

January 5, 2015 Project No. TV130367F

Turnaround, Inc. 3415 A Street Northwest Gig Harbor, Washington 98335

Attention:

Mr. Miles Stover

Subject:

November 2014 Ground Water Monitoring Report

Clear Lake Industrial Park

(aka Georgia Pacific Clear Lake Yard, VCP No. NW2791) 12785 State Route 9 and 12827 South Front Street

12713 Sawyer Court Clear Lake, Washington

Dear Mr. Stover:

This letter accompanies a report by Associated Earth Sciences, Inc. (AESI) documenting the results of a recent ground water monitoring event for the Clear Lake Industrial Park and the east-adjoining property in November 2014. This sampling event represents the sixteenth instance of ground water sampling from the existing monitoring well network to characterize the release of chlordane to the site soil and ground water that was identified in 1994, and the fourth event of 2014. The findings and conclusions in this report are based on our interpretation of information currently available and are subject to the limitations in the attached report.

We appreciate the opportunity to work with you on this project. If you have any questions regarding the scope of our study or our conclusions, please do not hesitate to contact us at (253) 722-2992.

Sincerely,

ASSOCIATED EARTH SCIENCES, INC.

Tacomà, Washington

Elizabath Rachman, L.G., L.Hg.

Senidr Hydrogeologist

EAR/Id ~ TV130367F3 ~ Projects\20130367\TV\WP



Geotechnical Engineering

Associated Earth Sciences, Inc.

Serving the Pacific Northwest Since 1981

November 2014 Ground Water Monitoring Report

CLEAR LAKE INDUSTRIAL PARK

Clear Lake, Washington

Prepared for

Turnaround, Inc.

Project No. TV130367F January 5, 2014



Water Resources



Environmental Assessments and Remediation



Sustainable Development Services



Geologic Assessments

NOVEMBER 2014 GROUND WATER MONITORING REPORT

CLEAR LAKE INDUSTRIAL PARK

Clear Lake, Washington

Prepared for:

Turnaround, Inc.

3415 A Street Northwest Gig Harbor, Washington 98335

Prepared by:

Associated Earth Sciences, Inc.

1552 Commerce Street, Suite 102 Tacoma, Washington 98402 253-722-2992

Fax: 253-722-2993

January 5, 2015 Project No. TV130367F

TABLE OF CONTENTS

	<u>Page</u>
	CTION
	Description 1
•	ect Background
	RING WELLS
	WATER MONITORING PROGRAM
	and Water Elevation Monitoring
	and Water Sample Collection Procedure
	and Water Sample Analysis
	CAL RESULTS
	IONS
	LIST OF TABLES
Table 1:	Well Survey Data
Table 2:	Summary of Historical Ground Water Analytical ResultsAttached
	LIST OF FIGURES
Figure 1: Figure 2: Figure 3: Figure 4:	Vicinity Map Site Plan Ground Water Flow Elevations and Flow Direction - November 3, 2014 Historical Ground Water Data

LIST OF APPENDICES

Appendix A: Laboratory Analytical Report

1.0 INTRODUCTION

The Clear Lake Industrial Park is located at 12785 State Route 9 and 12827 South Front Street in Clear Lake, Washington. The east-adjoining property, which is also considered part of the regulatory "site," is located at 12713 Sawyer Court in Clear Lake. Please refer to Figure 1, "Vicinity Map." Associated Earth Sciences, Inc. (AESI) has performed this ground water monitoring event at the client's request. Fifteen ground water sampling events have previously been performed by AESI and others from the existing monitoring well network at the site. The sixteenth ground water sampling event (and the fourth event in 2014) is summarized herein.

1.1 Site Description

The property is located within the city limits of Clear Lake, Skagit County, Washington. The site is located in Section 1, Township 34 North, Range 4 East on Tax Parcels P74820, P74823, P74826, P74833, and P23293. The site is situated on the northeast corner of the intersection of State Route 9 and South Front Street. The surrounding properties include:

North of site: Jackson Street, beyond which are several single-family residences.

East of site: Clear Lake.

South of site: Several single-family residences to the west, and Clear Lake to the east.

Southwest of site: South Front Street, beyond which is a single-family residence.

West of site: The intersection of South Front Street and State Route 9, beyond which

is vacant land.

Northwest of site: From south to north the Clear Lake General Store, several single-family

residences, and the Clear Lake Fire Department.

1.2 Project Background

Previous subsurface investigations at the site by others identified releases of chlordane to the soil and ground water at the site. Several subsurface investigations and remedial excavations have historically been performed by others at the site. Although the adversely-affected soils have been successfully removed from the subject property, residual ground water impacts remain on the site and east-adjoining property. The subject property was formerly enrolled into Washington State Department of Ecology's (Ecology's) Voluntary Cleanup Program (VCP) and a No Further Action (NFA) determination from Ecology was obtained for the subject property in 2004 after the placement of a Restrictive Covenant on the site that restricted exposure to the affected ground water. No such covenant was placed on the east-adjoining property, which was not included in the NFA. After a periodic review conducted by Ecology in 2011, the NFA was rescinded by Ecology since the institutional control in place (the Restrictive Covenant) was deemed ineffective in restricting exposure to the adversely-affected ground water on the east-adjoining property.

Subsequent subsurface characterization work was performed by others at the subject and east-adjoining properties in 2012 and 2013. The subject property has since been re-enrolled in the VCP and the recent studies submitted to Ecology in an effort to reinstate the NFA by placing an additional Restrictive Covenant on the east-adjoining property.

A Remedial Investigation was performed by AESI in 2014, the results of which successfully defined the vertical and horizontal extents of the chlordane-contaminated ground water and revealed that the chlordane is present in the ground water in discontinuous hot spots rather than one plume. In addition, chlordane concentrations in the ground water in the existing wells that were sampled were below the U.S. Environmental Protection Agency (EPA) and State Maximum Contaminant Level (MCL) of 2 micrograms per liter (μ g/L). AESI also prepared a Disproportionate Cost Analysis to illustrate that the MCL should be accepted as the site-specific ground water cleanup level (rather than the Model Toxics Control Act [MTCA] Method B cleanup level of 0.25 μ g/L), and that the cost of active remediation or monitored natural attenuation without the use of an institutional control (Restrictive Covenant) outweighed the benefits of such an approach.

Ecology determined that there was no clear downward trend in chlordane concentrations at the site, despite the documented decreases in chlordane concentrations (e.g., from 17 to 0.326 μ g/L since 1996 in MW-3). Furthermore, although Ecology concurred with the use of the MCL as the site-specific cleanup level, it suggested that active cleanup would be recommended at the site, even though the most recent concentrations were all below the MCL. Based on communications with the Ecology Project Manager, it appears that Ecology is concerned that the concentrations may increase to levels above 2 μ g/L over the next few rounds of monitoring.

