



## Glossary of Terms & Qualifier Definitions

**Client:** AEW Engineering, Inc.  
**Project:** 2014-003; Dunphy Park Stockpile  
**WorkOrder:** 1904909 A

### Glossary Abbreviation

%D	Serial Dilution Percent Difference
95% Interval	95% Confident Interval
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 µm filtered and acidified water sample)
DLT	Dilution Test (Serial Dilution)
DUP	Duplicate
EDL	Estimated Detection Limit
ERS	External reference sample. Second source calibration verification.
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
N/A	Not Applicable
ND	Not detected at or above the indicated MDL or RL
NR	Data Not Reported due to matrix interference or insufficient sample amount.
PDS	Post Digestion Spike
PDSD	Post Digestion Spike Duplicate
PF	Prep Factor
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
ST	Sorbent Tube
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxicity Equivalents
TZA	TimeZone Net Adjustment for sample collected outside of MAI's UTC.
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)



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1534 Willow Pass Road, Pittsburg, CA 94565-1701  
 Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269  
 http://www.mcccampbell.com / E-mail: main@mcccampbell.com

## Analytical Report

**Client:** AEW Engineering, Inc.  
**Date Received:** 4/18/19 11:50  
**Date Prepared:** 4/27/19  
**Project:** 2014-003; Dunphy Park Stockpile

**WorkOrder:** 1904909  
**Extraction Method:** CA Title 22  
**Analytical Method:** SW6020  
**Unit:** mg/L

### Metals (STLC)

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 4	1904909-006A	Soil	04/18/2019 10:35	ICP-MS3 105SMPL.D	176945

Analytes	Result	RL	DF	Date Analyzed
Chromium	0.18	0.10	1	04/29/2019 19:45
Copper	4.5	0.10	1	04/29/2019 19:45
Lead	16	0.10	1	04/29/2019 19:45
Nickel	0.63	0.10	1	04/29/2019 19:45

**Analyst(s):** DB



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**WorkOrder:** 1904909  
**Extraction Method:** CA Title 22  
**Analytical Method:** SW6020  
**Unit:** mg/L

### Metals (STLC)

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 1	1904909-003A	Soil	04/18/2019 10:05	ICP-MS3 109SMPL.D	176945

<u>Analytes</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
Chromium	0.20	0.10	1	04/29/2019 20:09
Lead	15	0.10	1	04/29/2019 20:09

Analyst(s): DB

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 2	1904909-004A	Soil	04/18/2019 10:15	ICP-MS3 119SMPL.D	176945

<u>Analytes</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
Chromium	0.22	0.10	1	04/29/2019 21:11
Lead	28	0.10	1	04/29/2019 21:11

Analyst(s): DB

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 3	1904909-005A	Soil	04/18/2019 10:25	ICP-MS3 120SMPL.D	176945

<u>Analytes</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
Chromium	0.23	0.10	1	04/29/2019 21:17
Lead	22	0.10	1	04/29/2019 21:17

Analyst(s): DB



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## Analytical Report

**Client:** AEW Engineering, Inc.  
**Date Received:** 4/18/19 11:50  
**Date Prepared:** 4/28/19  
**Project:** 2014-003; Dunphy Park Stockpile

**WorkOrder:** 1904909  
**Extraction Method:** SW1311/SW3010  
**Analytical Method:** SW6020  
**Unit:** mg/L

### Metals (TCLP)

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 1	1904909-003A	Soil	04/18/2019 10:05	ICP-MS3 098SMPL.D	176952

<u>Analytes</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
Lead	0.19	0.10	1	04/29/2019 19:02

Analyst(s): DB

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 2	1904909-004A	Soil	04/18/2019 10:15	ICP-MS3 099SMPL.D	176952

<u>Analytes</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
Lead	0.86	0.10	1	04/29/2019 19:08

Analyst(s): DB

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 3	1904909-005A	Soil	04/18/2019 10:25	ICP-MS3 100SMPL.D	176952

<u>Analytes</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
Lead	0.47	0.10	1	04/29/2019 19:14

Analyst(s): DB

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 4	1904909-006A	Soil	04/18/2019 10:35	ICP-MS3 101SMPL.D	176952

<u>Analytes</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
Lead	0.17	0.10	1	04/29/2019 19:20

Analyst(s): DB





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## Quality Control Report

**Client:** AEW Engineering, Inc.

**Date Prepared:** 4/27/19

**Date Analyzed:** 4/29/19

**Instrument:** ICP-MS3

**Matrix:** Soil

**Project:** 2014-003; Dunphy Park Stockpile

**WorkOrder:** 1904909

**BatchID:** 176945

**Extraction Method:** CA Title 22

**Analytical Method:** SW6020

**Unit:** mg/L

**Sample ID:** MB/LCS/LCSD-176945

### QC Summary Report for Metals (STLC)

Analyte	MB Result	MDL	RL			
Chromium	ND	0.10	0.10	-	-	-
Copper	ND	0.10	0.10	-	-	-
Lead	ND	0.10	0.10	-	-	-
Nickel	ND	0.10	0.10	-	-	-

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Chromium	9.6	9.5	10	96	95	75-125	1.13	20
Copper	9.8	9.6	10	98	96	75-125	2.50	20
Lead	10	9.8	10	100	98	75-125	2.15	20
Nickel	9.7	9.4	10	97	94	75-125	2.80	20



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<b>Client:</b> AEW Engineering, Inc.	<b>WorkOrder:</b> 1904909
<b>Date Prepared:</b> 4/28/19	<b>BatchID:</b> 176952
<b>Date Analyzed:</b> 4/29/19	<b>Extraction Method:</b> SW1311/SW3010
<b>Instrument:</b> ICP-MS3	<b>Analytical Method:</b> SW6020
<b>Matrix:</b> Soil	<b>Unit:</b> mg/L
<b>Project:</b> 2014-003; Dunphy Park Stockpile	<b>Sample ID:</b> MB/LCS/LCSD-176952

### QC Summary Report for Metals (TCLP)

Analyte	MB Result	MDL	RL			
Lead	ND	0.10	0.10	-	-	-

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Lead	9.7	10	10	97	103	75-125	5.99	20

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# CHAIN-OF-CUSTODY RECORD

**WorkOrder: 1904909 A**      **ClientCode: AEW**

WaterTrax     WriteOn     EDF

Excel     EQulS     Email     HardCopy     ThirdParty     J-flag

Detection Summary     Dry-Weight

**Report to:**

Randy Young  
AEW Engineering, Inc.  
55 New Montgomery St, Ste 722  
San Francisco, CA 94105  
(415) 495-8401    FAX: (415) 358-5598

Email: ryoung@aeweng.com  
cc/3rd Party:  
PO:  
Project: 2014-003; Dunphy Park Stockpile

**Bill to:**

Kenneth Leung  
AEW Engineering, Inc.  
55 New Montgomery St, Ste 507  
San Francisco, CA 94105  
kleung@aeweng.com; byeung@aeweng

**Requested TAT: 5 days;**

**Date Received: 04/18/2019**

**Date Logged: 04/18/2019**

**Date Add-On: 04/26/2019**

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below)											
					1	2	3	4	5	6	7	8	9	10	11	12
1904909-003	DP Stockpile Comp 1	Soil	4/18/2019 10:05	<input type="checkbox"/>		A	A									
1904909-004	DP Stockpile Comp 2	Soil	4/18/2019 10:15	<input type="checkbox"/>		A	A									
1904909-005	DP Stockpile Comp 3	Soil	4/18/2019 10:25	<input type="checkbox"/>		A	A									
1904909-006	DP Stockpile Comp 4	Soil	4/18/2019 10:35	<input type="checkbox"/>	A		A									

**Test Legend:**

1	METALSMS_STLC_S	2	PBCRMS_STLC_S	3	PBMS_TCLP_S	4	
5		6		7		8	
9		10		11		12	

**Project Manager: Heidi Fruhlinger**

**Prepared by: Agustina Venegas**

**Add-On Prepared By: Maria Venegas**

**Comments:** Hold all soil samples for 6mos per Ken Leung 3/14/14. New Comps added 4/24/19, Metals on 1 day TAT rest STAT. STLCs & TCLPs added 4/26/19 STAT.

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days). Hazardous samples will be returned to client or disposed of at client expense.



### WORK ORDER SUMMARY

**Client Name:** AEW ENGINEERING, INC.

**Project:** 2014-003; Dunphy Park Stockpile

**Work Order:** 1904909

**Client Contact:** Randy Young

**QC Level:** LEVEL 2

**Contact's Email:** ryoung@aeweng.com

**Comments:** Hold all soil samples for 6mos per Ken Leung 3/14/14. New Comps added 4/24/19, Metals on 1 day TAT rest STAT. STLCs & TCLPs added 4/26/19 STAT

**Date Logged:** 4/18/2019

**Date Add-On:** 4/26/2019

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1904909-003A	DP Stockpile Comp 1	Soil	SW6020 (Lead) (TCLP)	2 / (2:1)	Stainless Steel tube 2"x6"	4/18/2019 10:05	5 days*		<input type="checkbox"/>	
			SW6020 (Chromium & Lead) (STLC)							
1904909-004A	DP Stockpile Comp 2	Soil	SW6020 (Lead) (TCLP)	2 / (2:1)	Stainless Steel tube 2"x6"	4/18/2019 10:15	5 days*		<input type="checkbox"/>	
			SW6020 (Chromium & Lead) (STLC)							
1904909-005A	DP Stockpile Comp 3	Soil	SW6020 (Lead) (TCLP)	2 / (2:1)	Stainless Steel tube 2"x6"	4/18/2019 10:25	5 days*		<input type="checkbox"/>	
			SW6020 (Chromium & Lead) (STLC)							
1904909-006A	DP Stockpile Comp 4	Soil	SW6020 (Lead) (TCLP)	2 / (2:1)	Stainless Steel tube 2"x6"	4/18/2019 10:35	5 days*		<input type="checkbox"/>	
			SW6020 (Metals) (STLC) <Chromium, Copper, Lead, Nickel>							

**NOTES:** - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.

1904909

**RUSH!**

<b>AEW ENGINEERING, INC.</b> 55 New Montgomery Street, Suite 722, San Francisco, CA 94105 Telephone: (415) 495-8422 Fax: (415) 358-5598				CHAIN OF CUSTODY RECORD <span style="float: right;">Page <u>1</u> of <u>1</u></span>																																																																																																																																																																																																																																																																																															
Date: <u>4/18/19</u>				<b>TURN AROUND TIME</b> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> Others: <b>LABORATORY:</b> <u>McC Campbell Analytical</u> <span style="margin-left: 20px;">24 Hours</span> <span style="margin-left: 20px;">48 Hours</span> <span style="margin-left: 20px;">1 Week</span> <span style="margin-left: 20px;">Normal</span>																																																																																																																																																																																																																																																																																															
Report To: <u>Randall Young</u> Email: <u>ryoung@aeweng.com</u> Company: <u>AEW Engineering</u> Project No.: <u>2014-003</u> Project Name: <u>Dunphy Park Stockpile</u> Location: <u>Sausalito</u> Sampler: <u>Randall Young</u> Sampler's Phone Number: <u>415-290-6093</u> Sampler Signature: <u>Randall Young</u> Bill To:				Analysis Request																																																																																																																																																																																																																																																																																															
Reporting Requirement: Hard Copy: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Electronic: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> PDF File: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Electronic: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>				<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">SAMPLE ID</th> <th rowspan="2">LOCATION</th> <th colspan="2">Sampling</th> <th rowspan="2"># of Containers</th> <th rowspan="2">Type of Container</th> <th colspan="5">Matrix</th> <th colspan="4">Method Preserved</th> <th rowspan="2">TPH - Gas, BTEX, &amp; MTBE (EPA 8015 Mod)</th> <th rowspan="2">TPH-Diesel &amp; Motor Oil - Silica Gel Cleanup (8015 Mod)</th> <th rowspan="2">SVOCs Full List (EPA 8270c) with GPC cleanup to achieve ESLs criteria</th> <th rowspan="2">Organochlorine Pesticides &amp; PCBs with Florisil Cleanup (EPA 8081/8082)</th> <th rowspan="2">CVM 17 Metals (EPA 6000/7600 Series)</th> <th rowspan="2">Asbestos (CARB Method 435)</th> <th colspan="5">Analysis Request</th> <th rowspan="2">Other</th> <th rowspan="2">Comments</th> </tr> <tr> <th>Date</th> <th>Time</th> <th>Water</th> <th>Soil</th> <th>Air</th> <th>Sludge</th> <th>Other</th> <th>Ice</th> <th>HCl</th> <th>HNO<sub>3</sub></th> <th>Other</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>DP-1</td> <td>Sausalito</td> <td>4/18/19</td> <td>10:00</td> <td>1</td> <td>SS Liner</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td rowspan="8">           Need to Achieve Residential ESLs.         </td> </tr> <tr> <td>DP-2</td> <td>Sausalito</td> <td>4/18/19</td> <td>10:05</td> <td>1</td> <td>SS Liner</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>DP-3</td> <td>Sausalito</td> <td>4/18/19</td> <td>10:10</td> <td>1</td> <td>SS Liner</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>DP-4</td> <td>Sausalito</td> <td>4/18/19</td> <td>10:15</td> <td>1</td> <td>SS Liner</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>DP-5</td> <td>Sausalito</td> <td>4/18/19</td> <td>10:20</td> <td>1</td> <td>SS Liner</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>DP-6</td> <td>Sausalito</td> <td>4/18/19</td> <td>10:25</td> <td>1</td> <td>SS Liner</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>DP-7</td> <td>Sausalito</td> <td>4/18/19</td> <td>10:30</td> <td>1</td> <td>SS Liner</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>DP-8</td> <td>Sausalito</td> <td>4/18/19</td> <td>10:35</td> <td>1</td> <td>SS Liner</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		SAMPLE ID	LOCATION	Sampling		# of Containers	Type of Container	Matrix					Method Preserved				TPH - Gas, BTEX, & MTBE (EPA 8015 Mod)	TPH-Diesel & Motor Oil - Silica Gel Cleanup (8015 Mod)	SVOCs Full List (EPA 8270c) with GPC cleanup to achieve ESLs criteria	Organochlorine Pesticides & PCBs with Florisil Cleanup (EPA 8081/8082)	CVM 17 Metals (EPA 6000/7600 Series)	Asbestos (CARB Method 435)	Analysis Request					Other	Comments	Date	Time	Water	Soil	Air	Sludge	Other	Ice	HCl	HNO <sub>3</sub>	Other							DP-1	Sausalito	4/18/19	10:00	1	SS Liner	X					X																			Need to Achieve Residential ESLs.	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DP-5	Sausalito	4/18/19	10:20			1	SS Liner	X					X																																																																																																																																																																																																																																																																																						
DP-6	Sausalito	4/18/19	10:25			1	SS Liner	X					X																																																																																																																																																																																																																																																																																						
DP-7	Sausalito	4/18/19	10:30	1	SS Liner	X					X																																																																																																																																																																																																																																																																																								
DP-8	Sausalito	4/18/19	10:35	1	SS Liner	X					X																																																																																																																																																																																																																																																																																								
Relinquished By: <u>Randall Young</u> Date: <u>4/18/19</u> Time: <u>9:15</u> Received By: <u>[Signature]</u>				Need to achieve Residential ESLs. Please run all applicable clean-ups to achieve residential ESLs. Please do not dilute the samples.																																																																																																																																																																																																																																																																																															
Relinquished By: _____ Date: _____ Time: _____ Received By: _____				Hold samples for six months and call prior to disposal.																																																																																																																																																																																																																																																																																															
Relinquished By: _____ Date: _____ Time: _____ Received By: _____				* Run metals on 24 hr turn-around-time. ** Sub asbestos analyses to Forensic Analytical																																																																																																																																																																																																																																																																																															

Added 4/26/19 STAT

Samples off HOLD 4/24/19



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## **Analytical Report**

**WorkOrder:** 1904909 B

**Report Created for:** AEW Engineering, Inc.

55 New Montgomery St, Ste 722  
San Francisco, CA 94105

**Project Contact:** Randy Young

**Project P.O.:**

**Project:** 2014-003; Dunphy Park Stockpile

**Project Received:** 04/18/2019

Analytical Report reviewed & approved for release on 05/02/2019 by:

Jennifer Lagerbom  
Project Manager

*The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.*







## Glossary of Terms & Qualifier Definitions

**Client:** AEW Engineering, Inc.  
**Project:** 2014-003; Dunphy Park Stockpile  
**WorkOrder:** 1904909 B

### Glossary Abbreviation

%D	Serial Dilution Percent Difference
95% Interval	95% Confident Interval
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 µm filtered and acidified water sample)
DLT	Dilution Test (Serial Dilution)
DUP	Duplicate
EDL	Estimated Detection Limit
ERS	External reference sample. Second source calibration verification.
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
N/A	Not Applicable
ND	Not detected at or above the indicated MDL or RL
NR	Data Not Reported due to matrix interference or insufficient sample amount.
PDS	Post Digestion Spike
PDSD	Post Digestion Spike Duplicate
PF	Prep Factor
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
ST	Sorbent Tube
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxicity Equivalents
TZA	TimeZone Net Adjustment for sample collected outside of MAI's UTC.
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)



## Glossary of Terms & Qualifier Definitions

**Client:** AEW Engineering, Inc.  
**Project:** 2014-003; Dunphy Park Stockpile  
**WorkOrder:** 1904909 B

### Quality Control Qualifiers

F1 MS/MSD recovery and/or RPD is out of acceptance criteria; LCS validates the prep batch.





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<http://www.mccampbell.com> / E-mail: [main@mccampbell.com](mailto:main@mccampbell.com)

## Analytical Report

**Client:** AEW Engineering, Inc.  
**Date Received:** 4/18/19 11:50  
**Date Prepared:** 4/30/19  
**Project:** 2014-003; Dunphy Park Stockpile

**WorkOrder:** 1904909  
**Extraction Method:** SW5030B  
**Analytical Method:** SW8260B  
**Unit:** mg/kg

### Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 2	1904909-004A	Soil	04/18/2019 10:15	GC10 05011917.D	177048
Analytes	Result	RL	DF	Date Analyzed	
Acetone	ND	0.10	1	05/01/2019 17:43	
tert-Amyl methyl ether (TAME)	ND	0.0050	1	05/01/2019 17:43	
Benzene	ND	0.0050	1	05/01/2019 17:43	
Bromobenzene	ND	0.0050	1	05/01/2019 17:43	
Bromochloromethane	ND	0.0050	1	05/01/2019 17:43	
Bromodichloromethane	ND	0.0050	1	05/01/2019 17:43	
Bromoform	ND	0.0050	1	05/01/2019 17:43	
Bromomethane	ND	0.0050	1	05/01/2019 17:43	
2-Butanone (MEK)	ND	0.050	1	05/01/2019 17:43	
t-Butyl alcohol (TBA)	ND	0.050	1	05/01/2019 17:43	
n-Butyl benzene	ND	0.0050	1	05/01/2019 17:43	
sec-Butyl benzene	ND	0.0050	1	05/01/2019 17:43	
tert-Butyl benzene	ND	0.0050	1	05/01/2019 17:43	
Carbon Disulfide	ND	0.0050	1	05/01/2019 17:43	
Carbon Tetrachloride	ND	0.0050	1	05/01/2019 17:43	
Chlorobenzene	ND	0.0050	1	05/01/2019 17:43	
Chloroethane	ND	0.0050	1	05/01/2019 17:43	
Chloroform	ND	0.0050	1	05/01/2019 17:43	
Chloromethane	ND	0.0050	1	05/01/2019 17:43	
2-Chlorotoluene	ND	0.0050	1	05/01/2019 17:43	
4-Chlorotoluene	ND	0.0050	1	05/01/2019 17:43	
Dibromochloromethane	ND	0.0050	1	05/01/2019 17:43	
1,2-Dibromo-3-chloropropane	ND	0.0050	1	05/01/2019 17:43	
1,2-Dibromoethane (EDB)	ND	0.0040	1	05/01/2019 17:43	
Dibromomethane	ND	0.0050	1	05/01/2019 17:43	
1,2-Dichlorobenzene	ND	0.0050	1	05/01/2019 17:43	
1,3-Dichlorobenzene	ND	0.0050	1	05/01/2019 17:43	
1,4-Dichlorobenzene	ND	0.0050	1	05/01/2019 17:43	
Dichlorodifluoromethane	ND	0.0050	1	05/01/2019 17:43	
1,1-Dichloroethane	ND	0.0050	1	05/01/2019 17:43	
1,2-Dichloroethane (1,2-DCA)	ND	0.0040	1	05/01/2019 17:43	
1,1-Dichloroethene	ND	0.0050	1	05/01/2019 17:43	
cis-1,2-Dichloroethene	ND	0.0050	1	05/01/2019 17:43	
trans-1,2-Dichloroethene	ND	0.0050	1	05/01/2019 17:43	
1,2-Dichloropropane	ND	0.0050	1	05/01/2019 17:43	
1,3-Dichloropropane	ND	0.0050	1	05/01/2019 17:43	
2,2-Dichloropropane	ND	0.0050	1	05/01/2019 17:43	

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## Analytical Report

**Client:** AEW Engineering, Inc.  
**Date Received:** 4/18/19 11:50  
**Date Prepared:** 4/30/19  
**Project:** 2014-003; Dunphy Park Stockpile

**WorkOrder:** 1904909  
**Extraction Method:** SW5030B  
**Analytical Method:** SW8260B  
**Unit:** mg/kg

### Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 2	1904909-004A	Soil	04/18/2019 10:15	GC10 05011917.D	177048
Analytes	Result	RL	DF	Date Analyzed	
1,1-Dichloropropene	ND	0.0050	1	05/01/2019 17:43	
cis-1,3-Dichloropropene	ND	0.0050	1	05/01/2019 17:43	
trans-1,3-Dichloropropene	ND	0.0050	1	05/01/2019 17:43	
Diisopropyl ether (DIPE)	ND	0.0050	1	05/01/2019 17:43	
Ethylbenzene	ND	0.0050	1	05/01/2019 17:43	
Ethyl tert-butyl ether (ETBE)	ND	0.0050	1	05/01/2019 17:43	
Freon 113	ND	0.0050	1	05/01/2019 17:43	
Hexachlorobutadiene	ND	0.0050	1	05/01/2019 17:43	
Hexachloroethane	ND	0.0050	1	05/01/2019 17:43	
2-Hexanone	ND	0.0050	1	05/01/2019 17:43	
Isopropylbenzene	ND	0.0050	1	05/01/2019 17:43	
4-Isopropyl toluene	ND	0.0050	1	05/01/2019 17:43	
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	05/01/2019 17:43	
Methylene chloride	ND	0.020	1	05/01/2019 17:43	
4-Methyl-2-pentanone (MIBK)	ND	0.0050	1	05/01/2019 17:43	
Naphthalene	ND	0.0050	1	05/01/2019 17:43	
n-Propyl benzene	ND	0.0050	1	05/01/2019 17:43	
Styrene	ND	0.0050	1	05/01/2019 17:43	
1,1,1,2-Tetrachloroethane	ND	0.0050	1	05/01/2019 17:43	
1,1,2,2-Tetrachloroethane	ND	0.0050	1	05/01/2019 17:43	
Tetrachloroethene	ND	0.0050	1	05/01/2019 17:43	
Toluene	ND	0.0050	1	05/01/2019 17:43	
1,2,3-Trichlorobenzene	ND	0.0050	1	05/01/2019 17:43	
1,2,4-Trichlorobenzene	ND	0.0050	1	05/01/2019 17:43	
1,1,1-Trichloroethane	ND	0.0050	1	05/01/2019 17:43	
1,1,2-Trichloroethane	ND	0.0050	1	05/01/2019 17:43	
Trichloroethene	ND	0.0050	1	05/01/2019 17:43	
Trichlorofluoromethane	ND	0.0050	1	05/01/2019 17:43	
1,2,3-Trichloropropane	ND	0.0050	1	05/01/2019 17:43	
1,2,4-Trimethylbenzene	ND	0.0050	1	05/01/2019 17:43	
1,3,5-Trimethylbenzene	ND	0.0050	1	05/01/2019 17:43	
Vinyl Chloride	ND	0.0050	1	05/01/2019 17:43	
m,p-Xylene	ND	0.0050	1	05/01/2019 17:43	
o-Xylene	ND	0.0050	1	05/01/2019 17:43	
Xylenes, Total	ND	0.0050	1	05/01/2019 17:43	

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**Project:** 2014-003; Dunphy Park Stockpile

**WorkOrder:** 1904909  
**Extraction Method:** SW5030B  
**Analytical Method:** SW8260B  
**Unit:** mg/kg

### Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 2	1904909-004A	Soil	04/18/2019 10:15	GC10 05011917.D	177048

Analytes	Result	RL	DF	Date Analyzed
<u>Surrogates</u>	<u>REC (%)</u>		<u>Limits</u>	
Dibromofluoromethane	92		66-116	05/01/2019 17:43
Toluene-d8	107		86-110	05/01/2019 17:43
4-BFB	112		71-114	05/01/2019 17:43
Benzene-d6	89		62-122	05/01/2019 17:43
Ethylbenzene-d10	108		69-130	05/01/2019 17:43
1,2-DCB-d4	81		55-108	05/01/2019 17:43

**Analyst(s):** HK

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**Extraction Method:** SW5030B  
**Analytical Method:** SW8260B  
**Unit:** mg/kg

### Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 3	1904909-005A	Soil	04/18/2019 10:25	GC10 05011916.D	177048

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	0.10	1	05/01/2019 17:02
tert-Amyl methyl ether (TAME)	ND	0.0050	1	05/01/2019 17:02
Benzene	ND	0.0050	1	05/01/2019 17:02
Bromobenzene	ND	0.0050	1	05/01/2019 17:02
Bromochloromethane	ND	0.0050	1	05/01/2019 17:02
Bromodichloromethane	ND	0.0050	1	05/01/2019 17:02
Bromoform	ND	0.0050	1	05/01/2019 17:02
Bromomethane	ND	0.0050	1	05/01/2019 17:02
2-Butanone (MEK)	ND	0.050	1	05/01/2019 17:02
t-Butyl alcohol (TBA)	ND	0.050	1	05/01/2019 17:02
n-Butyl benzene	ND	0.0050	1	05/01/2019 17:02
sec-Butyl benzene	ND	0.0050	1	05/01/2019 17:02
tert-Butyl benzene	ND	0.0050	1	05/01/2019 17:02
Carbon Disulfide	ND	0.0050	1	05/01/2019 17:02
Carbon Tetrachloride	ND	0.0050	1	05/01/2019 17:02
Chlorobenzene	ND	0.0050	1	05/01/2019 17:02
Chloroethane	ND	0.0050	1	05/01/2019 17:02
Chloroform	ND	0.0050	1	05/01/2019 17:02
Chloromethane	ND	0.0050	1	05/01/2019 17:02
2-Chlorotoluene	ND	0.0050	1	05/01/2019 17:02
4-Chlorotoluene	ND	0.0050	1	05/01/2019 17:02
Dibromochloromethane	ND	0.0050	1	05/01/2019 17:02
1,2-Dibromo-3-chloropropane	ND	0.0050	1	05/01/2019 17:02
1,2-Dibromoethane (EDB)	ND	0.0040	1	05/01/2019 17:02
Dibromomethane	ND	0.0050	1	05/01/2019 17:02
1,2-Dichlorobenzene	ND	0.0050	1	05/01/2019 17:02
1,3-Dichlorobenzene	ND	0.0050	1	05/01/2019 17:02
1,4-Dichlorobenzene	ND	0.0050	1	05/01/2019 17:02
Dichlorodifluoromethane	ND	0.0050	1	05/01/2019 17:02
1,1-Dichloroethane	ND	0.0050	1	05/01/2019 17:02
1,2-Dichloroethane (1,2-DCA)	ND	0.0040	1	05/01/2019 17:02
1,1-Dichloroethene	ND	0.0050	1	05/01/2019 17:02
cis-1,2-Dichloroethene	ND	0.0050	1	05/01/2019 17:02
trans-1,2-Dichloroethene	ND	0.0050	1	05/01/2019 17:02
1,2-Dichloropropane	ND	0.0050	1	05/01/2019 17:02
1,3-Dichloropropane	ND	0.0050	1	05/01/2019 17:02
2,2-Dichloropropane	ND	0.0050	1	05/01/2019 17:02

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**Project:** 2014-003; Dunphy Park Stockpile

**WorkOrder:** 1904909  
**Extraction Method:** SW5030B  
**Analytical Method:** SW8260B  
**Unit:** mg/kg

### Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 3	1904909-005A	Soil	04/18/2019 10:25	GC10 05011916.D	177048
Analytes	Result	RL	DF	Date Analyzed	
1,1-Dichloropropene	ND	0.0050	1	05/01/2019 17:02	
cis-1,3-Dichloropropene	ND	0.0050	1	05/01/2019 17:02	
trans-1,3-Dichloropropene	ND	0.0050	1	05/01/2019 17:02	
Diisopropyl ether (DIPE)	ND	0.0050	1	05/01/2019 17:02	
Ethylbenzene	ND	0.0050	1	05/01/2019 17:02	
Ethyl tert-butyl ether (ETBE)	ND	0.0050	1	05/01/2019 17:02	
Freon 113	ND	0.0050	1	05/01/2019 17:02	
Hexachlorobutadiene	ND	0.0050	1	05/01/2019 17:02	
Hexachloroethane	ND	0.0050	1	05/01/2019 17:02	
2-Hexanone	ND	0.0050	1	05/01/2019 17:02	
Isopropylbenzene	ND	0.0050	1	05/01/2019 17:02	
4-Isopropyl toluene	ND	0.0050	1	05/01/2019 17:02	
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	05/01/2019 17:02	
Methylene chloride	ND	0.020	1	05/01/2019 17:02	
4-Methyl-2-pentanone (MIBK)	ND	0.0050	1	05/01/2019 17:02	
Naphthalene	ND	0.0050	1	05/01/2019 17:02	
n-Propyl benzene	ND	0.0050	1	05/01/2019 17:02	
Styrene	ND	0.0050	1	05/01/2019 17:02	
1,1,1,2-Tetrachloroethane	ND	0.0050	1	05/01/2019 17:02	
1,1,2,2-Tetrachloroethane	ND	0.0050	1	05/01/2019 17:02	
Tetrachloroethene	ND	0.0050	1	05/01/2019 17:02	
Toluene	ND	0.0050	1	05/01/2019 17:02	
1,2,3-Trichlorobenzene	ND	0.0050	1	05/01/2019 17:02	
1,2,4-Trichlorobenzene	ND	0.0050	1	05/01/2019 17:02	
1,1,1-Trichloroethane	ND	0.0050	1	05/01/2019 17:02	
1,1,2-Trichloroethane	ND	0.0050	1	05/01/2019 17:02	
Trichloroethene	ND	0.0050	1	05/01/2019 17:02	
Trichlorofluoromethane	ND	0.0050	1	05/01/2019 17:02	
1,2,3-Trichloropropane	ND	0.0050	1	05/01/2019 17:02	
1,2,4-Trimethylbenzene	ND	0.0050	1	05/01/2019 17:02	
1,3,5-Trimethylbenzene	ND	0.0050	1	05/01/2019 17:02	
Vinyl Chloride	ND	0.0050	1	05/01/2019 17:02	
m,p-Xylene	ND	0.0050	1	05/01/2019 17:02	
o-Xylene	ND	0.0050	1	05/01/2019 17:02	
Xylenes, Total	ND	0.0050	1	05/01/2019 17:02	

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## Analytical Report

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**Project:** 2014-003; Dunphy Park Stockpile

**WorkOrder:** 1904909  
**Extraction Method:** SW5030B  
**Analytical Method:** SW8260B  
**Unit:** mg/kg

### Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 3	1904909-005A	Soil	04/18/2019 10:25	GC10 05011916.D	177048

Analytes	Result	RL	DF	Date Analyzed
<u>Surrogates</u>	<u>REC (%)</u>		<u>Limits</u>	
Dibromofluoromethane	91		66-116	05/01/2019 17:02
Toluene-d8	108		86-110	05/01/2019 17:02
4-BFB	110		71-114	05/01/2019 17:02
Benzene-d6	92		62-122	05/01/2019 17:02
Ethylbenzene-d10	116		69-130	05/01/2019 17:02
1,2-DCB-d4	85		55-108	05/01/2019 17:02

Analyst(s): HK

(Cont.)

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## Analytical Report

**Client:** AEW Engineering, Inc.  
**Date Received:** 4/18/19 11:50  
**Date Prepared:** 4/30/19  
**Project:** 2014-003; Dunphy Park Stockpile

**WorkOrder:** 1904909  
**Extraction Method:** SW5030B  
**Analytical Method:** SW8260B  
**Unit:** mg/kg

### Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 4	1904909-006A	Soil	04/18/2019 10:35	GC10 05011908.D	177048
Analytes	Result	RL	DF	Date Analyzed	
Acetone	ND	0.10	1	05/01/2019 11:33	
tert-Amyl methyl ether (TAME)	ND	0.0050	1	05/01/2019 11:33	
Benzene	ND	0.0050	1	05/01/2019 11:33	
Bromobenzene	ND	0.0050	1	05/01/2019 11:33	
Bromochloromethane	ND	0.0050	1	05/01/2019 11:33	
Bromodichloromethane	ND	0.0050	1	05/01/2019 11:33	
Bromoform	ND	0.0050	1	05/01/2019 11:33	
Bromomethane	ND	0.0050	1	05/01/2019 11:33	
2-Butanone (MEK)	ND	0.050	1	05/01/2019 11:33	
t-Butyl alcohol (TBA)	ND	0.050	1	05/01/2019 11:33	
n-Butyl benzene	ND	0.0050	1	05/01/2019 11:33	
sec-Butyl benzene	ND	0.0050	1	05/01/2019 11:33	
tert-Butyl benzene	ND	0.0050	1	05/01/2019 11:33	
Carbon Disulfide	ND	0.0050	1	05/01/2019 11:33	
Carbon Tetrachloride	ND	0.0050	1	05/01/2019 11:33	
Chlorobenzene	ND	0.0050	1	05/01/2019 11:33	
Chloroethane	ND	0.0050	1	05/01/2019 11:33	
Chloroform	ND	0.0050	1	05/01/2019 11:33	
Chloromethane	ND	0.0050	1	05/01/2019 11:33	
2-Chlorotoluene	ND	0.0050	1	05/01/2019 11:33	
4-Chlorotoluene	ND	0.0050	1	05/01/2019 11:33	
Dibromochloromethane	ND	0.0050	1	05/01/2019 11:33	
1,2-Dibromo-3-chloropropane	ND	0.0050	1	05/01/2019 11:33	
1,2-Dibromoethane (EDB)	ND	0.0040	1	05/01/2019 11:33	
Dibromomethane	ND	0.0050	1	05/01/2019 11:33	
1,2-Dichlorobenzene	ND	0.0050	1	05/01/2019 11:33	
1,3-Dichlorobenzene	ND	0.0050	1	05/01/2019 11:33	
1,4-Dichlorobenzene	ND	0.0050	1	05/01/2019 11:33	
Dichlorodifluoromethane	ND	0.0050	1	05/01/2019 11:33	
1,1-Dichloroethane	ND	0.0050	1	05/01/2019 11:33	
1,2-Dichloroethane (1,2-DCA)	ND	0.0040	1	05/01/2019 11:33	
1,1-Dichloroethene	ND	0.0050	1	05/01/2019 11:33	
cis-1,2-Dichloroethene	ND	0.0050	1	05/01/2019 11:33	
trans-1,2-Dichloroethene	ND	0.0050	1	05/01/2019 11:33	
1,2-Dichloropropane	ND	0.0050	1	05/01/2019 11:33	
1,3-Dichloropropane	ND	0.0050	1	05/01/2019 11:33	
2,2-Dichloropropane	ND	0.0050	1	05/01/2019 11:33	

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## Analytical Report

**Client:** AEW Engineering, Inc.  
**Date Received:** 4/18/19 11:50  
**Date Prepared:** 4/30/19  
**Project:** 2014-003; Dunphy Park Stockpile

**WorkOrder:** 1904909  
**Extraction Method:** SW5030B  
**Analytical Method:** SW8260B  
**Unit:** mg/kg

### Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 4	1904909-006A	Soil	04/18/2019 10:35	GC10 05011908.D	177048

Analytes	Result	RL	DF	Date Analyzed
1,1-Dichloropropene	ND	0.0050	1	05/01/2019 11:33
cis-1,3-Dichloropropene	ND	0.0050	1	05/01/2019 11:33
trans-1,3-Dichloropropene	ND	0.0050	1	05/01/2019 11:33
Diisopropyl ether (DIPE)	ND	0.0050	1	05/01/2019 11:33
Ethylbenzene	ND	0.0050	1	05/01/2019 11:33
Ethyl tert-butyl ether (ETBE)	ND	0.0050	1	05/01/2019 11:33
Freon 113	ND	0.0050	1	05/01/2019 11:33
Hexachlorobutadiene	ND	0.0050	1	05/01/2019 11:33
Hexachloroethane	ND	0.0050	1	05/01/2019 11:33
2-Hexanone	ND	0.0050	1	05/01/2019 11:33
Isopropylbenzene	ND	0.0050	1	05/01/2019 11:33
4-Isopropyl toluene	ND	0.0050	1	05/01/2019 11:33
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	05/01/2019 11:33
Methylene chloride	ND	0.020	1	05/01/2019 11:33
4-Methyl-2-pentanone (MIBK)	ND	0.0050	1	05/01/2019 11:33
Naphthalene	ND	0.0050	1	05/01/2019 11:33
n-Propyl benzene	ND	0.0050	1	05/01/2019 11:33
Styrene	ND	0.0050	1	05/01/2019 11:33
1,1,1,2-Tetrachloroethane	ND	0.0050	1	05/01/2019 11:33
1,1,2,2-Tetrachloroethane	ND	0.0050	1	05/01/2019 11:33
Tetrachloroethene	ND	0.0050	1	05/01/2019 11:33
Toluene	ND	0.0050	1	05/01/2019 11:33
1,2,3-Trichlorobenzene	ND	0.0050	1	05/01/2019 11:33
1,2,4-Trichlorobenzene	ND	0.0050	1	05/01/2019 11:33
1,1,1-Trichloroethane	ND	0.0050	1	05/01/2019 11:33
1,1,2-Trichloroethane	ND	0.0050	1	05/01/2019 11:33
Trichloroethene	ND	0.0050	1	05/01/2019 11:33
Trichlorofluoromethane	ND	0.0050	1	05/01/2019 11:33
1,2,3-Trichloropropane	ND	0.0050	1	05/01/2019 11:33
1,2,4-Trimethylbenzene	ND	0.0050	1	05/01/2019 11:33
1,3,5-Trimethylbenzene	ND	0.0050	1	05/01/2019 11:33
Vinyl Chloride	ND	0.0050	1	05/01/2019 11:33
m,p-Xylene	ND	0.0050	1	05/01/2019 11:33
o-Xylene	ND	0.0050	1	05/01/2019 11:33
Xylenes, Total	ND	0.0050	1	05/01/2019 11:33

