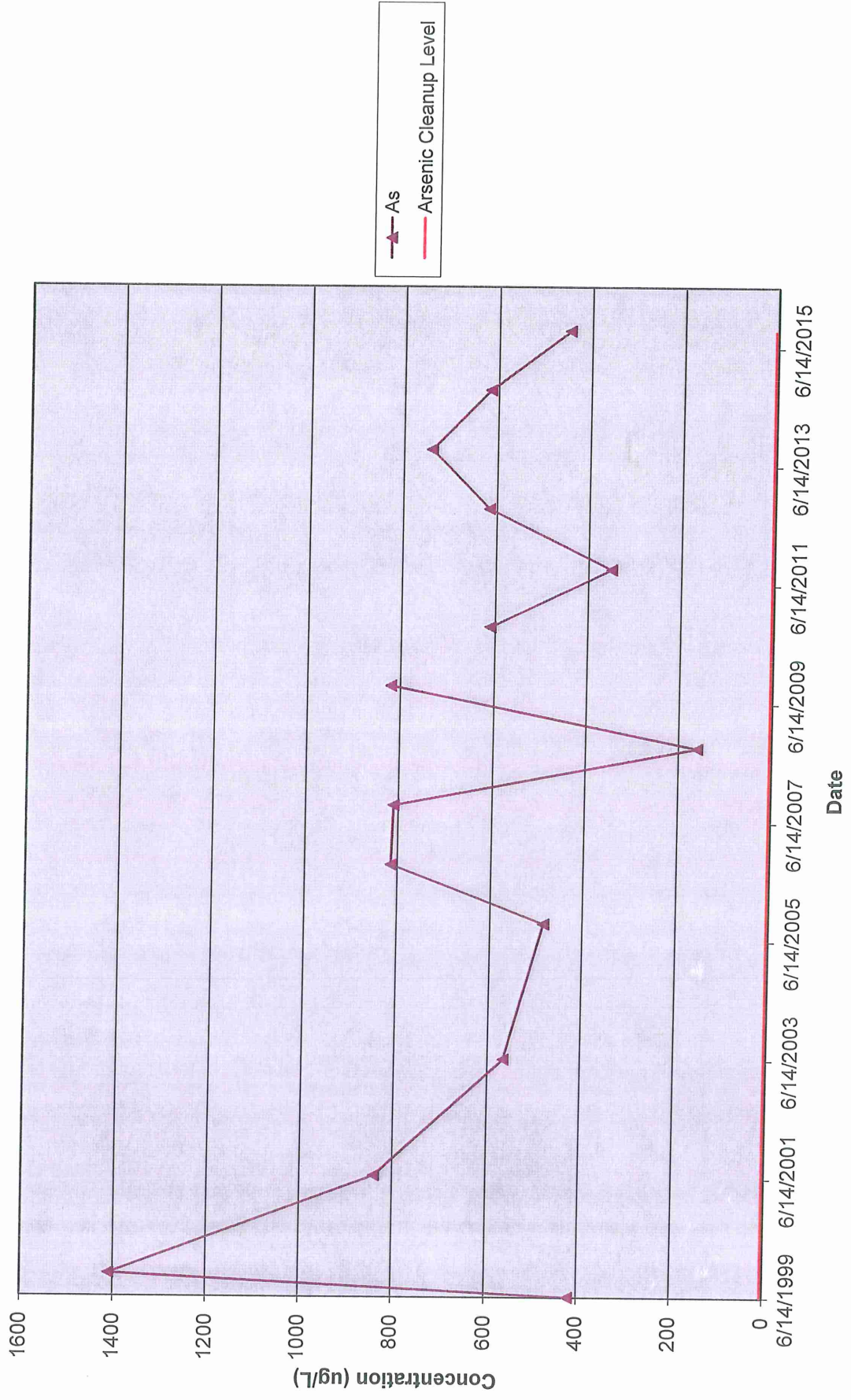
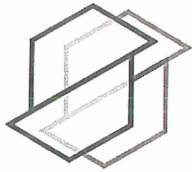