Therefore, at client request, AESI collected and analyzed ground water samples from nine of the thirteen existing on-site ground water monitoring wells. This report summarizes AESI's ground water monitoring activities from November 2014.

2.0 MONITORING WELLS

A release of chlordane to the soil and ground water was identified at the site during several subsurface investigations performed by others beginning in 1994. Fourteen ground water monitoring wells (MW-1 through MW-14) were installed and sampled at the subject and east-adjoining properties during various subsurface investigations performed by others from 1995 through the present. Monitoring well MW-5 was subsequently decommissioned since its integrity was suspected to have been compromised. Based on calculations of the historical ground water elevation data, the historical ground water flow directions have been measured to the north, northwest, or northeast.

Well completion information for these wells is summarized in Table 1. The approximate locations of the monitoring wells are shown on the attached Figure 2, "Site Plan."

January 5, 2015 ASSOCIATED EARTH SCIENCES, INC.

Site ID **Completion Date Borehole Depth**⁽²⁾ (feet) **Top of Casing Elevation (feet)** MW-1 4/25/1995 17 41.83 MW-2 4/25/1995 20 47.37 17.72⁽³⁾ 4/19/1996⁽¹⁾ MW-3 42.14 2/2/1999⁽¹⁾ MW-4 20 44.49 4/19/1996⁽¹⁾ MW-6 Unknown 41.415 MW-7 2/2/1999⁽¹⁾ Unknown 41.585 MW-8 9/10/2012 12 45.70 MW-9 9/10/2012 12 44.775 MW-10 9/10/2012 12 43.15 MW-11 9/10/2012 46.42 15 MW-12 5/24/2013 20 46.035 MW-13 5/24/2013 20 44.79 MW-14 5/24/2013 20 43.225

Table 1
Well Survey Data

3.0 GROUND WATER MONITORING PROGRAM

The most recent ground water sampling event was performed in November 2014, and represents the sixteenth sampling event at the site since discovery of the release and the fourth one of 2014. Not all of the monitoring wells were sampled during each of the sixteen events; monitoring wells MW-1 and MW-3 have been sampled the most often, likely due to the fact that the highest chlordane concentrations have historically been detected in those wells. Ground water condition and quality during both the wet and dry seasons have historically been represented.

3.1 Ground Water Elevation Monitoring

Monitoring of the ground water elevations has been performed on numerous occasions since 1995. All monitoring wells are screened within the shallow Quaternary alluvium aquifer. The reported flow direction has consistently been to the north, northwest, or northeast, away from Clear Lake (Figure 3).

3.2 Ground Water Sample Collection Procedure

Ground water sampling activities were performed on nine of the thirteen ground water monitoring wells at the site, including MW-1, MW-3, MW-4, MW-8, MW-9, MW-11, MW-12, MW-13, and MW-14. The other wells have either been abandoned (MW-5) or have historically exhibited non-detect or low detection analytical results. Each ground water monitoring well was accessed and allowed to equilibrate prior to measurement and sample collection activities.

⁽¹⁾ Completion dates are unknown. The date listed is the first known date the monitoring well was sampled.

⁽²⁾ Depths are below ground surface.

⁽³⁾ Construction details for the well are unknown. The depth listed is the depth of the well measured on June 17, 2014.

Depth to water measurements were collected using an audible, electronic water level meter, after which the sensor was allowed to descend to the bottom of the well. The length of the water column was used to determine the volume of water in the well for purging purposes. After the measurements were collected at each well, the water level meter was decontaminated using an Alconox® wash and rinsed with distilled water. Three well volumes of water were purged from each well prior to sampling. Ground water samples were obtained at each location using a peristaltic pump under low-flow conditions.

Samples were placed in laboratory-provided containers with the appropriate preservatives and stored in iced coolers. The samples were delivered to Friedman and Bruya, Inc. (F&BI) of Seattle, Washington, for analysis. F&BI subcontracted the analysis to Fremont Analytical (Fremont) of Seattle, Washington. Standard chain-of-custody procedures were followed from sample collection to delivery to the laboratories.

3.3 Ground Water Sample Analysis

All ground water samples collected in November 2014 were analyzed for chlordane using EPA Method 8081.

4.0 ANALYTICAL RESULTS

The ground water results from the ground water monitoring well sampling are summarized in Table 2, "Summary of Historical Ground Water Analytical Results," which is attached to this letter-report. The laboratory analytical report is included in Appendix A. A historical summary of laboratory analytical results from the monitoring well sampling events performed to date is provided on Figure 4 and summarized in Table 2.

Chlordane concentrations were reported by the laboratory as alpha- and gamma-chlordane. The two concentrations were summed to determine the total chlordane concentration for each sample. Total chlordane concentrations detected in the ground water samples collected at the subject and east-adjoining properties during the November 2014 monitoring event ranged from non-detect to 0.926 $\mu g/L$. The highest total chlordane concentration detected during this investigation was in monitoring well MW-3, which is located on the east-adjoining property near a former dry-well.

Total chlordane was not detected in five of the nine monitoring wells sampled; MW-4, MW-9, MW-12, MW-13, and MW-14. However, all of the chlordane concentrations detected were below the State MCL of 2 μ g/L, which is the Ecology-approved site-specific cleanup level. The laboratory analytical report is included in Appendix A.

January 5, 2015 ASSOCIATED EARTH SCIENCES, INC.

5.0 CONCLUSIONS

The following summary is based on a review of the laboratory analyses performed to date:

- The chlordane concentrations observed during this ground water monitoring event were all below 2 μg/L, which is the state (and federal) MCL used to determine threshold contaminant values in drinking water, and the Ecology-approved site-specific ground water cleanup level.
- To date, all four quarterly events in 2014 (February, June, August, and November) have shown chlordane concentrations to be below the site-specific ground water cleanup level.
- Measured ground water flow directions continue to be generally to the north, away from Clear Lake.

6.0 RECOMMENDATIONS

This report summarizes the fourth and final monitoring event for 2014. Chlordane concentrations in all sampled monitoring wells have remained below the site-specific for all four quarters of 2014. Therefore, an NFA is requested from Ecology.

We have enjoyed working with you on this study. If you should have any questions or require further assistance, please do not hesitate to call.

Sincerely,

ASSOCIATED EARTH SCIENCES, INC.

Tacoma, Washington

Jon M. Sondergaard, L.G., L.E.G.