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## Analytical Report

**Client:** AEW Engineering, Inc.  
**Date Received:** 4/18/19 11:50  
**Date Prepared:** 4/30/19  
**Project:** 2014-003; Dunphy Park Stockpile

**WorkOrder:** 1904909  
**Extraction Method:** SW5030B  
**Analytical Method:** SW8260B  
**Unit:** mg/kg

### Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 4	1904909-006A	Soil	04/18/2019 10:35	GC10 05011908.D	177048

Analytes	Result	RL	DF	Date Analyzed
<u>Surrogates</u>	<u>REC (%)</u>		<u>Limits</u>	
Dibromofluoromethane	92		66-116	05/01/2019 11:33
Toluene-d8	103		86-110	05/01/2019 11:33
4-BFB	108		71-114	05/01/2019 11:33
Benzene-d6	93		62-122	05/01/2019 11:33
Ethylbenzene-d10	115		69-130	05/01/2019 11:33
1,2-DCB-d4	83		55-108	05/01/2019 11:33

**Analyst(s):** AK



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## Quality Control Report

<b>Client:</b>	AEW Engineering, Inc.	<b>WorkOrder:</b>	1904909
<b>Date Prepared:</b>	4/30/19	<b>BatchID:</b>	177048
<b>Date Analyzed:</b>	4/30/19 - 5/1/19	<b>Extraction Method:</b>	SW5030B
<b>Instrument:</b>	GC10, GC18, GC38	<b>Analytical Method:</b>	SW8260B
<b>Matrix:</b>	Soil	<b>Unit:</b>	mg/kg
<b>Project:</b>	2014-003; Dunphy Park Stockpile	<b>Sample ID:</b>	MB/LCS/LCSD-177048 1904909-006AMS/MSD

### QC Summary Report for SW8260B

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
Acetone	ND	0.039	0.10	-	-	-
tert-Amyl methyl ether (TAME)	ND	0.0010	0.0050	-	-	-
Benzene	ND	0.0016	0.0050	-	-	-
Bromobenzene	ND	0.0030	0.0050	-	-	-
Bromochloromethane	ND	0.0015	0.0050	-	-	-
Bromodichloromethane	ND	0.0012	0.0050	-	-	-
Bromoform	ND	0.0012	0.0050	-	-	-
Bromomethane	ND	0.0020	0.0050	-	-	-
2-Butanone (MEK)	ND	0.021	0.050	-	-	-
t-Butyl alcohol (TBA)	ND	0.0053	0.050	-	-	-
n-Butyl benzene	ND	0.0035	0.0050	-	-	-
sec-Butyl benzene	ND	0.0034	0.0050	-	-	-
tert-Butyl benzene	ND	0.0029	0.0050	-	-	-
Carbon Disulfide	ND	0.0036	0.0050	-	-	-
Carbon Tetrachloride	ND	0.0017	0.0050	-	-	-
Chlorobenzene	ND	0.0018	0.0050	-	-	-
Chloroethane	ND	0.0016	0.0050	-	-	-
Chloroform	ND	0.0016	0.0050	-	-	-
Chloromethane	ND	0.0017	0.0050	-	-	-
2-Chlorotoluene	ND	0.0022	0.0050	-	-	-
4-Chlorotoluene	ND	0.0024	0.0050	-	-	-
Dibromochloromethane	ND	0.0011	0.0050	-	-	-
1,2-Dibromo-3-chloropropane	ND	0.0037	0.0050	-	-	-
1,2-Dibromoethane (EDB)	ND	0.0013	0.0040	-	-	-
Dibromomethane	ND	0.0014	0.0050	-	-	-
1,2-Dichlorobenzene	ND	0.0032	0.0050	-	-	-
1,3-Dichlorobenzene	ND	0.0018	0.0050	-	-	-
1,4-Dichlorobenzene	ND	0.0018	0.0050	-	-	-
Dichlorodifluoromethane	ND	0.0011	0.0050	-	-	-
1,1-Dichloroethane	ND	0.0017	0.0050	-	-	-
1,2-Dichloroethane (1,2-DCA)	ND	0.0014	0.0040	-	-	-
1,1-Dichloroethene	ND	0.0017	0.0050	-	-	-
cis-1,2-Dichloroethene	ND	0.0015	0.0050	-	-	-
trans-1,2-Dichloroethene	ND	0.0016	0.0050	-	-	-
1,2-Dichloropropane	ND	0.0014	0.0050	-	-	-
1,3-Dichloropropane	ND	0.0016	0.0050	-	-	-
2,2-Dichloropropane	ND	0.0013	0.0050	-	-	-
1,1-Dichloropropene	ND	0.0018	0.0050	-	-	-

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## Quality Control Report

<b>Client:</b>	AEW Engineering, Inc.	<b>WorkOrder:</b>	1904909
<b>Date Prepared:</b>	4/30/19	<b>BatchID:</b>	177048
<b>Date Analyzed:</b>	4/30/19 - 5/1/19	<b>Extraction Method:</b>	SW5030B
<b>Instrument:</b>	GC10, GC18, GC38	<b>Analytical Method:</b>	SW8260B
<b>Matrix:</b>	Soil	<b>Unit:</b>	mg/kg
<b>Project:</b>	2014-003; Dunphy Park Stockpile	<b>Sample ID:</b>	MB/LCS/LCSD-177048 1904909-006AMS/MSD

### QC Summary Report for SW8260B

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
cis-1,3-Dichloropropene	ND	0.0015	0.0050	-	-	-
trans-1,3-Dichloropropene	ND	0.0014	0.0050	-	-	-
Diisopropyl ether (DIPE)	ND	0.0014	0.0050	-	-	-
Ethylbenzene	ND	0.0025	0.0050	-	-	-
Ethyl tert-butyl ether (ETBE)	ND	0.0013	0.0050	-	-	-
Freon 113	ND	0.0016	0.0050	-	-	-
Hexachlorobutadiene	ND	0.0050	0.0050	-	-	-
Hexachloroethane	ND	0.0025	0.0050	-	-	-
2-Hexanone	ND	0.0022	0.0050	-	-	-
Isopropylbenzene	ND	0.0032	0.0050	-	-	-
4-Isopropyl toluene	ND	0.0032	0.0050	-	-	-
Methyl-t-butyl ether (MTBE)	ND	0.0013	0.0050	-	-	-
Methylene chloride	ND	0.010	0.020	-	-	-
4-Methyl-2-pentanone (MIBK)	ND	0.00080	0.0050	-	-	-
Naphthalene	ND	0.0044	0.0050	-	-	-
n-Propyl benzene	ND	0.0029	0.0050	-	-	-
Styrene	ND	0.0030	0.0050	-	-	-
1,1,1,2-Tetrachloroethane	ND	0.0016	0.0050	-	-	-
1,1,2,2-Tetrachloroethane	ND	0.0013	0.0050	-	-	-
Tetrachloroethene	ND	0.0023	0.0050	-	-	-
Toluene	ND	0.0024	0.0050	-	-	-
1,2,3-Trichlorobenzene	ND	0.0030	0.0050	-	-	-
1,2,4-Trichlorobenzene	ND	0.0029	0.0050	-	-	-
1,1,1-Trichloroethane	ND	0.0018	0.0050	-	-	-
1,1,2-Trichloroethane	ND	0.0019	0.0050	-	-	-
Trichloroethene	ND	0.0017	0.0050	-	-	-
Trichlorofluoromethane	ND	0.0016	0.0050	-	-	-
1,2,3-Trichloropropane	ND	0.0019	0.0050	-	-	-
1,2,4-Trimethylbenzene	ND	0.0028	0.0050	-	-	-
1,3,5-Trimethylbenzene	ND	0.0026	0.0050	-	-	-
Vinyl Chloride	ND	0.0015	0.0050	-	-	-
m,p-Xylene	ND	0.0040	0.0050	-	-	-
o-Xylene	ND	0.0018	0.0050	-	-	-

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## Quality Control Report

<b>Client:</b>	AEW Engineering, Inc.	<b>WorkOrder:</b>	1904909
<b>Date Prepared:</b>	4/30/19	<b>BatchID:</b>	177048
<b>Date Analyzed:</b>	4/30/19 - 5/1/19	<b>Extraction Method:</b>	SW5030B
<b>Instrument:</b>	GC10, GC18, GC38	<b>Analytical Method:</b>	SW8260B
<b>Matrix:</b>	Soil	<b>Unit:</b>	mg/kg
<b>Project:</b>	2014-003; Dunphy Park Stockpile	<b>Sample ID:</b>	MB/LCS/LCSD-177048 1904909-006AMS/MSD

### QC Summary Report for SW8260B

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
<b>Surrogate Recovery</b>						
Dibromofluoromethane	0.11			0.12	90	66-112
Toluene-d8	0.13			0.12	103	92-109
4-BFB	0.012			0.012	95	72-112
Benzene-d6	0.11			0.10	111	81-126
Ethylbenzene-d10	0.12			0.10	118	92-138
1,2-DCB-d4	0.085			0.10	85	68-108

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## Quality Control Report

**Client:** AEW Engineering, Inc.  
**Date Prepared:** 4/30/19  
**Date Analyzed:** 4/30/19 - 5/1/19  
**Instrument:** GC10, GC18, GC38  
**Matrix:** Soil  
**Project:** 2014-003; Dunphy Park Stockpile

**WorkOrder:** 1904909  
**BatchID:** 177048  
**Extraction Method:** SW5030B  
**Analytical Method:** SW8260B  
**Unit:** mg/kg  
**Sample ID:** MB/LCS/LCSD-177048  
 1904909-006AMS/MSD

### QC Summary Report for SW8260B

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Acetone	0.23	0.23	0.20	116	114	59-127	2.19	20
tert-Amyl methyl ether (TAME)	0.016	0.016	0.020	82	81	54-98	0.438	20
Benzene	0.018	0.018	0.020	90	90	71-115	0	20
Bromobenzene	0.019	0.019	0.020	93	94	69-120	1.72	20
Bromochloromethane	0.021	0.021	0.020	103	103	63-117	0	20
Bromodichloromethane	0.017	0.017	0.020	84	84	61-109	0	20
Bromoform	0.013	0.013	0.020	63	63	46-87	0	20
Bromomethane	0.019	0.019	0.020	94	94	22-195	0	20
2-Butanone (MEK)	0.063	0.064	0.080	79	80	53-124	1.56	20
t-Butyl alcohol (TBA)	0.076	0.073	0.080	96	92	29-142	4.03	20
n-Butyl benzene	0.025	0.025	0.020	126	127	102-169	0.721	20
sec-Butyl benzene	0.025	0.025	0.020	124	124	100-166	0	20
tert-Butyl benzene	0.023	0.024	0.020	117	119	91-153	1.86	20
Carbon Disulfide	0.018	0.018	0.020	88	89	60-125	0.561	20
Carbon Tetrachloride	0.020	0.020	0.020	101	100	69-124	0.276	20
Chlorobenzene	0.020	0.020	0.020	99	98	73-116	0.464	20
Chloroethane	0.016	0.016	0.020	81	79	47-140	2.30	20
Chloroform	0.019	0.019	0.020	97	97	69-118	0	20
Chloromethane	0.014	0.014	0.020	70	71	30-132	1.70	20
2-Chlorotoluene	0.021	0.021	0.020	106	106	75-147	0	20
4-Chlorotoluene	0.020	0.020	0.020	102	102	75-137	0	20
Dibromochloromethane	0.015	0.015	0.020	76	76	57-105	0	20
1,2-Dibromo-3-chloropropane	0.014	0.014	0.020	71	72	36-103	1.44	20
1,2-Dibromoethane (EDB)	0.018	0.018	0.020	89	89	66-101	0	20
Dibromomethane	0.018	0.018	0.020	89	90	61-103	0.686	20
1,2-Dichlorobenzene	0.017	0.016	0.020	83	82	59-104	0.819	20
1,3-Dichlorobenzene	0.020	0.020	0.020	98	99	70-133	1.02	20
1,4-Dichlorobenzene	0.019	0.019	0.020	95	95	68-123	0	20
Dichlorodifluoromethane	0.011	0.011	0.020	55	53	13-107	3.81	20
1,1-Dichloroethane	0.019	0.019	0.020	94	95	69-118	0.0902	20
1,2-Dichloroethane (1,2-DCA)	0.019	0.019	0.020	94	94	59-112	0	20
1,1-Dichloroethene	0.019	0.019	0.020	95	95	69-126	0	20
cis-1,2-Dichloroethene	0.019	0.019	0.020	96	97	69-116	0.741	20
trans-1,2-Dichloroethene	0.019	0.020	0.020	97	98	73-116	0.955	20
1,2-Dichloropropane	0.018	0.018	0.020	89	89	65-111	0	20
1,3-Dichloropropane	0.020	0.020	0.020	99	100	67-110	0.790	20
2,2-Dichloropropane	0.019	0.019	0.020	97	95	65-125	1.40	20
1,1-Dichloropropene	0.020	0.020	0.020	98	98	70-123	0	20

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## Quality Control Report

**Client:** AEW Engineering, Inc.  
**Date Prepared:** 4/30/19  
**Date Analyzed:** 4/30/19 - 5/1/19  
**Instrument:** GC10, GC18, GC38  
**Matrix:** Soil  
**Project:** 2014-003; Dunphy Park Stockpile

**WorkOrder:** 1904909  
**BatchID:** 177048  
**Extraction Method:** SW5030B  
**Analytical Method:** SW8260B  
**Unit:** mg/kg  
**Sample ID:** MB/LCS/LCSD-177048  
 1904909-006AMS/MSD

### QC Summary Report for SW8260B

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
cis-1,3-Dichloropropene	0.018	0.018	0.020	88	88	68-126	0	20
trans-1,3-Dichloropropene	0.017	0.017	0.020	85	85	69-117	0	20
Diisopropyl ether (DIPE)	0.017	0.017	0.020	84	84	57-110	0	20
Ethylbenzene	0.021	0.021	0.020	104	104	80-128	0	20
Ethyl tert-butyl ether (ETBE)	0.016	0.016	0.020	80	80	54-106	0	20
Freon 113	0.019	0.019	0.020	93	94	60-108	0.167	20
Hexachlorobutadiene	0.026	0.026	0.020	130	130	67-182	0	20
Hexachloroethane	0.018	0.018	0.020	88	89	85-156	0.931	20
2-Hexanone	0.013	0.013	0.020	64	64	37-90	0	20
Isopropylbenzene	0.023	0.023	0.020	116	116	64-167	0	20
4-Isopropyl toluene	0.025	0.025	0.020	124	123	88-167	0.526	20
Methyl-t-butyl ether (MTBE)	0.019	0.019	0.020	93	93	60-102	0	20
Methylene chloride	0.021	0.021	0.020	104	104	71-117	0	20
4-Methyl-2-pentanone (MIBK)	0.014	0.014	0.020	69	68	48-90	0.602	20
Naphthalene	0.010	0.010	0.020	51	50	29-65	1.85	20
n-Propyl benzene	0.024	0.024	0.020	120	120	88-161	0	20
Styrene	0.018	0.017	0.020	89	85	70-108	4.06	20
1,1,1,2-Tetrachloroethane	0.019	0.019	0.020	96	97	69-117	0.992	20
1,1,2,2-Tetrachloroethane	0.016	0.016	0.020	77	78	53-96	0.124	20
Tetrachloroethene	0.023	0.022	0.020	113	112	78-128	0.743	20
Toluene	0.020	0.020	0.020	99	99	78-121	0	20
1,2,3-Trichlorobenzene	0.012	0.012	0.020	59	60	35-80	1.03	20
1,2,4-Trichlorobenzene	0.015	0.016	0.020	76	79	46-101	2.97	20
1,1,1-Trichloroethane	0.020	0.020	0.020	98	98	69-121	0	20
1,1,2-Trichloroethane	0.018	0.018	0.020	89	89	64-104	0	20
Trichloroethene	0.020	0.021	0.020	102	104	73-118	1.08	20
Trichlorofluoromethane	0.020	0.020	0.020	100	100	31-119	0	20
1,2,3-Trichloropropane	0.019	0.019	0.020	96	97	65-107	1.04	20
1,2,4-Trimethylbenzene	0.022	0.022	0.020	108	109	80-147	1.08	20
1,3,5-Trimethylbenzene	0.022	0.023	0.020	111	113	83-156	1.30	20
Vinyl Chloride	0.015	0.015	0.020	76	75	40-125	0.231	20
m,p-Xylene	0.040	0.040	0.040	100	99	80-122	0.454	20
o-Xylene	0.020	0.020	0.020	98	98	79-116	0	20

(Cont.)

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## Quality Control Report

**Client:** AEW Engineering, Inc.  
**Date Prepared:** 4/30/19  
**Date Analyzed:** 4/30/19 - 5/1/19  
**Instrument:** GC10, GC18, GC38  
**Matrix:** Soil  
**Project:** 2014-003; Dunphy Park Stockpile

**WorkOrder:** 1904909  
**BatchID:** 177048  
**Extraction Method:** SW5030B  
**Analytical Method:** SW8260B  
**Unit:** mg/kg  
**Sample ID:** MB/LCS/LCSD-177048  
 1904909-006AMS/MSD

### QC Summary Report for SW8260B

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
<b>Surrogate Recovery</b>								
Dibromofluoromethane	0.11	0.11	0.12	91	91	66-112	0	20
Toluene-d8	0.13	0.13	0.12	102	103	92-109	0.375	20
4-BFB	0.012	0.012	0.012	97	98	72-112	1.10	20
Benzene-d6	0.12	0.12	0.10	116	115	81-126	0.549	20
Ethylbenzene-d10	0.13	0.13	0.10	126	126	92-138	0	20
1,2-DCB-d4	0.087	0.090	0.10	87	90	68-108	3.13	20

Analyte	MS DF	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Acetone	1	0.21	0.20	0.20	ND	103	98	48-114	4.39	20
tert-Amyl methyl ether (TAME)	1	0.018	0.018	0.020	ND	90	88	44-94	2.83	20
Benzene	1	0.023	0.021	0.020	ND	113	106	50-115	6.23	20
Bromobenzene	1	0.020	0.018	0.020	ND	99	92	60-114	6.76	20
Bromochloromethane	1	0.020	0.019	0.020	ND	99	96	50-113	3.07	20
Bromodichloromethane	1	0.019	0.018	0.020	ND	96	91	46-109	4.84	20
Bromoform	1	0.013	0.013	0.020	ND	65	64	38-83	0.171	20
Bromomethane	1	0.023	0.021	0.020	ND	115	107	10-149	6.54	20
2-Butanone (MEK)	1	0.068	0.068	0.080	ND	85	85	46-111	0	20
t-Butyl alcohol (TBA)	1	0.082	0.082	0.080	ND	103	103	32-112	0	20
n-Butyl benzene	1	0.024	0.022	0.020	ND	121	109	71-156	10.4	20
sec-Butyl benzene	1	0.024	0.022	0.020	ND	122	112	28-190	9.29	20
tert-Butyl benzene	1	0.023	0.021	0.020	ND	115	106	69-145	7.92	20
Carbon Disulfide	1	0.021	0.019	0.020	ND	103	94	19-135	9.31	20
Carbon Tetrachloride	1	0.020	0.019	0.020	ND	102	96	51-120	6.77	20
Chlorobenzene	1	0.020	0.019	0.020	ND	100	93	63-108	7.05	20
Chloroethane	1	0.018	0.017	0.020	ND	90	83	40-122	8.24	20
Chloroform	1	0.022	0.021	0.020	ND	110	104	55-114	5.78	20
Chloromethane	1	0.020	0.018	0.020	ND	102	92	14-128	10.0	20
2-Chlorotoluene	1	0.021	0.020	0.020	ND	107	100	45-153	6.34	20
4-Chlorotoluene	1	0.022	0.021	0.020	ND	108	103	65-126	5.29	20
Dibromochloromethane	1	0.016	0.016	0.020	ND	82	78	48-97	4.63	20
1,2-Dibromo-3-chloropropane	1	0.0084	0.0098	0.020	ND	42	49	32-95	15.9	20
1,2-Dibromoethane (EDB)	1	0.018	0.017	0.020	ND	89	86	52-99	3.94	20
Dibromomethane	1	0.019	0.018	0.020	ND	94	89	50-100	5.21	20
1,2-Dichlorobenzene	1	0.015	0.015	0.020	ND	77	75	38-116	2.38	20

(Cont.)

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## Quality Control Report

**Client:** AEW Engineering, Inc.  
**Date Prepared:** 4/30/19  
**Date Analyzed:** 4/30/19 - 5/1/19  
**Instrument:** GC10, GC18, GC38  
**Matrix:** Soil  
**Project:** 2014-003; Dunphy Park Stockpile

**WorkOrder:** 1904909  
**BatchID:** 177048  
**Extraction Method:** SW5030B  
**Analytical Method:** SW8260B  
**Unit:** mg/kg  
**Sample ID:** MB/LCS/LCSD-177048  
 1904909-006AMS/MSD

### QC Summary Report for SW8260B

Analyte	MS DF	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
1,3-Dichlorobenzene	1	0.019	0.018	0.020	ND	94	90	58-127	4.98	20
1,4-Dichlorobenzene	1	0.018	0.018	0.020	ND	92	88	54-123	4.31	20
Dichlorodifluoromethane	1	0.013	0.012	0.020	ND	64	62	8-93	3.14	20
1,1-Dichloroethane	1	0.022	0.021	0.020	ND	109	104	53-115	4.97	20
1,2-Dichloroethane (1,2-DCA)	1	0.020	0.019	0.020	ND	99	96	48-105	2.98	20
1,1-Dichloroethene	1	0.019	0.018	0.020	ND	93	89	47-127	4.47	20
cis-1,2-Dichloroethene	1	0.021	0.020	0.020	ND	103	98	56-111	4.92	20
trans-1,2-Dichloroethene	1	0.021	0.020	0.020	ND	107	101	51-115	5.87	20
1,2-Dichloropropane	1	0.020	0.019	0.020	ND	100	95	51-111	4.95	20
1,3-Dichloropropane	1	0.019	0.018	0.020	ND	96	91	51-109	5.80	20
2,2-Dichloropropane	1	0.023	0.022	0.020	ND	115	108	50-116	6.38	20
1,1-Dichloropropene	1	0.020	0.020	0.020	ND	100	100	46-124	0	20
cis-1,3-Dichloropropene	1	0.019	0.019	0.020	ND	97	93	41-127	4.78	20
trans-1,3-Dichloropropene	1	0.019	0.018	0.020	ND	96	91	50-111	5.94	20
Diisopropyl ether (DIPE)	1	0.020	0.020	0.020	ND	102	98	50-103	3.93	20
Ethylbenzene	1	0.022	0.020	0.020	ND	109	101	65-119	7.27	20
Ethyl tert-butyl ether (ETBE)	1	0.019	0.018	0.020	ND	97	92	47-100	5.18	20
Freon 113	1	0.018	0.017	0.020	ND	88	83	48-98	4.85	20
Hexachlorobutadiene	1	0.016	0.014	0.020	ND	80	72	36-166	10.6	20
Hexachloroethane	1	0.021	0.019	0.020	ND	104	95	61-146	8.78	20
2-Hexanone	1	0.016	0.016	0.020	ND	80	79	31-87	1.54	20
Isopropylbenzene	1	0.022	0.020	0.020	ND	109	102	24-171	6.53	20
4-Isopropyl toluene	1	0.025	0.023	0.020	ND	124	115	69-150	8.05	20
Methyl-t-butyl ether (MTBE)	1	0.019	0.019	0.020	ND	96,F1	93	50-95	2.97	20
Methylene chloride	1	0.024	0.022	0.020	ND	120	112	39-123	6.65	20
4-Methyl-2-pentanone (MIBK)	1	0.015	0.014	0.020	ND	73	72	41-83	1.08	20
Naphthalene	1	0.0077	0.0075	0.020	ND	38	37	13-77	3.14	20
n-Propyl benzene	1	0.024	0.022	0.020	ND	120	110	26-184	9.25	20
Styrene	1	0.019	0.019	0.020	ND	96	93	54-105	3.19	20
1,1,1,2-Tetrachloroethane	1	0.019	0.018	0.020	ND	94	89	60-108	5.05	20
1,1,2,2-Tetrachloroethane	1	0.016	0.016	0.020	ND	80	78	37-108	2.78	20
Tetrachloroethene	1	0.021	0.020	0.020	ND	107	102	54-127	4.98	20
Toluene	1	0.021	0.020	0.020	ND	105	98	63-114	6.08	20
1,2,3-Trichlorobenzene	1	0.0091	0.0081	0.020	ND	45	41	14-97	10.9	20
1,2,4-Trichlorobenzene	1	0.011	0.010	0.020	ND	53	51	31-106	4.13	20
1,1,1-Trichloroethane	1	0.022	0.021	0.020	ND	108	103	55-114	4.68	20
1,1,2-Trichloroethane	1	0.018	0.019	0.020	ND	88	97	50-104	9.09	20
Trichloroethene	1	0.020	0.019	0.020	ND	102	96	47-127	5.99	20

(Cont.)

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http://www.mccampbell.com / E-mail: main@mccampbell.com

## Quality Control Report

<b>Client:</b>	AEW Engineering, Inc.	<b>WorkOrder:</b>	1904909
<b>Date Prepared:</b>	4/30/19	<b>BatchID:</b>	177048
<b>Date Analyzed:</b>	4/30/19 - 5/1/19	<b>Extraction Method:</b>	SW5030B
<b>Instrument:</b>	GC10, GC18, GC38	<b>Analytical Method:</b>	SW8260B
<b>Matrix:</b>	Soil	<b>Unit:</b>	mg/kg
<b>Project:</b>	2014-003; Dunphy Park Stockpile	<b>Sample ID:</b>	MB/LCS/LCSD-177048 1904909-006AMS/MSD

### QC Summary Report for SW8260B

Analyte	MS DF	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Trichlorofluoromethane	1	0.020	0.019	0.020	ND	101	95	9-119	6.10	20
1,2,3-Trichloropropane	1	0.019	0.018	0.020	ND	93	87	45-115	5.75	20
1,2,4-Trimethylbenzene	1	0.023	0.021	0.020	ND	115	107	69-133	7.68	20
1,3,5-Trimethylbenzene	1	0.024	0.022	0.020	ND	121	111	27-172	7.86	20
Vinyl Chloride	1	0.021	0.019	0.020	ND	104	93	33-114	11.2	20
m,p-Xylene	1	0.041	0.039	0.040	ND	103	97	62-117	5.59	20
o-Xylene	1	0.020	0.019	0.020	ND	102	96	19-144	6.05	20
<b>Surrogate Recovery</b>										
Dibromofluoromethane	1	0.12	0.12	0.12		94	95	66-116	0.800	20
Toluene-d8	1	0.13	0.13	0.12		104	103	86-110	0.697	20
4-BFB	1	0.014	0.014	0.012		111	108	71-114	1.92	20
Benzene-d6	1	0.10	0.097	0.10		101	97	62-122	4.05	20
Ethylbenzene-d10	1	0.13	0.12	0.10		127	119	69-130	7.02	20
1,2-DCB-d4	1	0.087	0.086	0.10		87	86	55-108	2.09	20

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Pittsburg, CA 94565-1701  
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# CHAIN-OF-CUSTODY RECORD

**WorkOrder: 1904909 B ClientCode: AEW**

- WaterTrax   
  WriteOn   
  EDF   
  Excel   
  EQuIS   
  Email   
  HardCopy   
  ThirdParty   
  J-flag  
 Detection Summary   
  Dry-Weight

**Report to:**  
Randy Young  
AEW Engineering, Inc.  
55 New Montgomery St, Ste 722  
San Francisco, CA 94105  
(415) 495-8401    FAX: (415) 358-5598

Email: ryoung@aeweng.com  
cc/3rd Party:  
PO:  
Project: 2014-003; Dunphy Park Stockpile

**Bill to:**  
Kenneth Leung  
AEW Engineering, Inc.  
55 New Montgomery St, Ste 507  
San Francisco, CA 94105  
kleung@aeweng.com; byeung@aeweng

**Requested TAT: 2 days;**  
  
**Date Received: 04/18/2019**  
**Date Logged: 04/18/2019**  
**Date Add-On: 04/30/2019**

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below)												
					1	2	3	4	5	6	7	8	9	10	11	12	
1904909-004	DP Stockpile Comp 2	Soil	4/18/2019 10:15	<input type="checkbox"/>	A												
1904909-005	DP Stockpile Comp 3	Soil	4/18/2019 10:25	<input type="checkbox"/>	A												
1904909-006	DP Stockpile Comp 4	Soil	4/18/2019 10:35	<input type="checkbox"/>	A												

**Test Legend:**

1	8260B_S	2		3		4	
5		6		7		8	
9		10		11		12	

**Project Manager: Heidi Fruhlinger**

**Prepared by: Agustina Venegas**  
**Add-On Prepared By: Maria Venegas**

**Comments:** Hold all soil samples for 6mos per Ken Leung 3/14/14. New Comps added 4/24/19, Metals on 1 day TAT rest STAT. STLCs & TCLPs added 4/26/19 STAT. VOCs added to 004-006 4/30/19 2day TAT.

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days). Hazardous samples will be returned to client or disposed of at client expense.



### WORK ORDER SUMMARY

**Client Name:** AEW ENGINEERING, INC.

**Project:** 2014-003; Dunphy Park Stockpile

**Work Order:** 1904909

**Client Contact:** Randy Young

**QC Level:** LEVEL 2

**Contact's Email:** ryoung@aeweng.com

**Comments:** Hold all soil samples for 6mos per Ken Leung 3/14/14. New Comps added 4/24/19, Metals on 1 day TAT rest STAT. STLCs & TCLP on 4/24/19 STAT. VOCs on 4/24/19 STAT.

**Date Logged:** 4/18/2019

**Date Add-On:** 4/30/2019

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1904909-004A	DP Stockpile Comp 2	Soil	SW8260B (VOCs)	2 / (2:1)	Stainless Steel tube 2"x6"	4/18/2019 10:15	2 days		<input type="checkbox"/>	
1904909-005A	DP Stockpile Comp 3	Soil	SW8260B (VOCs)	2 / (2:1)	Stainless Steel tube 2"x6"	4/18/2019 10:25	2 days		<input type="checkbox"/>	
1904909-006A	DP Stockpile Comp 4	Soil	SW8260B (VOCs)	2 / (2:1)	Stainless Steel tube 2"x6"	4/18/2019 10:35	2 days		<input type="checkbox"/>	

**NOTES:** - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.

1904909

**RUSH!**

SAMPLE ID		LOCATION		Sampling		# of Containers	Type of Container	Matrix				Method Preserved				Analysis Request	Other	Comments
Date	Time	Date	Time	Water	Soil			Air	Sludge	Other	Ice	HCl	HNO <sub>3</sub>	Other				
DP-1	Sausalito	4/18/19	10:00	4/18/19	10:00	1	SS Liner	x									DP Stockpile Comp. 1 DP Stockpile Comp. 2 DP Stockpile Comp. 3 DP Stockpile Comp. 4	
DP-2	Sausalito	4/18/19	10:05	4/18/19	10:05	1	SS Liner	x										
DP-3	Sausalito	4/18/19	10:10	4/18/19	10:10	1	SS Liner	x										
DP-4	Sausalito	4/18/19	10:15	4/18/19	10:15	1	SS Liner	x										
DP-5	Sausalito	4/18/19	10:20	4/18/19	10:20	1	SS Liner	x										
DP-6	Sausalito	4/18/19	10:25	4/18/19	10:25	1	SS Liner	x										
DP-7	Sausalito	4/18/19	10:30	4/18/19	10:30	1	SS Liner	x										
DP-8	Sausalito	4/18/19	10:35	4/18/19	10:35	1	SS Liner	x										

**AEW ENGINEERING, INC.**  
 55 New Montgomery Street, Suite 722, San Francisco, CA 94105  
 Telephone: (415) 495-8422 Fax: (415) 358-5598  
 Date: 4/18/19  
 Report To: Randall Young Email: ryoung@aeweng.com  
 Company: AEW Engineering Project No.: 2014-003  
 Project Name: Dunphy Park Stockpile Location: Sausalito  
 Sampler: Randall Young Sampler's Phone Numbe: 415-290-6093  
 Sampler Signature: Randall Young Bill To:  
 Reporting Requirement: Hard Copy: Yes  No   
 PDF File: Yes  No  Electronic: Yes  No

**CHAIN OF CUSTODY RECORD** Page 1 of 1  
**TURN AROUND TIME**  24 Hours  48 Hours  1 Week  Normal  
**LABORATORY:** McC Campbell Analytical

TPH - Gas, BTEX & MTBE (EPA 8015 Mod)	StlC Cu, Pb
TPH-Diesel & Motor Oil - Silica Gel Cleanup (8015 Mod)	StlC Cu, Ni
SVOCs Full List (EPA 8270) with GPC cleanup to achieve ESLs criteria	TLP Pb
Organochlorine Pesticides & PCBs with Florisil Cleanup (EPA 8081/8082)	VOCS
CAV 17 Metals (EPA 6000/7000 Series) *	
Asbestos (CART Method 435) **	

Relinquished By: Randall Young Date: 4/18/19 Time: 11:50  
 Received By: [Signature]  
 Relinquished By: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_  
 Received By: \_\_\_\_\_  
 Relinquished By: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_  
 Received By: \_\_\_\_\_

Need to achieve Residential ESLs. Please run all applicable clean-ups to achieve residential ESLs. Please do not dilute the samples.  
 Hold samples for six months and call prior to disposal.  
 \* Run metals on 24 hr turn-around-time.  
 \*\* Sub asbestos analyses to Forensic Analytical

Added 4/26/19 STAT

Samples off HOLD 4/24/19

Added 4/30/19 2day



# McC Campbell Analytical, Inc.

"When Quality Counts"

## Analytical Report

**WorkOrder:** 1904909 **Amended:** 04/30/2019

**Report Created for:** AEW Engineering, Inc.

55 New Montgomery St, Ste 722  
San Francisco, CA 94105

**Project Contact:** Randy Young

**Project P.O.:**

**Project:** 2014-003; Dunphy Park Stockpile

**Project Received:** 04/18/2019

Analytical Report reviewed & approved for release on 04/30/2019 by:

Jennifer Lagerbom

Project Manager

*The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.*





## Glossary of Terms & Qualifier Definitions

**Client:** AEW Engineering, Inc.  
**Project:** 2014-003; Dunphy Park Stockpile  
**WorkOrder:** 1904909

### Glossary Abbreviation

%D	Serial Dilution Percent Difference
95% Interval	95% Confident Interval
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 µm filtered and acidified water sample)
DLT	Dilution Test (Serial Dilution)
DUP	Duplicate
EDL	Estimated Detection Limit
ERS	External reference sample. Second source calibration verification.
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
N/A	Not Applicable
ND	Not detected at or above the indicated MDL or RL
NR	Data Not Reported due to matrix interference or insufficient sample amount.
PDS	Post Digestion Spike
PDSD	Post Digestion Spike Duplicate
PF	Prep Factor
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
ST	Sorbent Tube
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxicity Equivalents
TZA	TimeZone Net Adjustment for sample collected outside of MAI's UTC.
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)





## Glossary of Terms & Qualifier Definitions

**Client:** AEW Engineering, Inc.  
**Project:** 2014-003; Dunphy Park Stockpile  
**WorkOrder:** 1904909

### Analytical Qualifiers

B	Analyte detected in the associated Method Blank and in the sample
J	Result is less than the RL/ML but greater than the MDL. The reported concentration is an estimated value.
S	Spike recovery outside accepted recovery limits
a1	Sample diluted due to matrix interference
a2	Sample diluted due to cluttered chromatogram
a3	Sample diluted due to high organic content.
c1	Surrogate recovery outside of the control limits due to the dilution of the sample.
c2	Surrogate recovery outside of the control limits due to matrix interference.
c4	Surrogate recovery outside of the control limits due to coelution with another peak(s) / cluttered chromatogram.
d7	Strongly aged gasoline or diesel range compounds are significant in the TPH(g) chromatogram
e2	Diesel range compounds are significant; no recognizable pattern
e7	Oil range compounds are significant
h3	Elemental sulfur (EPA 3660) cleanup

### Quality Control Qualifiers

F1	MS/MSD recovery and/or RPD is out of acceptance criteria; LCS validates the prep batch.
F2	LCS/LCSD recovery and/or RPD/RSD is out of acceptance criteria.
F10	MS/MSD outside control limits. Physical or chemical interferences exist due to sample matrix.
F16	RawVal < LQL.