Figure 5 Mill E
Arsenic Concentrations in Groundwater Well PZ-3A





associated
earth sciences
incorporated

FIELD REPORT

911 Fifth Avenue
Kirkland, Washington 98033
Phone: 425-827-7701
Fax: 425- 827-5424

www.aesgeo.com

TO: Pacific Topsoil Inc.
805 80th Street SW
Everett, WA 98203

ATTN: Mr. Januz Bajsarowicz

Date 10/27/15	Project Name Mill E Site		Project No. KV050654
Location Riverside Business Park		Municipality Everett	Weather 60s, overcast rain
Permit No.	DPD No.	Report No. 7	
Engineer/Architect AESI			
Client/Owner			
Excavator			

Performance and Compliance Monitoring Plan Update

As part of the Mill E Performance and Compliance Monitoring Plan, Associated Earth Sciences, Inc. (AESI) arrived on site to observe the existing asphalt section and fill soil covering previously identified contaminated soils on site.

Matthew A. Miller, PE a professional engineer with our firm was on site and performed site observations. The property is currently vacant. During our site visit, the asphalt cap was observed to be in a serviceable condition with no obvious signs of cracking, fissures, or pumping. There are areas where shallow depressions were noted that result in bird baths on the asphalt. These are mainly in the areas noted previously. See Photos below looking towards the northeast to east at the entrance:

The soil cap to the south of the asphalt cap appeared intact and in our opinion is performing as intended.

AESI should be contacted if indications of pavement distress are observed before our next scheduled site visit.

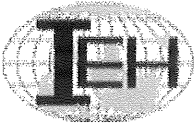


Copies To: _____

Field Rep: _____ 

Date Mailed: _____

Principal / PM: Matthew A. Miller, P.E.



IEH - Analytical Laboratories
 3927 Aurora Ave. N., Seattle, WA 98103 | (206) 632-2715

VOLATILE ORGANIC CHEMICAL REPORT

Results of Analysis by EPA Method 8260
 Measurement of Purgeable Organic Compounds by Capillary Column
 Gas Chromatography/Mass Spectrometry

Case File Number:	ASE00152A1	Matrix:	Water
Sample ID No.:	PZ-3A	Sample Wt/Vol. (gm/ml)	5.0
Date Collected:	09/28/15	Dilution Factor:	1
Date Received:	09/28/15	Analyst:	T. Meadows
Date Analyzed:	10/03/15	Supervisor's Initials:	DG
Date of Report:	10/05/15		
Data File Path:	C:\HPCHEM\1\DATA\VOA\151003\0601006.D		

CAS#	Name of Compound	Amount (ppb)	Flag	CAS#	Name of Compound	Amount (ppb)	Flag
71-43-2	Benzene	3.6			p/m-Xylene	7.6	
108-88-3	Toluene	2.0	U	95-47-6	o-Xylene	4.1	
100-41-4	Ethylbenzene	2.0	U		Total Xylene	11.6	

Amount
(mg/L)

TPH-G	0.40
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Surrogate Recoveries	%Rec.	QC limits	
		Water	Soil
Dibromofluoromethane	101%	66-118%	66-118%
Toluene-d8	93%	51-143%	51-143%
4-Bromofluorobenzene	96%	63 - 119	63 - 119%

FLAGS:

- U Indicates compound was analyzed for, but not detected at the specified detection limit.
- B Blank contaminated with this analyte.
- J Estimated value - compound positively identified, but below specified detection limit.
- E Estimated value - compound exceeded calibration range.
- D Compound analyzed at a secondary dilution factor of _____ from data file: _____
- PP Compound Purges Poorly, requiring elevated detection limit.

NOTE: ppb Amounts are in µg/L or µg/KG dry weight.