Senior Principal Engineering Geologist

Hydrogeologist 2494
Onsed Geologist 2494
Elizabeth Ang Rachman

Elizabeth Rachman, L.G., L.Hg. Senior Hydrogeologist November 2014 Ground W

Monitoring Well and Sample Date	Depth to Water Level	Groundwater Elevation	gamma Chlordane Concentration (ug/L)	alpha Chlordane Concentration (ug/L)	Total Chlordane Concentration (ug/L)
MW-1					
11/3/2014	5.98	35.85	0.162	0.141	0.303
8/1/2014	6.15	35.68	0.149	0.253	0.402
6/17/2014	5.19	36.64	ND	ND	ND 0.106
2/4/2014	4.40	37.43	ND	0.106	0.106
5/28/2013	4.96	36.87	NR ·	NR	1.7
10/4/2012 9/11/2012	6.39	35.44	0.206	0.31	6.79
8/25/2010	6.42	35.41	NR	NR	1.5
7/23/2008	5.89	35.94	NR	NR	1.8
7/12/2006	6	35.83	NR	NR	1.3
7/22/2004	6.54	35.29	NR	NR	2.7
1/9/2003	7.55	34.28	NR	NR	2.7
12/4/2002			NR	NR	ND (<0.06)
10/8/2002	7.74	34.09	NR	NR	2.3
7/18/2002	6.69	35.14	NR NB	NR NB	1.5 2.6
4/15/2002 1/31/2002	4.64	37.19 37.11	NR NR	NR NR	2.5
10/3/2001	4.72 7.2	34.63	NR NR	NR NR	2.3
7/9/2001	5.93	35.9	NR	NR NR	1.8
4/9/2001	5.51	36.32	NR	NR	2
1/4/2001	6.41	35.42	NR	NR	1.4
10/19/2000	7.22	34.61	NR	NR	1.7
7/13/2000	6.29	35.54	NR	NR	0.25
3/30/2000	5.08	36.75	NR	NR	1.3
1/10/2000	4.56	37.27	NR	NR	1.8
10/14/1999	7.04	34.79	NR NB	NR	2.7 3.8
7/26/1999	6.14	35.69 37.02	NR NR	NR NR	2.4
2/2/1999 10/13/1998	4.81 8.1	33.73	NR NR	NR NR	3.3
12/17/1996	4.72	37.11	NR NR	NR NR	4.1
4/19/1996	6.07	35.76	NR	NR	1.2
12/14/1995	3.38	38.45	NR	NR	6.5
10/19/1995	8.12	33.71			
4/25/1995	8.25	33.58			
MW-3					
11/3/2014	6.34	35.80	0.589	0.337	0.926
8/1/2014	6.60	35.54	0.402	0.632	1.034
6/17/2014	5.62	36.52	0.301	0.474 0.192	0.775 0.326
2/4/2014 5/28/2013	4.88 5.29	37.26 36.85	0.134 NR	0.192 NR	3.5
8/25/2010	6.78	35.36	NR NR	NR NR	1.2
7/23/2008	6.31	35.83	NR	NR NR	1.0
7/12/2006	6.39	35.75	NR	NR	4.9
7/22/2004	6.98	35.16	NR	NR	4.7
1/9/2003	7.75	34.39	NR	NR	4.4
12/4/2002			NR	NR	ND (<0.06)
10/8/2002	8.1	34.04	NR NR	NR NB	4.2
7/18/2002	7.15	34.99	NR NR	NR NR	4.2 6.2
4/15/2002 1/31/2002	5.03	37.11	NR NR	NR NR	8.8
10/3/2001	7.58	34.56	NR NR	NR NR	8.6
7/9/2001	6.36	35.78	NR NR	NR NR	7
4/9/2001	5.85	36.29	NR	NR	7.6
1/4/2001	6.64	35.5	NR	NR	5.1
10/19/2000	7.51	34.63	NR	NR	2.7
7/13/2000	6.8	35.34	NR	NR	2.6
3/30/2000	5.48	36.66	NR NR	NR NR	5.5
1/10/2000	4.94	37.2	NR NR	NR NR	9.5 5.9
10/14/1999 7/26/1999	7.4 6.5	34.74 35.64	NR NR	NR NR	5.9
2/2/1999	6.5 5.23	35.64 36.91	NR NR	NR NR	6.8
10/13/1998	8.5	33.64	NR NR	NR NR	8.3
12/17/1996	5.15	36.99	NR NR	NR NR	27
4/19/1996	6.5	35.64	NR	NR	17
12/14/1995	3.9	38.24	NR	NR	36
10/19/1995	8.41	33.73			
4/25/1995	6.65	35.49			****

MW-4					
11/3/2014	8.79	35.70	ND	ND	ND
8/1/2014	8.95	35.54	0.0349	0.0279	0.0628
6/17/2014	7.99	36.50	ND	ND	ND
2/4/2014	7.19	37.30	ND	ND	ND
5/28/2013	7.77	36.72	NR	NR	0.1
10/4/2012	9.21	35.28			
9/11/2012			ND	ND	1.75
8/25/2010	9.22	35.27	NR	NR	0.11
7/23/2008	8.7	35.79	NR	NR	0.08
7/12/2006	8.81	35.68	NR	NR	0.08
7/22/2004	9.34	35.15	NR	NR	0.22
1/9/2003	10.39	34.1	NR	NR	ND (<0.06)
12/4/2002			NR	NR	
10/8/2002	10.53	33.96	NR	NR	ND (<0.06)
7/18/2002	9.53	34.96	NR	NR	ND (<0.06)
4/15/2002	7.39	37.1	NR	NR	ND (<0.06)
1/31/2002	7.49	37	NR	NR	ND (<0.06)
10/3/2001	10	34.49	NR	NR	ND (<0.06)
7/9/2001	8.76	35.73	NR	NR	ND (<0.1)
4/9/2001	8.33	36.16	NR	NR	ND (<0.06)
1/4/2001	9.22	35.27	NR	NR	ND (<0.06)
10/19/2000	10.08	34.41	NR	NR	0.36
7/13/2000	9.1	35.39	NR	NR	ND (<0.06)
3/30/2000	7.83	36.66	NR	NR	ND (<0.06)
1/10/2000	7.3	37.19	NR	NR	ND (<0.06)
10/14/1999	9.84	34.65	NR	NR	0.09
7/26/1999	8.92	35.57	NR	NR	ND (<0.06)
2/2/1999	7.58	36.91	NR	NR	ND (<0.0033)
10/13/1998	10.9	33.59	NR	NR	ND (<0.05)
12/17/1996	7.51	36.98	NR	NR	
4/19/1996	8.87	35.62	NR	NR	
12/14/1995	6.08	38.41	NR	NR	ND (<0.05)
MW-8					
11/3/2014	10.13	35.57	0.394	0.358	0.752
8/1/2014	10.01	35.69	0.225	0.637	0.862
6/17/2014	9.04	36.66	0.341	0.839	1.180
2/3/2014	8.15	37.50	0.309	0.679	0.988
5/28/2013	8.86	36.84			ND (<0.045)
10/4/2012	10.35	35.35			
9/11/2012			1.27	0.964	7.7
8/25/2010					
7/23/2008			33 50 50		
7/12/2006		dwa			
7/22/2004					
1/9/2003					
4/15/2002					
4/9/2001					
3/30/2000					
2/2/1999					
4/19/1996				444	