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## Analytical Report

**Client:** AEW Engineering, Inc.  
**Date Received:** 4/18/19 11:50  
**Date Prepared:** 4/24/19  
**Project:** 2014-003; Dunphy Park Stockpile

**WorkOrder:** 1904909  
**Extraction Method:** SW3550B/3640Am/3630Cm  
**Analytical Method:** SW8081A/8082  
**Unit:** mg/kg

### Organochlorine Pesticides + PCBs

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 1	1904909-003A	Soil	04/18/2019 10:05	GC20 04251966.D	176763

Analytes	Result	RL	DF	Date Analyzed
Aldrin	ND	0.0020	20	04/26/2019 02:07
a-BHC	ND	0.0020	20	04/26/2019 02:07
b-BHC	ND	0.0060	20	04/26/2019 02:07
d-BHC	ND	0.0040	20	04/26/2019 02:07
g-BHC	ND	0.0020	20	04/26/2019 02:07
Chlordane (Technical)	ND	0.050	20	04/26/2019 02:07
a-Chlordane	ND	0.0020	20	04/26/2019 02:07
g-Chlordane	ND	0.0020	20	04/26/2019 02:07
p,p-DDD	ND	0.0020	20	04/26/2019 02:07
p,p-DDE	ND	0.0020	20	04/26/2019 02:07
p,p-DDT	<b>0.0022</b>	0.0020	20	04/26/2019 02:07
Dieldrin	ND	0.0020	20	04/26/2019 02:07
Endosulfan I	ND	0.0020	20	04/26/2019 02:07
Endosulfan II	ND	0.0020	20	04/26/2019 02:07
Endosulfan sulfate	ND	0.0020	20	04/26/2019 02:07
Endrin	ND	0.0020	20	04/26/2019 02:07
Endrin aldehyde	ND	0.0020	20	04/26/2019 02:07
Endrin ketone	ND	0.0020	20	04/26/2019 02:07
Heptachlor	ND	0.0020	20	04/26/2019 02:07
Heptachlor epoxide	ND	0.0020	20	04/26/2019 02:07
Hexachlorobenzene	ND	0.020	20	04/26/2019 02:07
Hexachlorocyclopentadiene	ND	0.040	20	04/26/2019 02:07
Methoxychlor	ND	0.0040	20	04/26/2019 02:07
Toxaphene	ND	0.10	20	04/26/2019 02:07
Aroclor1016	ND	0.10	20	04/26/2019 02:07
Aroclor1221	ND	0.10	20	04/26/2019 02:07
Aroclor1232	ND	0.10	20	04/26/2019 02:07
Aroclor1242	ND	0.10	20	04/26/2019 02:07
Aroclor1248	ND	0.10	20	04/26/2019 02:07
Aroclor1254	ND	0.10	20	04/26/2019 02:07
Aroclor1260	ND	0.10	20	04/26/2019 02:07
PCBs, total	ND	0.10	20	04/26/2019 02:07

Surrogates	REC (%)	Qualifiers	Limits	Date Analyzed
Decachlorobiphenyl	264	S	20-145	04/26/2019 02:07

Analyst(s): CK

Analytical Comments: a3,c1

(Cont.)

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## Analytical Report

**Client:** AEW Engineering, Inc.

**WorkOrder:** 1904909

**Date Received:** 4/18/19 11:50

**Extraction Method:** SW3550B/3640Am/3630Cm

**Date Prepared:** 4/24/19

**Analytical Method:** SW8081A/8082

**Project:** 2014-003; Dunphy Park Stockpile

**Unit:** mg/kg

### Organochlorine Pesticides + PCBs

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 2	1904909-004A	Soil	04/18/2019 10:15	GC20 04261917.D	176763

Analytes	Result	RL	DF	Date Analyzed
Aldrin	ND	0.10	1,000	04/26/2019 18:10
a-BHC	ND	0.10	1,000	04/26/2019 18:10
b-BHC	ND	0.30	1,000	04/26/2019 18:10
d-BHC	ND	0.20	1,000	04/26/2019 18:10
g-BHC	ND	0.10	1,000	04/26/2019 18:10
Chlordane (Technical)	ND	2.5	1,000	04/26/2019 18:10
a-Chlordane	ND	0.10	1,000	04/26/2019 18:10
g-Chlordane	ND	0.10	1,000	04/26/2019 18:10
p,p-DDD	ND	0.10	1,000	04/26/2019 18:10
p,p-DDE	ND	0.10	1,000	04/26/2019 18:10
p,p-DDT	ND	0.10	1,000	04/26/2019 18:10
Dieldrin	ND	0.10	1,000	04/26/2019 18:10
Endosulfan I	ND	0.10	1,000	04/26/2019 18:10
Endosulfan II	ND	0.10	1,000	04/26/2019 18:10
Endosulfan sulfate	ND	0.10	1,000	04/26/2019 18:10
Endrin	ND	0.10	1,000	04/26/2019 18:10
Endrin aldehyde	ND	0.10	1,000	04/26/2019 18:10
Endrin ketone	ND	0.10	1,000	04/26/2019 18:10
Heptachlor	ND	0.10	1,000	04/26/2019 18:10
Heptachlor epoxide	ND	0.10	1,000	04/26/2019 18:10
Hexachlorobenzene	ND	1.0	1,000	04/26/2019 18:10
Hexachlorocyclopentadiene	ND	2.0	1,000	04/26/2019 18:10
Methoxychlor	ND	0.20	1,000	04/26/2019 18:10
Toxaphene	ND	5.0	1,000	04/26/2019 18:10
Aroclor1016	ND	5.0	1,000	04/26/2019 18:10
Aroclor1221	ND	5.0	1,000	04/26/2019 18:10
Aroclor1232	ND	5.0	1,000	04/26/2019 18:10
Aroclor1242	ND	5.0	1,000	04/26/2019 18:10
Aroclor1248	ND	5.0	1,000	04/26/2019 18:10
Aroclor1254	ND	5.0	1,000	04/26/2019 18:10
Aroclor1260	ND	5.0	1,000	04/26/2019 18:10
PCBs, total	ND	5.0	1,000	04/26/2019 18:10

Surrogates	REC (%)	Qualifiers	Limits	Date Analyzed
Decachlorobiphenyl	70988	S	20-145	04/26/2019 18:10

**Analyst(s):** CK

**Analytical Comments:** a2,h3,c4

(Cont.)



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## Analytical Report

**Client:** AEW Engineering, Inc.  
**Date Received:** 4/18/19 11:50  
**Date Prepared:** 4/24/19  
**Project:** 2014-003; Dunphy Park Stockpile

**WorkOrder:** 1904909  
**Extraction Method:** SW3550B/3640Am/3630Cm  
**Analytical Method:** SW8081A/8082  
**Unit:** mg/kg

### Organochlorine Pesticides + PCBs

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 3	1904909-005A	Soil	04/18/2019 10:25	GC20 04261918.D	176763

Analytes	Result	RL	DF	Date Analyzed
Aldrin	ND	0.0050	50	04/26/2019 18:26
a-BHC	ND	0.0050	50	04/26/2019 18:26
b-BHC	ND	0.015	50	04/26/2019 18:26
d-BHC	ND	0.010	50	04/26/2019 18:26
g-BHC	ND	0.0050	50	04/26/2019 18:26
Chlordane (Technical)	ND	0.12	50	04/26/2019 18:26
a-Chlordane	ND	0.0050	50	04/26/2019 18:26
g-Chlordane	ND	0.0050	50	04/26/2019 18:26
p,p-DDD	ND	0.0050	50	04/26/2019 18:26
p,p-DDE	ND	0.0050	50	04/26/2019 18:26
p,p-DDT	<b>0.0054</b>	0.0050	50	04/26/2019 18:26
Dieldrin	ND	0.0050	50	04/26/2019 18:26
Endosulfan I	ND	0.0050	50	04/26/2019 18:26
Endosulfan II	ND	0.0050	50	04/26/2019 18:26
Endosulfan sulfate	ND	0.0050	50	04/26/2019 18:26
Endrin	ND	0.0050	50	04/26/2019 18:26
Endrin aldehyde	ND	0.0050	50	04/26/2019 18:26
Endrin ketone	ND	0.0050	50	04/26/2019 18:26
Heptachlor	ND	0.0050	50	04/26/2019 18:26
Heptachlor epoxide	ND	0.0050	50	04/26/2019 18:26
Hexachlorobenzene	ND	0.050	50	04/26/2019 18:26
Hexachlorocyclopentadiene	ND	0.10	50	04/26/2019 18:26
Methoxychlor	ND	0.010	50	04/26/2019 18:26
Toxaphene	ND	0.25	50	04/26/2019 18:26
Aroclor1016	ND	0.25	50	04/26/2019 18:26
Aroclor1221	ND	0.25	50	04/26/2019 18:26
Aroclor1232	ND	0.25	50	04/26/2019 18:26
Aroclor1242	ND	0.25	50	04/26/2019 18:26
Aroclor1248	ND	0.25	50	04/26/2019 18:26
Aroclor1254	ND	0.25	50	04/26/2019 18:26
Aroclor1260	ND	0.25	50	04/26/2019 18:26
PCBs, total	ND	0.25	50	04/26/2019 18:26

Surrogates	REC (%)	Qualifiers	Limits	Date Analyzed
Decachlorobiphenyl	235	S	20-145	04/26/2019 18:26

Analyst(s): CK

Analytical Comments: a1,c1

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## Analytical Report

**Client:** AEW Engineering, Inc.  
**Date Received:** 4/18/19 11:50  
**Date Prepared:** 4/24/19  
**Project:** 2014-003; Dunphy Park Stockpile

**WorkOrder:** 1904909  
**Extraction Method:** SW3550B/3640Am/3630Cm  
**Analytical Method:** SW8081A/8082  
**Unit:** mg/kg

### Organochlorine Pesticides + PCBs

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 4	1904909-006A	Soil	04/18/2019 10:35	GC20 04261919.D	176763

Analytes	Result	RL	DF	Date Analyzed
Aldrin	ND	0.0050	50	04/26/2019 18:41
a-BHC	ND	0.0050	50	04/26/2019 18:41
b-BHC	ND	0.015	50	04/26/2019 18:41
d-BHC	ND	0.010	50	04/26/2019 18:41
g-BHC	ND	0.0050	50	04/26/2019 18:41
Chlordane (Technical)	ND	0.12	50	04/26/2019 18:41
a-Chlordane	ND	0.0050	50	04/26/2019 18:41
g-Chlordane	ND	0.0050	50	04/26/2019 18:41
p,p-DDD	ND	0.0050	50	04/26/2019 18:41
p,p-DDE	ND	0.0050	50	04/26/2019 18:41
p,p-DDT	ND	0.0050	50	04/26/2019 18:41
Dieldrin	ND	0.0050	50	04/26/2019 18:41
Endosulfan I	ND	0.0050	50	04/26/2019 18:41
Endosulfan II	ND	0.0050	50	04/26/2019 18:41
Endosulfan sulfate	ND	0.0050	50	04/26/2019 18:41
Endrin	ND	0.0050	50	04/26/2019 18:41
Endrin aldehyde	ND	0.0050	50	04/26/2019 18:41
Endrin ketone	ND	0.0050	50	04/26/2019 18:41
Heptachlor	ND	0.0050	50	04/26/2019 18:41
Heptachlor epoxide	ND	0.0050	50	04/26/2019 18:41
Hexachlorobenzene	ND	0.050	50	04/26/2019 18:41
Hexachlorocyclopentadiene	ND	0.10	50	04/26/2019 18:41
Methoxychlor	ND	0.010	50	04/26/2019 18:41
Toxaphene	ND	0.25	50	04/26/2019 18:41
Aroclor1016	ND	0.25	50	04/26/2019 18:41
Aroclor1221	ND	0.25	50	04/26/2019 18:41
Aroclor1232	ND	0.25	50	04/26/2019 18:41
Aroclor1242	ND	0.25	50	04/26/2019 18:41
Aroclor1248	ND	0.25	50	04/26/2019 18:41
Aroclor1254	ND	0.25	50	04/26/2019 18:41
Aroclor1260	ND	0.25	50	04/26/2019 18:41
PCBs, total	ND	0.25	50	04/26/2019 18:41

Surrogates	REC (%)	Qualifiers	Limits	Date Analyzed
Decachlorobiphenyl	250	S	20-145	04/26/2019 18:41

Analyst(s): CK

Analytical Comments: a1,c1



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## Analytical Report

**Client:** AEW Engineering, Inc.

**WorkOrder:** 1904909

**Date Received:** 4/18/19 11:50

**Extraction Method:** SW3550B/3640A

**Date Prepared:** 4/25/19

**Analytical Method:** SW8270C

**Project:** 2014-003; Dunphy Park Stockpile

**Unit:** mg/Kg

### Semi-Volatile Organics (Low Level) with GPC Cleanup

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 1	1904909-003A	Soil	04/18/2019 10:05	GC21 04251930.D	176844

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Acenaphthene	0.015		0.013	10	04/26/2019 02:15
Acenaphthylene	0.047		0.013	10	04/26/2019 02:15
Acetochlor	ND		2.5	10	04/26/2019 02:15
Anthracene	0.11		0.013	10	04/26/2019 02:15
Benzidine	ND		12	10	04/26/2019 02:15
Benzo (a) anthracene	0.38		0.050	10	04/26/2019 02:15
Benzo (a) pyrene	0.25		0.025	10	04/26/2019 02:15
Benzo (b) fluoranthene	0.27		0.013	10	04/26/2019 02:15
Benzo (g,h,i) perylene	0.19		0.025	10	04/26/2019 02:15
Benzo (k) fluoranthene	0.20		0.013	10	04/26/2019 02:15
Benzyl Alcohol	ND		12	10	04/26/2019 02:15
1,1-Biphenyl	ND		0.13	10	04/26/2019 02:15
Bis (2-chloroethoxy) Methane	ND		2.5	10	04/26/2019 02:15
Bis (2-chloroethyl) Ether	ND		0.025	10	04/26/2019 02:15
Bis (2-chloroisopropyl) Ether	ND		0.025	10	04/26/2019 02:15
Bis (2-ethylhexyl) Adipate	ND		5.0	10	04/26/2019 02:15
Bis (2-ethylhexyl) Phthalate	0.059	B	0.050	10	04/26/2019 02:15
4-Bromophenyl Phenyl Ether	ND		2.5	10	04/26/2019 02:15
Butylbenzyl Phthalate	ND		0.25	10	04/26/2019 02:15
4-Chloroaniline	ND		0.025	10	04/26/2019 02:15
4-Chloro-3-methylphenol	ND		2.5	10	04/26/2019 02:15
2-Chloronaphthalene	ND		2.5	10	04/26/2019 02:15
2-Chlorophenol	ND		0.050	10	04/26/2019 02:15
4-Chlorophenyl Phenyl Ether	ND		2.5	10	04/26/2019 02:15
Chrysene	0.62		0.025	10	04/26/2019 02:15
Dibenzo (a,h) anthracene	0.048		0.025	10	04/26/2019 02:15
Dibenzofuran	ND		2.5	10	04/26/2019 02:15
Di-n-butyl Phthalate	ND		0.025	10	04/26/2019 02:15
1,2-Dichlorobenzene	ND		2.5	10	04/26/2019 02:15
1,3-Dichlorobenzene	ND		2.5	10	04/26/2019 02:15
1,4-Dichlorobenzene	ND		2.5	10	04/26/2019 02:15
3,3-Dichlorobenzidine	ND		0.025	10	04/26/2019 02:15
2,4-Dichlorophenol	ND		0.13	10	04/26/2019 02:15
Diethyl Phthalate	ND		0.050	10	04/26/2019 02:15
2,4-Dimethylphenol	ND		2.5	10	04/26/2019 02:15
Dimethyl Phthalate	ND		0.025	10	04/26/2019 02:15
4,6-Dinitro-2-methylphenol	ND		12	10	04/26/2019 02:15

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## Analytical Report

**Client:** AEW Engineering, Inc.

**WorkOrder:** 1904909

**Date Received:** 4/18/19 11:50

**Extraction Method:** SW3550B/3640A

**Date Prepared:** 4/25/19

**Analytical Method:** SW8270C

**Project:** 2014-003; Dunphy Park Stockpile

**Unit:** mg/Kg

### Semi-Volatile Organics (Low Level) with GPC Cleanup

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 1	1904909-003A	Soil	04/18/2019 10:05	GC21 04251930.D	176844
Analytes	Result	Qualifiers	RL	DF	Date Analyzed
2,4-Dinitrophenol	ND		1.3	10	04/26/2019 02:15
2,4-Dinitrotoluene	ND		0.063	10	04/26/2019 02:15
2,6-Dinitrotoluene	ND		0.025	10	04/26/2019 02:15
Di-n-octyl Phthalate	ND		0.050	10	04/26/2019 02:15
1,2-Diphenylhydrazine	ND		2.5	10	04/26/2019 02:15
Fluoranthene	<b>2.3</b>		0.013	10	04/26/2019 02:15
Fluorene	<b>0.032</b>		0.025	10	04/26/2019 02:15
Hexachlorobenzene	ND		0.013	10	04/26/2019 02:15
Hexachlorobutadiene	ND		0.025	10	04/26/2019 02:15
Hexachlorocyclopentadiene	ND		20	10	04/26/2019 02:15
Hexachloroethane	ND		0.025	10	04/26/2019 02:15
Indeno (1,2,3-cd) pyrene	<b>0.14</b>		0.025	10	04/26/2019 02:15
Isophorone	ND		2.5	10	04/26/2019 02:15
2-Methylnaphthalene	<b>0.029</b>		0.025	10	04/26/2019 02:15
2-Methylphenol (o-Cresol)	ND		5.0	10	04/26/2019 02:15
3 & 4-Methylphenol (m,p-Cresol)	ND		2.5	10	04/26/2019 02:15
Naphthalene	<b>0.027</b>	B	0.013	10	04/26/2019 02:15
2-Nitroaniline	ND		12	10	04/26/2019 02:15
3-Nitroaniline	ND		12	10	04/26/2019 02:15
4-Nitroaniline	ND		12	10	04/26/2019 02:15
Nitrobenzene	ND		2.5	10	04/26/2019 02:15
2-Nitrophenol	ND		12	10	04/26/2019 02:15
4-Nitrophenol	ND		12	10	04/26/2019 02:15
N-Nitrosodiphenylamine	ND		2.5	10	04/26/2019 02:15
N-Nitrosodi-n-propylamine	ND		2.5	10	04/26/2019 02:15
Pentachlorophenol	ND		0.31	10	04/26/2019 02:15
Phenanthrene	<b>0.50</b>	B	0.050	10	04/26/2019 02:15
Phenol	ND		0.050	10	04/26/2019 02:15
Pyrene	<b>2.0</b>		0.025	10	04/26/2019 02:15
Pyridine	ND		2.5	10	04/26/2019 02:15
1,2,4-Trichlorobenzene	ND		2.5	10	04/26/2019 02:15
2,4,5-Trichlorophenol	ND		0.025	10	04/26/2019 02:15
2,4,6-Trichlorophenol	ND		0.13	10	04/26/2019 02:15

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## Analytical Report

**Client:** AEW Engineering, Inc.  
**Date Received:** 4/18/19 11:50  
**Date Prepared:** 4/25/19  
**Project:** 2014-003; Dunphy Park Stockpile

**WorkOrder:** 1904909  
**Extraction Method:** SW3550B/3640A  
**Analytical Method:** SW8270C  
**Unit:** mg/Kg

### Semi-Volatile Organics (Low Level) with GPC Cleanup

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 1	1904909-003A	Soil	04/18/2019 10:05	GC21 04251930.D	176844

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
<u>Surrogates</u>	<u>REC (%)</u>		<u>Limits</u>		
2-Fluorophenol	100		30-167		04/26/2019 02:15
Phenol-d5	91		58-149		04/26/2019 02:15
Nitrobenzene-d5	85		54-137		04/26/2019 02:15
2-Fluorobiphenyl	93		59-113		04/26/2019 02:15
2,4,6-Tribromophenol	91		21-171		04/26/2019 02:15
4-Terphenyl-d14	113		65-126		04/26/2019 02:15

**Analyst(s):** REB



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## Analytical Report

**Client:** AEW Engineering, Inc.

**WorkOrder:** 1904909

**Date Received:** 4/18/19 11:50

**Extraction Method:** SW3550B/3640A

**Date Prepared:** 4/25/19

**Analytical Method:** SW8270C

**Project:** 2014-003; Dunphy Park Stockpile

**Unit:** mg/Kg

### Semi-Volatile Organics (Low Level) with GPC Cleanup

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 2	1904909-004A	Soil	04/18/2019 10:15	GC21 04251931.D	176844
Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Acenaphthene	ND		0.013	10	04/26/2019 02:42
Acenaphthylene	<b>0.022</b>		0.013	10	04/26/2019 02:42
Acetochlor	ND		2.5	10	04/26/2019 02:42
Anthracene	<b>0.018</b>		0.013	10	04/26/2019 02:42
Benzidine	ND		12	10	04/26/2019 02:42
Benzo (a) anthracene	<b>0.098</b>		0.050	10	04/26/2019 02:42
Benzo (a) pyrene	<b>0.12</b>		0.025	10	04/26/2019 02:42
Benzo (b) fluoranthene	<b>0.075</b>		0.013	10	04/26/2019 02:42
Benzo (g,h,i) perylene	<b>0.14</b>		0.025	10	04/26/2019 02:42
Benzo (k) fluoranthene	<b>0.046</b>		0.013	10	04/26/2019 02:42
Benzyl Alcohol	ND		12	10	04/26/2019 02:42
1,1-Biphenyl	ND		0.13	10	04/26/2019 02:42
Bis (2-chloroethoxy) Methane	ND		2.5	10	04/26/2019 02:42
Bis (2-chloroethyl) Ether	ND		0.025	10	04/26/2019 02:42
Bis (2-chloroisopropyl) Ether	ND		0.025	10	04/26/2019 02:42
Bis (2-ethylhexyl) Adipate	ND		5.0	10	04/26/2019 02:42
Bis (2-ethylhexyl) Phthalate	ND		0.050	10	04/26/2019 02:42
4-Bromophenyl Phenyl Ether	ND		2.5	10	04/26/2019 02:42
Butylbenzyl Phthalate	ND		0.25	10	04/26/2019 02:42
4-Chloroaniline	ND		0.025	10	04/26/2019 02:42
4-Chloro-3-methylphenol	ND		2.5	10	04/26/2019 02:42
2-Chloronaphthalene	ND		2.5	10	04/26/2019 02:42
2-Chlorophenol	ND		0.050	10	04/26/2019 02:42
4-Chlorophenyl Phenyl Ether	ND		2.5	10	04/26/2019 02:42
Chrysene	<b>0.10</b>		0.025	10	04/26/2019 02:42
Dibenzo (a,h) anthracene	<b>0.031</b>		0.025	10	04/26/2019 02:42
Dibenzofuran	ND		2.5	10	04/26/2019 02:42
Di-n-butyl Phthalate	ND		0.025	10	04/26/2019 02:42
1,2-Dichlorobenzene	ND		2.5	10	04/26/2019 02:42
1,3-Dichlorobenzene	ND		2.5	10	04/26/2019 02:42
1,4-Dichlorobenzene	ND		2.5	10	04/26/2019 02:42
3,3-Dichlorobenzidine	ND		0.025	10	04/26/2019 02:42
2,4-Dichlorophenol	ND		0.13	10	04/26/2019 02:42
Diethyl Phthalate	ND		0.050	10	04/26/2019 02:42
2,4-Dimethylphenol	ND		2.5	10	04/26/2019 02:42
Dimethyl Phthalate	ND		0.025	10	04/26/2019 02:42
4,6-Dinitro-2-methylphenol	ND		12	10	04/26/2019 02:42

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## Analytical Report

**Client:** AEW Engineering, Inc.

**WorkOrder:** 1904909

**Date Received:** 4/18/19 11:50

**Extraction Method:** SW3550B/3640A

**Date Prepared:** 4/25/19

**Analytical Method:** SW8270C

**Project:** 2014-003; Dunphy Park Stockpile

**Unit:** mg/Kg

### Semi-Volatile Organics (Low Level) with GPC Cleanup

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 2	1904909-004A	Soil	04/18/2019 10:15	GC21 04251931.D	176844
Analytes	Result	Qualifiers	RL	DF	Date Analyzed
2,4-Dinitrophenol	ND		1.3	10	04/26/2019 02:42
2,4-Dinitrotoluene	ND		0.063	10	04/26/2019 02:42
2,6-Dinitrotoluene	ND		0.025	10	04/26/2019 02:42
Di-n-octyl Phthalate	ND		0.050	10	04/26/2019 02:42
1,2-Diphenylhydrazine	ND		2.5	10	04/26/2019 02:42
Fluoranthene	<b>0.18</b>		0.013	10	04/26/2019 02:42
Fluorene	ND		0.025	10	04/26/2019 02:42
Hexachlorobenzene	ND		0.013	10	04/26/2019 02:42
Hexachlorobutadiene	ND		0.025	10	04/26/2019 02:42
Hexachlorocyclopentadiene	ND		20	10	04/26/2019 02:42
Hexachloroethane	ND		0.025	10	04/26/2019 02:42
Indeno (1,2,3-cd) pyrene	<b>0.076</b>		0.025	10	04/26/2019 02:42
Isophorone	ND		2.5	10	04/26/2019 02:42
2-Methylnaphthalene	<b>0.11</b>		0.025	10	04/26/2019 02:42
2-Methylphenol (o-Cresol)	ND		5.0	10	04/26/2019 02:42
3 & 4-Methylphenol (m,p-Cresol)	ND		2.5	10	04/26/2019 02:42
Naphthalene	<b>0.024</b>	B	0.013	10	04/26/2019 02:42
2-Nitroaniline	ND		12	10	04/26/2019 02:42
3-Nitroaniline	ND		12	10	04/26/2019 02:42
4-Nitroaniline	ND		12	10	04/26/2019 02:42
Nitrobenzene	ND		2.5	10	04/26/2019 02:42
2-Nitrophenol	ND		12	10	04/26/2019 02:42
4-Nitrophenol	ND		12	10	04/26/2019 02:42
N-Nitrosodiphenylamine	ND		2.5	10	04/26/2019 02:42
N-Nitrosodi-n-propylamine	ND		2.5	10	04/26/2019 02:42
Pentachlorophenol	ND		0.31	10	04/26/2019 02:42
Phenanthrene	<b>0.10</b>	B	0.050	10	04/26/2019 02:42
Phenol	ND		0.050	10	04/26/2019 02:42
Pyrene	<b>0.23</b>		0.025	10	04/26/2019 02:42
Pyridine	ND		2.5	10	04/26/2019 02:42
1,2,4-Trichlorobenzene	ND		2.5	10	04/26/2019 02:42
2,4,5-Trichlorophenol	ND		0.025	10	04/26/2019 02:42
2,4,6-Trichlorophenol	ND		0.13	10	04/26/2019 02:42

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## Analytical Report

**Client:** AEW Engineering, Inc.  
**Date Received:** 4/18/19 11:50  
**Date Prepared:** 4/25/19  
**Project:** 2014-003; Dunphy Park Stockpile

**WorkOrder:** 1904909  
**Extraction Method:** SW3550B/3640A  
**Analytical Method:** SW8270C  
**Unit:** mg/Kg

### Semi-Volatile Organics (Low Level) with GPC Cleanup

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 2	1904909-004A	Soil	04/18/2019 10:15	GC21 04251931.D	176844

<u>Analytes</u>	<u>Result</u>	<u>Qualifiers</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
<u>Surrogates</u>	<u>REC (%)</u>		<u>Limits</u>		
2-Fluorophenol	104		30-167		04/26/2019 02:42
Phenol-d5	87		58-149		04/26/2019 02:42
Nitrobenzene-d5	83		54-137		04/26/2019 02:42
2-Fluorobiphenyl	80		59-113		04/26/2019 02:42
2,4,6-Tribromophenol	84		21-171		04/26/2019 02:42
4-Terphenyl-d14	108		65-126		04/26/2019 02:42

Analyst(s): REB



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## Analytical Report

**Client:** AEW Engineering, Inc.

**WorkOrder:** 1904909

**Date Received:** 4/18/19 11:50

**Extraction Method:** SW3550B/3640A

**Date Prepared:** 4/25/19

**Analytical Method:** SW8270C

**Project:** 2014-003; Dunphy Park Stockpile

**Unit:** mg/Kg

### Semi-Volatile Organics (Low Level) with GPC Cleanup

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 3	1904909-005A	Soil	04/18/2019 10:25	GC21 04251932.D	176844
Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Acenaphthene	ND		0.013	10	04/26/2019 03:09
Acenaphthylene	<b>0.020</b>		0.013	10	04/26/2019 03:09
Acetochlor	ND		2.5	10	04/26/2019 03:09
Anthracene	<b>0.023</b>		0.013	10	04/26/2019 03:09
Benzidine	ND		12	10	04/26/2019 03:09
Benzo (a) anthracene	<b>0.12</b>		0.050	10	04/26/2019 03:09
Benzo (a) pyrene	<b>0.14</b>		0.025	10	04/26/2019 03:09
Benzo (b) fluoranthene	<b>0.12</b>		0.013	10	04/26/2019 03:09
Benzo (g,h,i) perylene	<b>0.14</b>		0.025	10	04/26/2019 03:09
Benzo (k) fluoranthene	<b>0.060</b>		0.013	10	04/26/2019 03:09
Benzyl Alcohol	ND		12	10	04/26/2019 03:09
1,1-Biphenyl	ND		0.13	10	04/26/2019 03:09
Bis (2-chloroethoxy) Methane	ND		2.5	10	04/26/2019 03:09
Bis (2-chloroethyl) Ether	ND		0.025	10	04/26/2019 03:09
Bis (2-chloroisopropyl) Ether	ND		0.025	10	04/26/2019 03:09
Bis (2-ethylhexyl) Adipate	ND		5.0	10	04/26/2019 03:09
Bis (2-ethylhexyl) Phthalate	<b>0.057</b>	B	0.050	10	04/26/2019 03:09
4-Bromophenyl Phenyl Ether	ND		2.5	10	04/26/2019 03:09
Butylbenzyl Phthalate	ND		0.25	10	04/26/2019 03:09
4-Chloroaniline	ND		0.025	10	04/26/2019 03:09
4-Chloro-3-methylphenol	ND		2.5	10	04/26/2019 03:09
2-Chloronaphthalene	ND		2.5	10	04/26/2019 03:09
2-Chlorophenol	ND		0.050	10	04/26/2019 03:09
4-Chlorophenyl Phenyl Ether	ND		2.5	10	04/26/2019 03:09
Chrysene	<b>0.19</b>		0.025	10	04/26/2019 03:09
Dibenzo (a,h) anthracene	<b>0.036</b>		0.025	10	04/26/2019 03:09
Dibenzofuran	ND		2.5	10	04/26/2019 03:09
Di-n-butyl Phthalate	ND		0.025	10	04/26/2019 03:09
1,2-Dichlorobenzene	ND		2.5	10	04/26/2019 03:09
1,3-Dichlorobenzene	ND		2.5	10	04/26/2019 03:09
1,4-Dichlorobenzene	ND		2.5	10	04/26/2019 03:09
3,3-Dichlorobenzidine	ND		0.025	10	04/26/2019 03:09
2,4-Dichlorophenol	ND		0.13	10	04/26/2019 03:09
Diethyl Phthalate	ND		0.050	10	04/26/2019 03:09
2,4-Dimethylphenol	ND		2.5	10	04/26/2019 03:09
Dimethyl Phthalate	ND		0.025	10	04/26/2019 03:09
4,6-Dinitro-2-methylphenol	ND		12	10	04/26/2019 03:09

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## Analytical Report

**Client:** AEW Engineering, Inc.

**WorkOrder:** 1904909

**Date Received:** 4/18/19 11:50

**Extraction Method:** SW3550B/3640A

**Date Prepared:** 4/25/19

**Analytical Method:** SW8270C

**Project:** 2014-003; Dunphy Park Stockpile

**Unit:** mg/Kg

### Semi-Volatile Organics (Low Level) with GPC Cleanup

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 3	1904909-005A	Soil	04/18/2019 10:25	GC21 04251932.D	176844
Analytes	Result	Qualifiers	RL	DF	Date Analyzed
2,4-Dinitrophenol	ND		1.3	10	04/26/2019 03:09
2,4-Dinitrotoluene	ND		0.063	10	04/26/2019 03:09
2,6-Dinitrotoluene	ND		0.025	10	04/26/2019 03:09
Di-n-octyl Phthalate	ND		0.050	10	04/26/2019 03:09
1,2-Diphenylhydrazine	ND		2.5	10	04/26/2019 03:09
Fluoranthene	<b>0.32</b>		0.013	10	04/26/2019 03:09
Fluorene	ND		0.025	10	04/26/2019 03:09
Hexachlorobenzene	ND		0.013	10	04/26/2019 03:09
Hexachlorobutadiene	ND		0.025	10	04/26/2019 03:09
Hexachlorocyclopentadiene	ND		20	10	04/26/2019 03:09
Hexachloroethane	ND		0.025	10	04/26/2019 03:09
Indeno (1,2,3-cd) pyrene	<b>0.087</b>		0.025	10	04/26/2019 03:09
Isophorone	ND		2.5	10	04/26/2019 03:09
2-Methylnaphthalene	ND		0.025	10	04/26/2019 03:09
2-Methylphenol (o-Cresol)	ND		5.0	10	04/26/2019 03:09
3 & 4-Methylphenol (m,p-Cresol)	ND		2.5	10	04/26/2019 03:09
Naphthalene	<b>0.015</b>	B	0.013	10	04/26/2019 03:09
2-Nitroaniline	ND		12	10	04/26/2019 03:09
3-Nitroaniline	ND		12	10	04/26/2019 03:09
4-Nitroaniline	ND		12	10	04/26/2019 03:09
Nitrobenzene	ND		2.5	10	04/26/2019 03:09
2-Nitrophenol	ND		12	10	04/26/2019 03:09
4-Nitrophenol	ND		12	10	04/26/2019 03:09
N-Nitrosodiphenylamine	ND		2.5	10	04/26/2019 03:09
N-Nitrosodi-n-propylamine	ND		2.5	10	04/26/2019 03:09
Pentachlorophenol	ND		0.31	10	04/26/2019 03:09
Phenanthrene	<b>0.15</b>	B	0.050	10	04/26/2019 03:09
Phenol	ND		0.050	10	04/26/2019 03:09
Pyrene	<b>0.32</b>		0.025	10	04/26/2019 03:09
Pyridine	ND		2.5	10	04/26/2019 03:09
1,2,4-Trichlorobenzene	ND		2.5	10	04/26/2019 03:09
2,4,5-Trichlorophenol	ND		0.025	10	04/26/2019 03:09
2,4,6-Trichlorophenol	ND		0.13	10	04/26/2019 03:09

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## Analytical Report

**Client:** AEW Engineering, Inc.  
**Date Received:** 4/18/19 11:50  
**Date Prepared:** 4/25/19  
**Project:** 2014-003; Dunphy Park Stockpile

**WorkOrder:** 1904909  
**Extraction Method:** SW3550B/3640A  
**Analytical Method:** SW8270C  
**Unit:** mg/Kg

### Semi-Volatile Organics (Low Level) with GPC Cleanup

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 3	1904909-005A	Soil	04/18/2019 10:25	GC21 04251932.D	176844

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
<u>Surrogates</u>	<u>REC (%)</u>	<u>Qualifiers</u>	<u>Limits</u>		
2-Fluorophenol	102		30-167		04/26/2019 03:09
Phenol-d5	102		58-149		04/26/2019 03:09
Nitrobenzene-d5	98		54-137		04/26/2019 03:09
2-Fluorobiphenyl	98		59-113		04/26/2019 03:09
2,4,6-Tribromophenol	95		21-171		04/26/2019 03:09
4-Terphenyl-d14	127	S	65-126		04/26/2019 03:09

**Analyst(s):** REB

**Analytical Comments:** c2



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## Analytical Report

**Client:** AEW Engineering, Inc.

**WorkOrder:** 1904909

**Date Received:** 4/18/19 11:50

**Extraction Method:** SW3550B/3640A

**Date Prepared:** 4/25/19

**Analytical Method:** SW8270C

**Project:** 2014-003; Dunphy Park Stockpile

**Unit:** mg/Kg

### Semi-Volatile Organics (Low Level) with GPC Cleanup

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 4	1904909-006A	Soil	04/18/2019 10:35	GC21 04251933.D	176844
Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Acenaphthene	ND		0.013	10	04/26/2019 03:36
Acenaphthylene	ND		0.013	10	04/26/2019 03:36
Acetochlor	ND		2.5	10	04/26/2019 03:36
Anthracene	ND		0.013	10	04/26/2019 03:36
Benzidine	ND		12	10	04/26/2019 03:36
Benzo (a) anthracene	<b>0.085</b>		0.050	10	04/26/2019 03:36
Benzo (a) pyrene	<b>0.073</b>		0.025	10	04/26/2019 03:36
Benzo (b) fluoranthene	<b>0.050</b>		0.013	10	04/26/2019 03:36
Benzo (g,h,i) perylene	<b>0.084</b>		0.025	10	04/26/2019 03:36
Benzo (k) fluoranthene	<b>0.038</b>		0.013	10	04/26/2019 03:36
Benzyl Alcohol	ND		12	10	04/26/2019 03:36
1,1-Biphenyl	ND		0.13	10	04/26/2019 03:36
Bis (2-chloroethoxy) Methane	ND		2.5	10	04/26/2019 03:36
Bis (2-chloroethyl) Ether	ND		0.025	10	04/26/2019 03:36
Bis (2-chloroisopropyl) Ether	ND		0.025	10	04/26/2019 03:36
Bis (2-ethylhexyl) Adipate	ND		5.0	10	04/26/2019 03:36
Bis (2-ethylhexyl) Phthalate	<b>0.059</b>	B	0.050	10	04/26/2019 03:36
4-Bromophenyl Phenyl Ether	ND		2.5	10	04/26/2019 03:36
Butylbenzyl Phthalate	ND		0.25	10	04/26/2019 03:36
4-Chloroaniline	ND		0.025	10	04/26/2019 03:36
4-Chloro-3-methylphenol	ND		2.5	10	04/26/2019 03:36
2-Chloronaphthalene	ND		2.5	10	04/26/2019 03:36
2-Chlorophenol	ND		0.050	10	04/26/2019 03:36
4-Chlorophenyl Phenyl Ether	ND		2.5	10	04/26/2019 03:36
Chrysene	<b>0.053</b>		0.025	10	04/26/2019 03:36
Dibenzo (a,h) anthracene	ND		0.025	10	04/26/2019 03:36
Dibenzofuran	ND		2.5	10	04/26/2019 03:36
Di-n-butyl Phthalate	ND		0.025	10	04/26/2019 03:36
1,2-Dichlorobenzene	ND		2.5	10	04/26/2019 03:36
1,3-Dichlorobenzene	ND		2.5	10	04/26/2019 03:36
1,4-Dichlorobenzene	ND		2.5	10	04/26/2019 03:36
3,3-Dichlorobenzidine	ND		0.025	10	04/26/2019 03:36
2,4-Dichlorophenol	ND		0.13	10	04/26/2019 03:36
Diethyl Phthalate	ND		0.050	10	04/26/2019 03:36
2,4-Dimethylphenol	ND		2.5	10	04/26/2019 03:36
Dimethyl Phthalate	ND		0.025	10	04/26/2019 03:36
4,6-Dinitro-2-methylphenol	ND		12	10	04/26/2019 03:36

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## Analytical Report

**Client:** AEW Engineering, Inc.

**WorkOrder:** 1904909

**Date Received:** 4/18/19 11:50

**Extraction Method:** SW3550B/3640A

**Date Prepared:** 4/25/19

**Analytical Method:** SW8270C

**Project:** 2014-003; Dunphy Park Stockpile

**Unit:** mg/Kg

### Semi-Volatile Organics (Low Level) with GPC Cleanup

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 4	1904909-006A	Soil	04/18/2019 10:35	GC21 04251933.D	176844
Analytes	Result	Qualifiers	RL	DF	Date Analyzed
2,4-Dinitrophenol	ND		1.3	10	04/26/2019 03:36
2,4-Dinitrotoluene	ND		0.063	10	04/26/2019 03:36
2,6-Dinitrotoluene	ND		0.025	10	04/26/2019 03:36
Di-n-octyl Phthalate	ND		0.050	10	04/26/2019 03:36
1,2-Diphenylhydrazine	ND		2.5	10	04/26/2019 03:36
Fluoranthene	<b>0.088</b>		0.013	10	04/26/2019 03:36
Fluorene	ND		0.025	10	04/26/2019 03:36
Hexachlorobenzene	ND		0.013	10	04/26/2019 03:36
Hexachlorobutadiene	ND		0.025	10	04/26/2019 03:36
Hexachlorocyclopentadiene	ND		20	10	04/26/2019 03:36
Hexachloroethane	ND		0.025	10	04/26/2019 03:36
Indeno (1,2,3-cd) pyrene	<b>0.050</b>		0.025	10	04/26/2019 03:36
Isophorone	ND		2.5	10	04/26/2019 03:36
2-Methylnaphthalene	<b>0.050</b>		0.025	10	04/26/2019 03:36
2-Methylphenol (o-Cresol)	ND		5.0	10	04/26/2019 03:36
3 & 4-Methylphenol (m,p-Cresol)	ND		2.5	10	04/26/2019 03:36
Naphthalene	<b>0.023</b>	B	0.013	10	04/26/2019 03:36
2-Nitroaniline	ND		12	10	04/26/2019 03:36
3-Nitroaniline	ND		12	10	04/26/2019 03:36
4-Nitroaniline	ND		12	10	04/26/2019 03:36
Nitrobenzene	ND		2.5	10	04/26/2019 03:36
2-Nitrophenol	ND		12	10	04/26/2019 03:36
4-Nitrophenol	ND		12	10	04/26/2019 03:36
N-Nitrosodiphenylamine	ND		2.5	10	04/26/2019 03:36
N-Nitrosodi-n-propylamine	ND		2.5	10	04/26/2019 03:36
Pentachlorophenol	ND		0.31	10	04/26/2019 03:36
Phenanthrene	<b>0.066</b>	B	0.050	10	04/26/2019 03:36
Phenol	ND		0.050	10	04/26/2019 03:36
Pyrene	<b>0.096</b>		0.025	10	04/26/2019 03:36
Pyridine	ND		2.5	10	04/26/2019 03:36
1,2,4-Trichlorobenzene	ND		2.5	10	04/26/2019 03:36
2,4,5-Trichlorophenol	ND		0.025	10	04/26/2019 03:36
2,4,6-Trichlorophenol	ND		0.13	10	04/26/2019 03:36

(Cont.)