IEH ANALYTICAL LABORATORIES
 3927 Aurora Ave. N., Seattle, WA 98103 | (206) 632-2715

SEMI-VOLATILE ORGANIC CHEMICAL REPORT

Results of Analysis by EPA Method 8270
 Measurement of Extractable Organic Compounds in Water by Capillary Column
 Gas Chromatography/Mass Spectrometry

Case File Number:	ASE00152A1	Matrix:	Water
Sample ID No.:	PZ-03A	Sample Vol. (ml)	1070
Date Collected:	09/28/15	Final Volume (ml)	1.0
Date Received:	09/28/15	Dilution Factor:	1
Date Extracted:	10/02/15		
Date Analyzed:	10/19/15	Analyst:	T. Meadows
Date of Report:	10/20/15	Supervisor's Initials:	
Data File Path:	D:\5975 Data\8270\2015\101915\ 00601006.D		

CAS#	Name of Compound	Amount (ppb)	Flag
87-86-5	Pentachlorophenol	10.3	

FLAGS:

- U Indicates compound was analyzed for, but not detected at the specified detection limit.
- B Blank contaminated with this analyte.
- J Estimated value - compound positively identified, but below specified detection limit.
- E Estimated value - compound exceeded calibration range.
- D Compound analyzed at a secondary dilution factor of _____ from data file: _____
- PP Compound Purges Poorly, requiring elevated detection limit.

NOTE: ppm Amounts are in mg/L or mg/KG dry weight.

Surrogate Recoveries	%Rec.	QC limits	
		Water	Soil
2,4,6-Tribromophenol	91%	0-183%	65-135%



IEH ANALYTICAL LABORATORIES

LABORATORY & CONSULTING SERVICES

3927 AURORA AVENUE NORTH, SEATTLE, WA 98103

PHONE: (206) 632-2715 FAX: (206) 632-2417

CASE FILE NUMBER: ASE001-52

PAGE 1

REPORT DATE: 10/22/15

DATE SAMPLED: 09/28/15

DATE RECEIVED: 09/28/15

FINAL REPORT, LABORATORY ANALYSIS OF SELECTED PARAMETERS ON WATER

SAMPLES FROM ASSOCIATED EARTH SCIENCES, INC

CASE NARRATIVE

One water sample was received by the laboratory in good condition and analyzed according to the chain of custody. No difficulties were encountered in the preparation or analysis of this sample. Sample data follows while QA/QC data is contained on subsequent pages.

SAMPLE DATA

	NWTPH-DX		
SAMPLE ID	DIESEL (mg/L)	MOTOR OIL (mg/L)	TOTAL ARSENIC (ug/L)
PZ-3A	0.80	0.46	446



IEH ANALYTICAL LABORATORIES

LABORATORY & CONSULTING SERVICES

3927 AURORA AVENUE NORTH, SEATTLE, WA 98103

PHONE: (206) 632-2715 FAX: (206) 632-2417

CASE FILE NUMBER:	ASE001-52	PAGE 2
REPORT DATE:	10/22/15	
DATE SAMPLED:	09/28/15	DATE RECEIVED: 09/28/15
FINAL REPORT, LABORATORY ANALYSIS OF SELECTED PARAMETERS ON WATER		
SAMPLES FROM ASSOCIATED EARTH SCIENCES, INC		

QA/QC DATA

QC PARAMETER	DIESEL (mg/L)	MOTOR OIL (mg/L)	TOTAL ARSENIC (ug/L)
METHOD	NWTPH-DX	NWTPH-DX	EPA 6020
DATE ANALYZED	09/28/15	09/28/15	10/06/15
DETECTION LIMIT	0.05	0.10	2.0
DUPLICATE			
SAMPLE ID			BATCH
ORIGINAL			<2.0
DUPLICATE			<2.0
RPD	NA	NA	NC
SPIKE SAMPLE			
SAMPLE ID			BATCH
ORIGINAL			<2.0
SPIKED SAMPLE			50.2
SPIKE ADDED			50.0
% RECOVERY	NA	NA	100.40%
QC CHECK			
FOUND	0.92	1.92	46.7
TRUE	1.00	2.00	50.0
% RECOVERY	92.00%	96.00%	93.40%
PREP BLANK	<0.05	<0.10	<2.0

RPD = RELATIVE PERCENT DIFFERENCE.

NA = NOT APPLICABLE OR NOT AVAILABLE.

NC = NOT CALCULABLE DUE TO ONE OR MORE VALUES BEING BELOW THE DETECTION LIMIT.

OR = RECOVERY NOT CALCULABLE DUE TO SPIKE SAMPLE OUT OF RANGE OR SPIKE TOO LOW RELATIVE TO SAMPLE CONCENTRATION.

SUBMITTED BY:

Damien Gadomski
Project Manager