MW-9 ND 11/3/2014 9.23 35.545 ND ND 0.0544 0.0207 8/1/2014 9.20 35.575 0.0337 ND 8.25 36.525 ND ND 6/17/2014 2/3/2014 7.34 37.375 ND ND ND ND (<0.044) 5/28/2013 8.04 36.735 10/4/2012 9.46 35.315 2.06 9/11/2012 0.144 0.118 8/25/2010 7/23/2008 7/12/2006 ---7/22/2004 ------1/9/2003 4/15/2002 4/9/2001 3/30/2000 2/2/1999 4/19/1996 ---MW-11 11/3/2014 0.271 0.178 0.449 10.20 36.22 0.524 0.212 0.312 8/1/2014 10.72 35.70 9.75 36.67 0.180 0.277 0.457 6/17/2014 2/4/2014 8.88 37.54 0.125 0.184 0.309 1.7 9.46 36.96 NR NR 5/28/2013 10/4/2012 10.99 35.43 0.313 0.39 5.19 9/11/2012 8/25/2010 ___ 7/23/2008 7/12/2006 7/22/2004 1/9/2003 4/15/2002 ---4/9/2001 3/30/2000 ------2/2/1999 4/19/1996 MW-12 ND ND ND 11/3/2014 10.49 35.545 8/1/2014 10.45 35.585 ND 0.0186 0.0186 6/17/2014 9.43 36.605 ND ND ND ND 37.385 ND ND 8.60 2/3/2014 ND (<0.050) 5/28/2013 9.28 36.755 9/11/2012 8/25/2010 ---7/23/2008 7/12/2006 ---7/22/2004 ------1/9/2003 4/15/2002 4/9/2001 3/30/2000 ------2/2/1999 ---4/19/1996

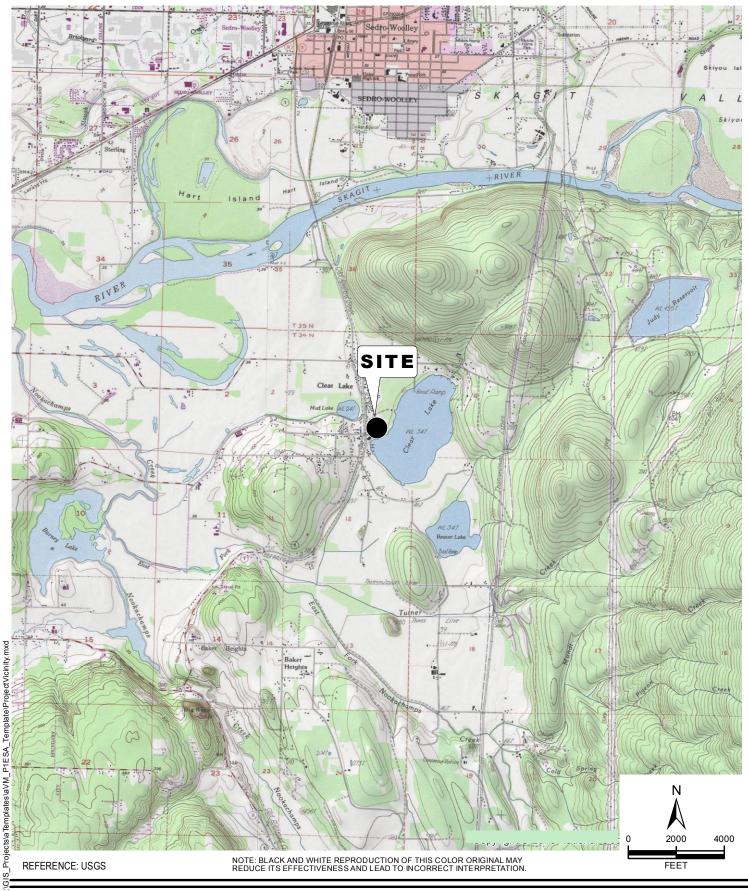
MW-13				***************************************	
11/3/2014	8.28	36.56	ND	ND	ND
8/1/2014	9.25	35.54	ND	ND	ND
6/17/2014	8.25	36.54	ND	ND	ND
2/3/2014	7.37	37.34	ND	ND	ND
5/28/2013	8.07	36.72			ND (<0.044)
9/11/2012					
8/25/2010					
7/23/2008					
7/12/2006					
7/22/2004					
1/9/2003					
4/15/2002					
4/9/2001					
3/30/2000					
2/2/1999	449				
4/19/1996					
MW-14					
11/3/2014	6.60	36.625	ND	ND	ND
8/1/2014	7.70	35.525	ND	0.0188	0.0188
6/17/2014	6.73	36.495	ND	ND	ND
2/3/2014	5.83	37.305	ND	ND	ND
5/28/2013	6.51	36.715			ND (<0.042)
9/11/2012					
8/25/2010					
7/23/2008					
7/12/2006	===				
7/22/2004					
1/9/2003				***	
4/15/2002					
4/9/2001					
3/30/2000					
2/2/1999					
4/19/1996					

Notes: Results above the State and Federal MCL level (site-specific cleanup level), if any, are in **bold**. ug/L = micrograms per Liter (equivalent to parts per billion).

ND = non detect.

^{--- =} not sampled.

NR = Not Reported





VICINITY MAP
CLEAR LAKE INDUSTRIAL PARK
CLEAR LAKE, WASHINGTON

FIGURE 1

DATE 7/14

PROJ. NO. TV130367F

Associated Earth Sciences, Inc.