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## Analytical Report

**Client:** AEW Engineering, Inc.  
**Date Received:** 4/18/19 11:50  
**Date Prepared:** 4/25/19  
**Project:** 2014-003; Dunphy Park Stockpile

**WorkOrder:** 1904909  
**Extraction Method:** SW3550B/3640A  
**Analytical Method:** SW8270C  
**Unit:** mg/Kg

### Semi-Volatile Organics (Low Level) with GPC Cleanup

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 4	1904909-006A	Soil	04/18/2019 10:35	GC21 04251933.D	176844

<u>Analytes</u>	<u>Result</u>	<u>Qualifiers</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
<u>Surrogates</u>	<u>REC (%)</u>		<u>Limits</u>		
2-Fluorophenol	97		30-167		04/26/2019 03:36
Phenol-d5	90		58-149		04/26/2019 03:36
Nitrobenzene-d5	89		54-137		04/26/2019 03:36
2-Fluorobiphenyl	89		59-113		04/26/2019 03:36
2,4,6-Tribromophenol	83		21-171		04/26/2019 03:36
4-Terphenyl-d14	104		65-126		04/26/2019 03:36

**Analyst(s):** REB



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## Analytical Report

**Client:** AEW Engineering, Inc.  
**Date Received:** 4/18/19 11:50  
**Date Prepared:** 4/24/19  
**Project:** 2014-003; Dunphy Park Stockpile

**WorkOrder:** 1904909  
**Extraction Method:** SW3050B  
**Analytical Method:** SW6020  
**Unit:** mg/Kg

### CAM / CCR 17 Metals

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 1	1904909-003A	Soil	04/18/2019 10:05	ICP-MS3 135SMPL.D	176733

Analytes	Result	RL	DF	Date Analyzed
Antimony	2.8	0.50	1	04/25/2019 01:49
Arsenic	8.8	0.50	1	04/25/2019 01:49
Barium	290	5.0	1	04/25/2019 01:49
Beryllium	0.52	0.50	1	04/25/2019 01:49
Cadmium	0.67	0.25	1	04/25/2019 01:49
Chromium	68	0.50	1	04/25/2019 01:49
Cobalt	12	0.50	1	04/25/2019 01:49
Copper	84	0.50	1	04/25/2019 01:49
Lead	300	0.50	1	04/25/2019 01:49
Mercury	0.84	0.050	1	04/25/2019 01:49
Molybdenum	0.88	0.50	1	04/25/2019 01:49
Nickel	56	0.50	1	04/25/2019 01:49
Selenium	ND	0.50	1	04/25/2019 01:49
Silver	ND	0.50	1	04/25/2019 01:49
Thallium	ND	0.50	1	04/25/2019 01:49
Vanadium	57	0.50	1	04/25/2019 01:49
Zinc	270	5.0	1	04/25/2019 01:49

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	97	70-130	04/25/2019 01:49

**Analyst(s):** ND

(Cont.)





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## Analytical Report

**Client:** AEW Engineering, Inc.  
**Date Received:** 4/18/19 11:50  
**Date Prepared:** 4/24/19  
**Project:** 2014-003; Dunphy Park Stockpile

**WorkOrder:** 1904909  
**Extraction Method:** SW3050B  
**Analytical Method:** SW6020  
**Unit:** mg/Kg

### CAM / CCR 17 Metals

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 2	1904909-004A	Soil	04/18/2019 10:15	ICP-MS3 136SMPL.D	176733

Analytes	Result	RL	DF	Date Analyzed
Antimony	2.9	0.50	1	04/25/2019 01:55
Arsenic	11	0.50	1	04/25/2019 01:55
Barium	240	5.0	1	04/25/2019 01:55
Beryllium	0.59	0.50	1	04/25/2019 01:55
Cadmium	0.91	0.25	1	04/25/2019 01:55
Chromium	71	0.50	1	04/25/2019 01:55
Cobalt	15	0.50	1	04/25/2019 01:55
Copper	89	0.50	1	04/25/2019 01:55
Lead	440	0.50	1	04/25/2019 01:55
Mercury	0.96	0.050	1	04/25/2019 01:55
Molybdenum	1.4	0.50	1	04/25/2019 01:55
Nickel	54	0.50	1	04/25/2019 01:55
Selenium	ND	0.50	1	04/25/2019 01:55
Silver	ND	0.50	1	04/25/2019 01:55
Thallium	ND	0.50	1	04/25/2019 01:55
Vanadium	77	0.50	1	04/25/2019 01:55
Zinc	310	5.0	1	04/25/2019 01:55

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	96	70-130	04/25/2019 01:55

**Analyst(s):** ND

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## Analytical Report

**Client:** AEW Engineering, Inc.  
**Date Received:** 4/18/19 11:50  
**Date Prepared:** 4/24/19  
**Project:** 2014-003; Dunphy Park Stockpile

**WorkOrder:** 1904909  
**Extraction Method:** SW3050B  
**Analytical Method:** SW6020  
**Unit:** mg/Kg

### CAM / CCR 17 Metals

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 3	1904909-005A	Soil	04/18/2019 10:25	ICP-MS3 137SMPL.D	176733

Analytes	Result	RL	DF	Date Analyzed
Antimony	7.2	0.50	1	04/25/2019 02:01
Arsenic	8.9	0.50	1	04/25/2019 02:01
Barium	290	5.0	1	04/25/2019 02:01
Beryllium	ND	0.50	1	04/25/2019 02:01
Cadmium	0.69	0.25	1	04/25/2019 02:01
Chromium	70	0.50	1	04/25/2019 02:01
Cobalt	11	0.50	1	04/25/2019 02:01
Copper	83	0.50	1	04/25/2019 02:01
Lead	270	0.50	1	04/25/2019 02:01
Mercury	0.66	0.050	1	04/25/2019 02:01
Molybdenum	0.64	0.50	1	04/25/2019 02:01
Nickel	65	0.50	1	04/25/2019 02:01
Selenium	ND	0.50	1	04/25/2019 02:01
Silver	ND	0.50	1	04/25/2019 02:01
Thallium	ND	0.50	1	04/25/2019 02:01
Vanadium	57	0.50	1	04/25/2019 02:01
Zinc	280	5.0	1	04/25/2019 02:01

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	99	70-130	04/25/2019 02:01

**Analyst(s):** ND

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## Analytical Report

**Client:** AEW Engineering, Inc.  
**Date Received:** 4/18/19 11:50  
**Date Prepared:** 4/24/19  
**Project:** 2014-003; Dunphy Park Stockpile

**WorkOrder:** 1904909  
**Extraction Method:** SW3050B  
**Analytical Method:** SW6020  
**Unit:** mg/Kg

### CAM / CCR 17 Metals

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 4	1904909-006A	Soil	04/18/2019 10:35	ICP-MS3 138SMPL.D	176733

Analytes	Result	RL	DF	Date Analyzed
Antimony	9.2	0.50	1	04/25/2019 02:07
Arsenic	27	0.50	1	04/25/2019 02:07
Barium	280	5.0	1	04/25/2019 02:07
Beryllium	ND	0.50	1	04/25/2019 02:07
Cadmium	1.2	0.25	1	04/25/2019 02:07
Chromium	95	0.50	1	04/25/2019 02:07
Cobalt	28	0.50	1	04/25/2019 02:07
Copper	380	0.50	1	04/25/2019 02:07
Lead	310	0.50	1	04/25/2019 02:07
Mercury	0.58	0.050	1	04/25/2019 02:07
Molybdenum	29	0.50	1	04/25/2019 02:07
Nickel	340	0.50	1	04/25/2019 02:07
Selenium	ND	0.50	1	04/25/2019 02:07
Silver	ND	0.50	1	04/25/2019 02:07
Thallium	ND	0.50	1	04/25/2019 02:07
Vanadium	52	0.50	1	04/25/2019 02:07
Zinc	430	5.0	1	04/25/2019 02:07

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	98	70-130	04/25/2019 02:07

**Analyst(s):** ND



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## Analytical Report

<b>Client:</b> AEW Engineering, Inc.	<b>WorkOrder:</b> 1904909
<b>Date Received:</b> 4/18/19 11:50	<b>Extraction Method:</b> SW5030B
<b>Date Prepared:</b> 4/24/19-4/25/19	<b>Analytical Method:</b> SW8021B/8015Bm
<b>Project:</b> 2014-003; Dunphy Park Stockpile	<b>Unit:</b> mg/Kg

### Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 1	1904909-003A	Soil	04/18/2019 10:05	GC19 04241912.D	176717

Analytes	Result	RL	DF	Date Analyzed
TPH(g) (C6-C12)	1.4	1.0	1	04/24/2019 17:55
MTBE	ND	0.050	1	04/24/2019 17:55
Benzene	ND	0.0050	1	04/24/2019 17:55
Toluene	ND	0.0050	1	04/24/2019 17:55
Ethylbenzene	ND	0.0050	1	04/24/2019 17:55
m,p-Xylene	ND	0.010	1	04/24/2019 17:55
o-Xylene	ND	0.0050	1	04/24/2019 17:55
Xylenes	ND	0.0050	1	04/24/2019 17:55

Surrogates	REC (%)	Limits	Date Analyzed
2-Fluorotoluene	78	62-126	04/24/2019 17:55

Analyst(s): IA      Analytical Comments: d7

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 2	1904909-004A	Soil	04/18/2019 10:15	GC3 04251905.D	176788

Analytes	Result	RL	DF	Date Analyzed
TPH(g) (C6-C12)	2.4	1.0	1	04/25/2019 13:21
MTBE	ND	0.050	1	04/25/2019 13:21
Benzene	ND	0.0050	1	04/25/2019 13:21
Toluene	ND	0.0050	1	04/25/2019 13:21
Ethylbenzene	ND	0.0050	1	04/25/2019 13:21
m,p-Xylene	ND	0.010	1	04/25/2019 13:21
o-Xylene	ND	0.0050	1	04/25/2019 13:21
Xylenes	ND	0.0050	1	04/25/2019 13:21

Surrogates	REC (%)	Limits	Date Analyzed
2-Fluorotoluene	80	62-126	04/25/2019 13:21

Analyst(s): IA      Analytical Comments: d7

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## Analytical Report

<b>Client:</b> AEW Engineering, Inc.	<b>WorkOrder:</b> 1904909
<b>Date Received:</b> 4/18/19 11:50	<b>Extraction Method:</b> SW5030B
<b>Date Prepared:</b> 4/24/19-4/25/19	<b>Analytical Method:</b> SW8021B/8015Bm
<b>Project:</b> 2014-003; Dunphy Park Stockpile	<b>Unit:</b> mg/Kg

### Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 3	1904909-005A	Soil	04/18/2019 10:25	GC7 04251905.D	176717

Analytes	Result	RL	DF	Date Analyzed
TPH(g) (C6-C12)	1.3	1.0	1	04/25/2019 13:07
MTBE	ND	0.050	1	04/25/2019 13:07
Benzene	ND	0.0050	1	04/25/2019 13:07
Toluene	ND	0.0050	1	04/25/2019 13:07
Ethylbenzene	ND	0.0050	1	04/25/2019 13:07
m,p-Xylene	ND	0.010	1	04/25/2019 13:07
o-Xylene	ND	0.0050	1	04/25/2019 13:07
Xylenes	ND	0.0050	1	04/25/2019 13:07

Surrogates	REC (%)	Limits	Date Analyzed
2-Fluorotoluene	74	62-126	04/25/2019 13:07

Analyst(s): IA Analytical Comments: d7

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 4	1904909-006A	Soil	04/18/2019 10:35	GC19 04241913.D	176717

Analytes	Result	RL	DF	Date Analyzed
TPH(g) (C6-C12)	1.2	1.0	1	04/24/2019 18:27
MTBE	ND	0.050	1	04/24/2019 18:27
Benzene	ND	0.0050	1	04/24/2019 18:27
Toluene	ND	0.0050	1	04/24/2019 18:27
Ethylbenzene	ND	0.0050	1	04/24/2019 18:27
m,p-Xylene	ND	0.010	1	04/24/2019 18:27
o-Xylene	ND	0.0050	1	04/24/2019 18:27
Xylenes	ND	0.0050	1	04/24/2019 18:27

Surrogates	REC (%)	Limits	Date Analyzed
2-Fluorotoluene	81	62-126	04/24/2019 18:27

Analyst(s): IA Analytical Comments: d7



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## Analytical Report

**Client:** AEW Engineering, Inc.  
**Date Received:** 4/18/19 11:50  
**Date Prepared:** 4/24/19  
**Project:** 2014-003; Dunphy Park Stockpile

**WorkOrder:** 1904909  
**Extraction Method:** SW3550B/3630C  
**Analytical Method:** SW8015B  
**Unit:** mg/Kg

### Total Extractable Petroleum Hydrocarbons with Silica Gel Clean-Up

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 1	1904909-003A	Soil	04/18/2019 10:05	GC6A 04251962.D	176758

<u>Analytes</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
TPH-Diesel (C10-C23)	25	5.0	5	04/26/2019 10:26
TPH-Motor Oil (C18-C36)	140	25	5	04/26/2019 10:26

<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>	<u>Date Analyzed</u>
C9	100	74-123	04/26/2019 10:26

Analyst(s): JIS Analytical Comments: e7,e2

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 2	1904909-004A	Soil	04/18/2019 10:15	GC6B 04291917.D	176758

<u>Analytes</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
TPH-Diesel (C10-C23)	51	10	10	04/29/2019 14:20
TPH-Motor Oil (C18-C36)	160	50	10	04/29/2019 14:20

<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>	<u>Date Analyzed</u>
C9	95	74-123	04/29/2019 14:20

Analyst(s): JIS Analytical Comments: e7,e2

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 3	1904909-005A	Soil	04/18/2019 10:25	GC6B 04291921.D	176758

<u>Analytes</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
TPH-Diesel (C10-C23)	26	10	10	04/29/2019 15:38
TPH-Motor Oil (C18-C36)	130	50	10	04/29/2019 15:38

<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>	<u>Date Analyzed</u>
C9	96	74-123	04/29/2019 15:38

Analyst(s): JIS Analytical Comments: e7,e2

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## Analytical Report

**Client:** AEW Engineering, Inc.  
**Date Received:** 4/18/19 11:50  
**Date Prepared:** 4/24/19  
**Project:** 2014-003; Dunphy Park Stockpile

**WorkOrder:** 1904909  
**Extraction Method:** SW3550B/3630C  
**Analytical Method:** SW8015B  
**Unit:** mg/Kg

### Total Extractable Petroleum Hydrocarbons with Silica Gel Clean-Up

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
DP Stockpile Comp 4	1904909-006A	Soil	04/18/2019 10:35	GC9a 04251946.D	176758
<b>Analytes</b>					
	<u>Result</u>		<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
TPH-Diesel (C10-C23)	12		10	10	04/26/2019 05:35
TPH-Motor Oil (C18-C36)	160		50	10	04/26/2019 05:35
<b>Surrogates</b>					
	<u>REC (%)</u>		<u>Limits</u>		
C9	88		74-123		04/26/2019 05:35
<b>Analyst(s):</b> JIS			<b>Analytical Comments:</b> e7,e2		



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## Quality Control Report

**Client:** AEW Engineering, Inc.

**WorkOrder:** 1904909

**Date Prepared:** 4/24/19

**BatchID:** 176763

**Date Analyzed:** 4/24/19

**Extraction Method:** SW3550B/3640Am/3630Cm

**Instrument:** GC20

**Analytical Method:** SW8081A/8082

**Matrix:** Soil

**Unit:** mg/kg

**Project:** 2014-003; Dunphy Park Stockpile

**Sample ID:** MB/LCS/LCSD-176763

### QC Summary Report for SW8081A/8082

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
Aldrin	ND	0.000036	0.00010	-	-	-
a-BHC	ND	0.000025	0.00010	-	-	-
b-BHC	ND	0.00025	0.00030	-	-	-
d-BHC	ND	0.00013	0.00020	-	-	-
g-BHC	ND	0.000066	0.00010	-	-	-
Chlordane (Technical)	ND	0.00043	0.0025	-	-	-
a-Chlordane	ND	0.000095	0.00010	-	-	-
g-Chlordane	ND	0.000047	0.00010	-	-	-
p,p-DDD	ND	0.000043	0.00010	-	-	-
p,p-DDE	ND	0.000094	0.00010	-	-	-
p,p-DDT	ND	0.000092	0.00010	-	-	-
Dieldrin	ND	0.000061	0.00010	-	-	-
Endosulfan I	ND	0.000048	0.00010	-	-	-
Endosulfan II	ND	0.000076	0.00010	-	-	-
Endosulfan sulfate	ND	0.000078	0.00010	-	-	-
Endrin	ND	0.000035	0.00010	-	-	-
Endrin aldehyde	ND	0.000067	0.00010	-	-	-
Endrin ketone	ND	0.000084	0.00010	-	-	-
Heptachlor	ND	0.000040	0.00010	-	-	-
Heptachlor epoxide	ND	0.000054	0.00010	-	-	-
Hexachlorobenzene	ND	0.00011	0.0010	-	-	-
Hexachlorocyclopentadiene	ND	0.00034	0.0020	-	-	-
Methoxychlor	ND	0.00013	0.00020	-	-	-
Toxaphene	ND	0.0034	0.0050	-	-	-
Aroclor1016	ND	0.0020	0.0050	-	-	-
Aroclor1221	ND	0.0022	0.0050	-	-	-
Aroclor1232	ND	0.0022	0.0050	-	-	-
Aroclor1242	ND	0.0022	0.0050	-	-	-
Aroclor1248	ND	0.0022	0.0050	-	-	-
Aroclor1254	ND	0.0022	0.0050	-	-	-
Aroclor1260	ND	0.0022	0.0050	-	-	-
PCBs, total	ND	N/A	0.0050	-	-	-
<b>Surrogate Recovery</b>						
Decachlorobiphenyl	0.0060			0.0050	121	28-170

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CA ELAP 1644 • NELAP 4033ORELAP





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## Quality Control Report

**Client:** AEW Engineering, Inc.

**Date Prepared:** 4/24/19

**Date Analyzed:** 4/24/19

**Instrument:** GC20

**Matrix:** Soil

**Project:** 2014-003; Dunphy Park Stockpile

**WorkOrder:** 1904909

**BatchID:** 176763

**Extraction Method:** SW3550B/3640Am/3630Cm

**Analytical Method:** SW8081A/8082

**Unit:** mg/kg

**Sample ID:** MB/LCS/LCSD-176763

### QC Summary Report for SW8081A/8082

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Aldrin	0.0039	0.0045	0.0050	77	89	31-155	14.3	20
a-BHC	0.0035	0.0042	0.0050	71	83	32-160	16.2	20
b-BHC	0.0037	0.0042	0.0050	75	84	44-149	11.4	20
d-BHC	0.0042	0.0049	0.0050	85	98	37-157	15.0	20
g-BHC	0.0037	0.0043	0.0050	74	85	43-154	14.5	20
a-Chlordane	0.0040	0.0046	0.0050	79	92	39-150	14.1	20
g-Chlordane	0.0040	0.0047	0.0050	81	94	39-151	15.4	20
p,p-DDD	0.0032	0.0039	0.0050	63	78	30-158	20.9,F2	20
p,p-DDE	0.0043	0.0050	0.0050	86	100	47-149	14.7	20
p,p-DDT	0.0048	0.0058	0.0050	97	115	56-166	17.4	20
Dieldrin	0.0048	0.0055	0.0050	96	111	50-163	14.4	20
Endosulfan I	0.0041	0.0047	0.0050	81	93	45-159	13.6	20
Endosulfan II	0.0040	0.0047	0.0050	80	94	41-155	15.0	20
Endosulfan sulfate	0.0045	0.0047	0.0050	89	94	45-156	4.93	20
Endrin	0.0047	0.0055	0.0050	94	110	54-154	15.3	20
Endrin aldehyde	0.0041	0.0043	0.0050	82	87	27-159	5.10	20
Endrin ketone	0.0042	0.0048	0.0050	85	96	40-147	12.2	20
Heptachlor	0.0042	0.0049	0.0050	84	98	52-165	16.0	20
Heptachlor epoxide	0.0038	0.0044	0.0050	77	89	46-145	14.6	20
Hexachlorobenzene	0.0016	0.0020	0.0050	32	40	22-156	21.1,F2	20
Hexachlorocyclopentadiene	0.0064	0.0052	0.0050	128	103	43-173	21.5,F2	20
Methoxychlor	0.0048	0.0050	0.0050	96	100	49-150	4.52	20
Aroclor1016	0.012	0.012	0.015	77	78	49-120	2.22	20
Aroclor1260	0.013	0.013	0.015	86	89	48-160	4.00	20
<b>Surrogate Recovery</b>								
Decachlorobiphenyl	0.0060	0.0063	0.0050	121	125	28-170	3.86	20



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## Quality Control Report

<b>Client:</b>	AEW Engineering, Inc.	<b>WorkOrder:</b>	1904909
<b>Date Prepared:</b>	4/25/19	<b>BatchID:</b>	176844
<b>Date Analyzed:</b>	4/26/19	<b>Extraction Method:</b>	SW3550B/3640A
<b>Instrument:</b>	GC21	<b>Analytical Method:</b>	SW8270C
<b>Matrix:</b>	Soil	<b>Unit:</b>	mg/Kg
<b>Project:</b>	2014-003; Dunphy Park Stockpile	<b>Sample ID:</b>	MB/LCS/LCSD-176844 1904909-003AMS/MSD

### QC Summary Report for SW8270C (Low Level) w/ GPC

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
Benzoic Acid	ND	0.96	1.2	-	-	-
Acenaphthene	ND	0.0012	0.0013	-	-	-
Acenaphthylene	ND	0.0012	0.0013	-	-	-
Acetochlor	ND	0.16	0.25	-	-	-
Anthracene	ND	0.00096	0.0013	-	-	-
Benzidine	ND	0.72	1.2	-	-	-
Benzo (a) anthracene	ND	0.0044	0.0050	-	-	-
Benzo (a) pyrene	ND	0.0011	0.0025	-	-	-
Benzo (b) fluoranthene	ND	0.0012	0.0013	-	-	-
Benzo (g,h,i) perylene	0.0013,J	0.0010	0.0025	-	-	-
Benzo (k) fluoranthene	ND	0.0010	0.0013	-	-	-
Benzyl Alcohol	ND	1.2	1.2	-	-	-
1,1-Biphenyl	ND	0.0026	0.013	-	-	-
Bis (2-chloroethoxy) Methane	ND	0.16	0.25	-	-	-
Bis (2-chloroethyl) Ether	ND	0.0019	0.0025	-	-	-
Bis (2-chloroisopropyl) Ether	ND	0.0018	0.0025	-	-	-
Bis (2-ethylhexyl) Adipate	ND	0.23	0.50	-	-	-
Bis (2-ethylhexyl) Phthalate	ND	0.0045	0.0050	-	-	-
4-Bromophenyl Phenyl Ether	ND	0.16	0.25	-	-	-
Butylbenzyl Phthalate	ND	0.023	0.025	-	-	-
4-Chloroaniline	ND	0.0016	0.0025	-	-	-
4-Chloro-3-methylphenol	ND	0.16	0.25	-	-	-
2-Chloronaphthalene	ND	0.20	0.25	-	-	-
2-Chlorophenol	ND	0.0026	0.0050	-	-	-
4-Chlorophenyl Phenyl Ether	ND	0.18	0.25	-	-	-
Chrysene	ND	0.00098	0.0025	-	-	-
Dibenzo (a,h) anthracene	0.0014,J	0.0011	0.0025	-	-	-
Dibenzofuran	ND	0.18	0.25	-	-	-
Di-n-butyl Phthalate	ND	0.0018	0.0025	-	-	-
1,2-Dichlorobenzene	ND	0.13	0.25	-	-	-
1,3-Dichlorobenzene	ND	0.15	0.25	-	-	-
1,4-Dichlorobenzene	ND	0.15	0.25	-	-	-
3,3-Dichlorobenzidine	ND	0.00096	0.0025	-	-	-
2,4-Dichlorophenol	ND	0.0017	0.013	-	-	-
Diethyl Phthalate	ND	0.0023	0.0050	-	-	-
2,4-Dimethylphenol	ND	0.19	0.25	-	-	-
Dimethyl Phthalate	ND	0.0024	0.0025	-	-	-
4,6-Dinitro-2-methylphenol	ND	0.77	1.2	-	-	-

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## Quality Control Report

<b>Client:</b>	AEW Engineering, Inc.	<b>WorkOrder:</b>	1904909
<b>Date Prepared:</b>	4/25/19	<b>BatchID:</b>	176844
<b>Date Analyzed:</b>	4/26/19	<b>Extraction Method:</b>	SW3550B/3640A
<b>Instrument:</b>	GC21	<b>Analytical Method:</b>	SW8270C
<b>Matrix:</b>	Soil	<b>Unit:</b>	mg/Kg
<b>Project:</b>	2014-003; Dunphy Park Stockpile	<b>Sample ID:</b>	MB/LCS/LCSD-176844 1904909-003AMS/MSD

### QC Summary Report for SW8270C (Low Level) w/ GPC

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
2,4-Dinitrophenol	ND	0.058	0.13	-	-	-
2,4-Dinitrotoluene	ND	0.0011	0.0063	-	-	-
2,6-Dinitrotoluene	ND	0.0019	0.0025	-	-	-
Di-n-octyl Phthalate	ND	0.0032	0.0050	-	-	-
1,2-Diphenylhydrazine	ND	0.20	0.25	-	-	-
Fluoranthene	ND	0.0011	0.0013	-	-	-
Fluorene	ND	0.0019	0.0025	-	-	-
Hexachlorobenzene	ND	0.0013	0.0013	-	-	-
Hexachlorobutadiene	ND	0.0017	0.0025	-	-	-
Hexachlorocyclopentadiene	ND	0.13	2.0	-	-	-
Hexachloroethane	ND	0.0012	0.0025	-	-	-
Indeno (1,2,3-cd) pyrene	0.0013,J	0.0010	0.0025	-	-	-
Isophorone	ND	0.14	0.25	-	-	-
2-Methylnaphthalene	ND	0.0018	0.0025	-	-	-
2-Methylphenol (o-Cresol)	ND	0.21	0.50	-	-	-
3 & 4-Methylphenol (m,p-Cresol)	ND	0.17	0.25	-	-	-
Naphthalene	ND	0.0013	0.0013	-	-	-
2-Nitroaniline	ND	1.1	1.2	-	-	-
3-Nitroaniline	ND	0.82	1.2	-	-	-
4-Nitroaniline	ND	0.98	1.2	-	-	-
Nitrobenzene	ND	0.15	0.25	-	-	-
2-Nitrophenol	ND	1.1	1.2	-	-	-
4-Nitrophenol	ND	1.2	1.2	-	-	-
N-Nitrosodimethylamine	ND	0.73	1.2	-	-	-
N-Nitrosodiphenylamine	ND	0.18	0.25	-	-	-
N-Nitrosodi-n-propylamine	ND	0.23	0.25	-	-	-
Pentachlorophenol	ND	0.011	0.031	-	-	-
Phenanthrene	ND	0.0011	0.0050	-	-	-
Phenol	ND	0.0016	0.0050	-	-	-
Pyrene	ND	0.0012	0.0025	-	-	-
Pyridine	ND	0.16	0.25	-	-	-
1,2,4-Trichlorobenzene	ND	0.15	0.25	-	-	-
2,4,5-Trichlorophenol	ND	0.0019	0.0025	-	-	-
2,4,6-Trichlorophenol	ND	0.0012	0.013	-	-	-

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## Quality Control Report

<b>Client:</b> AEW Engineering, Inc.	<b>WorkOrder:</b> 1904909
<b>Date Prepared:</b> 4/25/19	<b>BatchID:</b> 176844
<b>Date Analyzed:</b> 4/26/19	<b>Extraction Method:</b> SW3550B/3640A
<b>Instrument:</b> GC21	<b>Analytical Method:</b> SW8270C
<b>Matrix:</b> Soil	<b>Unit:</b> mg/Kg
<b>Project:</b> 2014-003; Dunphy Park Stockpile	<b>Sample ID:</b> MB/LCS/LCSD-176844 1904909-003AMS/MSD

### QC Summary Report for SW8270C (Low Level) w/ GPC

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
<b>Surrogate Recovery</b>						
2-Fluorophenol	1.4			1.25	111	71-114
Phenol-d5	1.2			1.25	99	72-121
Nitrobenzene-d5	1.2			1.25	98	70-134
2-Fluorobiphenyl	1.1			1.25	90	69-118
2,4,6-Tribromophenol	0.96			1.25	77	53-139
4-Terphenyl-d14	1.2			1.25	93	69-128

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## Quality Control Report

**Client:** AEW Engineering, Inc.

**WorkOrder:** 1904909

**Date Prepared:** 4/25/19

**BatchID:** 176844

**Date Analyzed:** 4/26/19

**Extraction Method:** SW3550B/3640A

**Instrument:** GC21

**Analytical Method:** SW8270C

**Matrix:** Soil

**Unit:** mg/Kg

**Project:** 2014-003; Dunphy Park Stockpile

**Sample ID:** MB/LCS/LCSD-176844  
1904909-003AMS/MSD

### QC Summary Report for SW8270C (Low Level) w/ GPC

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Acenaphthene	0.13	0.12	0.12	107	96	83-119	10.7	30
Acenaphthylene	0.14	0.12	0.12	110	99	80-123	10.6	30
Anthracene	0.13	0.14	0.12	101	115	84-130	12.9	30
Benzidine	5.8	6.1	12.5	46	49	35-76	5.41	30
Benzo (a) anthracene	0.13	0.13	0.12	100	105	81-123	4.30	30
Benzo (a) pyrene	0.15	0.15	0.12	121	119	83-137	2.27	30
Benzo (b) fluoranthene	0.15	0.14	0.12	118	116	84-137	1.80	30
Benzo (g,h,i) perylene	0.14	0.13	0.12	115	107	74-133	7.71	30
Benzo (k) fluoranthene	0.13	0.15	0.12	107	117	78-131	8.69	30
Benzyl Alcohol	10	11	12.5	83	89	71-125	7.17	30
Bis (2-chloroethoxy) Methane	2.5	2.7	2.5	99	110	89-126	9.88	30
Bis (2-chloroethyl) Ether	0.12	0.12	0.12	92	96	77-112	3.61	30
Bis (2-chloroisopropyl) Ether	0.13	0.13	0.12	103	105	77-127	1.63	30
Bis (2-ethylhexyl) Adipate	2.2	2.3	2.5	89	92	69-155	3.97	30
Bis (2-ethylhexyl) Phthalate	0.14	0.14	0.12	110	115	81-148	4.68	30
4-Bromophenyl Phenyl Ether	2.2	2.5	2.5	88	101	80-121	13.8	30
Butylbenzyl Phthalate	0.13	0.14	0.12	102	108	82-141	5.78	30
4-Chloroaniline	0.088	0.10	0.12	71	82	65-120	15.2	30
4-Chloro-3-methylphenol	2.7	2.9	2.5	107	117	94-132	8.32	30
2-Chloronaphthalene	2.7	2.4	2.5	108	97	77-127	10.5	30
2-Chlorophenol	0.12	0.12	0.12	93	96	83-117	3.85	30
4-Chlorophenyl Phenyl Ether	2.4	2.2	2.5	96	90	83-125	6.53	30
Chrysene	0.12	0.13	0.12	99	101	81-127	2.51	30
Dibenzo (a,h) anthracene	0.16	0.14	0.12	126	114	74-145	9.53	30
Dibenzofuran	2.4	2.1	2.5	95	86	81-120	10.5	30
Di-n-butyl Phthalate	0.14	0.16	0.12	113	127	87-134	11.4	30
1,2-Dichlorobenzene	2.3	2.3	2.5	90	92	76-104	1.84	30
1,3-Dichlorobenzene	2.2	2.3	2.5	88	91	72-106	3.45	30
1,4-Dichlorobenzene	2.2	2.2	2.5	87	88	75-109	1.73	30
3,3-Dichlorobenzidine	0.11	0.11	0.12	88	88	44-130	0	30
2,4-Dichlorophenol	2.5	2.9	2.5	101	115	83-135	12.6	30
Diethyl Phthalate	0.13	0.12	0.12	105	93	88-126	11.7	30
2,4-Dimethylphenol	2.3	2.6	2.5	93	106	76-139	13.3	30
Dimethyl Phthalate	0.13	0.12	0.12	104	94	86-123	10.7	30
4,6-Dinitro-2-methylphenol	11	13	12.5	92	103	74-127	11.0	30
2,4-Dinitrophenol	0.55	0.48	0.62	87	76	43-125	13.7	30
2,4-Dinitrotoluene	0.14	0.12	0.12	112	100	28-166	12.1	30
2,6-Dinitrotoluene	0.13	0.12	0.12	104	95	85-137	9.02	30

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## Quality Control Report

**Client:** AEW Engineering, Inc.

**WorkOrder:** 1904909

**Date Prepared:** 4/25/19

**BatchID:** 176844

**Date Analyzed:** 4/26/19

**Extraction Method:** SW3550B/3640A

**Instrument:** GC21

**Analytical Method:** SW8270C

**Matrix:** Soil

**Unit:** mg/Kg

**Project:** 2014-003; Dunphy Park Stockpile

**Sample ID:** MB/LCS/LCSD-176844  
1904909-003AMS/MSD

### QC Summary Report for SW8270C (Low Level) w/ GPC

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Di-n-octyl Phthalate	0.17	0.18	0.12	132	142	75-153	7.43	30
1,2-Diphenylhydrazine	2.4	2.8	2.5	94	112	82-133	17.5	30
Fluoranthene	0.15	0.16	0.12	116	128	84-136	9.32	30
Fluorene	0.15	0.13	0.12	117	107	71-144	8.88	30
Hexachlorobenzene	0.10	0.12	0.12	84	96	79-116	12.9	30
Hexachlorobutadiene	0.11	0.13	0.12	91	103	80-122	12.5	30
Hexachlorocyclopentadiene	11	10	12.5	91	83	57-112	9.31	30
Hexachloroethane	0.12	0.13	0.12	98	101	70-106	2.67	30
Indeno (1,2,3-cd) pyrene	0.14	0.13	0.12	115	107	75-139	7.11	30
Isophorone	2.2	2.5	2.5	90	102	87-127	12.2	30
2-Methylnaphthalene	0.13	0.15	0.12	107	118	78-134	9.84	30
2-Methylphenol (o-Cresol)	2.6	2.7	2.5	105	107	81-117	2.37	30
3 & 4-Methylphenol (m,p-Cresol)	2.4	2.4	2.5	96	97	76-119	0.566	30
Naphthalene	0.12	0.13	0.12	93	105	80-115	12.1	30
2-Nitroaniline	15	13	12.5	117	101	88-135	15.1	30
3-Nitroaniline	11	10	12.5	92	82	63-129	10.8	30
4-Nitroaniline	15	12	12.5	122	99	75-133	20.0	30
Nitrobenzene	2.5	2.7	2.5	99	107	83-125	7.60	30
2-Nitrophenol	13	14	12.5	106	116	90-132	8.81	30
4-Nitrophenol	15	13	12.5	122	106	77-141	14.1	30
N-Nitrosodiphenylamine	2.3	2.6	2.5	93	104	84-123	11.5	30
N-Nitrosodi-n-propylamine	2.2	2.3	2.5	90	92	78-117	1.96	30
Pentachlorophenol	0.56	0.60	0.62	90	97	65-157	7.24	30
Phenanthrene	0.12	0.14	0.12	100	114	82-119	12.8	30
Phenol	0.43	0.45	0.50	86	89	66-125	3.14	30
Pyrene	0.12	0.13	0.12	99	106	81-132	6.85	30
Pyridine	1.6	1.4	2.5	65	56	34-84	16.0	30
1,2,4-Trichlorobenzene	2.4	2.7	2.5	96	108	73-129	11.6	30
2,4,5-Trichlorophenol	0.13	0.12	0.12	103	99	81-134	4.64	30
2,4,6-Trichlorophenol	0.13	0.12	0.12	105	94	83-129	11.3	30

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## Quality Control Report

<b>Client:</b>	AEW Engineering, Inc.	<b>WorkOrder:</b>	1904909
<b>Date Prepared:</b>	4/25/19	<b>BatchID:</b>	176844
<b>Date Analyzed:</b>	4/26/19	<b>Extraction Method:</b>	SW3550B/3640A
<b>Instrument:</b>	GC21	<b>Analytical Method:</b>	SW8270C
<b>Matrix:</b>	Soil	<b>Unit:</b>	mg/Kg
<b>Project:</b>	2014-003; Dunphy Park Stockpile	<b>Sample ID:</b>	MB/LCS/LCSD-176844 1904909-003AMS/MSD

### QC Summary Report for SW8270C (Low Level) w/ GPC

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
<b>Surrogate Recovery</b>								
2-Fluorophenol	1.3	1.3	1.25	102	103	71-114	1.61	30
Phenol-d5	1.3	1.3	1.25	102	101	72-121	0.156	30
Nitrobenzene-d5	1.3	1.5	1.25	105	121	70-134	13.5	30
2-Fluorobiphenyl	1.4	1.2	1.25	114	98	69-118	14.9	30
2,4,6-Tribromophenol	1.1	1.3	1.25	92	105	53-139	13.4	30
4-Terphenyl-d14	1.3	1.3	1.25	102	107	69-128	4.78	30

Analyte	MS DF	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Acenaphthene	10	0.12	0.13	0.12	0.01481	83	90	32-118	7.21	30
Acenaphthylene	10	0.16	0.14	0.12	0.04735	89	77	32-122	10.2	30
Anthracene	10	0.19	0.16	0.12	0.1056	70	40	36-125	21.7	30
Benzidine	10	1.8	1.7	12.5	ND<12	15	13	4-83	8.46	30
Benzo (a) anthracene	10	0.37	0.24	0.12	0.3765	0,F10	0,F10	35-117	NA	30
Benzo (a) pyrene	10	0.39	0.31	0.12	0.2469	116	49	42-138	24.0	30
Benzo (b) fluoranthene	10	0.32	0.22	0.12	0.2688	38	0,F10	37-125	NA	30
Benzo (g,h,i) perylene	10	0.32	0.30	0.12	0.1915	101	84	45-146	6.69	30
Benzo (k) fluoranthene	10	0.27	0.21	0.12	0.2041	52	2,F10	39-124	26.6	30
Benzyl Alcohol	10	7.2	6.5	12.5	ND<12	58	52	5-105	11.2	30
Bis (2-chloroethoxy) Methane	10	2.2	2.6	2.5	ND<2.5	89	103	35-115	14.4	30
Bis (2-chloroethyl) Ether	10	0.12	0.13	0.12	ND<0.025	93	101	35-105	8.87	30
Bis (2-chloroisopropyl) Ether	10	0.11	0.12	0.12	ND<0.025	90	96	34-119	6.47	30
Bis (2-ethylhexyl) Adipate	10	2.7	2.7	2.5	ND<5.0	106	109	27-117	2.49	30
Bis (2-ethylhexyl) Phthalate	10	0.24	0.40	0.12	0.05883	144,F10	277,F10	34-124	51.3,F1	30
4-Bromophenyl Phenyl Ether	10	2.6	2.6	2.5	ND<2.5	103	104	33-112	0.677	30
Butylbenzyl Phthalate	10	0.20	0.19	0.12	ND<0.25	162,F10	156,F10	35-127	3.80	30
4-Chloroaniline	10	0.071	0.071	0.12	ND<0.025	57	57	12-77	0	30
4-Chloro-3-methylphenol	10	2.6	2.7	2.5	ND<2.5	104	106	35-123	2.47	30
2-Chloronaphthalene	10	2.4	2.4	2.5	ND<2.5	95	94	28-109	0.995	30
2-Chlorophenol	10	0.12	0.13	0.12	ND<0.050	94	100	38-116	6.00	30
4-Chlorophenyl Phenyl Ether	10	2.1	2.5	2.5	ND<2.5	85	99	33-122	15.0	30
Chrysene	10	0.60	0.31	0.12	0.6230	0,F10	0,F10	37-116	NA	30
Dibenzo (a,h) anthracene	10	0.20	0.20	0.12	0.04791	123	124	43-141	0.757	30
Dibenzofuran	10	2.2	2.4	2.5	ND<2.5	86	94	33-117	8.69	30
Di-n-butyl Phthalate	10	0.18	0.15	0.12	ND<0.025	146,F10	123	38-126	17.1	30

(Cont.)