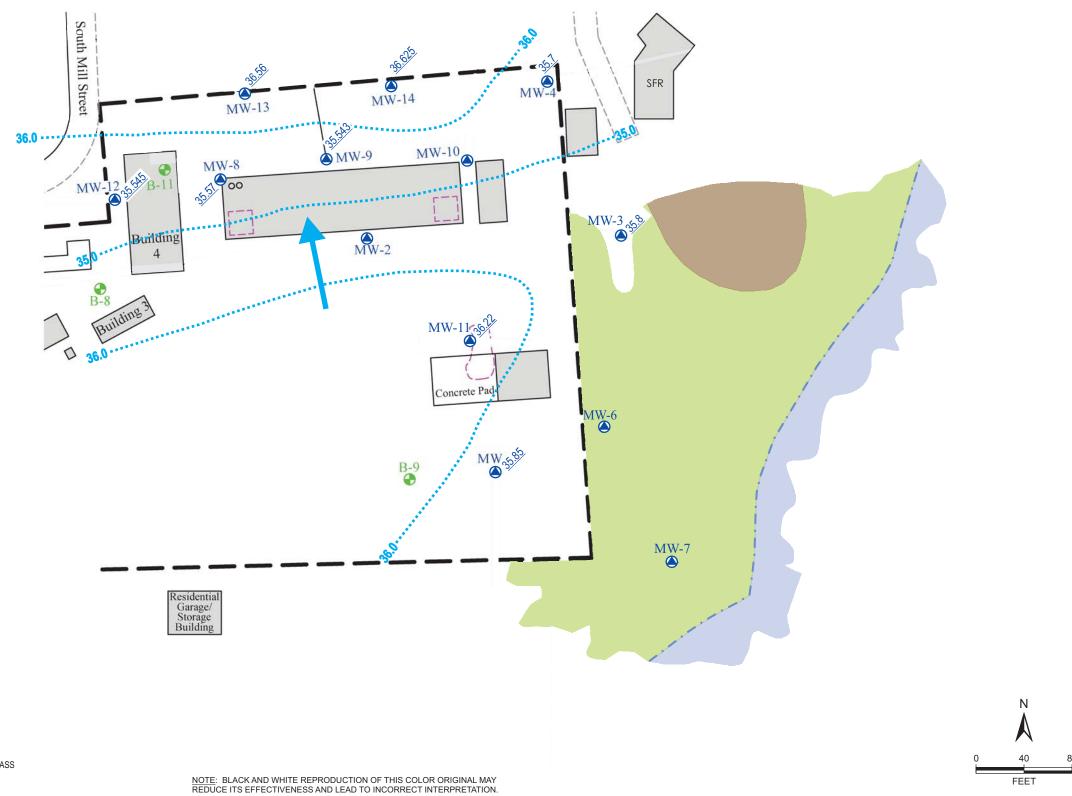


SITE PLAN
CLEAR LAKE INDUSTRIAL PARK
CLEAR LAKE, WASHINGTON

FIGURE 2

DATE 2/14

PROJ. NO. TV130367E



LEGEND:

SITE BOUNDARY

SFR SINGLE-FAMILY RESIDENCE

____ CHLORDANE REMEDIAL EXCAVATION

MONITORING WELL LOCATION BY OTHERS - GROUND WATER LEVEL MEASURED 6/17/14

GROUND WATER FLOW CONTOUR MEASURED 6/17/14

GROUND WATER FLOW DIRECTION

TEST PROBE LOCATION BY OTHERS 9/7/12

SHORELINE

AREA FILLED WITH LARGE PIECES OF CONCRETE COVERED BY A THIN LAYER OF SOIL AND GRASS

REFERENCE: THE RILEY GROUP

HEAVY VEGETATION

associated
earth sciences
incorporated

GROUND WATER FLOW ELEVATIONS AND FLOW DIRECTION - NOVEMBER 3, 2014

CLEAR LAKE INDUSTRIAL PARK

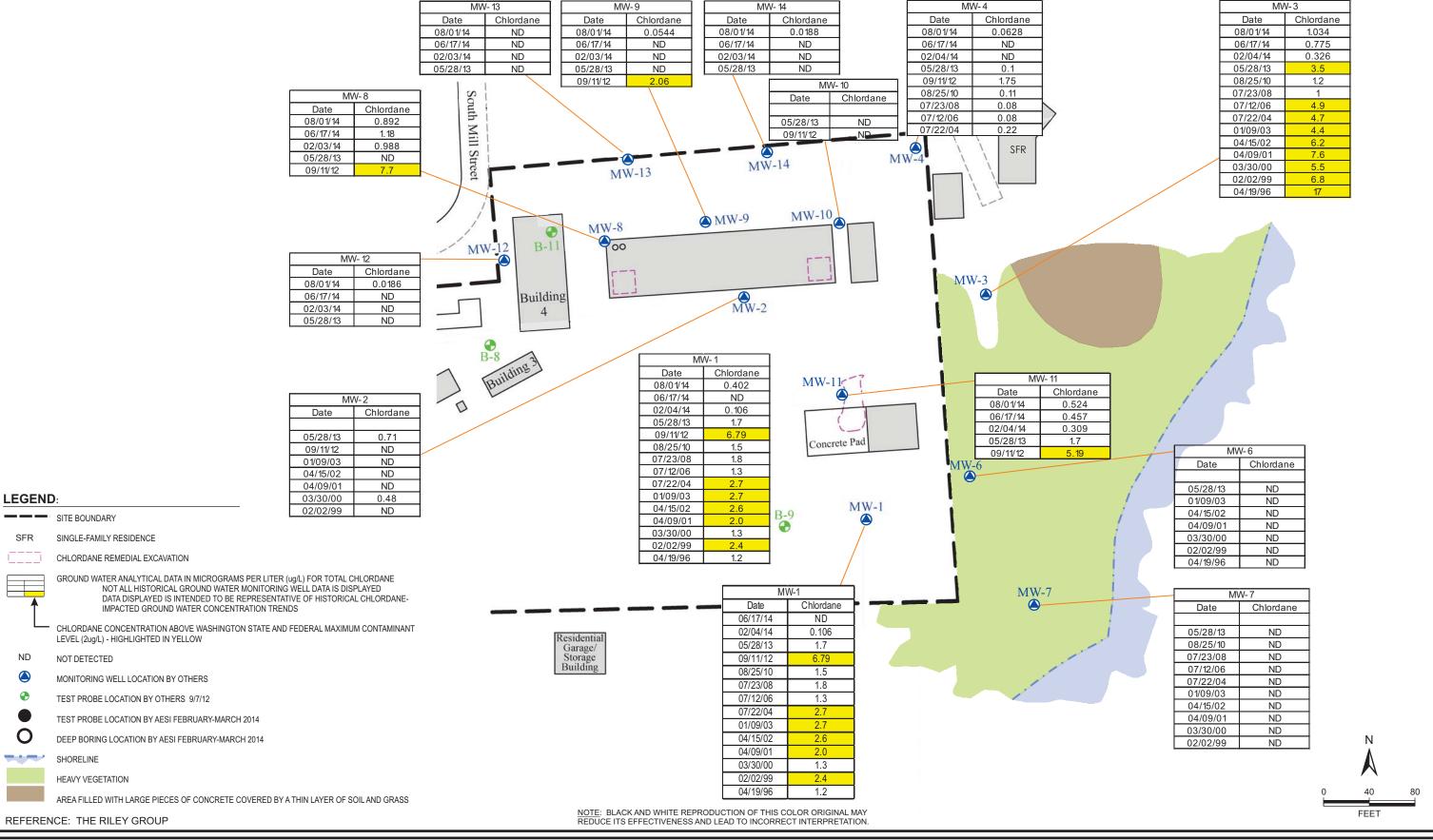
CLEAR LAKE, WASHINGTON

FIGURE 3

DATE 1/15

PROJ. NO. TV130367F

ite GW - 1-15.cdr PAGE 3



associated
earth sciences
incorporated

HISTORICAL GROUND WATER DATA
CLEAR LAKE INDUSTRIAL PARK
CLEAR LAKE, WASHINGTON

FIGURE 4

DATE 12/14

PROJ. NO. TV130367F

APPENDIX A Laboratory Analytical Report

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D. Yelena Aravkina, M.S. Michael Erdahl, B.S. Arina Podnozova, B.S. Eric Young, B.S. 3012 16th Avenue West Seattle, WA 98119-2029 (206) 285-8282 fbi@isomedia.com www.friedmanandbruya.com