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## Quality Control Report

**Client:** AEW Engineering, Inc.

**WorkOrder:** 1904909

**Date Prepared:** 4/25/19

**BatchID:** 176844

**Date Analyzed:** 4/26/19

**Extraction Method:** SW3550B/3640A

**Instrument:** GC21

**Analytical Method:** SW8270C

**Matrix:** Soil

**Unit:** mg/Kg

**Project:** 2014-003; Dunphy Park Stockpile

**Sample ID:** MB/LCS/LCSD-176844  
1904909-003AMS/MSD

### QC Summary Report for SW8270C (Low Level) w/ GPC

Analyte	MS DF	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
1,2-Dichlorobenzene	10	2.4	2.4	2.5	ND<2.5	95	95	34-105	0	30
1,3-Dichlorobenzene	10	2.2	2.4	2.5	ND<2.5	89	97	33-104	8.04	30
1,4-Dichlorobenzene	10	2.1	2.3	2.5	ND<2.5	83	93	31-102	10.8	30
3,3-Dichlorobenzidine	10	0.12	0.12	0.12	ND<0.025	92,F10	96,F10	14-84	3.80	30
2,4-Dichlorophenol	10	2.4	2.5	2.5	ND<0.13	95	101	31-124	5.60	30
Diethyl Phthalate	10	0.12	0.12	0.12	ND<0.050	96	98	35-118	2.10	30
2,4-Dimethylphenol	10	2.1	2.2	2.5	ND<2.5	84	89	30-120	5.33	30
Dimethyl Phthalate	10	0.12	0.12	0.12	ND<0.025	93	97	33-118	4.21	30
4,6-Dinitro-2-methylphenol	10	5.7	6.3	12.5	ND<12	45	50	12-126	10.1	30
2,4-Dinitrophenol	10	0.68	0.69	0.62	ND<1.3	109	110	8-130	1.24	30
2,4-Dinitrotoluene	10	0.11	0.12	0.12	ND<0.063	89	92	38-117	4.35	30
2,6-Dinitrotoluene	10	0.11	0.12	0.12	ND<0.025	89	97	35-121	8.35	30
Di-n-octyl Phthalate	10	0.40	0.37	0.12	ND<0.050	318,F10	293,F10	42-150	8.31	30
1,2-Diphenylhydrazine	10	2.4	2.4	2.5	ND<2.5	97	95	30-117	1.91	30
Fluoranthene	10	1.4	0.47	0.12	2.272	0,F10	0,F10	38-126	NA	30
Fluorene	10	0.18	0.18	0.12	0.03242	116	116	34-118	0	30
Hexachlorobenzene	10	0.12	0.12	0.12	ND<0.013	94	95	30-130	1.02	30
Hexachlorobutadiene	10	0.10	0.11	0.12	ND<0.025	81	90	33-121	10.5	30
Hexachlorocyclopentadiene	10	4.0	4.9	12.5	ND<20	32	39	8-89	18.2	30
Hexachloroethane	10	0.12	0.12	0.12	ND<0.025	94	97	32-106	3.11	30
Indeno (1,2,3-cd) pyrene	10	0.25	0.23	0.12	0.1353	90	76	43-138	7.30	30
Isophorone	10	2.1	2.2	2.5	ND<2.5	85	87	26-92	2.33	30
2-Methylnaphthalene	10	0.16	0.16	0.12	0.02895	106	103	30-121	2.40	30
2-Methylphenol (o-Cresol)	10	2.6	2.6	2.5	ND<5.0	103	103	34-114	0	30
3 & 4-Methylphenol (m,p-Cresol)	10	2.3	2.5	2.5	ND<2.5	92	101	26-130	9.16	30
Naphthalene	10	0.13	0.12	0.12	0.02730	82	74	33-113	7.67	30
2-Nitroaniline	10	13	13	12.5	ND<12	103	107	29-115	4.08	30
3-Nitroaniline	10	11	11	12.5	ND<12	86	88	25-93	2.70	30
4-Nitroaniline	10	13	14	12.5	ND<12	101	116,F10	31-108	13.3	30
Nitrobenzene	10	2.0	2.2	2.5	ND<2.5	81	87	33-122	6.54	30
2-Nitrophenol	10	11	12	12.5	ND<12	91	100	32-121	8.96	30
4-Nitrophenol	10	12	13	12.5	ND<12	98	102	27-102	4.11	30
N-Nitrosodiphenylamine	10	2.5	2.5	2.5	ND<2.5	102	102	45-110	0	30
N-Nitrosodi-n-propylamine	10	2.2	2.5	2.5	ND<2.5	86	102	25-108	16.4	30
Pentachlorophenol	10	0.48	0.45	0.62	ND<0.31	76	73	28-134	5.22	30
Phenanthrene	10	0.34	0.23	0.12	0.4964	0,F10	0,F10	36-123	NA	30
Phenol	10	0.42	0.45	0.50	ND<0.050	84	90	33-107	6.39	30
Pyrene	10	1.2	0.46	0.12	1.981	0,F10	0,F10	38-124	NA	30

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## Quality Control Report

**Client:** AEW Engineering, Inc.

**WorkOrder:** 1904909

**Date Prepared:** 4/25/19

**BatchID:** 176844

**Date Analyzed:** 4/26/19

**Extraction Method:** SW3550B/3640A

**Instrument:** GC21

**Analytical Method:** SW8270C

**Matrix:** Soil

**Unit:** mg/Kg

**Project:** 2014-003; Dunphy Park Stockpile

**Sample ID:** MB/LCS/LCSD-176844  
 1904909-003AMS/MSD

### QC Summary Report for SW8270C (Low Level) w/ GPC

Analyte	MS DF	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Pyridine	10	1.1	1.2	2.5	ND<2.5	43	48	30-130	8.98	30
1,2,4-Trichlorobenzene	10	2.1	2.4	2.5	ND<2.5	85	97	34-121	12.6	30
2,4,5-Trichlorophenol	10	0.13	0.13	0.12	ND<0.025	106	103	31-126	3.14	30
2,4,6-Trichlorophenol	10	0.12	0.13	0.12	ND<0.13	98	106	32-128	7.24	30
<b>Surrogate Recovery</b>										
2-Fluorophenol	10	1.2	1.3	1.25		95	104	30-167	9.25	30
Phenol-d5	10	1.2	1.2	1.25		100	99	58-149	0.785	30
Nitrobenzene-d5	10	1.1	1.2	1.25		91	94	54-137	3.55	30
2-Fluorobiphenyl	10	1.2	1.3	1.25		95	105	59-113	9.44	30
2,4,6-Tribromophenol	10	1.2	1.2	1.25		93	93	21-171	0	30
4-Terphenyl-d14	10	1.4	1.4	1.25		110	112	65-126	1.73	30



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## Quality Control Report

<b>Client:</b> AEW Engineering, Inc.	<b>WorkOrder:</b> 1904909
<b>Date Prepared:</b> 4/23/19	<b>BatchID:</b> 176733
<b>Date Analyzed:</b> 4/24/19	<b>Extraction Method:</b> SW3050B
<b>Instrument:</b> ICP-MS2	<b>Analytical Method:</b> SW6020
<b>Matrix:</b> Soil	<b>Unit:</b> mg/Kg
<b>Project:</b> 2014-003; Dunphy Park Stockpile	<b>Sample ID:</b> MB/LCS/LCSD-176733

### QC Summary Report for Metals

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
Antimony	ND	0.094	0.50	-	-	-
Arsenic	ND	0.14	0.50	-	-	-
Barium	ND	0.97	5.0	-	-	-
Beryllium	ND	0.072	0.50	-	-	-
Cadmium	ND	0.058	0.25	-	-	-
Chromium	ND	0.092	0.50	-	-	-
Cobalt	ND	0.056	0.50	-	-	-
Copper	ND	0.069	0.50	-	-	-
Lead	ND	0.094	0.50	-	-	-
Mercury	ND	0.0050	0.050	-	-	-
Molybdenum	ND	0.23	0.50	-	-	-
Nickel	ND	0.072	0.50	-	-	-
Selenium	ND	0.13	0.50	-	-	-
Silver	ND	0.055	0.50	-	-	-
Thallium	ND	0.10	0.50	-	-	-
Vanadium	ND	0.064	0.50	-	-	-
Zinc	ND	1.4	5.0	-	-	-
<b>Surrogate Recovery</b>						
Terbium	540			500	108	70-130

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## Quality Control Report

**Client:** AEW Engineering, Inc.

**Date Prepared:** 4/23/19

**Date Analyzed:** 4/24/19

**Instrument:** ICP-MS2

**Matrix:** Soil

**Project:** 2014-003; Dunphy Park Stockpile

**WorkOrder:** 1904909

**BatchID:** 176733

**Extraction Method:** SW3050B

**Analytical Method:** SW6020

**Unit:** mg/Kg

**Sample ID:** MB/LCS/LCSD-176733

### QC Summary Report for Metals

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Antimony	52	58	50	104	117	75-125	11.2	20
Arsenic	51	55	50	102	110	75-125	7.17	20
Barium	530	600	500	107	120	75-125	11.6	20
Beryllium	47	53	50	95	106	75-125	11.3	20
Cadmium	51	55	50	103	111	75-125	7.35	20
Chromium	53	55	50	105	111	75-125	5.25	20
Cobalt	53	59	50	106	117	75-125	10.7	20
Copper	52	55	50	104	110	75-125	6.11	20
Lead	52	57	50	104	115	75-125	9.41	20
Mercury	1.3	1.4	1.25	103	111	75-125	7.24	20
Molybdenum	51	57	50	101	114	75-125	11.4	20
Nickel	51	55	50	102	109	75-125	6.28	20
Selenium	52	54	50	104	109	75-125	4.16	20
Silver	50	55	50	100	110	75-125	9.64	20
Thallium	51	56	50	102	112	75-125	9.24	20
Vanadium	53	55	50	105	111	75-125	5.18	20
Zinc	500	540	500	101	107	75-125	6.30	20
<b>Surrogate Recovery</b>								
Terbium	570	640	500	114	127	70-130	10.9	20



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## Quality Control Report

<b>Client:</b> AEW Engineering, Inc.	<b>WorkOrder:</b> 1904909
<b>Date Prepared:</b> 4/23/19	<b>BatchID:</b> 176717
<b>Date Analyzed:</b> 4/23/19 - 4/26/19	<b>Extraction Method:</b> SW5030B
<b>Instrument:</b> GC19, GC7	<b>Analytical Method:</b> SW8021B/8015Bm
<b>Matrix:</b> Soil	<b>Unit:</b> mg/Kg
<b>Project:</b> 2014-003; Dunphy Park Stockpile	<b>Sample ID:</b> MB/LCS/LCSD-176717

### QC Summary Report for SW8021B/8015Bm

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
TPH(g) (C6-C12)	0.093,J	0.090	1.0	-	-	-
MTBE	ND	0.0023	0.050	-	-	-
Benzene	ND	0.0010	0.0050	-	-	-
Toluene	ND	0.0012	0.0050	-	-	-
Ethylbenzene	ND	0.0020	0.0050	-	-	-
m,p-Xylene	ND	0.0013	0.010	-	-	-
o-Xylene	ND	0.0013	0.0050	-	-	-

**Surrogate Recovery**

2-Fluorotoluene	0.084		0.10	84	75-134
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Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
TPH(btex)	0.57	0.54	0.60	95	91	82-118	4.57	20
MTBE	0.086	0.083	0.10	86	83	61-119	3.85	20
Benzene	0.088	0.091	0.10	88	91	77-128	3.39	20
Toluene	0.095	0.098	0.10	95	98	74-132	3.38	20
Ethylbenzene	0.097	0.10	0.10	97	101	84-127	3.54	20
m,p-Xylene	0.20	0.21	0.20	102	105	80-120	3.15	20
o-Xylene	0.10	0.10	0.10	102	105	80-120	2.71	20

**Surrogate Recovery**

2-Fluorotoluene	0.090	0.095	0.10	90	95	75-134	5.65	20
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## Quality Control Report

<b>Client:</b> AEW Engineering, Inc.	<b>WorkOrder:</b> 1904909
<b>Date Prepared:</b> 4/24/19	<b>BatchID:</b> 176788
<b>Date Analyzed:</b> 4/25/19	<b>Extraction Method:</b> SW5030B
<b>Instrument:</b> GC3	<b>Analytical Method:</b> SW8021B/8015Bm
<b>Matrix:</b> Soil	<b>Unit:</b> mg/Kg
<b>Project:</b> 2014-003; Dunphy Park Stockpile	<b>Sample ID:</b> MB/LCS/LCSD-176788

### QC Summary Report for SW8021B/8015Bm

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
TPH(g) (C6-C12)	0.14,J	0.090	1.0	-	-	-
MTBE	ND	0.0023	0.050	-	-	-
Benzene	ND	0.0010	0.0050	-	-	-
Toluene	ND	0.0012	0.0050	-	-	-
Ethylbenzene	ND	0.0020	0.0050	-	-	-
m,p-Xylene	ND	0.0013	0.010	-	-	-
o-Xylene	ND	0.0013	0.0050	-	-	-

**Surrogate Recovery**

2-Fluorotoluene	0.098			0.10	98	75-134
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Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
TPH(btex)	0.62	0.62	0.60	104	103	82-118	0.554	20
MTBE	0.083	0.081	0.10	83	81	61-119	2.33	20
Benzene	0.096	0.094	0.10	96	94	77-128	2.09	20
Toluene	0.10	0.10	0.10	104	102	74-132	1.48	20
Ethylbenzene	0.11	0.10	0.10	106	105	84-127	1.55	20
m,p-Xylene	0.22	0.21	0.20	108	107	80-120	1.20	20
o-Xylene	0.10	0.10	0.10	104	104	80-120	0	20

**Surrogate Recovery**

2-Fluorotoluene	0.098	0.095	0.10	98	95	75-134	2.36	20
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## Quality Control Report

<b>Client:</b> AEW Engineering, Inc.	<b>WorkOrder:</b> 1904909
<b>Date Prepared:</b> 4/24/19	<b>BatchID:</b> 176758
<b>Date Analyzed:</b> 4/25/19 - 4/26/19	<b>Extraction Method:</b> SW3550B/3630C
<b>Instrument:</b> GC6B, GC9a	<b>Analytical Method:</b> SW8015B
<b>Matrix:</b> Soil	<b>Unit:</b> mg/Kg
<b>Project:</b> 2014-003; Dunphy Park Stockpile	<b>Sample ID:</b> MB/LCS/LCSD-176758 1904909-006AMS/MSD

### QC Report for SW8015B w/ Silica Gel Clean-Up

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
TPH-Diesel (C10-C23)	0.87,J	0.83	1.0	-	-	-
TPH-Motor Oil (C18-C36)	ND	3.8	5.0	-	-	-
<b>Surrogate Recovery</b>						
C9	23			25	93	72-122

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
TPH-Diesel (C10-C23)	44	45	40	110	113	75-128	2.41	30
<b>Surrogate Recovery</b>								
C9	24	24	25	94	96	72-122	2.23	30

Analyte	MS DF	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
TPH-Diesel (C10-C23)	10	31	34	40	12.24	46,F1	NR,F16	71-134	NR	30
<b>Surrogate Recovery</b>										
C9	10	22	22	25		87	87	78-126	0	30



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# CHAIN-OF-CUSTODY RECORD

**WorkOrder: 1904909**

**ClientCode: AEW**

WaterTrax     WriteOn     EDF

Excel     EQUiS     Email     HardCopy     ThirdParty     J-flag

Detection Summary     Dry-Weight

**Report to:**

Randy Young  
AEW Engineering, Inc.  
55 New Montgomery St, Ste 722  
San Francisco, CA 94105  
(415) 495-8401    FAX: (415) 358-5598

Email: ryoung@aeweng.com  
cc/3rd Party:  
PO:  
Project: 2014-003; Dunphy Park Stockpile

**Bill to:**

Kenneth Leung  
AEW Engineering, Inc.  
55 New Montgomery St, Ste 507  
San Francisco, CA 94105  
kleung@aeweng.com; byeung@aeweng

**Requested TATs: 1 day;  
5 days;**

**Date Received: 04/18/2019**

**Date Logged: 04/18/2019**

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below)											
					1	2	3	4	5	6	7	8	9	10	11	12
1904909-001	Dunphy Park Stockpile Comp 1	Soil	4/18/2019 10:15	<input checked="" type="checkbox"/>	A	A	A	A	A	A						
1904909-002	Dunphy Park Stockpile Comp 2	Soil	4/18/2019 10:35	<input checked="" type="checkbox"/>	A	A	A	A	A	A						
1904909-003	DP Stockpile Comp 1	Soil	4/18/2019 10:05	<input type="checkbox"/>	A	A	A	A	A	A						
1904909-004	DP Stockpile Comp 2	Soil	4/18/2019 10:15	<input type="checkbox"/>	A	A	A	A	A	A						
1904909-005	DP Stockpile Comp 3	Soil	4/18/2019 10:25	<input type="checkbox"/>	A	A	A	A	A	A						
1904909-006	DP Stockpile Comp 4	Soil	4/18/2019 10:35	<input type="checkbox"/>	A	A	A	A	A	A						

**Test Legend:**

1	8081pcB_ESL_LL_S	2	8270_SCSM_GPC_S	3	ASBEST400 (435 CARB)_S	4	CAM17MS_TTLC_S
5	G-MBTX_S	6	TPH(DMO)WSG_S	7		8	
9		10		11		12	

**Project Manager: Heidi Fruhlinger**

**Prepared by: Agustina Venegas**

**Comments:** Hold all soil samples for 6mos per Ken Leung 3/14/14. New Comps added 4/24/19, Metals on 1 day TAT rest STAT.

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).  
Hazardous samples will be returned to client or disposed of at client expense.



### WORK ORDER SUMMARY

**Client Name:** AEW ENGINEERING, INC.

**Project:** 2014-003; Dunphy Park Stockpile

**Work Order:** 1904909

**Client Contact:** Randy Young

**QC Level:** LEVEL 2

**Contact's Email:** ryoung@aeweng.com

**Comments:** Hold all soil samples for 6mos per Ken Leung 3/14/14. New Comps added 4/24/19, Metals on 1 day TAT rest STAT.

**Date Logged:** 4/18/2019

WaterTrax     WriteOn     EDF     Excel     EQUIS     Email     HardCopy     ThirdParty     J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut		
1904909-001A	Dunphy Park Stockpile Comp 1	Soil	SW8015B (TPH-d,mo w/ S.G. Clean-Up)	4 / (4:1)	Stainless Steel tube 2"x6"	<input type="checkbox"/>	4/18/2019 10:15	5 days		<input checked="" type="checkbox"/>			
			SW8021B/8015Bm (G/MBTEX)			<input type="checkbox"/>				5 days		<input checked="" type="checkbox"/>	
			SW6020 (CAM 17)			<input type="checkbox"/>				5 days		<input checked="" type="checkbox"/>	
			Asbestos, 435 CARB 400			<input type="checkbox"/>				5 days		<input checked="" type="checkbox"/>	SubOut
			SW8270C (Low Level SVOCs) with GPC Cleanup			<input type="checkbox"/>				5 days		<input checked="" type="checkbox"/>	
			SW8081A/8082 (OC Pesticides+PCBs) ESLs			<input type="checkbox"/>				5 days		<input checked="" type="checkbox"/>	
1904909-002A	Dunphy Park Stockpile Comp 2	Soil	SW8015B (TPH-d,mo w/ S.G. Clean-Up)	4 / (4:1)	Stainless Steel tube 2"x6"	<input type="checkbox"/>	4/18/2019 10:35	5 days		<input checked="" type="checkbox"/>			
			SW8021B/8015Bm (G/MBTEX)			<input type="checkbox"/>				5 days		<input checked="" type="checkbox"/>	
			SW6020 (CAM 17)			<input type="checkbox"/>				5 days		<input checked="" type="checkbox"/>	
			Asbestos, 435 CARB 400			<input type="checkbox"/>				5 days		<input checked="" type="checkbox"/>	SubOut
			SW8270C (Low Level SVOCs) with GPC Cleanup			<input type="checkbox"/>				5 days		<input checked="" type="checkbox"/>	
			SW8081A/8082 (OC Pesticides+PCBs) ESLs			<input type="checkbox"/>				5 days		<input checked="" type="checkbox"/>	
1904909-003A	DP Stockpile Comp 1	Soil	SW8015B (TPH-d,mo w/ S.G. Clean-Up)	2 / (2:1)	Stainless Steel tube 2"x6"	<input type="checkbox"/>	4/18/2019 10:05	5 days		<input type="checkbox"/>			
			SW8021B/8015Bm (G/MBTEX)			<input type="checkbox"/>				5 days		<input type="checkbox"/>	

**NOTES:** - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.





### WORK ORDER SUMMARY

**Client Name:** AEW ENGINEERING, INC.

**Project:** 2014-003; Dunphy Park Stockpile

**Work Order:** 1904909

**Client Contact:** Randy Young

**QC Level:** LEVEL 2

**Contact's Email:** ryoung@aeweng.com

**Comments:** Hold all soil samples for 6mos per Ken Leung 3/14/14. New Comps added 4/24/19, Metals on 1 day TAT rest STAT.

**Date Logged:** 4/18/2019

WaterTrax     WriteOn     EDF     Excel     EQUIS     Email     HardCopy     ThirdParty     J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut	
1904909-003A	DP Stockpile Comp 1	Soil	SW6020 (CAM 17)	2 / (2:1)	Stainless Steel tube 2"x6"	<input type="checkbox"/>	4/18/2019 10:05	1 day		<input type="checkbox"/>		
			Asbestos, 435 CARB 400			<input type="checkbox"/>		5 days		<input type="checkbox"/>		SubOut
			SW8270C (Low Level SVOCs) with GPC Cleanup			<input type="checkbox"/>		5 days		<input type="checkbox"/>		
			SW8081A/8082 (OC Pesticides+PCBs) ESLs			<input type="checkbox"/>		5 days		<input type="checkbox"/>		
1904909-004A	DP Stockpile Comp 2	Soil	SW8015B (TPH-d,mo w/ S.G. Clean-Up)	2 / (2:1)	Stainless Steel tube 2"x6"	<input type="checkbox"/>	4/18/2019 10:15	5 days		<input type="checkbox"/>		
			SW8021B/8015Bm (G/MBTEX)			<input type="checkbox"/>		5 days		<input type="checkbox"/>		
			SW6020 (CAM 17)			<input type="checkbox"/>		1 day		<input type="checkbox"/>		
			Asbestos, 435 CARB 400			<input type="checkbox"/>		5 days		<input type="checkbox"/>		SubOut
			SW8270C (Low Level SVOCs) with GPC Cleanup			<input type="checkbox"/>		5 days		<input type="checkbox"/>		
SW8081A/8082 (OC Pesticides+PCBs) ESLs	<input type="checkbox"/>	5 days	<input type="checkbox"/>									
1904909-005A	DP Stockpile Comp 3	Soil	SW8015B (TPH-d,mo w/ S.G. Clean-Up)	2 / (2:1)	Stainless Steel tube 2"x6"	<input type="checkbox"/>	4/18/2019 10:25	5 days		<input type="checkbox"/>		
			SW8021B/8015Bm (G/MBTEX)			<input type="checkbox"/>		5 days		<input type="checkbox"/>		
			SW6020 (CAM 17)			<input type="checkbox"/>		1 day		<input type="checkbox"/>		
			Asbestos, 435 CARB 400			<input type="checkbox"/>		5 days		<input type="checkbox"/>		SubOut
			SW8270C (Low Level SVOCs) with GPC Cleanup			<input type="checkbox"/>		5 days		<input type="checkbox"/>		

**NOTES:** - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.



### WORK ORDER SUMMARY

**Client Name:** AEW ENGINEERING, INC.

**Project:** 2014-003; Dunphy Park Stockpile

**Work Order:** 1904909

**Client Contact:** Randy Young

**QC Level:** LEVEL 2

**Contact's Email:** ryoung@aeweng.com

**Comments:** Hold all soil samples for 6mos per Ken Leung 3/14/14. New Comps added 4/24/19, Metals on 1 day TAT rest STAT.

**Date Logged:** 4/18/2019

WaterTrax     WriteOn     EDF     Excel     EQUIS     Email     HardCopy     ThirdParty     J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1904909-005A	DP Stockpile Comp 3	Soil	SW8081A/8082 (OC Pesticides+PCBs) ESLs	2 / (2:1)	Stainless Steel tube 2"x6"	<input type="checkbox"/>	4/18/2019 10:25	5 days		<input type="checkbox"/>	
1904909-006A	DP Stockpile Comp 4	Soil	SW8015B (TPH-d,mo w/ S.G. Clean-Up)	2 / (2:1)	Stainless Steel tube 2"x6"	<input type="checkbox"/>	4/18/2019 10:35	5 days		<input type="checkbox"/>	
			SW8021B/8015Bm (G/MBTEX)			<input type="checkbox"/>		5 days		<input type="checkbox"/>	
			SW6020 (CAM 17)			<input type="checkbox"/>		1 day		<input type="checkbox"/>	
			Asbestos, 435 CARB 400			<input type="checkbox"/>		5 days		<input type="checkbox"/>	SubOut
			SW8270C (Low Level SVOCs) with GPC Cleanup			<input type="checkbox"/>		5 days		<input type="checkbox"/>	
			SW8081A/8082 (OC Pesticides+PCBs) ESLs			<input type="checkbox"/>		5 days		<input type="checkbox"/>	

**NOTES:** - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.





1904959

**AEW ENGINEERING, INC.**  
 55 New Montgomery Street, Suite 722, San Francisco, CA 94105  
 Telephone: (415) 495-8422 Fax: (415) 358-5598

**CHAIN OF CUSTODY RECORD** Page 1 of 1

Date: 4/18/19  
 Report To: Randall Young Email: ryoung@aewengineering.com  
 Company: AEW Engineering, Inc. Project No.: 2014-003  
 Project Name: Dunphy Park Stockpile Location: San Francisco  
 Sampler: Randall Young Sampler's Phone Number: 415-290-6093  
 Sampler Signature: *Randall Young* Bill To: AEW Engineering, Inc.  
 Reporting Requirement: Hard Copy: Yes  No   
 PDF File: Yes  No  Electronic: Yes  No

**TURN AROUND TIME**  
**LABORATORY:** McCampbell Analytical  
 24 Hours  48 Hours  1 Week  Normal Others:

SAMPLE ID	LOCATION	Sampling		# of Containers	Type of Container	Matrix					Method Preserved				
		Date	Time			Water	Soil	Air	Sludge	Other	Ice	HCl	HNO <sub>3</sub>	Other	
DP-1	Sags Lake	4/18/19	1000	1	SS 1 liter	X					X				
DP-2			1005	1		X					X				
DP-3			1010	1		X					X				
DP-4			1015	1		X					X				
DP-5			1020	1		X					X				
DP-6			1025	1		X					X				
DP-7			1030	1		X					X				
DP-8			1635	1		X					X				

Analysis Request										Other	Comments
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Need to Achieve Residential ESLs.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

Relinquished By: *Randall Young* Date: 4/18/19 Time: 11:50 AM Received By: *[Signature]*  
 Relinquished By: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_ Received By: \_\_\_\_\_  
 Relinquished By: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_ Received By: \_\_\_\_\_

Need to achieve Residential ESLs. Please run all applicable clean-ups to achieve residential ESLs. Please do not dilute the samples. \*Asbestos to forensic analytical  
 SIBO  
 WEA



## Sample Receipt Checklist

Client Name: **AEW Engineering, Inc.**  
 Project: **2014-003; Dunphy Park Stockpile**  
 WorkOrder No: **1904909** Matrix: Soil  
 Carrier: Client Drop-In

Date and Time Received: **4/18/2019 11:50**  
 Date Logged: **4/18/2019**  
 Received by: **Agustina Venegas**  
 Logged by: **Agustina Venegas**

### Chain of Custody (COC) Information

Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample IDs noted by Client on COC?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Date and Time of collection noted by Client on COC?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sampler's name noted on COC?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
COC agrees with Quote?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	NA <input checked="" type="checkbox"/>

### Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	NA <input checked="" type="checkbox"/>
Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper containers/bottles?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	

### Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	NA <input type="checkbox"/>
Samples Received on Ice?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	

(Ice Type: WET ICE )

Sample/Temp Blank temperature	Temp: 5.3°C	NA <input type="checkbox"/>	
Water - VOA vials have zero headspace / no bubbles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	NA <input checked="" type="checkbox"/>
Sample labels checked for correct preservation?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
pH acceptable upon receipt (Metal: <2; Nitrate 353.2/4500NO3: <2; 522: <4; 218.7: >8)?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	NA <input checked="" type="checkbox"/>

UCMR Samples:

pH tested and acceptable upon receipt (200.8: ≤2; 525.3: ≤4; 530: ≤7; 541: <3; 544: <6.5 & 7.5)?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	NA <input checked="" type="checkbox"/>
Free Chlorine tested and acceptable upon receipt (<0.1mg/L)?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	NA <input checked="" type="checkbox"/>

Comments:



# Bulk Asbestos Material Analysis

(Air Resources Board Method 435, June 6, 1991)

McCampbell Analytical, Inc.  
Account Payable  
1534 Willow Pass Rd  
  
Pittsburg, CA 94565

**Client ID:** A31409  
**Report Number:** N011771  
**Date Received:** 04/25/19  
**Date Analyzed:** 05/01/19  
**Date Printed:** 05/01/19

**Job ID/Site:** 1904909 - Dunphy Park Stockpile

**FALI Job ID:** A31409

**PLM Report Number:** N/A

**Total Samples Submitted:** 4  
**Total Samples Analyzed:** 4

## Sample Preparation and Analysis:

Samples were analyzed by the Air Resources Board's Method 435, Determination of Asbestos Content of Serpentine Aggregate. Samples were ground to 200 particle size in the laboratory. Approximately 1 pint was retained for analysis. Samples were prepared for observation according to the guidelines of Exception I and Exception II as defined by the 435 Method. Samples which contained less than 10% asbestos were prepared for observation according to the point count technique as defined by the 435 Method. This analysis was performed with a standard cross-hair reticle.

Sample ID	Lab Number	Layer Description
-----------	------------	-------------------

<b>DP Stockpile Comp 1</b>	12157733	<b>Brown Soil</b>
----------------------------	----------	-------------------

*Visual Estimation Results:*

Matrix percentage of entire 100

**Visual estimation percentage: None Detected**

Asbestos type(s) detected: None Detected

Comment: This result meets the requirements of Exception I as defined by the 435 Method.

<b>DP Stockpile Comp 2</b>	12157734	<b>Brown Soil</b>
----------------------------	----------	-------------------

*Visual Estimation Results:*

Matrix percentage of entire 100

**Visual estimation percentage: None Detected**

Asbestos type(s) detected: None Detected

Comment: This result meets the requirements of Exception I as defined by the 435 Method.

<b>DP Stockpile Comp 3</b>	12157735	<b>Brown Soil</b>
----------------------------	----------	-------------------

*Visual Estimation Results:*

Matrix percentage of entire 100

**Visual estimation percentage: None Detected**

Asbestos type(s) detected: None Detected

Comment: This result meets the requirements of Exception I as defined by the 435 Method.

<b>DP Stockpile Comp 4</b>	12157736	<b>Brown Soil</b>
----------------------------	----------	-------------------

*Visual Estimation Results:*

Matrix percentage of entire 100

**Visual estimation percentage: None Detected**

Asbestos type(s) detected: None Detected

Comment: This result meets the requirements of Exception I as defined by the 435 Method.



# Bulk Asbestos Material Analysis

(Air Resources Board Method 435, June 6, 1991)

McC Campbell Analytical, Inc.  
Account Payable  
1534 Willow Pass Rd  
  
Pittsburg, CA 94565

**Client ID:** A31409  
**Report Number:** N011771  
**Date Received:** 04/25/19  
**Date Analyzed:** 05/01/19  
**Date Printed:** 05/01/19

**Job ID/Site:** 1904909 - Dunphy Park Stockpile

**FALI Job ID:** A31409

**PLM Report Number:** N/A

**Total Samples Submitted:** 4  
**Total Samples Analyzed:** 4

### Sample Preparation and Analysis:

Samples were analyzed by the Air Resources Board's Method 435, Determination of Asbestos Content of Serpentine Aggregate. Samples were ground to 200 particle size in the laboratory. Approximately 1 pint was retained for analysis. Samples were prepared for observation according to the guidelines of Exception I and Exception II as defined by the 435 Method. Samples which contained less than 10% asbestos were prepared for observation according to the point count technique as defined by the 435 Method. This analysis was performed with a standard cross-hair reticle.

Sample ID	Lab Number	Layer Description
-----------	------------	-------------------

Tad Thrower, Laboratory Supervisor, Hayward Laboratory

Note: Limit of Quantification (LOQ) = 0.25%. Trace denotes the presence of asbestos below the LOQ. ND = None Detected. Analytical results and reports are generated by Forensic Analytical Laboratories Inc. (FALI) at the request of and for the exclusive use of the person or entity (client) named on such report. Results, reports or copies of same will not be released by FALI to any third party without prior written request from client. This report applies only to the sample(s) tested. Supporting laboratory documentation is available upon request. This report must not be reproduced except in full, unless approved by FALI. The client is solely responsible for the use and interpretation of test results and reports requested from FALI. Forensic Analytical Laboratories Inc. is not able to assess the degree of hazard resulting from materials analyzed. FALI reserves the right to dispose of all samples after a period of thirty (30) days, according to all state and federal guidelines, unless otherwise specified. All samples received in acceptable condition unless otherwise noted.



August 8, 2019

Mr. Loren Umbertis  
Maintenance Division Manager  
Department of Public Works  
City of Sausalito  
420 Litho Street  
Sausalito, CA 94965-1933

**WORK PLAN - ADDITIONAL SOIL SAMPLING AND SELECTIVE EXCAVATION AND REPLACEMENT**  
**Dunphy Park Improvement Project**  
**City Of Sausalito, California**

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Dear Mr. Umbertis:

Geo-Logic Associates (GLA) prepared this Work Plan for the City of Sausalito (City) to describe additional soil sampling and selective excavation and replacement procedures to meet health risk assessment (HRA) thresholds for the soils within two feet of the top of subgrade at the Dunphy Park improvement project in Sausalito, California. Dunphy Park is located east of Bridgeway between Napa and Locust Streets and was constructed on the top of a former burn dump and solid waste landfill that ceased operation in 1970 when the waste was covered with soil and the area was converted to a park. Dunphy Park is identified by the California Department of Resources Recycling and Recovery (CalRecycle) as an unpermitted, closed solid waste disposal site (SWIS No. 21-CR-0005) and the County of Marin Environmental Health Services (Marin EHS) is identified as the Local Enforcement Agency (LEA) for the site.

The park is currently being renovated and rough grading for the project has been substantially completed. As described in more detail below, the thicknesses and characteristics of soils on top of the pre-existing waste was previously evaluated and this information was used to develop health risk-based threshold concentrations for the soils within two feet of the ground surface. Construction of the improvement project has started and testing performed to date indicates most of the exposed subgrade meets these thresholds. However, the chemical characteristics of several areas of the park have not be evaluated and the previous soil testing indicated several areas where the soil lead concentrations are higher than the thresholds specified in the site-specific HRA. Accordingly, the purposes of this Work Plan are to: (i) summarize the results of near-surface soil sampling completed to date; (ii) provide recommendations for additional sampling and



analysis to fill in areas with no testing data; and (iii) propose selective excavation and replacement protocols to address compliance with HRA-based acceptance thresholds.

## BACKGROUND

### Initial Soil Sampling and HRA Recommendations

CalRecycle representatives collected bulk samples of cover soil and waste from selected test pits excavated during the initial site characterization studies described in the GLA 2018 Subsurface Investigation Report.<sup>1</sup> Because the potential waste materials that may be present originated from unknown sources, CalRecycle submitted the samples to its contract laboratory (Oilfield Environmental & Compliance, Inc. [OEC]) for the following analyses:

- TPH as gasoline (TPH<sub>GASOLINE [C4-C12]</sub>), diesel (TPH<sub>DIESEL [C13-C22]</sub>), and motor oil (TPH<sub>MOTOR OIL [C23 OR GREATER]</sub>) in accordance with EPA 8015M methods;
- Volatile organic compounds (VOCs) and oxygenates in accordance with EPA 8260B methods;
- Semivolatile Organic Compounds (SVOCs) in accordance with EPA 8270C methods;
- Pesticides and PCBs in accordance with EPA 8080A/8081A methods;
- Total concentrations of the 17 metals identified in the California Assessment Manual (CAM-17 metals) by EPA Methods 6010B, 7471A, and 7199; and/or
- Soluble metals concentrations in accordance with Soluble Threshold Limit Concentration (STLC), Toxicity Characteristics Leaching Protocol (TCLP), or Distilled Water Waste Extraction Tests (DI WET).

The results of these analyses are included in the GLA (2018) report and showed occasional, relatively low-level detections of some VOCs, SVOCs, pesticides, PCBs, and TPH compounds in some of the test pit samples. Lead was detected at a concentration that exceeded the TTLC in one test pit, and at concentrations that exceeded the STLC in five test pits. Lead concentrations exceeding TTLC and/or STLC thresholds are relatively common at old burn disposal sites. No other hazardous waste threshold concentrations were exceeded for any compound in any of the soil or waste samples submitted by CalRecycle for analysis.

Based on its review of the GLA (2018) report and the CalRecycle analytical data, Environmental Health Decisions (EHD) completed an HRA for Dunphy Park that concluded the potential exposure risk at the site was governed by inhalation of non-volatile particulate metals in outdoor air, ingestion of metals in soil, and dermal contact with metals in soil. In accordance with these findings, EHD developed total metal threshold concentrations for the

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<sup>1</sup> Geo-Logic Associates, 2018, Subsurface Investigation, Dunphy Park Improvements Project, City of Sausalito, California; report prepared for the City of Sausalito, September 20, 2018.

near surface soils that represent potential exposure pathways for park visitors.<sup>2</sup> The EHD threshold concentrations are summarized in Table 1 and the EHD HRA is included in Appendix A. As summarized in Table 1, the CalRecycle test results indicated that arsenic, lead, and thallium concentrations exceeded the EHD thresholds in one or more sample of near-surface soil from the test pits.

### Preliminary Soil Testing

Based on these results, GLA performed near surface sampling on June 10, 2019 to better characterize the near-surface distribution and concentration of arsenic, lead, and thallium in soil. At the time sampling was performed, rough grading of the project had been completed and additional cuts or fills were not planned. A total of 32 soil samples were collected on approximately 50-foot centers at the locations shown in Figure 1. As indicated in this figure, some sample locations could not be accessed because of ongoing construction activities (westerly map Area 3), or a land owner that did not grant access to their property (map Areas 4 east of the reentrant), and a narrow strip of shoreline was isolated behind security fence (north map Area 4 and Area 5). Approximately half of the samples were collected about 6 inches below the ground surface and about half of the samples were collected about 1.5 feet below the ground surface. Soil sampling equipment was decontaminated prior to sampling and after each sample was collected. A Trimble Geo 7x handheld GPS device was used to identify the sample locations prior to sampling and to record the location where each sample was collected.

Following collection, the samples were submitted to BC Analytical Laboratory (BC) for laboratory analysis of arsenic, lead, and thallium by EPA Method 6010B. The results of these analyses are included in Appendix B and are summarized in Table 2. As indicated in Table 2, the lead 80 mg/kg threshold was exceeded at the six locations and the arsenic threshold of 11 mg/kg exceeded at five locations (Figure 1). Statistical analyses were also performed to calculate the 95-percent upper confidence level (UCL) for each metal and the results were compared to the EHD HRA threshold concentration limits. These analyses showed that the arsenic (in spite of the five elevated sample concentrations) and thallium UCLs were below the threshold limits and the lead UCL exceeded its threshold limit:

Metal	HRA Limit (mg/kg)	95-Percent UCL (mg/kg)
Arsenic	11	8.1
Lead	80	103.6
Thallium	5.0	2.6

<sup>2</sup> Environmental Health Decisions, 2018, Health Risk Assessment – Dunphy Park, 1601 Bridgeway, Sausalito, California; report prepared for City of Sausalito, November 16, 2018.

### EHD Recommendations

Based on its review of the sample locations and analytical results, EHD concluded that the near-surface soils met the threshold requirements for arsenic and thallium. However, EHD noted that the 95-percent UCL concentration for lead (103.6 mg/kg) indicated the site soils did not meet the HRA lead thresholds established for the project. EHD suggested that demonstrating the site soils met a 95-percent UCL concentration of 80 mg/kg for lead could potentially be met by: (i) selectively excavating an approximately 4-foot diameter or 4-foot square area around each of the sample location exceedances shown in Figure 1 and replacing it with “clean” soil that has less than 80 mg/kg total lead; and (ii) testing the side walls on each side of the excavation to verify that the high lead soil had been removed before backfilling the excavation. Under this approach, the site would comply with the HRA thresholds if the sidewall samples indicated lead concentrations less than 80 mg/kg or if all site samples indicated an overall site-wide 95-percent UCL lead concentration of 80 mg/kg or less.

Two alternative mitigation alternatives were identified based on the EHD recommendations:

1. Alternative 1 includes selectively excavating the hot spots, sampling the sidewalls and then “chasing” each excavation until the excavation is area is closed by four samples with lead concentrations less than 80 mg/kg or until the lead 95-percent UCL for all site-wide samples is less than 80 mg/kg. When the limits of the excavations have been characterized, the excavations would be backfilled with imported soil that has been previously tested and that has lead concentrations lower than 80 mg/kg. The potential limits of excavation associated with this alternative are not known; and/or
2. Alternative 2 includes selectively excavating the hot spots approximately to the closest existing and adjacent test locations with lead concentrations less than 80 mg/kg and then backfill the excavations with imported soil that has lead concentrations less than 80 mg/kg.

### County and CalRecycle Meeting

A meeting was held on July 3, 2019 with CalRecycle and Marin County EHS representatives to discuss the results of soil sampling performed to date and to identify CalRecycle and EHS concerns and requirements for agency approval of the project. Both of the excavation alternatives described above were discussed and both agencies indicated either approach would be appropriate for the project. CalRecycle requested that a work plan be prepared to describe the results to date, proposed methods to meet the HRA thresholds for lead, and recommendations for additional testing to verify that the near-surface soils would meet these thresholds.

### Subsequent Testing and Analysis

Following this meeting, the City requested that preliminary testing around the six lead exceedance areas be sampled and tested in accordance with the EHD selective excavation recommendation. In accordance with this request, GLA collected additional samples on July 11, 2019 to better evaluate the lateral limits around the six lead “hot spot” locations shown in Figure 2. As recommended by EHD, three to four soil samples were collected approximately four feet from each hot spot at depths of 18 to 24 inches below the ground surface. The samples were collected by hand using a clean trowel that was decontaminated before and after each sample was collected. A total of 23 soils samples were collected and delivered to BC for lead analysis in accordance with EPA Method 6010B procedures. The results of these analyses are included in Appendix C, summarized in Table 3, and plotted in Figure 2. As shown by these data, 15 of the 23 focused samples had concentrations greater than the threshold limit of 80 mg/kg.

### PROPOSED SCOPE OF WORK

The scope of work summarized below describes steps to further assess the lead content of near-surface soils at Dunphy Park and provides a methodology for the replacement of soils that do not (or may not) meet the 80 mg/kg HRA threshold. This work is explicitly based on the following assumptions:

1. Based on the EHD HRA recommendations and the results of testing to date, lead is the only potential contaminant of concern in the near-surface soils at the site. To meet the HRA threshold for lead, all sample concentrations must be less than 80 mg/L or the total site-wide 95-percent UCL for lead must be less than 80 mg/L.
2. Areas of park that will be covered with pavements or hardscaped pathways do not represent potential exposure pathways and do not require testing or mitigation. Areas where the existing soils may be excavated and replaced as part of construction do not represent potential pathways if these areas are subsequently backfilled or covered with materials that meet the HRA thresholds.
3. Additional testing is warranted in areas of the site that weren't previously tested due to construction limitations and/or access restrictions.

### Supplemental Sampling

As shown on Figure 2, three samples are proposed for the westerly portion of map Area 3 that has yet to be sampled, and six samples are proposed for the northerly stretch of shoreline (map Areas 4 and 5) that was inaccessible during previous site visits. Additionally, two samples are proposed for easterly map Area 4 to identify the limits of a lead “hot spot” near the bluff overlooking the reentrant. The samples will be collected using the same equipment and procedures used for the previous site sampling efforts.

Of note, the grading plan approved for the Dunphy Park Improvements Project includes establishing a “living shoreline” where water in Richardson Bay overlaps the Park’s shoreline west of the reentrant. As shown on Figure 2, five of the proposed sample locations in Area 4 are located within the boundary scheduled for living shoreline construction. Drawings detailing living shoreline construction call for replacement of the upper-most two feet of existing materials between the Park’s aggregate pathway and Richardson Bay. As long as the replacement materials comply with the HRA threshold for Lead, the five shoreline sampling locations proposed in Figure 2 will not be necessary.

### **Selective Soil Excavation and Replacement**

As discussed during the July 3, 2019 meeting with CalRecycle and County representatives, two alternative approaches are practicable to meet and demonstrate compliance with the site acceptance thresholds:

- Alternative 1 includes selectively excavating the hot spots shown in Figure 2, sampling the sidewalls of the excavation, and then “chasing” each excavation until the excavation is area is closed by four surrounding samples with lead concentrations less than 80 mg/kg or until the lead 95-percent UCL for all site-wide samples is less than 80 mg/kg. When the limits of the excavations have been characterized, the excavations would be backfilled with imported soil that has been previously tested and that has lead concentrations lower than 80 mg/kg. The potential limits of excavation associated with this alternative will depend on the results of sampling and analysis and are not known. Similarly, the number of individual samples that will be required to demonstrate compliance with the threshold limit is also not known.
- Alternative 2 includes selectively excavating the hot spots approximately to the closest existing and adjacent test locations with lead concentrations less than 80 mg/kg and then backfilling the excavations with imported soil that has lead concentrations less than 80 mg/kg. The approximate limits of these excavations are shown in Figure 2. The approximate total amount of excavation shown in this figure is about 985 yd<sup>3</sup>. It should be noted that additional excavation areas could be required depending on the results of the supplemental sampling described above (i.e., westerly Area 3 and easterly Area 4).

Imported soil used for backfilling should be tested and/or documentation should be provided to demonstrate the soil meets the EHD HRA thresholds. Depending on the source of the soil, testing for constituents other than lead or other metals may be warranted.

## Documentation

We recommend that the limits of excavation be documented by survey as the work is performed and that a report be prepared when the work has been completed that includes a narrative description of the work and:

- The results of soil sampling and laboratory analyses;
- A drawing that shows the sample locations and the surveyed limits of excavations; and
- Documentation that demonstrates soil fill used to backfill the excavations meets the HRA thresholds for this project.

## CLOSURE

GLA'S services on this project were performed in accordance with current generally accepted environmental consulting principles and practices. Environmental conditions may exist at the site that could not be observed. Where the scope of services was limited to observations made during site reconnaissance, interviews, and/or review of available reports and literature, our conclusions and recommendations are necessarily based largely on information supplied by others. Our professional analyses are based in part on interpretation of data from discrete sampling locations that may not represent actual conditions between such sampling points. Additional data from future work or changing conditions may lead to modifications to our professional opinions and recommendations. Any reliance on this report, or portions thereof, by a third party shall be at such party's sole risk.

Very truly yours,  
Geo-Logic Associates, Inc.



Richard A. Mitchell, PG, CEG  
Principal Engineering Geologist

## Attachments

- Table 1 – Summary of Surface and Stockpile Soil Results
- Table 2 – Summary of Soil Near-Surface Soil Results
- Table 3 – Summary of Focused Additional Soil Analytical Results
- Figure 1 – Preliminary Sample Locations
- Figure 2 – Proposed Selective Excavations
- Appendix A – Health Risk Assessment (Environmental Health Decisions, 2018)

# For Reference Only

Tables

<b>Table 1</b> <b>SUMMARY OF SURFACE AND STOCKPILE SOIL TOTAL ARSENIC,</b> <b>LEAD, AND THALLIUM ANALYTICAL RESULTS</b> <b>Dunphy Park Improvement Project</b> <b>City of Sausalito, California</b>				
REFERENCES AND SAMPLES	UNITS	Arsenic	Lead	Thallium
<b>Reference Concentrations</b>				
EHD HRA Threshold	mg/kg	11	80	5.0
<b>Sample IDs</b>				
TP-1 Surface (.5')	mg/kg	6.9	240	1.8
TP-10 Surface	mg/kg	6.6	120	2.9
TP-11 Surface (.5')	mg/kg	5.2	57	5.0
TP-12 Surface	mg/kg	7	24	3.1
TP-14 Surface (.5')	mg/kg	ND	28	ND
TP-15 Surface	mg/kg	6	100	4.4
TP-3 Surface	mg/kg	5.8	24	2.4
TP-6 Surface	mg/kg	6.6	42	6.8
TP-7 Surface	mg/kg	7.4	120	4.7
TP-8 Surface	mg/kg	5.8	37	2.2
TP-9 Surface (.5')	mg/kg	8.8	120	3.9
Stockpile Comp 1	mg/kg	8.8	300	ND
Stockpile Comp 2	mg/kg	11	440	ND
Stockpile Comp 3	mg/kg	8.9	270	ND
Stockpile Comp 4	mg/kg	27	310	ND
AV (ND NEGLECTED)		8.1	149	2.5
MAX DETECTED		27	440	6.8
MIN DETECTED		5.20	24	1.80
SD (DETECTED)		5.3	126	1.5



**Table 2**  
**SUMMARY OF SOIL NEAR-SURFACE ANALYTICAL RESULTS**  
**Dunphy Park Improvement Project**  
**City of Sausalito, California**

Sample		Analytical Results (mg/Kg)			Carruthers Coordinate System (feet)		
Name	Depth <sub>1</sub>	Arsenic <sub>2</sub>	Lead <sub>3</sub>	Thallium <sub>4</sub>	Easting	Northing	Elevation <sub>5</sub>
S-8	Deep	2.5	13	3.6	879,220.82	1,230,249.56	7.06
S-9	Deep	<b>12</b>	<b>220</b>	4.1	879,264.79	1,230,245.09	7.63
S-10	Shallow	3.7	49	2.4	879,310.68	1,230,242.11	7.75
S-11	Shallow	8.3	<b>160</b>	3.6	879,368.88	1,230,253.77	8.04
S-12	Deep	5.2	4.8	1	879,124.79	1,230,149.24	7.92
S-13	Deep	3.5	16	2.4	879,176.84	1,230,145.16	8.18
S-14	Shallow	1.8	32	3.6	879,221.53	1,230,167.87	11.67
S-15	Shallow	ND	3.5	4.5	879,265.08	1,230,197.13	8.46
S-16	Deep	8.1	55	1.3	879,318.20	1,230,198.60	7.85
S-17	Shallow	7.1	48	1.6	879,369.38	1,230,196.95	8.13
S-18	Shallow	5.4	47	1.6	879,418.46	1,230,196.30	10.14
S-19	Deep	4.6	<b>140</b>	2.8	879,455.75	1,230,186.37	8.55
S-20	Shallow	9.3	55	2.1	879,263.36	1,230,145.19	9.29
S-21	Deep	<b>11</b>	72	1.6	879,314.74	1,230,148.56	8.57
S-22	Deep	8.9	48	1.6	879,359.45	1,230,144.57	7.79
S-23	Deep	ND	48	3.6	879,410.29	1,230,142.30	8.16
S-24	Deep	2.7	43	1.3	879,452.55	1,230,138.78	7.65
S-25	Deep	4.6	37	2.2	879,488.26	1,230,146.08	7.50
S-26	Shallow	5.7	<b>150</b>	2.4	879,115.49	1,230,096.51	9.42
S-27	Shallow	<b>21</b>	65	2.2	879,175.88	1,230,083.51	9.35
S-28	Deep	2.6	35	3.2	879,211.88	1,230,098.17	8.82
S-29	Shallow	<b>19</b>	60	2.3	879,261.01	1,230,098.33	11.66
S-30	Deep	5.7	45	1.6	879,311.47	1,230,097.32	10.58
S-31	Deep	4.9	49	1.5	879,360.03	1,230,098.36	8.96
S-32	Deep	3.8	28	1.8	879,402.90	1,230,094.65	9.75
S-33	Deep	3.6	43	1.7	879,458.25	1,230,096.42	8.69
S-34	Deep	4.2	56	1.9	879,513.16	1,230,100.46	7.95
S-37	Deep	5.2	55	1.6	879,366.90	1,230,047.71	10.00
S-38	Shallow	7.4	72	2.6	879,407.78	1,230,030.86	9.65
S-39	Shallow	4.1	<b>84</b>	1.6	879,467.79	1,230,034.54	9.35
S-40	Shallow	<b>12</b>	<b>180</b>	2.6	879,520.00	1,230,036.13	9.03
S-41	Shallow	2.5	50	3.7	879,566.58	1,230,047.00	8.94

**Notes**

- 1 - Shallow sample obtained from ~6 inches, and Deep sample obtained ~18 inches, below grade.
- 2 - Shaded-bold result equaled or exceeded HRA **Arsenic** threshold concentration of **11 mg/Kg**.
- 3 - Shaded-bold result equaled or exceeded HRA **Lead** threshold concentration of **80 mg/Kg**.
- 4 - Shaded-bold result equaled or exceeded HRA **Thallium** threshold concentration of **5.0 mg/Kg**.
- 5 - Elevation reported in feet above mean sea level.

**Table 3**  
**SUMMARY OF FOCUSED ADDITIONAL SOIL ANALYTICAL RESULTS**  
**Dunphy Park Improvement Project**  
**City of Sausalito, California**

Sample	Analytical Lead Result (mg/Kg) <sup>1</sup>	Carruthers Coordinate System (feet)		
		Easting	Northing	Elevation <sub>2</sub>
9-A	58	879,220.82	1,230,249.56	7.06
9-B	14	879,264.79	1,230,245.09	7.63
9-C	13	879,310.68	1,230,242.11	7.75
9-D	<b>90</b>	879,368.88	1,230,253.77	8.04
11-A	13	879,124.79	1,230,149.24	7.92
11-B	26	879,176.84	1,230,145.16	8.18
11-C	<b>340</b>	879,221.53	1,230,167.87	11.67
11-D	<b>110</b>	879,265.08	1,230,197.13	8.46
19-A	<b>260</b>	879,318.20	1,230,198.60	7.85
19-B	<b>190</b>	879,369.38	1,230,196.95	8.13
19-C	<b>97</b>	879,418.46	1,230,196.30	10.14
19-D	<b>500</b>	879,455.75	1,230,186.37	8.55
26-A	42	879,263.36	1,230,145.19	9.29
26-B	<b>130</b>	879,314.74	1,230,148.56	8.57
26-C	0.57	879,359.45	1,230,144.57	7.79
39-A	<b>190</b>	879,410.29	1,230,142.30	8.16
39-B	39	879,452.55	1,230,138.78	7.65
39-C	<b>260</b>	879,488.26	1,230,146.08	7.50
39-D	<b>200</b>	879,115.49	1,230,096.51	9.42
40-A	<b>130</b>	879,175.88	1,230,083.51	9.35
40-B	<b>180</b>	879,211.88	1,230,098.17	8.82
40-C	<b>290</b>	879,261.01	1,230,098.33	11.66
40-D	<b>190</b>	879,566.58	1,230,047.00	8.94

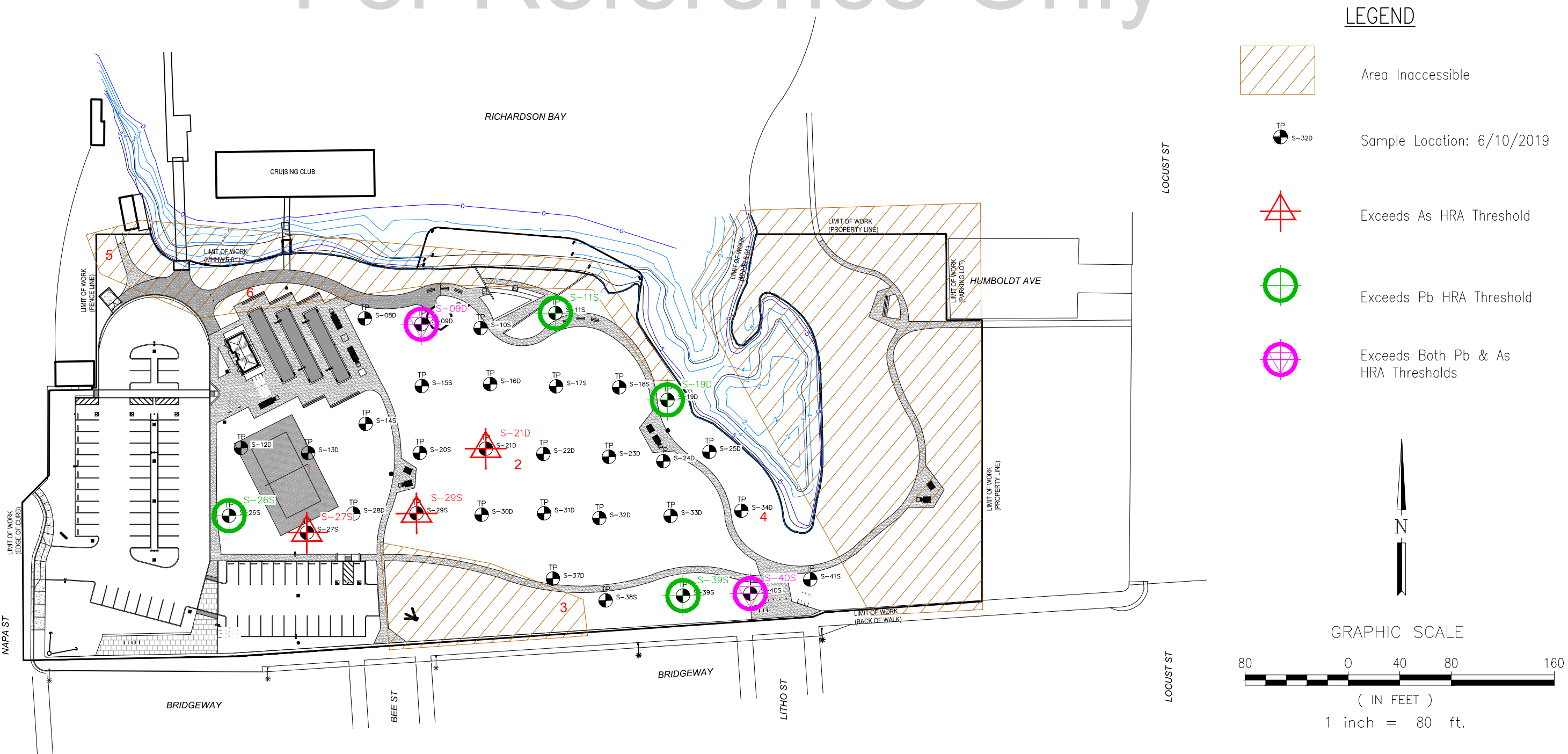
Notes

1 - Shaded-bold non-compliant with HRA **Pb** threshold concentration (**80 mg/Kg**).

2 - Elevation reported in feet above mean sea level.

# For Reference Only

Figures



**FIGURE 1**

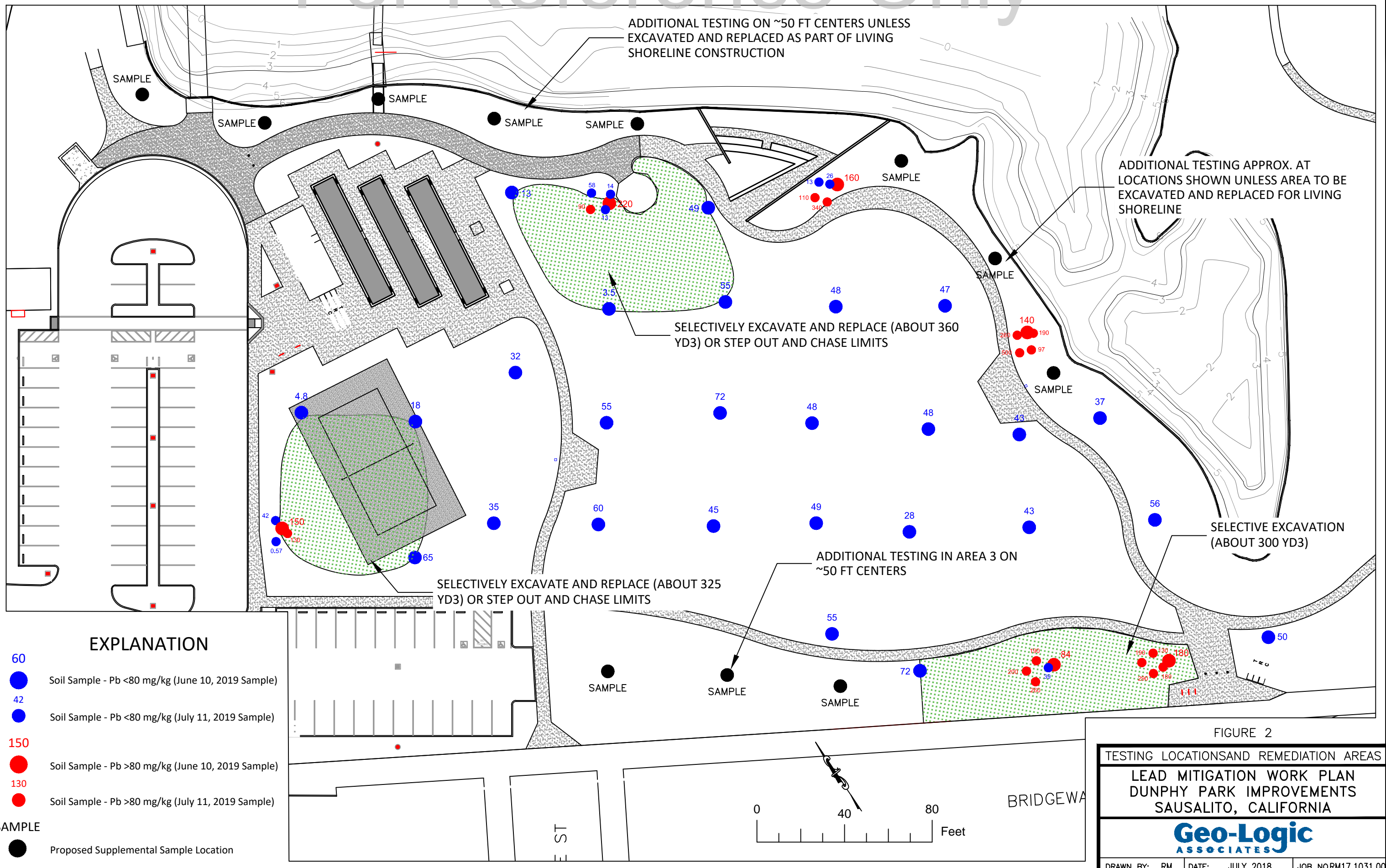
Sample Locations: June 10, 2019

**WORK PLAN: ADDITIONAL SOIL SAMPLING  
 SELECTIVE EXCAVATION, AND REPLACEMENT  
 DUNPHY PARK  
 SAUSALITO, CALIFORNIA**



DRAWN BY: RMW | DATE: AUGUST 2019 | JOB NO.: RM17.1031

Base Map: rhaa, 1/10/2019



**EXPLANATION**

- 60 Soil Sample - Pb <80 mg/kg (June 10, 2019 Sample)
- 42 Soil Sample - Pb <80 mg/kg (July 11, 2019 Sample)
- 150 Soil Sample - Pb >80 mg/kg (June 10, 2019 Sample)
- 130 Soil Sample - Pb >80 mg/kg (July 11, 2019 Sample)
- SAMPLE ● Proposed Supplemental Sample Location

FIGURE 2  
 TESTING LOCATIONS AND REMEDIATION AREAS  
 LEAD MITIGATION WORK PLAN  
 DUNPHY PARK IMPROVEMENTS  
 SAUSALITO, CALIFORNIA



For Reference Only

Appendix A  
**HEALTH RISK ASSESSMENT**

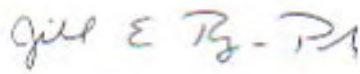
## *Environmental Health Decisions*

### Technical Memorandum

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**To:** Jonathon Goldman, PE QSD, CFM, City of Sausalito

**From:** Jill Ryer-Powder, Ph.D., DABT, Environmental Health Decisions



**Date:** November 16, 2018

**Re:** **Health Risk Assessment – Dunphy Park, 1601 Bridgeway, Sausalito, California**

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This Health Risk Assessment is prepared by Environmental Health Decisions (EHD) for use in evaluating the soil conditions at Dunphy Park in Sausalito, California (the Site). The purpose of this report is to describe information regarding potential health risks to users of the Site from chemicals detected in soil. Information regarding the Site was obtained from the report entitled “*Subsurface Investigation – Dunphy Park Improvements Project, City of Sausalito, California*” prepared by RMC Geoscience, Inc. [RMC, 2018, 2018], herein referred to as the Subsurface Investigation.

The Site is adjacent to the Richardson Bay and runs along Bridgeway Road, north of the Golden Gate Bridge. The planned use of the Site is a public park. The existing park was constructed on top of a former burn dump that contains mostly limited amounts of inert wastes. RMC Geoscience, Inc. recently completed a Subsurface Evaluation that included an assessment of cover thicknesses, soil and waste sample collection and analysis, and groundwater grab sample collection and analysis [RMC, 2018, 2018]. Following CalRecycle’s review of the draft evaluation, they “*suggested that the LEA request a discussion comparing results to the appropriate health screening risk levels since Dunphy is a park that will be used by the public.*” As such, EHD has conducted this human health risk assessment. The risk assessment is conducted as a screening assessment for a hypothetical resident and a worker. A risk assessment is also conducted for adult and child park visitors. The Site is assessed using current soil data. All data is presented in the report prepared by RMC [RMC, 2018]. A summary of the soil data is presented in Table 1.

As presented in Table 1, metals, total petroleum hydrocarbons (TPH), volatile organic chemicals (VOCs), chlorinated pesticides, polychlorinated biphenyls (PCBs), and polycyclic aromatic hydrocarbons (PAHs) have been detected in soil. There is the potential for those using the Site to contact chemicals in soil. The California Environmental

Protection Agency's (Cal/EPA) Department of Toxic Substance Control (DTSC) provides guidance to evaluate the potential for adverse health effects from contact with chemicals in soil [Cal/EPA, 2015]. The soil screening assessment is presented in Table 2. The United States Environmental Protection Agency (USEPA) and DTSC provide guidance to assess potential health risks to receptors allowing the use of site-specific exposure parameters to evaluate additional receptors [USEPA, 2009, 2018; DTSC HERO, 2014]. These risk assessment guidance documents were used to assess potential health risks to adult and child park visitors. This assessment is presented in Tables 3-11.

This Technical Memorandum presents the methodology and results of the assessment of potential health risks resulting from contact with soil at the Site. This Technical Memorandum is presented in five sections. Section 1.0 presents the methodology of the screening assessment of soil exposure to hypothetical residents and outdoor workers. Section 2.0 presents the methodology of the assessment of soil exposure to adult and child park visitors. Section 3.0 presents the results of the assessments. Section 4.0 presents the discussion and conclusions. Section 5.0 presents the literature cited in this Technical Memorandum.

## 1.0 Screening Assessment of Exposure to Soil

The California Environmental Protection Agency's (Cal/EPA) Department of Toxic Substance Control (DTSC) provides guidance to evaluate the potential for adverse health effects from contact with chemicals in soil [Cal/EPA, 2015]. For a chemical identified as a carcinogen, the maximum detected soil concentration is divided by the USEPA Regional Screening Level (RSL) [USEPA, 2018], modified, if necessary (as discussed in DTSC HHRA Note 3 [DTSC, 2018] so that the screening level utilized is that specifically recommended by the DTSC), and multiplied by 1 in 1 million ( $10^{-6}$ ) to calculate the cancer risk posed by that chemical. For a chemical identified as causing noncancer health effects, the maximum detected concentration is divided by its screening level to obtain a Hazard Quotient (HQ) for that chemical. The screening levels are based on the assumptions that, for residents, exposure to the maximum detected concentration of each chemical occurs 350 days per year, 24 hours per day for 26 years. For workers, exposure is to the maximum detected concentration of each chemical for 250 days per year, 8 hours per day, for 25 years. The calculated cancer risk and noncancer hazard in this screening assessment are conservative values and are not indicative of actual exposures to park visitors.

Table 2 presents the maximum concentration of each chemical detected in soil and the USEPA RSL or modified DTSC screening levels for cancer and noncancer effects. As an example of the cancer risk calculation, the maximum detected concentration of arsenic in soil was 29 milligrams per kilogram (mg/kg). The screening level for cancer effects is 0.1 mg/kg [DTSC, 2018]. The cancer risk associated with arsenic in soil at the maximum detected concentration is calculated as follows:

$$(29 \text{ mg/kg} / 0.1 \text{ mg/kg}) \times 10^{-6} = 2.9E-04$$



The noncancer hazard index associated with the maximum detected concentration is calculated using the noncancer screening level as follows:

$$29 \text{ mg/kg} / 0.4 \text{ mg/kg} = 72.5$$

The cumulative cancer risk for chemicals in soil at the Site is calculated by summing the individual cancer risks from each chemical. As presented in Table 2, the cumulative cancer risks for the Site for residents and commercial workers are 3.0E-04 (also expressed as  $3.0 \times 10^{-4}$  or 300 in 1,000,000) and 8.1E-05 (also expressed as  $8.1 \times 10^{-5}$  or 81 in 1,000,000). The cancer risk is driven by the presence of arsenic, vinyl chloride, and benzo(a)pyrene.

The cumulative noncancer hazard index for chemicals in soil at the Site is calculated by summing the individual noncancer hazard index from each chemical. As presented in Table 2, the cumulative noncancer hazard indices for the Site for residents and commercial workers are 89.6 and 0.86. The noncancer hazard index is driven by the presence of arsenic and thallium.

Lead is evaluated by comparing the representative concentration at the Site (in this case, the maximum detected concentration) to DTSC HERO's risk-based concentrations of 80 mg/kg for residential soil 320 mg/kg for lead in commercial/industrial soil. These concentrations are considered to be protective of residents and workers including women of child-bearing ages, respectively [DTSC, 2018]. The maximum detected concentration at the Site was 1100 mg/kg (detected in Sample TP-8, North Site Wall). This value exceeds the health risk-based concentration for lead for both residents and commercial/industrial workers.

## 2.0 Site-Specific Assessment of Exposure to Soil

A site-specific risk assessment was conducted to evaluate the potential cancer risk and noncancer hazard to adult and child park visitors. The methodology used to conduct the risk assessment is presented in the California Environmental Protection Agency's Department of Toxic Substances Control's *Preliminary Endangerment Assessment Guidance Manual* (PEA) [DTSC, 2015], the United States Environmental Protection Agency's *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual, Part F, Supplemental Guidance for Inhalation Risk Assessment* [USEPA, 2009] and *Regional Screening Levels Users Guide* [USEPA, 2018] and DTSC's Office of Human and Ecological Risk (HERO) Note Number 1 [DTSC HERO, 2014].

For an adult park visitor (greater than 6 years of age), it is assumed that they will visit the Park 100 times per year (about 2 times per week), 4 hours per day, for 20 years. For a child park visitor (ages 0-6), it is assumed that they will visit the Park 100 times per year, 4 hours per day, for 6 years. There is no specific risk assessment guidance regarding exposure duration and exposure time. These values are conservative and based on professional judgement.

Intake of chemicals are based on exposure via inhalation of particulates (from nonvolatile chemicals such as metals) and vapors (from volatile chemicals such as solvents), incidental ingestion of soil, and dermal contact with soil. The intake from each of these exposure pathways is combined with cancer toxicity factors (obtained from DTSC or, if not available, USEPA) to calculate cancer risk from each chemical and noncancer toxicity factors (obtained from DTSC or, if not available, USEPA) to calculate noncancer hazard quotient from each chemical. The cancer risk from each chemical is summed to arrive at a total or cumulative cancer risk. The noncancer hazard from each chemical is summed to arrive at a total noncancer hazard index.