November 14, 2014

Liz Rachman, Project Manager Associated Earth Sciences, Inc. 1552 Commerce St., Suite 102 Tacoma, WA 98402

Dear Ms. Rachman:

Included are the results from the testing of material submitted on November 4, 2014 from the TV130367F, F&BI 411033 project. There is 1 page included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl Project Manager

Enclosures c: Emily Cressman AE11114R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on November 4, 2014 by Friedman & Bruya, Inc. from the Associated Earth Sciences TV130367F, F&BI 411033 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Associated Earth Sciences
411033 -01	m MW-12 $ m GW$
411033 -02	MW-13 GW
411033 -03	m MW-14 $ m GW$
411033 -04	MW-4 GW
411033 -05	MW-9 GW
411033 -06	MW-8 GW
411033 -07	MW-11~GW
411033 -08	MW-1 GW
411033 -09	MW-3 GW

The samples were sent to Fremont for chlordane analysis. Review of the enclosed report indicates that all quality assurance were acceptable.



3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Friedman & Bruya Michael Erdahl 3012 16th Ave. W. Seattle, WA 98119

RE: 411033

Lab ID: 1411032

November 12, 2014

Attention Michael Erdahl:

Fremont Analytical, Inc. received 9 sample(s) on 11/5/2014 for the analyses presented in the following report.

Organochlorine Pesticides by EPA Method 8081

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Mulchay

Sincerely,

Mike Ridgeway President

Date: 11/12/2014



CLIENT: Friedman & Bruya Work Order Sample Summary

Project: 411033 **Lab Order:** 1411032

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1411032-001	MW-12-GW	11/03/2014 9:15 AM	11/05/2014 2:04 PM
1411032-002	MW-13-GW	11/03/2014 10:00 AM	11/05/2014 2:04 PM
1411032-003	MW-14-GW	11/03/2014 10:45 AM	11/05/2014 2:04 PM
1411032-004	MW-4-GW	11/03/2014 11:35 AM	11/05/2014 2:04 PM
1411032-005	MW-9-GW	11/03/2014 12:00 PM	11/05/2014 2:04 PM
1411032-006	MW-8-GW	11/03/2014 12:10 PM	11/05/2014 2:04 PM
1411032-007	MW-11-GW	11/03/2014 1:05 PM	11/05/2014 2:04 PM
1411032-008	MW-1-GW	11/03/2014 2:00 PM	11/05/2014 2:04 PM
1411032-009	MW-3-GW	11/03/2014 3:00 PM	11/05/2014 2:04 PM



Case Narrative

WO#: **1411032**Date: **11/12/2014**

CLIENT:

Friedman & Bruya

Project:

411033

I. SAMPLE RECEIPT:

Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:

Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:

Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.



WO#:

1411032

Date Reported: 11/12/2014

CLIENT:

Friedman & Bruya

Project:

Analyses

411033

1411032-001 Lab ID:

Collection Date: 11/3/2014 9:15:00 AM

Matrix: Water

DF

Units

%REC

Client Sample ID: MW-12-GW

RL Qual

Date Analyzed

					-
Organochlorine Pesticides by	EPA Method 80	<u>81</u>	Bato	h ID: 9245	Analyst: DB
gamma-Chlordane	ND	0.100	μg/L	1	11/12/2014 2:14:00 PM
alpha-Chlordane	ND	0.100	μg/L	1	11/12/2014 2:14:00 PM
Surr: Decachlorobiphenyl	76.4	53.2-135	%REC	1	11/12/2014 2:14:00 PM

31.4-125

Result

65.8

Lab ID: 1411032-002

Surr: Tetrachloro-m-xylene

Collection Date: 11/3/2014 10:00:00 AM

11/12/2014 2:14:00 PM

Client Sample ID: MW-13-GW

Matrix: Water

Analyses	Result	RL Qual	Units	DF	Date Analyzed
Organochlorine Pesticides by I	Batcl	n ID: 92	45 Analyst: DB		
gamma-Chlordane	ND	0.100	μg/L	1	11/12/2014 2:53:00 PM
alpha-Chlordane	ND	0.100	μg/L	1	11/12/2014 2:53:00 PM
Surr: Decachlorobiphenyl	75.3	53.2-135	%REC	1	11/12/2014 2:53:00 PM
Surr: Tetrachloro-m-xylene	81.8	31.4-125	%REC	1	11/12/2014 2:53:00 PM

Qualifiers:

Analyte detected in the associated Method Blank В

Ε Value above quantitation range

Analyte detected below quantitation limits

RL Reporting Limit

Dilution was required D

Holding times for preparation or analysis exceeded

Not detected at the Reporting Limit ND



WO#:

1411032

Date Reported:

11/12/2014

CLIENT:

Friedman & Bruya

MW-14-GW

Project:

411033

Lab ID: 1411032-003

Client Sample ID:

Collection Date: 11/3/2014 10:45:00 AM

Matrix: Water

Date Analyzed Analyses Result RL Qual **Units** DF Batch ID: 9245 Analyst: DB Organochlorine Pesticides by EPA Method 8081 11/12/2014 3:32:00 PM 1 gamma-Chlordane ND 0.100 μg/L 11/12/2014 3:32:00 PM alpha-Chlordane ND 0.100 μg/L 1 %REC 11/12/2014 3:32:00 PM Surr: Decachlorobiphenyl 90.2 53.2-135 1

31.4-125

100

68.8

Lab ID: 1411032-004

Surr: Tetrachloro-m-xylene

Surr: Tetrachloro-m-xylene

Collection Date: 11/3/2014 11:35:00 AM

11/12/2014 3:52:00 PM

11/12/2014 3:32:00 PM

Client Sample ID:

MW-4-GW

Matrix: Water

%REC

%REC

RL Qual DF **Date Analyzed** Result Units **Analyses** Batch ID: 9245 Analyst: DB Organochlorine Pesticides by EPA Method 8081 11/12/2014 3:52:00 PM gamma-Chlordane ND 0.100 µg/L 1 11/12/2014 3:52:00 PM ND 0.100 μg/L 1 alpha-Chlordane 11/12/2014 3:52:00 PM %REC 77.3 53.2-135 1 Surr: Decachlorobiphenyl

31.4-125

Qualifiers:

- Analyte detected in the associated Method Blank
- Ε Value above quantitation range
- Analyte detected below quantitation limits
- Reporting Limit

В

- Dilution was required
- Н Holding times for preparation or analysis exceeded
- Not detected at the Reporting Limit ND
- Spike recovery outside accepted recovery limits



WO#:

1411032

Date Reported: 11/12/2014

CLIENT:

Friedman & Bruya

Project:

411033

1411032-005 Lab ID:

Collection Date: 11/3/2014 12:00:00 PM

Matrix: Water

Client Sample ID: MW-9-GW

Surr: Tetrachloro-m-xylene

Analyses Result RL Qual **Units** DF **Date Analyzed** Organochlorine Pesticides by EPA Method 8081 Batch ID: 9245 Analyst: DB 11/12/2014 4:11:00 PM gamma-Chlordane ND 0.100 μg/L 1 μg/L alpha-Chlordane ND 0.100 11/12/2014 4:11:00 PM Surr: Decachlorobiphenyl 111 53.2-135 %REC 1 11/12/2014 4:11:00 PM

31.4-125

101

Lab ID:

1411032-006

Collection Date: 11/3/2014 12:10:00 PM

11/12/2014 4:11:00 PM

Client Sample ID: MW-8-GW

Matrix: Water

%REC

Analyses	Result	Result RL Qual		DF	Date Analyzed		
Organochlorine Pesticides by	Batc	h ID: 924	5 Analyst: DB				
gamma-Chlordane	0.394	0.100	μg/L	1	11/12/2014 4:31:00 PM		
alpha-Chlordane	0.358	0.100	μg/L	1	11/12/2014 4:31:00 PM		
Surr: Decachlorobiphenyl	115	53.2-135	%REC	1	11/12/2014 4:31:00 PM		
Surr: Tetrachloro-m-xylene	115	31.4-125	%REC	1	11/12/2014 4:31:00 PM		

Qualifiers:

В

Analyte detected in the associated Method Blank

Value above quantitation range Ε

Analyte detected below quantitation limits

RL Reporting Limit

Dilution was required D

Holding times for preparation or analysis exceeded Н

Not detected at the Reporting Limit ND



WO#:

1411032

Date Reported: 11/12/2014

CLIENT:

Friedman & Bruya

Project:

411033

Lab ID:

1411032-007

Collection Date: 11/3/2014 1:05:00 PM

Client Sample ID: MW-11-GW

Matrix: Water

Analyses	Result	RL Qual	Units	DF	Date Analyzed		
Organochlorine Pesticides by EPA	Batch	ID: 9245	Analyst: DB				
gamma-Chlordane	0.271	0.100	μg/L	1	11/12/2014 4:51:00 PM		
alpha-Chlordane	0.178	0.100	μg/L	1	11/12/2014 4:51:00 PM		
Surr: Decachlorobiphenyl	94.9	53.2-135	%REC	1	11/12/2014 4:51:00 PM		
Surr: Tetrachloro-m-xylene	91.7	31.4-125	%REC	1	11/12/2014 4:51:00 PM		

Lab ID: 1411032-008

Surr: Tetrachloro-m-xylene

Client Sample ID: MW-1-GW

Collection Date: 11/3/2014 2:00:00 PM

11/12/2014 5:10:00 PM

Matrix: Water

%REC

Analyses	Result	RL Qual	Units	DF	Date Analyzed
Organochlorine Pesticides by	EPA Method 80	<u>81</u>	Batch	n ID: 924	5 Analyst: DB
gamma-Chlordane	0.165	0.100	μg/L	1	11/12/2014 5:10:00 PM
alpha-Chlordane	0.141	0.100	μg/L	1	11/12/2014 5:10:00 PM
Surr: Decachlorobiphenyl	102	53.2-135	%REC	1	11/12/2014 5:10:00 PM

31.4-125

101

Qualifiers:

B Analyte detected in the associated Method Blank

E Value above quantitation range

Analyte detected below quantitation limits

RL Reporting Limit

Dilution was required

Н Holding times for preparation or analysis exceeded

Not detected at the Reporting Limit ND



WO#:

1411032

Date Reported: 11/12/2014

CLIENT:

Friedman & Bruya

Organochlorine Pesticides by EPA Method 8081

Project:

411033

1411032-009 Lab ID:

gamma-Chlordane

Surr: Decachlorobiphenyl

Surr: Tetrachloro-m-xylene

alpha-Chlordane

Collection Date: 11/3/2014 3:00:00 PM

Matrix: Water

%REC

Client Sample ID: MW-3-GW Result RL Qual **Units Analyses**

0.589

0.337

86.4

100

0.100

0.100

53.2-135

31.4-125

Date Analyzed DF Batch ID: 9245 Analyst: DB 11/12/2014 5:30:00 PM μg/L 1 11/12/2014 5:30:00 PM μg/L 11/12/2014 5:30:00 PM %REC 1

11/12/2014 5:30:00 PM

Qualifiers:

Analyte detected in the associated Method Blank В

Ε Value above quantitation range

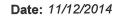
Analyte detected below quantitation limits J

RL Reporting Limit

D Dilution was required

Holding times for preparation or analysis exceeded Н

Not detected at the Reporting Limit ND





Work Order:

1411032

CLIENT:

Friedman & Bruya

QC SUMMARY REPORT

Organochlorine Pesticides by EPA Method 8081

Project: 411033								IIIC I COLION	ucs by Er	- Wictilot	1 000 1
Sample ID: MB-9245	SampType: MBLK			Units: µg/L		Prep Date	e: 11/7/20 ′	14	RunNo: 179	91	
Client ID: MBLKW	Batch ID: 9245					Analysis Date	e: 11/12/2 0	014	SeqNo: 358	579	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
gamma-Chlordane	ND	0.100									
alpha-Chlordane	ND	0.100									
Surr: Decachlorobiphenyl	0.374		0.4000		93.5	53.2	135				
Surr: Tetrachloro-m-xylene	0.377		0.4000		94.2	31.4	125				
Sample ID: LCS-9245	SampType: LCS			Units: µg/L		Prep Date	e: 11/7/20°	14	RunNo: 17 9	91	
Client ID: LCSW	Batch ID: 9245					Analysis Date	e: 11/12/2 0	014	SeqNo: 358	3580	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
gamma-Chlordane	0.793	0.100	1.000	0	79.3	38	129				
alpha-Chlordane	0.797	0.100	1.000	0	79.7	41.6	127				
Surr: Decachlorobiphenyl	0.356		0.4000		89.0	53.2	135				
Surr: Tetrachloro-m-xylene	0.346		0.4000		86.5	31.4	125				
Sample ID: 1411032-001ADUP	SampType: DUP			Units: µg/L		Prep Date	e: 11/7/20	14	RunNo: 179	91	
Client ID: MW-12-GW	Batch ID: 9245					Analysis Date	e: 11/12/2 0	014	SeqNo: 358	3582	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
gamma-Chlordane	ND	0.100						0		30	
alpha-Chlordane	ND	0.100						0		30	
Surr: Decachlorobiphenyl	0.410		0.4000		103	53.2	135		0		
Surr: Tetrachloro-m-xylene	0.319		0.4000		79.9	31.4	125		0		

Qualifiers:

Analyte detected in the associated Method Blank

Holding times for preparation or analysis exceeded

RPD outside accepted recovery limits

Dilution was required

Analyte detected below quantitation limits

Reporting Limit

E Value above quantitation range

Not detected at the Reporting Limit

Spike recovery outside accepted recovery limits



Date: 11/12/2014

Work Order:

1411032

Friedman & Bruya

CLIENT: Project:

411033

QC SUMMARY REPORT

Organochlorine Pesticides by EPA Method 8081

•											
Sample ID: 1411032-002AMS	SampType: MS			Units: µg/L		Prep Dat	e: 11/7/20 1	14	RunNo: 179	91	
Client ID: MW-13-GW	Batch ID: 9245					Analysis Dat	e: 11/12/2 0	014	SeqNo: 358	584	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
gamma-Chlordane	0.982	0.100	1.000	0	98.2	34.7	126				
alpha-Chlordane	0.991	0.100	1.000	0.0003680	99.0	38.2	125				
Surr: Decachlorobiphenyl	0.401		0.4000		100	53.2	135				
Surr: Tetrachloro-m-xylene	0.360		0.4000		90.1	31.4	125				

Analyte detected in the associated Method Blank

H Holding times for preparation or analysis exceeded

R RPD outside accepted recovery limits

D Dilution was required

Analyte detected below quantitation limits

RL Reporting Limit

Value above quantitation range

ND Not detected at the Reporting Limit



Sample Log-In Check List

Logged by: Erica Silva Date Received: 11/5/2014 2:04:00 PM	
Chain of Custody	
1. Is Chain of Custody complete? Yes ✓ No Not Present ✓	
2. How was the sample delivered? <u>Courier</u>	
<u>Log In</u>	
3. Coolers are present? Yes ✓ No □ NA □	
4. Shipping container/cooler in good condition?	
5. Custody seals intact on shipping container/cooler? Yes ☐ No 🗹 Not Required ☐	
6. Was an attempt made to cool the samples? Yes ✓ No NA NA NA	
7. Were all coolers received at a temperature of >0°C to 10.0°C Yes ✓ No NA NA NA NA NA NA NA	
8. Sample(s) in proper container(s)? Yes ✓ No	
9. Sufficient sample volume for indicated test(s)? Yes ✓ No	
10. Are samples properly preserved? Yes ✓ No	
11. Was preservative added to bottles?	
12. Is the headspace in the VOA vials? Yes ☐ No ☐ NA 🗹	
12. It the restriction to the second	
15. Die uit earlieptes eerstaat en geet eerstaat (anderstaar)	
14. Does paperwork match bottle labels? Yes ✓ No ✓	
15. Are matrices correctly identified on Chain of Custody? Yes ✓ No □	
16. Is it clear what analyses were requested? Yes ✓ No	
17. Were all holding times able to be met?	
Special Handling (if applicable)	
18. Was client notified of all discrepancies with this order? Yes □ No □ NA ✔	
Person Notified: Date:	
By Whom: Via: eMail Phone Fax In Person	
Regarding:	
Client Instructions:	
19. Additional remarks:	

Item Information

Item #	Temp °C	Condition
Cooler	3.2	Good
Sample	3.6	Good

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

Send Report To Michael Erdahl	SUBCONTRACTER Tremon	Page # of TURNAROUND TIME	
Company Friedman and Bruya, Inc. Address 3012 16th Ave W	PROJECT NAME/NO. 2	PO# D-268	☐ Standard (2 Weeks) ☐ RUSH (Weak. Rush charges authorized by:
City, State, ZIP_Seattle, WA 98119 Phone #_ (206) 285-8282 Fax #_ (206) 283-5044	REMARKS Please Email Results		SAMPLE DISPOSAL Dispose after 30 days Return samples Will call with instructions

						_							A. ITT	WILL WATE	n instructions
Sample ID	Lab ID	Date Sampled	Time Sampled	Matrix	#of jars	Dioxins and Furans by 8290	ЕРН	VPH	Nitrate	Sulfate	Alkalinity	alphae samma Chloidane			Notes
MW-12-GW		11/3/14	0915	water	ì							X			
MW-13-GW		1	10 00		1							×			, v., v.o.
MW-14-GW			1045		1							×			
MW-4-6W			1135		١							×			2
MW-9-6W			1206		(X			Commence of the Commence of th
MW-8-6W			1210		2							Х			
MW-11-6W			1365		ı							×			
MW-1-6W			1400		١							×			
MW-3-6W		1	1500	1	1							×			
														j	
													7		

Friedman & Bruya, Inc. 3012 16th Avenue West

Seattle, WA 98119-2029

Ph. (206) 285-8282

BLI CHNIL

Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Belingstot W:	Michael Erdahl	Friedman & Bruya	11/4/14	2:55
Received by:	Seplain Good	FAL /	11/5/19	A04
Relinquished by	/ / /			
Received by:				,

411033 SA	AMPLE CHAIN OF CUSTODY	ME 11/4/	/14 / of 1
Send Report To Liz lachman Company AESI Address 1552 Commerce St Swife 182	PROJECT NAME/NO.) TV130367F	PO#	TURNAROUND TIME Standard (2 Weeks) RUSH Rush charges authorized by
City, State, ZIP Tacoma, WA 98402 Phone #253)722-2992 Fax #(253)722-2993	REMARKS		SAMPLE DISPOSAL Dispose after 30 days Return samples Will call with instructions

									<i>P</i>	NA	LYSES R	EQUI	ESTEL)	_	
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by8260	SVOCs by 8270	HFS alpha - and gamma- Chlordam					Notes
MW-126W	01	11/3/14	0915	water							X			-		
mw-13 Gw	02		1000		1					_	X				_	
mw-14 GW	03		1045		١			•,		_	ΪŽ				-	
mw-4 Gw	04		1135		1						_\X		\dashv		-	
mw-9 GW	05		1200		. \						X					Anduze iar
mw-8 Gw	06 A-1	}	1210		2	<u> </u>					X				-	Analyze jar with * on label
mw-1: GW	07		1305		1						LX,				<u> </u>	
mw-1 Gw	08		1400		1		L Ì				JX					
mw-3 GW	09	1	1500	1	1						$\bot X$					
				,									S i	amples	ece	red at 2 °C

Friedman & Bruya, Inc. 3012 16th Avenue West Seattle, WA 98119-2029 Ph. (206) 285-8282

Fax (206) 283-5044 FORMS\COC\COC.DOC

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME	
Reinquished by: (W) Shill	Fruit Cressman	1KS/	11/4/14	1042	
Received by:	8 Dmith	Feder SIC	1/4/19	1012	
Relinquished by:			1.7 4		
Received by Alexander	HONG NEW CUSEN	FBI	11/4/14	12:00	
 			• 6		