Table 3 presents the cancer and noncancer toxicity values used in this assessment. Toxicity values were obtained from DTSC HERO Note 3 [DTSC HERO, 2018] or, if not available, USEPA Regional Screening Levels [USEPA, 2018]. For cancer effects, the toxicity values are cancer slope factors (for oral and dermal exposure) and inhalation unit risk values (for inhalation exposure). For noncancer effects, the toxicity values are reference doses (for ingestion and dermal exposure) and reference concentrations (for inhalation exposure).

Table 4 presents the calculations for concentrations of chemicals in outdoor air as particulates (for nonvolatile chemicals) and vapors (for volatile chemicals). For nonvolatile chemicals, the maximum detected concentration of the chemical in soil is multiplied by a particulate emission factor (PEF) of 1.36E+09 meters cubed per kilogram [DTSC HERO, 2014]. For volatile chemicals, the maximum detected concentration of the chemical is multiplied by a chemical specific volatilization factor (VF) [USEPA, 2018].

Tables 5 and 6 present the calculations for cancer risk and noncancer hazard for the inhalation route of exposure. Tables 7 and 8 present the calculations for cancer risk and noncancer hazard for the ingestion route of exposure. Tables 9 and 10 present the calculations for cancer risk and noncancer hazard for the dermal route of exposure. Table 11 presents a summary of the results.

### 3.0 Results of Risk Assessment

Chemicals of potential concern were evaluated for both potential cancer and noncancer effects. For potential carcinogens, risk is defined as “the theoretical probability of developing cancer from that chemical upon exposure to that medium” [Cal/EPA, 2015]. California’s Proposition 65 considers a cancer risk of 10 in 1,000,000 ( $1E-05$  or  $1 \times 10^{-5}$ ) as an acceptable level and does not require a cancer warning. Within the state of California, the Cal/EPA typically considers a cancer risk of 1 in 1,000,000 ( $1E-06$  or  $1 \times 10^{-6}$ ) as *de minimis* or insignificant.

The noncancer hazard index (HI), calculated for all chemicals of potential concern, is a measure of the potential for the exposures to produce adverse noncarcinogenic health effects (e.g., kidney disease, liver disease, etc.), and is expressed as a ratio of the estimated dose to a dose that is believed to produce no adverse health effects. A noncancer hazard index less than 1.0 indicates that the predicted exposures would not be expected to cause adverse noncancer health effects in exposed individuals.

California Environmental Protection Agency presents an acceptable lead soil concentration of 80 mg/kg for residential exposures and 320 mg/kg for worker exposures.

The result of the assessment of exposure of park visitors to chemicals in soil is presented in Table 11 and below:

	Inhalation	Ingestion	Dermal	Total
Cancer Risk - Adult	2.3E-08	4.5E-06	5.8E-07	5.1E-06
Cancer Risk - Child	6.8E-08	1.4E-05	1.3E-06	1.6E-05
Noncancer Hazard - Adult	0.03	0.54	0.02	0.6
Noncancer Hazard - Child	0.03	5.78	0.04	5.9

The cancer risks for adults and children were 5.1E-06 and 1.6E-05, respectively. The noncancer hazard index for adults and children were 0.6 and 5.9, respectively. These values (except for the noncancer hazard index for adults) are greater than the benchmark levels for cancer risk and noncancer hazard index for residential receptors. Lead was detected at a maximum concentration that exceeds the health risk-based concentration for residents and workers.

The chemical driving the cancer risk and noncancer hazard index is arsenic. Arsenic was detected at a maximum concentration of 29 mg/kg. For samples taken in the surface soil, the maximum detected concentration was 9 mg/kg. Use of the surface soil maximum concentration in the site-specific risk assessment would render the cancer risk and noncancer hazard index to be about ½ that reported in the above table. The background concentration of arsenic in soil in the urbanized San Francisco Bay Region has been reported as 11.0 mg/kg [Duverge, 2011]. It is possible that arsenic in surface soils is present at background concentrations.

Lead was detected at a maximum concentration of 1100 mg/kg. Lead in surface soils range from 24 mg/kg to 240 mg/kg. Values greater than 80 mg/kg exceed California's EPA threshold for lead concentration in residential soil.

#### 4.0 Discussion and Conclusions

The purpose of this assessment was to evaluate the potential health risks associated with exposure to soil at Dunphy Park in Sausalito, California. The most current soil data was used for this evaluation. The maximum detected concentration of each chemical detected in soil was assessed for potential health risks to hypothetical residents and outdoor workers using a screening risk assessment procedure recommended by California Environmental Protection Agency and United States Environmental Protection Agency. This screening assessment involves the use of default exposure parameters. Exposures to residents assumes 24 hours per day, 350 days per year, for 26 years. Exposures to workers assumes 8 hours per day, 250 days per year, for 25 years.

As second assessment was performed that incorporated exposure parameters that are more specific to actual exposures to park visitors. It was assumed that adult park visitors would be at the Park for 4 hours per day, 100 days per year, for 20 years and child park visitors would be at the Park for 4 hours per day, 100 days per year, for 6 years.

Results of the screening assessment (exposures to hypothetical residents and workers) showed that potential exposures to chemicals in soil may exceed health risk-based standards. Responsible chemicals are arsenic, lead, vinyl chloride, benzo(a)pyrene, and thallium. Results of the site-specific assessment showed that potential exposures to chemicals in soil may exceed health risk-based standards. Responsible chemicals include arsenic and lead.

The results of this assessment may be considered as conservative. It was assumed that the maximum detected concentration of each chemical is present throughout the Site and available for exposure. The exposure assumptions may overestimate actual exposures to park visitors.

EHD understands that there are plans to cover the existing soil with two (2) feet of clean fill. There was no existing regulatory guidance located that describes the amount of soil necessary to avoid exposure to chemicals in surface soil. In the case of Dunphy Park, the chemicals that are driving the cancer risk and hazards are metals, which are not volatile. Therefore, the only potential pathways of exposure are inhalation of particulates that migrate to outdoor air, incidental ingestion of metals in soil, and dermal contact with metals in soil. If a soil cover of 2 feet is placed over the existing soil, the new “surface soil” would represent what a park visitor would normally be exposed to if the exposure area was used for recreational purposes (e.g., walking, hiking, sports). It is expected that 2 feet would adequately prevent exposure to the existing surface and therefore mitigate the potential cancer risk and noncancer hazard index associated with metals in surface soil. The soil cover may be routinely inspected to assure that the depth of the cover remains intact.

## **5.0 Literature Cited**

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TABLE 1: Summary of Data

Chemical	Concentration (milligrams per kilogram, mg/kg)
Antimony	27
Arsenic	29
<b>Arsenic 95% UCL</b>	<b>13.32</b>
Barium	800
Beryllium	0.62
Cadmium	1.4
Chromium	110
Cobalt	20
Copper	690
Mercury	1
Molybdenum	3.7
Nickel	65
Selenium	0
Silver	0.88
Thallium	9
Vanadium	140
Zinc	2200
TPH-G aliph	50
TPH-G arom	50
TPH-D aliph	8
TPH-D arom	8
TPH-O aliph	1100
TPH-O arom	1100
1,2,4-Trimethylbenzene	0.063
1,3,5-Trimethylbenzene	0.028
Isopropylbenzene	0.007
Naphthalene	0.008
Vinyl chloride	0.018
Xylenes (total)	0.02
2-Methylnaphthalene	0.25
Benz (a) anthracene	0.2
Benzo (a) pyrene	1.1
Benzo (b) fluoranthene	0.73
Benzo (k) fluoranthene	0.74
Chrysene	0.22
Fluoranthene	1.5
Phenanthrene	0.77
Pyrene	1.6
4-4'-DDD	0.37
PCB-1254	0.024

Note: TPH (total petroleum hydrocarbon) presented as 1/2 aliphatic and 1/2 aromatic

TPH - G - TPH as gasoline

TPH - D - TPH as diesel

TPH - O - TPH as heavy oil

aliph - aliphatic

arom - aromatic

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TABLE 2: Screening Human Health Risk Assessment

Chemical	Maximum Concentration (mg/kg)	Residential				Commercial			
		Cancer SL (mg/kg)	Cancer Risk	Noncancer SL (mg/kg)	Noncancer Hazard Index	Cancer SL (mg/kg)	Cancer Risk	Noncancer SL (mg/kg)	Noncancer Hazard Index
Antimony	27	nc	0.00E+00	31	0.871	nc	0.00E+00	470	0.057
Arsenic	29	0.1	2.90E-04	0.4	72.5	0.36	8.06E-05	4.2	6.9
Barium	800	nc	0.00E+00	15000	0.053	nc	0.00E+00	22000	0.036
Beryllium	0.62	1600	3.88E-10	15	0.041	6900	8.99E-11	210	0.003
Cadmium	1.4	2100	6.67E-10	5.2	0.269	9300	1.51E-10	7.3	0.192
Chromium	110	nc	0.00E+00	36000	0.003	nc	0.00E+00	170000	0.001
Cobalt	20	420	4.76E-08	23	0.870	1900	1.05E-08	350	0.057
Copper	690	nc	0.00E+00	3100	0.223	nc	0.00E+00	47000	0.015
Mercury	1	nc	0.00E+00	1	1.000	nc	0.00E+00	4.4	0.227
Molybdenum	3.7	nc	0.00E+00	390	0.009	nc	0.00E+00	5800	0.001
Nickel	65	15000	4.33E-09	490	0.133	64000	1.02E-09	3100	0.021
Selenium	0	nc	0.00E+00	390	0.000	nc	0.00E+00	5800	0.000
Silver	0.88	nc	0.00E+00	390	0.002	nc	0.00E+00	1500	0.001
Thallium	9	nc	0.00E+00	0.78	11.5	nc	0.00E+00	12	0.750
Vanadium	140	nc	0.00E+00	390	0.359	nc	0.00E+00	1000	0.140
Zinc	2200	nc	0.00E+00	23000	0.096	nc	0.00E+00	350000	0.006
TPH-G aliph	50	nc	0.00E+00	520	0.096	nc	0.00E+00	2200	0.023
TPH-G arom	50	nc	0.00E+00	82	0.610	nc	0.00E+00	440	0.114
TPH-D aliph	8	nc	0.00E+00	96	0.083	nc	0.00E+00	440	0.018
TPH-D arom	8	nc	0.00E+00	110	0.073	nc	0.00E+00	600	0.013
TPH-O aliph	1100	nc	0.00E+00	230000	0.005	nc	0.00E+00	3500000	0.0003
TPH-O arom	1100	nc	0.00E+00	2500	0.440	nc	0.00E+00	33000	0.033
1,2,4-Trimethylbenzene	0.063	nc	0.00E+00	300	0.000	nc	0.00E+00	1800	0.00004
1,3,5-Trimethylbenzene	0.028	nc	0.00E+00	270	0.000	nc	0.00E+00	1500	0.00002
Isopropylbenzene	0.007	nc	0.00E+00	1900	0.000	nc	0.00E+00	9900	0.000001
Naphthalene	0.008	3.8	2.11E-09	130	0.000	17	4.71E-10	590	0.00001
Vinyl chloride	0.018	0.0087	2.07E-06	70	0.000	0.15	1.20E-07	370	0.00005
Xylenes (total)	0.02	nc	0.00E+00	580	0.000	nc	0.00E+00	2500	0.00001
2-Methylnaphthalene	0.25	nc	0.00E+00	240	0.001	nc	0.00E+00	3000	0.00008
Benz (a) anthracene	0.2	1.1	1.82E-07	no value	0.000	21	9.52E-09	no value	0.000
Benzo (a) pyrene	1.1	0.1	1.10E-05	18	0.061	2.1	5.24E-07	220	0.005
Benzo (b) fluoranthene	0.73	1.1	6.64E-07	no value	0.000	21	3.48E-08	no value	0.000
Benzo (k) fluoranthene	0.74	11	6.73E-08	no value	0.000	210	3.52E-09	no value	0.000
Chrysene	0.22	110	2.00E-09	no value	0.000	2100	1.05E-10	no value	0.000
Fluoranthene	1.5	nc	0.00E+00	2400	0.001	nc	0.00E+00	30000	0.0001
Phenanthrene	0.77	nc	0.00E+00	no value	0.000	no value	0.00E+00	no value	0.000
Pyrene	1.6	nc	0.00E+00	1800	0.001	nc	0.00E+00	23000	0.0001
4-4'-DDD	0.37	2.3	1.61E-07	1.9	0.195	9.6	3.85E-08	25	0.015
PCB-1254	0.024	0.24	1.00E-07	1.2	0.020	0.97	2.47E-08	15	0.002

3.0E-04 89.6 8.1E-05 8.6

Red - exceeds cancer risk of 1 in 1 million or noncancer hazard index of 1

mg/kg - milligrams per kilogram

SL - USEPA Regional Screening Level (USEPA, 2018) or, if available, DTSC HERO Note 3 Screening Level (DTSC, 2018)

nc - not a carcinogen

nv - no value listed by USEPA or DTSC

TABLE 3: Toxicity Values

Chemical	Cancer Toxicity Values		Noncancer Toxicity Values	
	Oral CSF	IUR (ug/m3)-1	Oral RfD	Inhalation RfC (ug/m3)-1
Antimony	nc	nc	4.00E-04	no value
Arsenic	9.50E+00	4.30E-03	3.50E-06	1.50E-02
Barium	nc	nc	2.00E-01	5.00E-01
Beryllium	nc	nc	2.00E-04	7.00E-03
Cadmium	no value	4.20E-03	1.00E-03	1.00E-02
Chromium	nc	nc	3.00E-03	1.00E-01
Cobalt	no value	9.00E-03	3.00E-04	6.00E-03
Copper	nc	nc	4.00E-02	no value
Mercury	nc	nc	1.60E-04	3.00E-02
Molybdenum	nc	nc	5.00E-03	no value
Nickel	no value	2.60E-04	1.10E-02	1.40E-02
Selenium	nc	nc	5.00E-03	2.00E+01
Silver	nc	nc	5.00E-03	no value
Thallium	nc	nc	1.00E-05	no value
Vanadium	nc	nc	5.00E-03	1.00E-01
Zinc	nc	nc	3.00E-01	no value
TPH-G aliph	nc	nc	no value	6.00E+02
TPH-G arom	nc	nc	4.00E-03	3.00E+01
TPH-D aliph	nc	nc	1.00E-02	1.00E+02
TPH-D arom	nc	nc	4.00E-03	3.00E+00
TPH-O aliph	nc	nc	3.00E+00	no value
TPH-O arom	nc	nc	4.00E-02	no value
1,2,4-Trimethylbenzene	nc	nc	1.00E-02	6.00E+01
1,3,5-Trimethylbenzene	nc	nc	1.00E-02	6.00E+01
Isopropylbenzene	nc	nc	1.00E-01	4.00E+02
Naphthalene	no value	3.40E-05	2.00E-02	3.00E+00
Vinyl chloride	7.20E-01	7.80E-05	3.00E-03	1.00E+02
Xylenes (total)	nc	nc	2.00E-01	1.00E+02
2-Methylnaphthalene	nc	nc	4.00E-03	no value
Benz (a) anthracene	1.00E-01	1.10E-04	no value	no value
Benzo (a) pyrene	1.00E+00	1.10E-03	3.00E-04	2.00E-03
Benzo (b) fluoranthene	1.00E-01	1.10E-04	no value	no value
Benzo (k) fluoranthene	1.00E-02	1.10E-04	no value	no value
Chrysene	1.00E-03	1.10E-05	no value	no value
Fluoranthene	nc	nc	4.00E-02	no value
Phenanthrene	nc	nc	no value	no value
Pyrene	nc	nc	3.00E-02	no value
4-4'-DDD	2.40E-01	6.90E-05	3.00E-05	no value
PCB-1254	2.00E+00	5.70E-04	2.00E-05	no value

mg/kg - milligrams per kilogram

IUR - Inhalation Unit Risk - in (micrograms per cubic meter) -1

Oral CSF - oral cancer slope factor - in (milligrams per kilogram per day)-1

RfD - reference dose - in milligrams per kilogram per day

RfC - reference concentration - in micrograms per cubic meter

nc - not a carcinogen

no value - no value listed by USEPA or DTSC



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TABLE 4: Calculation of Outdoor Air Concentrations

Chemical	Maximum Concentration (mg/kg)	Volatile (Y/N)	Volatization Factor (m3/kg)	Air Concentration (mg/m3)	Air Concentration (ug/m3)
Antimony	27	N	1.36E+09	1.99E-08	1.99E-05
Arsenic	29	N	1.36E+09	2.13E-08	2.13E-05
Barium	800	N	1.36E+09	5.88E-07	5.88E-04
Beryllium	0.62	N	1.36E+09	4.56E-10	4.56E-07
Cadmium	1.4	N	1.36E+09	1.03E-09	1.03E-06
Chromium	110	N	1.36E+09	8.09E-08	8.09E-05
Cobalt	20	N	1.36E+09	1.47E-08	1.47E-05
Copper	690	N	1.36E+09	5.07E-07	5.07E-04
Mercury	1	N	1.36E+09	7.35E-10	7.35E-07
Molybdenum	3.7	N	1.36E+09	2.72E-09	2.72E-06
Nickel	65	N	1.36E+09	4.78E-08	4.78E-05
Selenium	0	N	1.36E+09	0.00E+00	0.00E+00
Silver	0.88	N	1.36E+09	6.47E-10	6.47E-07
Thallium	9	N	1.36E+09	6.62E-09	6.62E-06
Vanadium	140	N	1.36E+09	1.03E-07	1.03E-04
Zinc	2200	N	1.36E+09	1.62E-06	1.62E-03
TPH-G aliph	50	Y	8.29E+02	6.03E-02	6.03E+01
TPH-G arom	50	y	3.54E+03	1.41E-02	1.41E+01
TPH-D aliph	8	y	1.04E+03	7.69E-03	7.69E+00
TPH-D arom	8	y	5.24E+04	1.53E-04	1.53E-01
TPH-O aliph	1100	N	1.36E+09	8.09E-07	8.09E-04
TPH-O arom	1100	N	1.36E+09	8.09E-07	8.09E-04
1,2,4-Trimethylbenzene	0.063	Y	7.91E+03	7.96E-06	7.96E-03
1,3,5-Trimethylbenzene	0.028	Y	6.61E+03	4.24E-06	4.24E-03
Isopropylbenzene	0.007	Y	6.21E+03	1.13E-06	1.13E-03
Naphthalene	0.008	Y	4.63E+04	1.73E-07	1.73E-04
Vinyl chloride	0.018	Y	9.56E+02	1.88E-05	1.88E-02
Xylenes (total)	0.02	Y	5.74E+03	3.48E-06	3.48E-03
2-Methylnaphthalene	0.25	Y	5.80E+04	4.31E-06	4.31E-03
Benz (a) anthracene	0.2	Y	4.41E+06	4.54E-08	4.54E-05
Benzo (a) pyrene	1.1	N	1.36E+09	8.09E-10	8.09E-07
Benzo (b) fluoranthene	0.73	N	1.36E+09	5.37E-10	5.37E-07
Benzo (k) fluoranthene	0.74	N	1.36E+09	5.44E-10	5.44E-07
Chrysene	0.22	N	1.36E+09	1.62E-10	1.62E-07
Fluoranthene	1.5	N	1.36E+09	1.10E-09	1.10E-06
Phenanthrene	0.77	N	1.36E+09	5.66E-10	5.66E-07
Pyrene	1.6	Y	2.38E+06	6.72E-07	6.72E-04
4-4'-DDD	0.37	N	1.36E+09	2.72E-10	2.72E-07
PCB-1254	0.024	Y	8.43E+05	2.85E-08	2.85E-05

mg/kg - milligrams per kilogram

mg/m3 - milligrams per cubic meter

ug/m3 - micrograms per cubic meter

Y/N - yes or no

TABLE 5: Cancer Risk Calculations - Inhalation

Chemical	Adult Cancer								Child Cancer							
	Ca	ET	EF	ED	AT	EC	IUR	Risk	Ca	ET	EF	ED	AT	EC	IUR	Risk
Antimony	1.99E-05	4	100	20	613200	2.59E-07	nc	0	1.99E-05	4	100	6	61320	7.77E-07	nc	0
Arsenic	2.13E-05	4	100	20	613200	2.78E-07	4.30E-03	1.20E-09	2.13E-05	4	100	6	61320	8.35E-07	4.30E-03	3.59E-09
Barium	5.88E-04	4	100	20	613200	7.67E-06	nc	0	5.88E-04	4	100	6	61320	2.30E-05	nc	0
Beryllium	4.56E-07	4	100	20	613200	5.95E-09	nc	0	4.56E-07	4	100	6	61320	1.78E-08	nc	0
Cadmium	1.03E-06	4	100	20	613200	1.34E-08	4.20E-03	5.64E-11	1.03E-06	4	100	6	61320	4.03E-08	4.20E-03	1.69E-10
Chromium	8.09E-05	4	100	20	613200	1.06E-06	nc	0	8.09E-05	4	100	6	61320	3.17E-06	nc	0
Cobalt	1.47E-05	4	100	20	613200	1.92E-07	9.00E-03	1.73E-09	1.47E-05	4	100	6	61320	5.76E-07	9.00E-03	5.18E-09
Copper	5.07E-04	4	100	20	613200	6.62E-06	nc	0	5.07E-04	4	100	6	61320	1.99E-05	nc	0
Mercury	7.35E-07	4	100	20	613200	9.59E-09	nc	0	7.35E-07	4	100	6	61320	2.88E-08	nc	0
Molybdenum	6.62E-06	4	100	20	613200	3.55E-08	nc	0	2.72E-06	4	100	6	61320	1.06E-07	nc	0
Nickel	4.78E-05	4	100	20	613200	6.24E-07	2.60E-04	1.62E-10	4.78E-05	4	100	6	61320	1.87E-06	2.60E-04	4.86E-10
Selenium	0.00E+00	4	100	20	613200	0.00E+00	nc	0	0.00E+00	4	100	6	61320	0.00E+00	nc	0
Silver	6.47E-07	4	100	20	613200	8.44E-09	nc	0	6.47E-07	4	100	6	61320	2.53E-08	nc	0
Thallium	6.62E-06	4	100	20	613200	8.63E-08	nc	0	6.62E-06	4	100	6	61320	2.59E-07	nc	0
Vanadium	1.03E-04	4	100	20	613200	1.34E-06	nc	0	1.03E-04	4	100	6	61320	4.03E-06	nc	0
Zinc	1.62E-03	4	100	20	613200	2.11E-05	nc	0	1.62E-03	4	100	6	61320	6.33E-05	nc	0
TPH-G aliph	6.03E+01	4	100	20	613200	7.87E-01	nc	0	6.03E+01	4	100	6	61320	2.36E+00	nc	0
TPH-G arom	1.41E+01	4	100	20	613200	1.84E-01	nc	0	1.41E+01	4	100	6	61320	5.53E-01	nc	0
TPH-D aliph	7.69E+00	4	100	20	613200	1.00E-01	nc	0	7.69E+00	4	100	6	61320	3.01E-01	nc	0
TPH-D arom	1.53E-01	4	100	20	613200	1.99E-03	nc	0	1.53E-01	4	100	6	61320	5.98E-03	nc	0
TPH-O aliph	8.09E-04	4	100	20	613200	1.06E-05	nc	0	8.09E-04	4	100	6	61320	3.17E-05	nc	0
TPH-O arom	8.09E-04	4	100	20	613200	1.06E-05	nc	0	8.09E-04	4	100	6	61320	3.17E-05	nc	0
1,2,4-Trimethylbenzene	7.96E-03	4	100	20	613200	1.04E-04	nc	0	7.96E-03	4	100	6	61320	3.12E-04	nc	0
1,3,5-Trimethylbenzene	4.24E-03	4	100	20	613200	5.53E-05	nc	0	4.24E-03	4	100	6	61320	1.66E-04	nc	0
Isopropylbenzene	1.13E-03	4	100	20	613200	1.47E-05	nc	0	1.13E-03	4	100	6	61320	4.41E-05	nc	0
Naphthalene	1.73E-04	4	100	20	613200	2.25E-06	3.40E-05	7.66E-11	1.73E-04	4	100	6	61320	6.76E-06	3.40E-05	2.3E-10
Vinyl chloride	1.88E-02	4	100	20	613200	2.46E-04	7.80E-05	1.92E-08	1.88E-02	4	100	6	61320	7.37E-04	7.80E-05	5.75E-08
Xylenes (total)	3.48E-03	4	100	20	613200	4.55E-05	nc	0	3.48E-03	4	100	6	61320	1.36E-04	nc	0
2-Methylnaphthalene	4.31E-03	4	100	20	613200	5.62E-05	nc	0	4.31E-03	4	100	6	61320	1.69E-04	nc	0
Benz (a) anthracene	4.54E-05	4	100	20	613200	5.92E-07	1.10E-04	6.51E-11	4.54E-05	4	100	6	61320	1.78E-06	1.10E-04	1.95E-10
Benzo (a) pyrene	8.09E-07	4	100	20	613200	1.06E-08	1.10E-03	1.16E-11	8.09E-07	4	100	6	61320	3.17E-08	1.10E-03	3.48E-11
Benzo (b) fluoranthene	5.37E-07	4	100	20	613200	7.00E-09	1.10E-04	7.70E-13	5.37E-07	4	100	6	61320	2.10E-08	1.10E-04	2.31E-12
Benzo (k) fluoranthene	5.44E-07	4	100	20	613200	7.10E-09	1.10E-04	7.81E-13	5.44E-07	4	100	6	61320	2.13E-08	1.10E-04	2.34E-12
Chrysene	1.62E-07	4	100	20	613200	2.11E-09	1.10E-05	2.32E-14	1.62E-07	4	100	6	61320	6.33E-09	1.10E-05	6.96E-14
Fluoranthene	1.10E-06	4	100	20	613200	1.44E-08	nc	0	1.10E-06	4	100	6	61320	4.32E-08	nc	0
Phenanthrene	5.66E-07	4	100	20	613200	7.39E-09	nc	0	5.66E-07	4	100	6	61320	2.22E-08	nc	0
Pyrene	6.72E-04	4	100	20	613200	8.77E-06	nc	0	6.72E-04	4	100	6	61320	2.63E-05	nc	0
4-4'-DDD	2.72E-07	4	100	20	613200	3.55E-09	6.90E-05	2.45E-13	2.72E-07	4	100	6	61320	1.06E-08	6.90E-05	7.35E-13
PCB-1254	2.85E-05	4	100	20	613200	3.71E-07	5.70E-04	2.12E-10	2.85E-05	4	100	6	61320	1.11E-06	5.70E-04	6.35E-10

2.3E-08

6.8E-08

EC = (CA\*ET\*EF\*ED)/AT

Risk = EC \* IUR

EC (ug/m3) - exposure concentration

CE (ug/m3) - contaminant concentration in air

ET (hours/day) - exposure time

EF (days/year) - exposure frequency

ED (years) - exposure duration

AT (lifetime in years x 365 days/year x 24 hours/day) - averaging time

IUR (ug/m3)-1 - inhalation unit risk

nc - not a carcinogen

TABLE 6: Noncancer Hazard Calculations - Inhalation

	Adult Noncancer							RfC		Child Noncancer							RfC	
	Ca	ET	EF	ED	AT	EC	RfC	Hazard Quotient	Ca	ET	EF	ED	AT	EC	RfC	Hazard Quotient		
Antimony	1.99E-05	4	100	26	227760	9.07E-07	no value	0	1.99E-05	4	100	6	52560	9.07E-07	no value	0		
Arsenic	2.13E-05	4	100	26	227760	9.74E-07	1.50E-02	6.49E-05	2.13E-05	4	100	6	52560	9.74E-07	1.50E-02	6.49E-05		
Barium	5.88E-04	4	100	26	227760	2.69E-05	5.00E-01	5.37E-05	5.88E-04	4	100	6	52560	2.69E-05	5.00E-01	5.37E-05		
Beryllium	4.56E-07	4	100	26	227760	2.08E-08	7.00E-03	2.97E-06	4.56E-07	4	100	6	52560	2.08E-08	7.00E-03	2.97E-06		
Cadmium	1.03E-06	4	100	26	227760	4.70E-08	1.00E-02	4.70E-06	1.03E-06	4	100	6	52560	4.70E-08	1.00E-02	4.7E-06		
Chromium	8.09E-05	4	100	26	227760	3.69E-06	1.00E-01	3.69E-05	8.09E-05	4	100	6	52560	3.69E-06	1.00E-01	3.69E-05		
Cobalt	1.47E-05	4	100	26	227760	6.72E-07	6.00E-03	1.12E-04	1.47E-05	4	100	6	52560	6.72E-07	6.00E-03	0.000112		
Copper	5.07E-04	4	100	26	227760	2.32E-05	no value	0	5.07E-04	4	100	6	52560	2.32E-05	no value	0		
Mercury	7.35E-07	4	100	26	227760	3.36E-08	3.00E-02	1.12E-06	7.35E-07	4	100	6	52560	3.36E-08	3.00E-02	1.12E-06		
Molybdenum	2.72E-06	4	100	26	227760	1.24E-07	no value	0	2.72E-06	4	100	6	52560	1.24E-07	no value	0		
Nickel	4.78E-05	4	100	26	227760	2.18E-06	1.40E-02	1.56E-04	4.78E-05	4	100	6	52560	2.18E-06	1.40E-02	0.000156		
Selenium	0.00E+00	4	100	26	227760	0.00E+00	2.00E+01	0.00E+00	0.00E+00	4	100	6	52560	0.00E+00	2.00E+01	0		
Silver	6.47E-07	4	100	26	227760	2.95E-08	no value	0	6.47E-07	4	100	6	52560	2.95E-08	no value	0		
Thallium	6.62E-06	4	100	26	227760	3.02E-07	no value	0	6.62E-06	4	100	6	52560	3.02E-07	no value	0		
Vanadium	1.03E-04	4	100	26	227760	4.70E-06	1.00E-01	4.70E-05	1.03E-04	4	100	6	52560	4.70E-06	1.00E-01	4.7E-05		
Zinc	1.62E-03	4	100	26	227760	7.39E-05	no value	0	1.62E-03	4	100	6	52560	7.39E-05	no value	0		
TPH-G aliph	6.03E+01	4	100	26	227760	3.36E-08	3.00E+02	4.59E-03	6.03E+01	4	100	6	52560	2.75E+00	6.00E+02	0.00459		
TPH-G arom	1.41E+01	4	100	26	227760	6.45E-01	3.00E+01	2.15E-02	1.41E+01	4	100	6	52560	6.45E-01	3.00E+01	0.021498		
TPH-D aliph	7.69E+00	4	100	26	227760	3.51E-01	1.00E+02	3.51E-03	7.69E+00	4	100	6	52560	3.51E-01	1.00E+02	0.003512		
TPH-D arom	1.53E-01	4	100	26	227760	6.97E-03	3.00E+00	2.32E-03	1.53E-01	4	100	6	52560	6.97E-03	3.00E+00	0.002324		
TPH-O aliph	8.09E-04	4	100	26	227760	3.69E-05	no value	0	8.09E-04	4	100	6	52560	3.69E-05	no value	0		
TPH-O arom	8.09E-04	4	100	26	227760	3.69E-05	no value	0	8.09E-04	4	100	6	52560	3.69E-05	no value	0		
1,2,4-Trimethylbenzene	7.96E-03	4	100	26	227760	3.64E-04	6.00E+01	6.06E-06	7.96E-03	4	100	6	52560	3.64E-04	6.00E+01	6.06E-06		
1,3,5-Trimethylbenzene	4.24E-03	4	100	26	227760	1.93E-04	6.00E+01	3.22E-06	4.24E-03	4	100	6	52560	1.93E-04	6.00E+01	3.22E-06		
Isopropylbenzene	1.13E-03	4	100	26	227760	5.15E-05	4.00E+02	1.29E-07	1.13E-03	4	100	6	52560	5.15E-05	4.00E+02	1.29E-07		
Naphthalene	1.73E-04	4	100	26	227760	7.89E-06	3.00E+00	2.63E-06	1.73E-04	4	100	6	52560	7.89E-06	3.00E+00	2.63E-06		
Vinyl chloride	1.88E-02	4	100	26	227760	8.60E-04	1.00E+02	8.60E-06	1.88E-02	4	100	6	52560	8.60E-04	1.00E+02	8.6E-06		
Xylenes (total)	3.48E-03	4	100	26	227760	1.59E-04	1.00E+02	1.59E-06	3.48E-03	4	100	6	52560	1.59E-04	1.00E+02	1.59E-06		
2-Methylnaphthalene	4.31E-03	4	100	26	227760	1.97E-04	no value	0	4.31E-03	4	100	6	52560	1.97E-04	no value	0		
Benz (a) anthracene	4.54E-05	4	100	26	227760	2.07E-06	no value	0	4.54E-05	4	100	6	52560	2.07E-06	no value	0		
Benzo (a) pyrene	8.09E-07	4	100	26	227760	3.69E-08	2.00E-03	1.85E-05	8.09E-07	4	100	6	52560	3.69E-08	2.00E-03	1.85E-05		
Benzo (b) fluoranthene	5.37E-07	4	100	26	227760	2.45E-08	no value	0	5.37E-07	4	100	6	52560	2.45E-08	no value	0		
Benzo (k) fluoranthene	5.44E-07	4	100	26	227760	2.48E-08	no value	0	5.44E-07	4	100	6	52560	2.48E-08	no value	0		
Chrysene	1.62E-07	4	100	26	227760	7.39E-09	no value	0	1.62E-07	4	100	6	52560	7.39E-09	no value	0		
Fluoranthene	1.10E-06	4	100	26	227760	5.04E-08	no value	0	1.10E-06	4	100	6	52560	5.04E-08	no value	0		
Phenanthrene	5.66E-07	4	100	26	227760	2.59E-08	no value	0	5.66E-07	4	100	6	52560	2.59E-08	no value	0		
Pyrene	6.72E-04	4	100	26	227760	3.07E-05	no value	0	6.72E-04	4	100	6	52560	3.07E-05	no value	0		
4,4'-DDD	2.72E-07	4	100	26	227760	1.24E-08	no value	0	2.72E-07	4	100	6	52560	1.24E-08	no value	0		
PCB-1254	2.85E-05	4	100	26	227760	1.30E-06	no value	0	2.85E-05	4	100	6	52560	1.30E-06	no value	0		

0.03

0.03

EC = (CA\*ET\*EF\*ED)/AT

Hazard Quotient = EC / RfD (in mg/m3) x 1000

EC (ug/m3) - exposure concentration

CE (ug/m3) - contaminant concentration in air

ET (hours/day) - exposure time

EF (days/year) - exposure frequency

ED (years) - exposure duration

AT (exposure duration in years x 365 days/year x 24 hours/day) - averaging time

TABLE 7: Cancer Risk Calculations - Ingestion

Chemical	Soil Concentration (SC) (mg/kg)	Cancer Risk - Adults										Cancer Risk - Child									
		IR	ET	ED	EF	CF	BW	AT	Intake	CSF	Risk	IR	ET	ED	EF	CF	BW	AT	Intake	CSF	Risk
Antimony	27.00	100	0.166667	20	100	1.00E-06	80	25550	4.40E-07	nc	0	200	0.166667	6	100	1.00E-06	15	25550	1.41E-06	nc	0
Arsenic	29.00	100	0.166667	20	100	1.00E-06	80	25550	4.73E-07	9.50E+00	4.49E-06	200	0.166667	6	100	1.00E-06	15	25550	1.51E-06	9.50E+00	1.44E-05
Barium	800.00	100	0.166667	20	100	1.00E-06	80	25550	1.30E-05	nc	0	200	0.166667	6	100	1.00E-06	15	25550	4.17E-05	nc	0
Beryllium	0.62	100	0.166667	20	100	1.00E-06	80	25550	1.01E-08	nc	0	200	0.166667	6	100	1.00E-06	15	25550	3.24E-08	nc	0
Cadmium	1.40	100	0.166667	20	100	1.00E-06	80	25550	2.28E-08	no value	0.00E+00	200	0.166667	6	100	1.00E-06	15	25550	7.31E-08	no value	0
Chromium	110.00	100	0.166667	20	100	1.00E-06	80	25550	1.79E-06	nc	0	200	0.166667	6	100	1.00E-06	15	25550	5.74E-06	nc	0
Cobalt	20.00	100	0.166667	20	100	1.00E-06	80	25550	3.26E-07	no value	0.00E+00	200	0.166667	6	100	1.00E-06	15	25550	1.04E-06	no value	0
Copper	690.00	100	0.166667	20	100	1.00E-06	80	25550	1.13E-05	nc	0	200	0.166667	6	100	1.00E-06	15	25550	3.60E-05	nc	0
Mercury	1.00	100	0.166667	20	100	1.00E-06	80	25550	1.63E-08	nc	0	200	0.166667	6	100	1.00E-06	15	25550	5.22E-08	nc	0
Molybdenum	3.70	100	0.166667	20	100	1.00E-06	80	25550	6.03E-08	nc	0	200	0.166667	6	100	1.00E-06	15	25550	1.93E-07	nc	0
Nickel	65.00	100	0.166667	20	100	1.00E-06	80	25550	1.06E-06	no value	0.00E+00	200	0.166667	6	100	1.00E-06	15	25550	3.39E-06	no value	0
Selenium	0.00	100	0.166667	20	100	1.00E-06	80	25550	0.00E+00	nc	0	200	0.166667	6	100	1.00E-06	15	25550	0.00E+00	nc	0
Silver	0.88	100	0.166667	20	100	1.00E-06	80	25550	1.44E-08	nc	0	200	0.166667	6	100	1.00E-06	15	25550	4.59E-08	nc	0
Thallium	9.00	100	0.166667	20	100	1.00E-06	80	25550	1.47E-07	nc	0	200	0.166667	6	100	1.00E-06	15	25550	4.70E-07	nc	0
Vanadium	140.00	100	0.166667	20	100	1.00E-06	80	25550	2.28E-06	nc	0	200	0.166667	6	100	1.00E-06	15	25550	7.31E-06	nc	0
Zinc	2200.00	100	0.166667	20	100	1.00E-06	80	25550	3.59E-05	nc	0	200	0.166667	6	100	1.00E-06	15	25550	1.15E-04	nc	0
TPH-G aliph	50.00	100	0.166667	20	100	1.00E-06	80	25550	8.15E-07	nc	0	200	0.166667	6	100	1.00E-06	15	25550	2.61E-06	nc	0
TPH-G arom	50.00	100	0.166667	20	100	1.00E-06	80	25550	8.15E-07	nc	0	200	0.166667	6	100	1.00E-06	15	25550	2.61E-06	nc	0
TPH-D aliph	8.00	100	0.166667	20	100	1.00E-06	80	25550	1.30E-07	nc	0	200	0.166667	6	100	1.00E-06	15	25550	4.17E-07	nc	0
TPH-D arom	8.00	100	0.166667	20	100	1.00E-06	80	25550	1.30E-07	nc	0	200	0.166667	6	100	1.00E-06	15	25550	4.17E-07	nc	0
TPH-O aliph	1100.00	100	0.166667	20	100	1.00E-06	80	25550	1.79E-05	nc	0	200	0.166667	6	100	1.00E-06	15	25550	5.74E-05	nc	0
TPH-O arom	1100.00	100	0.166667	20	100	1.00E-06	80	25550	1.79E-05	nc	0	200	0.166667	6	100	1.00E-06	15	25550	5.74E-05	nc	0
1,2,4-Trimethylbenzene	0.06	100	0.166667	20	100	1.00E-06	80	25550	1.03E-09	nc	0	200	0.166667	6	100	1.00E-06	15	25550	3.29E-09	nc	0
1,3,5-Trimethylbenzene	0.03	100	0.166667	20	100	1.00E-06	80	25550	4.57E-10	nc	0	200	0.166667	6	100	1.00E-06	15	25550	1.46E-09	nc	0
Isopropylbenzene	0.01	100	0.166667	20	100	1.00E-06	80	25550	1.14E-10	nc	0	200	0.166667	6	100	1.00E-06	15	25550	3.65E-10	nc	0
Naphthalene	0.01	100	0.166667	20	100	1.00E-06	80	25550	1.30E-10	no value	0.00E+00	200	0.166667	6	100	1.00E-06	15	25550	4.17E-10	no value	0
Vinyl chloride	0.02	100	0.166667	20	100	1.00E-06	80	25550	2.94E-10	7.20E-01	2.11E-10	200	0.166667	6	100	1.00E-06	15	25550	9.39E-10	7.20E-01	6.76E-10
Xylenes (total)	0.02	100	0.166667	20	100	1.00E-06	80	25550	3.26E-10	nc	0	200	0.166667	6	100	1.00E-06	15	25550	1.04E-09	nc	0
2-Methylnaphthalene	0.25	100	0.166667	20	100	1.00E-06	80	25550	4.08E-09	nc	0	200	0.166667	6	100	1.00E-06	15	25550	1.30E-08	nc	0
Benz (a) anthracene	0.20	100	0.166667	20	100	1.00E-06	80	25550	3.26E-09	1.00E-01	3.26E-10	200	0.166667	6	100	1.00E-06	15	25550	1.04E-08	1.00E-01	1.04E-09
Benzo (a) pyrene	1.10	100	0.166667	20	100	1.00E-06	80	25550	1.79E-08	1.00E+00	1.79E-08	200	0.166667	6	100	1.00E-06	15	25550	5.74E-08	1.00E+00	5.74E-08
Benzo (b) fluoranthene	0.73	100	0.166667	20	100	1.00E-06	80	25550	1.19E-08	1.00E-01	1.19E-09	200	0.166667	6	100	1.00E-06	15	25550	3.81E-08	1.00E-01	3.81E-09
Benzo (k) fluoranthene	0.74	100	0.166667	20	100	1.00E-06	80	25550	1.21E-08	1.00E-02	1.21E-10	200	0.166667	6	100	1.00E-06	15	25550	3.86E-08	1.00E-02	3.86E-10
Chrysene	0.22	100	0.166667	20	100	1.00E-06	80	25550	3.59E-09	1.00E-03	3.59E-12	200	0.166667	6	100	1.00E-06	15	25550	1.15E-08	1.00E-03	1.15E-11
Fluoranthene	1.50	100	0.166667	20	100	1.00E-06	80	25550	2.45E-08	nc	0	200	0.166667	6	100	1.00E-06	15	25550	7.83E-08	nc	0
Phenanthrene	0.77	100	0.166667	20	100	1.00E-06	80	25550	1.26E-08	nc	0	200	0.166667	6	100	1.00E-06	15	25550	4.02E-08	nc	0
Pyrene	1.60	100	0.166667	20	100	1.00E-06	80	25550	2.61E-08	nc	0	200	0.166667	6	100	1.00E-06	15	25550	8.35E-08	nc	0
4-4'-DDD	0.37	100	0.166667	20	100	1.00E-06	80	25550	6.03E-09	2.40E-01	1.45E-09	200	0.166667	6	100	1.00E-06	15	25550	1.93E-08	2.40E-01	4.63E-09
PCB-1254	0.02	100	0.166667	20	100	1.00E-06	80	25550	3.91E-10	2.00E+00	7.83E-10	200	0.166667	6	100	1.00E-06	15	25550	1.25E-09	2.00E+00	2.5E-09

4.5E-06

1.4E-05

Intake (mg/kg-day) = SC\*IR\*ET\*EF\*ED\*CF / BW\*AT  
 Cancer Risk = Intake\*CSF (cancer slope factor, [mg/kg-day]-1)  
 SC - soil concentration (mg/kg)  
 IR - ingestion rate (mg/day)  
 ET - exposure time (4 hours per 24 hours)  
 EF - exposure frequency (days per year)  
 ED - exposure duration (years)  
 CF - conversion factor  
 BW - body weight (kg)  
 AT - averaging time (days)  
 nc - not a carcinogen  
 no value - no toxicity values available from DTSC or USEPA

TABLE 8: Noncancer Hazard Calculations - Ingestion

Chemical	Soil Concentration (SC) (mg/kg)	Noncancer Hazard - Adults											Cancer Risk - Child								
		IR	ET	ED	EF	CF	BW	AT	Intake	RfD	Hazard Quotient	IR	ET	ED	EF	CF	BW	AT	Intake	RfD	Hazard Quotient
Antimony	27.00	100	0.166667	20	100	1.00E-06	80	7300	1.54E-06	4.00E-04	3.85E-03	200	0.166667	6	100	1.00E-06	15	2190	1.64E-05	4.00E-04	4.11E-02
Arsenic	29.00	100	0.166667	20	100	1.00E-06	80	7300	1.66E-06	3.50E-06	4.73E-01	200	0.166667	6	100	1.00E-06	15	2190	1.77E-05	3.50E-06	5.04E+00
Barium	800.00	100	0.166667	20	100	1.00E-06	80	7300	4.57E-05	2.00E-01	2.28E-04	200	0.166667	6	100	1.00E-06	15	2190	4.87E-04	2.00E-01	2.44E-03
Beryllium	0.62	100	0.166667	20	100	1.00E-06	80	7300	3.54E-08	2.00E-04	1.77E-04	200	0.166667	6	100	1.00E-06	15	2190	3.77E-07	2.00E-04	1.89E-03
Cadmium	1.40	100	0.166667	20	100	1.00E-06	80	7300	7.99E-08	1.00E-03	7.99E-05	200	0.166667	6	100	1.00E-06	15	2190	8.52E-07	1.00E-03	8.52E-04
Chromium	110.00	100	0.166667	20	100	1.00E-06	80	7300	6.28E-06	3.00E-03	2.09E-03	200	0.166667	6	100	1.00E-06	15	2190	6.70E-05	3.00E-03	2.23E-02
Cobalt	20.00	100	0.166667	20	100	1.00E-06	80	7300	1.14E-06	3.00E-04	3.81E-03	200	0.166667	6	100	1.00E-06	15	2190	1.22E-05	3.00E-04	4.06E-02
Copper	690.00	100	0.166667	20	100	1.00E-06	80	7300	3.94E-05	4.00E-02	9.85E-04	200	0.166667	6	100	1.00E-06	15	2190	4.20E-04	4.00E-02	1.05E-02
Mercury	1.00	100	0.166667	20	100	1.00E-06	80	7300	5.71E-08	1.60E-04	3.57E-04	200	0.166667	6	100	1.00E-06	15	2190	6.09E-07	1.60E-04	3.81E-03
Molybdenum	3.70	100	0.166667	20	100	1.00E-06	80	7300	2.11E-07	5.00E-03	4.22E-05	200	0.166667	6	100	1.00E-06	15	2190	2.25E-06	5.00E-03	4.51E-04
Nickel	65.00	100	0.166667	20	100	1.00E-06	80	7300	3.71E-06	1.10E-02	3.37E-04	200	0.166667	6	100	1.00E-06	15	2190	3.96E-05	1.10E-02	3.60E-03
Selenium	0.00	100	0.166667	20	100	1.00E-06	80	7300	0.00E+00	5.00E-03	0.00E+00	200	0.166667	6	100	1.00E-06	15	2190	0.00E+00	5.00E-03	0.00E+00
Silver	0.88	100	0.166667	20	100	1.00E-06	80	7300	5.02E-08	5.00E-03	1.00E-05	200	0.166667	6	100	1.00E-06	15	2190	5.36E-07	5.00E-03	1.07E-04
Thallium	9.00	100	0.166667	20	100	1.00E-06	80	7300	5.14E-07	1.00E-05	5.14E-02	200	0.166667	6	100	1.00E-06	15	2190	5.48E-06	1.00E-05	5.48E-01
Vanadium	140.00	100	0.166667	20	100	1.00E-06	80	7300	7.99E-06	5.00E-03	1.60E-03	200	0.166667	6	100	1.00E-06	15	2190	8.52E-05	5.00E-03	1.70E-02
Zinc	2200.00	100	0.166667	20	100	1.00E-06	80	7300	1.26E-04	3.00E-01	4.19E-04	200	0.166667	6	100	1.00E-06	15	2190	1.34E-03	3.00E-01	4.46E-03
TPH-G aliph	50.00	100	0.166667	20	100	1.00E-06	80	7300	2.85E-06	no value	0	200	0.166667	6	100	1.00E-06	15	2190	3.04E-05	no value	0
TPH-G arom	50.00	100	0.166667	20	100	1.00E-06	80	7300	2.85E-06	4.00E-03	7.13E-04	200	0.166667	6	100	1.00E-06	15	2190	3.04E-05	4.00E-03	7.61E-03
TPH-D aliph	8.00	100	0.166667	20	100	1.00E-06	80	7300	4.57E-07	1.00E-02	4.57E-05	200	0.166667	6	100	1.00E-06	15	2190	4.87E-06	1.00E-02	4.87E-04
TPH-D arom	8.00	100	0.166667	20	100	1.00E-06	80	7300	4.57E-07	4.00E-03	1.14E-04	200	0.166667	6	100	1.00E-06	15	2190	4.87E-06	4.00E-03	1.22E-03
TPH-O aliph	1100.00	100	0.166667	20	100	1.00E-06	80	7300	6.28E-05	3.00E+00	2.09E-05	200	0.166667	6	100	1.00E-06	15	2190	6.70E-04	3.00E+00	2.23E-04
TPH-O arom	1100.00	100	0.166667	20	100	1.00E-06	80	7300	6.28E-05	4.00E-02	1.57E-03	200	0.166667	6	100	1.00E-06	15	2190	6.70E-04	4.00E-02	1.67E-02
1,2,4-Trimethylbenzene	0.06	100	0.166667	20	100	1.00E-06	80	7300	3.60E-09	1.00E-02	3.60E-07	200	0.166667	6	100	1.00E-06	15	2190	3.84E-08	1.00E-02	3.84E-06
1,3,5-Trimethylbenzene	0.03	100	0.166667	20	100	1.00E-06	80	7300	1.60E-09	1.00E-02	1.60E-07	200	0.166667	6	100	1.00E-06	15	2190	1.70E-08	1.00E-02	1.70E-06
Isopropylbenzene	0.01	100	0.166667	20	100	1.00E-06	80	7300	4.00E-10	1.00E-01	4.00E-09	200	0.166667	6	100	1.00E-06	15	2190	4.26E-09	1.00E-01	4.26E-08
Naphthalene	0.01	100	0.166667	20	100	1.00E-06	80	7300	4.57E-10	2.00E-02	2.28E-08	200	0.166667	6	100	1.00E-06	15	2190	4.87E-09	2.00E-02	2.44E-07
Vinyl chloride	0.02	100	0.166667	20	100	1.00E-06	80	7300	1.03E-09	3.00E-03	3.42E-07	200	0.166667	6	100	1.00E-06	15	2190	1.10E-08	3.00E-03	3.65E-06
Xylenes (total)	0.02	100	0.166667	20	100	1.00E-06	80	7300	1.14E-09	2.00E-01	5.71E-09	200	0.166667	6	100	1.00E-06	15	2190	1.22E-08	2.00E-01	6.09E-08
2-Methylnaphthalene	0.25	100	0.166667	20	100	1.00E-06	80	7300	1.43E-08	4.00E-03	3.57E-06	200	0.166667	6	100	1.00E-06	15	2190	1.52E-07	4.00E-03	3.81E-05
Benz (a) anthracene	0.20	100	0.166667	20	100	1.00E-06	80	7300	1.14E-08	no value	0	200	0.166667	6	100	1.00E-06	15	2190	1.22E-07	no value	0
Benzo (a) pyrene	1.10	100	0.166667	20	100	1.00E-06	80	7300	6.28E-08	3.00E-04	2.09E-04	200	0.166667	6	100	1.00E-06	15	2190	6.70E-07	3.00E-04	2.23E-03
Benzo (b) fluoranthene	0.73	100	0.166667	20	100	1.00E-06	80	7300	4.17E-08	no value	0	200	0.166667	6	100	1.00E-06	15	2190	4.44E-07	no value	0
Benzo (k) fluoranthene	0.74	100	0.166667	20	100	1.00E-06	80	7300	4.22E-08	no value	0	200	0.166667	6	100	1.00E-06	15	2190	4.51E-07	no value	0
Chrysene	0.22	100	0.166667	20	100	1.00E-06	80	7300	1.26E-08	no value	0	200	0.166667	6	100	1.00E-06	15	2190	1.34E-07	no value	0
Fluoranthene	1.50	100	0.166667	20	100	1.00E-06	80	7300	8.56E-08	4.00E-02	2.14E-06	200	0.166667	6	100	1.00E-06	15	2190	9.13E-07	4.00E-02	2.28E-05
Phenanthrene	0.77	100	0.166667	20	100	1.00E-06	80	7300	4.39E-08	no value	0	200	0.166667	6	100	1.00E-06	15	2190	4.69E-07	no value	0
Pyrene	1.60	100	0.166667	20	100	1.00E-06	80	7300	9.13E-08	3.00E-02	3.04E-06	200	0.166667	6	100	1.00E-06	15	2190	9.74E-07	3.00E-02	3.25E-05
4'-DDD	0.37	100	0.166667	20	100	1.00E-06	80	7300	2.11E-08	3.00E-05	7.04E-04	200	0.166667	6	100	1.00E-06	15	2190	2.25E-07	3.00E-05	7.51E-03
PCB-1254	0.02	100	0.166667	20	100	1.00E-06	80	7300	1.37E-09	2.00E-05	6.85E-05	200	0.166667	6	100	1.00E-06	15	2190	1.46E-08	2.00E-05	7.31E-04

0.54

5.78

Intake (mg/kg-day) = SC\*IR\*ET\*EF\*ED\*CF / BW\*AT

Noncancer Hazard Quotient = Intake/RfD (reference dose, [mg/kg-day])

SC - soil concentration (mg/kg)

IR - ingestion rate (mg/day)

ET - exposure time (4 hours per 24 hours)

EF - exposure frequency (days per year)

ED - exposure duration (years)

CF - conversion factor

BW - body weight (kg)

AT - averaging time (days)

nc - not a carcinogen

no value - no toxicity values available from DTSC or USEPA

TABLE 9: Cancer Risk Calculations - Dermal Contact

Chemical	Soil Concentration	Cancer Risk - Adult											Cancer Risk - Child												
		SA	AF	ABS	EF	ED	ET	CF	BW	AT	Intake	CSF	Risk	SA	AF	ABS	EF	ED	ET	CF	BW	AT	Intake	CSF	Risk
Antimony	27	6032	0.07	0.01	100	20	0.166667	1.00E-06	80	25550	1.86E-08	nc	0	2900	0.2	0.01	100	6	0.166667	1.00E-06	15	25550	4.09E-08	nc	0
Arsenic	29	6032	0.07	0.03	100	20	0.166667	1.00E-06	80	25550	5.99E-08	9.50E+00	5.69E-07	2900	0.2	0.03	100	6	0.166667	1.00E-06	15	25550	1.32E-07	9.50E+00	1.25E-06
Barium	800	6032	0.07	0.01	100	20	0.166667	1.00E-06	80	25550	5.51E-07	nc	0	2900	0.2	0.01	100	6	0.166667	1.00E-06	15	25550	1.21E-06	nc	0
Beryllium	0.62	6032	0.07	0.01	100	20	0.166667	1.00E-06	80	25550	4.27E-10	nc	0	2900	0.2	0.01	100	6	0.166667	1.00E-06	15	25550	9.38E-10	nc	0
Cadmium	1.4	6032	0.07	0.00	100	20	0.166667	1.00E-06	80	25550	9.64E-11	no value	0.00E+00	2900	0.2	0.00	100	6	0.166667	1.00E-06	15	25550	2.12E-10	no value	0.00E+00
Chromium	110	6032	0.07	0.01	100	20	0.166667	1.00E-06	80	25550	7.57E-08	nc	0	2900	0.2	0.01	100	6	0.166667	1.00E-06	15	25550	1.66E-07	nc	0
Cobalt	20	6032	0.07	0.01	100	20	0.166667	1.00E-06	80	25550	1.38E-08	no value	0.00E+00	2900	0.2	0.01	100	6	0.166667	1.00E-06	15	25550	3.03E-08	no value	0.00E+00
Copper	690	6032	0.07	0.01	100	20	0.166667	1.00E-06	80	25550	4.75E-07	nc	0	2900	0.2	0.01	100	6	0.166667	1.00E-06	15	25550	1.04E-06	nc	0
Mercury	1	6032	0.07	0.01	100	20	0.166667	1.00E-06	80	25550	6.89E-10	nc	0	2900	0.2	0.01	100	6	0.166667	1.00E-06	15	25550	1.51E-09	nc	0
Molybdenum	3.7	6032	0.07	0.01	100	20	0.166667	1.00E-06	80	25550	2.55E-09	nc	0	2900	0.2	0.01	100	6	0.166667	1.00E-06	15	25550	5.60E-09	nc	0
Nickel	65	6032	0.07	0.01	100	20	0.166667	1.00E-06	80	25550	4.48E-08	no value	0.00E+00	2900	0.2	0.01	100	6	0.166667	1.00E-06	15	25550	9.84E-08	no value	0.00E+00
Selenium	0	6032	0.07	0.01	100	20	0.166667	1.00E-06	80	25550	0.00E+00	nc	0	2900	0.2	0.01	100	6	0.166667	1.00E-06	15	25550	0.00E+00	nc	0
Silver	0.88	6032	0.07	0.01	100	20	0.166667	1.00E-06	80	25550	6.06E-10	nc	0	2900	0.2	0.01	100	6	0.166667	1.00E-06	15	25550	1.33E-09	nc	0
Thallium	9	6032	0.07	0.01	100	20	0.166667	1.00E-06	80	25550	6.20E-09	nc	0	2900	0.2	0.01	100	6	0.166667	1.00E-06	15	25550	1.36E-08	nc	0
Vanadium	140	6032	0.07	0.01	100	20	0.166667	1.00E-06	80	25550	9.64E-08	nc	0	2900	0.2	0.01	100	6	0.166667	1.00E-06	15	25550	2.12E-07	nc	0
Zinc	2200	6032	0.07	0.01	100	20	0.166667	1.00E-06	80	25550	1.51E-06	nc	0	2900	0.2	0.01	100	6	0.166667	1.00E-06	15	25550	3.33E-06	nc	0
TPH-G aliph	50	6032	0.07	0.00	100	20	0.166667	1.00E-06	80	25550	0.00E+00	nc	0	2900	0.2	0.00	100	6	0.166667	1.00E-06	15	25550	0.00E+00	nc	0
TPH-G arom	50	6032	0.07	0.00	100	20	0.166667	1.00E-06	80	25550	0.00E+00	nc	0	2900	0.2	0.00	100	6	0.166667	1.00E-06	15	25550	0.00E+00	nc	0
TPH-D aliph	8	6032	0.07	0.00	100	20	0.166667	1.00E-06	80	25550	0.00E+00	nc	0	2900	0.2	0.00	100	6	0.166667	1.00E-06	15	25550	0.00E+00	nc	0
TPH-D arom	8	6032	0.07	0.00	100	20	0.166667	1.00E-06	80	25550	0.00E+00	nc	0	2900	0.2	0.00	100	6	0.166667	1.00E-06	15	25550	0.00E+00	nc	0
TPH-O aliph	1100	6032	0.07	0.10	100	20	0.166667	1.00E-06	80	25550	7.57E-06	nc	0	2900	0.2	0.10	100	6	0.166667	1.00E-06	15	25550	1.66E-05	nc	0
TPH-O arom	1100	6032	0.07	0.10	100	20	0.166667	1.00E-06	80	25550	7.57E-06	nc	0	2900	0.2	0.10	100	6	0.166667	1.00E-06	15	25550	1.66E-05	nc	0
1,2,4-Trimethylbenzene	0.063	6032	0.07	0.00	100	20	0.166667	1.00E-06	80	25550	0.00E+00	nc	0	2900	0.2	0.00	100	6	0.166667	1.00E-06	15	25550	0.00E+00	nc	0
1,3,5-Trimethylbenzene	0.028	6032	0.07	0.00	100	20	0.166667	1.00E-06	80	25550	0.00E+00	nc	0	2900	0.2	0.00	100	6	0.166667	1.00E-06	15	25550	0.00E+00	nc	0
Isopropylbenzene	0.007	6032	0.07	0.00	100	20	0.166667	1.00E-06	80	25550	0.00E+00	nc	0	2900	0.2	0.00	100	6	0.166667	1.00E-06	15	25550	0.00E+00	nc	0
Naphthalene	0.008	6032	0.07	0.13	100	20	0.166667	1.00E-06	80	25550	7.16E-11	no value	0.00E+00	2900	0.2	0.13	100	6	0.166667	1.00E-06	15	25550	1.57E-10	no value	0.00E+00
Vinyl chloride	0.018	6032	0.07	0.00	100	20	0.166667	1.00E-06	80	25550	0.00E+00	7.20E-01	0.00E+00	2900	0.2	0.00	100	6	0.166667	1.00E-06	15	25550	0.00E+00	7.20E-01	0.00E+00
Xylenes (total)	0.02	6032	0.07	0.00	100	20	0.166667	1.00E-06	80	25550	0.00E+00	nc	0	2900	0.2	0.00	100	6	0.166667	1.00E-06	15	25550	0.00E+00	nc	0
2-Methylnaphthalene	0.25	6032	0.07	0.13	100	20	0.166667	1.00E-06	80	25550	2.24E-09	nc	0	2900	0.2	0.13	100	6	0.166667	1.00E-06	15	25550	4.92E-09	nc	0
Benzo (a) anthracene	0.2	6032	0.07	0.13	100	20	0.166667	1.00E-06	80	25550	1.79E-09	1.00E-01	1.79E-10	2900	0.2	0.13	100	6	0.166667	1.00E-06	15	25550	3.93E-09	1.00E-01	3.93E-10
Benzo (a) pyrene	1.1	6032	0.07	0.13	100	20	0.166667	1.00E-06	80	25550	9.85E-09	1.00E+00	9.85E-09	2900	0.2	0.13	100	6	0.166667	1.00E-06	15	25550	2.16E-08	1.00E+00	2.16E-08
Benzo (b) fluoranthene	0.73	6032	0.07	0.13	100	20	0.166667	1.00E-06	80	25550	6.53E-09	1.00E-01	6.53E-10	2900	0.2	0.13	100	6	0.166667	1.00E-06	15	25550	1.44E-08	1.00E-01	1.44E-09
Benzo (k) fluoranthene	0.74	6032	0.07	0.13	100	20	0.166667	1.00E-06	80	25550	6.62E-09	1.00E-02	6.62E-11	2900	0.2	0.13	100	6	0.166667	1.00E-06	15	25550	1.46E-08	1.00E-02	1.46E-10
Chrysene	0.22	6032	0.07	0.13	100	20	0.166667	1.00E-06	80	25550	1.97E-09	1.00E-03	1.97E-12	2900	0.2	0.13	100	6	0.166667	1.00E-06	15	25550	4.33E-09	1.00E-03	4.33E-12
Fluoranthene	1.5	6032	0.07	0.13	100	20	0.166667	1.00E-06	80	25550	1.34E-08	nc	0	2900	0.2	0.13	100	6	0.166667	1.00E-06	15	25550	2.95E-08	nc	0
Phenanthrene	0.77	6032	0.07	0.13	100	20	0.166667	1.00E-06	80	25550	6.89E-09	nc	0	2900	0.2	0.13	100	6	0.166667	1.00E-06	15	25550	1.51E-08	nc	0
Pyrene	1.6	6032	0.07	0.13	100	20	0.166667	1.00E-06	80	25550	1.43E-08	nc	0	2900	0.2	0.13	100	6	0.166667	1.00E-06	15	25550	3.15E-08	nc	0
4-4'-DDD	0.37	6032	0.07	0.03	100	20	0.166667	1.00E-06	80	25550	7.64E-10	2.40E-01	1.83E-10	2900	0.2	0.03	100	6	0.166667	1.00E-06	15	25550	1.68E-09	2.40E-01	4.03E-10
PCB-1254	0.024	6032	0.07	0.14	100	20	0.166667	1.00E-06	80	25550	2.31E-10	2.00E+00	4.63E-10	2900	0.2	0.14	100	6	0.166667	1.00E-06	15	25550	5.08E-10	2.00E+00	1.02E-09

5.8E-07

1.3E-06

Intake (mg/kg-day) = SC\*SA\*AF\*ABS\*ET\*EF\*ED\*CF / BW\*AT  
 Cancer Risk = Intake\*CSF (cancer slope factor, [mg/kg-day]<sup>-1</sup>)  
 SC - soil concentration (mg/kg)  
 SA - skin surface area for soil contact (cm<sup>2</sup>)  
 AF - soil adherence factor (mg/cm<sup>2</sup>)  
 ABS - dermal absorption rate (unitless)  
 ET - exposure time (4 hours per 24 hours)  
 EF - exposure frequency (days per year)  
 ED - exposure duration (years)  
 CF - conversion factor  
 BW - body weight (kg)  
 AT - averaging time (days)  
 nc - not a carcinogen  
 no value - no toxicity values available from DTSC or USEPA

TABLE 10: Noncancer Hazard Quotient Calculations - Dermal Contact

Chemical	Soil Concentration (SC) (mg/kg)	Cancer Risk - Adult											Cancer Risk - Child												
		SA	AF	ABS	EF	ED	ET	CF	BW	AT	Intake	RfD	Hazard Quotient	SA	AF	ABS	EF	ED	ET	CF	BW	AT	Intake	RfD	Hazard Quotient
Antimony	27	6032	0.07	0.01	100	20	0.166667	1.00E-06	80	25550	1.86E-08	4.00E-04	4.65E-05	2900	0.2	0.01	100	6	0.166667	1.00E-06	15	25550	4.00E-08	4.00E-04	1.02E-04
Arsenic	29	6032	0.07	0.03	100	20	0.166667	1.00E-06	80	25550	5.99E-08	3.50E-06	1.71E-02	2900	0.2	0.03	100	6	0.166667	1.00E-06	15	25550	1.32E-07	3.50E-06	3.76E-02
Barium	800	6032	0.07	0.01	100	20	0.166667	1.00E-06	80	25550	5.51E-07	2.00E-01	2.75E-06	2900	0.2	0.01	100	6	0.166667	1.00E-06	15	25550	1.21E-06	2.00E-01	6.05E-06
Beryllium	0.62	6032	0.07	0.01	100	20	0.166667	1.00E-06	80	25550	4.27E-10	2.00E-04	2.13E-06	2900	0.2	0.01	100	6	0.166667	1.00E-06	15	25550	9.38E-10	2.00E-04	4.69E-06
Cadmium	1.4	6032	0.07	0.00	100	20	0.166667	1.00E-06	80	25550	9.64E-11	1.00E-03	9.64E-08	2900	0.2	0.00	100	6	0.166667	1.00E-06	15	25550	2.12E-10	1.00E-03	2.12E-07
Chromium	110	6032	0.07	0.01	100	20	0.166667	1.00E-06	80	25550	7.57E-08	3.00E-03	2.52E-05	2900	0.2	0.01	100	6	0.166667	1.00E-06	15	25550	1.66E-07	3.00E-03	5.55E-05
Cobalt	20	6032	0.07	0.01	100	20	0.166667	1.00E-06	80	25550	1.38E-08	3.00E-04	4.59E-05	2900	0.2	0.01	100	6	0.166667	1.00E-06	15	25550	3.03E-08	3.00E-04	1.01E-04
Copper	690	6032	0.07	0.01	100	20	0.166667	1.00E-06	80	25550	4.75E-07	4.00E-02	1.19E-05	2900	0.2	0.01	100	6	0.166667	1.00E-06	15	25550	1.04E-06	4.00E-02	2.61E-05
Mercury	1	6032	0.07	0.01	100	20	0.166667	1.00E-06	80	25550	6.89E-10	1.60E-04	4.30E-06	2900	0.2	0.01	100	6	0.166667	1.00E-06	15	25550	1.51E-09	1.60E-04	9.46E-06
Molybdenum	3.7	6032	0.07	0.01	100	20	0.166667	1.00E-06	80	25550	2.55E-09	5.00E-03	5.10E-07	2900	0.2	0.01	100	6	0.166667	1.00E-06	15	25550	5.60E-09	5.00E-03	1.12E-06
Nickel	65	6032	0.07	0.01	100	20	0.166667	1.00E-06	80	25550	4.48E-08	1.10E-02	4.07E-06	2900	0.2	0.01	100	6	0.166667	1.00E-06	15	25550	9.84E-08	1.10E-02	8.94E-06
Selenium	0	6032	0.07	0.01	100	20	0.166667	1.00E-06	80	25550	0.00E+00	5.00E-03	0.00E+00	2900	0.2	0.01	100	6	0.166667	1.00E-06	15	25550	0.00E+00	5.00E-03	0.00E+00
Silver	0.88	6032	0.07	0.01	100	20	0.166667	1.00E-06	80	25550	6.06E-10	5.00E-03	1.21E-07	2900	0.2	0.01	100	6	0.166667	1.00E-06	15	25550	1.33E-09	5.00E-03	2.66E-07
Thallium	9	6032	0.07	0.01	100	20	0.166667	1.00E-06	80	25550	6.20E-09	1.00E-05	6.20E-04	2900	0.2	0.01	100	6	0.166667	1.00E-06	15	25550	1.36E-08	1.00E-05	1.36E-03
Vanadium	140	6032	0.07	0.01	100	20	0.166667	1.00E-06	80	25550	9.64E-08	5.00E-03	1.93E-05	2900	0.2	0.01	100	6	0.166667	1.00E-06	15	25550	2.12E-07	5.00E-03	4.24E-05
Zinc	2200	6032	0.07	0.01	100	20	0.166667	1.00E-06	80	25550	1.51E-06	3.00E-01	5.05E-06	2900	0.2	0.01	100	6	0.166667	1.00E-06	15	25550	3.33E-06	3.00E-01	1.11E-05
TPH-G aliph	50	6032	0.07	0.00	100	20	0.166667	1.00E-06	80	25550	0.00E+00	no value	0	2900	0.2	0.00	100	6	0.166667	1.00E-06	15	25550	0.00E+00	no value	0
TPH-G arom	50	6032	0.07	0.00	100	20	0.166667	1.00E-06	80	25550	0.00E+00	4.00E-03	0.00E+00	2900	0.2	0.00	100	6	0.166667	1.00E-06	15	25550	0.00E+00	4.00E-03	0.00E+00
TPH-D aliph	8	6032	0.07	0.00	100	20	0.166667	1.00E-06	80	25550	0.00E+00	1.00E-02	0.00E+00	2900	0.2	0.00	100	6	0.166667	1.00E-06	15	25550	0.00E+00	1.00E-02	0.00E+00
TPH-D arom	8	6032	0.07	0.00	100	20	0.166667	1.00E-06	80	25550	0.00E+00	4.00E-03	0.00E+00	2900	0.2	0.00	100	6	0.166667	1.00E-06	15	25550	0.00E+00	4.00E-03	0.00E+00
TPH-O aliph	1100	6032	0.07	0.10	100	20	0.166667	1.00E-06	80	25550	7.57E-06	3.00E+00	2.52E-06	2900	0.2	0.10	100	6	0.166667	1.00E-06	15	25550	1.66E-05	3.00E+00	5.55E-06
TPH-O arom	1100	6032	0.07	0.10	100	20	0.166667	1.00E-06	80	25550	7.57E-06	4.00E-02	1.89E-04	2900	0.2	0.10	100	6	0.166667	1.00E-06	15	25550	1.66E-05	4.00E-02	4.16E-04
1,2,4-Trimethylbenzene	0.063	6032	0.07	0.00	100	20	0.166667	1.00E-06	80	25550	0.00E+00	1.00E-02	0.00E+00	2900	0.2	0.00	100	6	0.166667	1.00E-06	15	25550	0.00E+00	1.00E-02	0.00E+00
1,3,5-Trimethylbenzene	0.028	6032	0.07	0.00	100	20	0.166667	1.00E-06	80	25550	0.00E+00	1.00E-02	0.00E+00	2900	0.2	0.00	100	6	0.166667	1.00E-06	15	25550	0.00E+00	1.00E-02	0.00E+00
Isopropylbenzene	0.007	6032	0.07	0.00	100	20	0.166667	1.00E-06	80	25550	0.00E+00	1.00E-01	0.00E+00	2900	0.2	0.00	100	6	0.166667	1.00E-06	15	25550	0.00E+00	1.00E-01	0.00E+00
Naphthalene	0.008	6032	0.07	0.13	100	20	0.166667	1.00E-06	80	25550	7.16E-11	2.00E-02	3.58E-09	2900	0.2	0.13	100	6	0.166667	1.00E-06	15	25550	1.57E-10	2.00E-02	7.87E-09
Vinyl chloride	0.018	6032	0.07	0.00	100	20	0.166667	1.00E-06	80	25550	0.00E+00	3.00E-03	0.00E+00	2900	0.2	0.00	100	6	0.166667	1.00E-06	15	25550	0.00E+00	3.00E-03	0.00E+00
Xylenes (total)	0.02	6032	0.07	0.00	100	20	0.166667	1.00E-06	80	25550	0.00E+00	2.00E-01	0.00E+00	2900	0.2	0.00	100	6	0.166667	1.00E-06	15	25550	0.00E+00	2.00E-01	0.00E+00
2-Methylnaphthalene	0.25	6032	0.07	0.13	100	20	0.166667	1.00E-06	80	25550	2.24E-09	4.00E-03	5.59E-07	2900	0.2	0.13	100	6	0.166667	1.00E-06	15	25550	4.92E-09	4.00E-03	1.23E-06
Benzo (a) anthracene	0.2	6032	0.07	0.13	100	20	0.166667	1.00E-06	80	25550	1.79E-09	no value	0	2900	0.2	0.13	100	6	0.166667	1.00E-06	15	25550	3.93E-09	no value	0
Benzo (a) pyrene	1.1	6032	0.07	0.13	100	20	0.166667	1.00E-06	80	25550	9.85E-09	3.00E-04	3.28E-05	2900	0.2	0.13	100	6	0.166667	1.00E-06	15	25550	2.16E-08	3.00E-04	7.21E-05
Benzo (b) fluoranthene	0.73	6032	0.07	0.13	100	20	0.166667	1.00E-06	80	25550	6.53E-09	no value	0	2900	0.2	0.13	100	6	0.166667	1.00E-06	15	25550	1.44E-08	no value	0
Benzo (k) fluoranthene	0.74	6032	0.07	0.13	100	20	0.166667	1.00E-06	80	25550	6.62E-09	no value	0	2900	0.2	0.13	100	6	0.166667	1.00E-06	15	25550	1.46E-08	no value	0
Chrysene	0.22	6032	0.07	0.13	100	20	0.166667	1.00E-06	80	25550	1.97E-09	no value	0	2900	0.2	0.13	100	6	0.166667	1.00E-06	15	25550	4.33E-09	no value	0
Fluoranthene	1.5	6032	0.07	0.13	100	20	0.166667	1.00E-06	80	25550	1.34E-08	4.00E-02	3.36E-07	2900	0.2	0.13	100	6	0.166667	1.00E-06	15	25550	2.95E-08	4.00E-02	7.38E-07
Phenanthrene	0.77	6032	0.07	0.13	100	20	0.166667	1.00E-06	80	25550	6.89E-09	no value	0	2900	0.2	0.13	100	6	0.166667	1.00E-06	15	25550	1.51E-08	no value	0
Pyrene	1.6	6032	0.07	0.13	100	20	0.166667	1.00E-06	80	25550	1.43E-08	3.00E-02	4.77E-07	2900	0.2	0.13	100	6	0.166667	1.00E-06	15	25550	3.15E-08	3.00E-02	1.05E-06
4-4'-DDD	0.37	6032	0.07	0.03	100	20	0.166667	1.00E-06	80	25550	7.64E-10	3.00E-05	2.55E-05	2900	0.2	0.03	100	6	0.166667	1.00E-06	15	25550	1.68E-09	3.00E-05	5.60E-05
PCB-1254	0.024	6032	0.07	0.14	100	20	0.166667	1.00E-06	80	25550	2.31E-10	2.00E-05	1.16E-05	2900	0.2	0.14	100	6	0.166667	1.00E-06	15	25550	5.08E-10	2.00E-05	2.54E-05

0.02

0.04

Intake (mg/kg-day) = SC\*SA\*AF\*ABS\*ET\*EF\*ED\*CF / BW\*AT

Noncancer Hazard Quotient = Intake/RfD (reference dose, [mg/kg-day])

SC - soil concentration (mg/kg)

SA - skin surface area for soil contact (cm2)

AF - soil adherence factor (mg/cm2)

ABS - dermal absorption rate (unitless)

ET - exposure time (4 hours per 24 hours)

EF - exposure frequency (days per year)

ED - exposure duration (years)

CF - conversion factor

BW - body weight (kg)

AT - averaging time (days)

nc - not a carcinogen

no value - no toxicity values available from DTSC or USEPA

Shoreline Soil Removal Plan  
 (one Sheet prepared by Geo Logic)

