EES
ENVIRONMENTAL CONSULTING, INC.
240 N. Broadway, Suite 203, Portland OR 97227
(503) 847-2740
www.ees-environmental.com

Technical Memorandum

To: Mark McCuddy, MC Marine, LLC
John Rapp, Washington Dept. of Ecology, SW Region VCP
From: Paul Ecker, LHG and Chris Rhea, LG
Date: September 29, 2015

Subject: **Quarterly Groundwater Monitoring Results (August 2015)**
R.J. Frank Site
5 Mill Street
Ridgefield, Washington
Ecology VCP File SW1331
EES Project 2001-01

This memorandum provides a summary of the results associated with the fourth consecutive quarterly groundwater monitoring event, conducted in August 2015, at the subject Property located at 5 Mill Street in Ridgefield, Washington (Property, Figure 1). Work scope items were completed in accordance with the EES Site Investigation report dated August 25, 2014, and discussions and email correspondence with the Washington Department of Ecology (Ecology) dated October 15-17, 2014. Figure 2 illustrates Property features and monitoring well locations.

WATER TABLE ELEVATIONS

On August 28, 2015, static water levels were measured in all six monitoring wells relative to the surveyed top-of-casing elevations. Water table elevations were variable across the site well network in August (Figure 2) and as observed during prior monitoring events, but groundwater flow trends are generally to the west towards Lake River. The cause of water table variability observed at site wells is uncertain and may be influenced by heterogeneous subsurface conditions, tidal and/or seasonal fluctuation, rainfall/surface water infiltration, or other factors that have not been determined. Similar localized water table variability is reported for the adjacent Pacific Wood Treating facility (Maul Foster Alongi, 2013).

During the August 2015 monitoring event, site water table elevations averaged approximately 2.5 feet lower compared to May 2015 (see Table 1 and Figure 2) and represent seasonal low water conditions. The greatest water table decrease relative to May 2015 was observed at wells MW-4 and MW-5, both

located at the northern end of the site near Lake River. Seasonal groundwater conditions may be further modified by tidal effects, particularly near Lake River.

ANALYTICAL TESTING RESULTS

The specified five-well network (monitoring wells MW-1, -3, -4, -5, and -6) was purged and sampled on August 28, 2015. Groundwater samples collected from the five wells were submitted for laboratory analysis of diesel- and heavy oil-range petroleum hydrocarbons by Method NWPTH-Dx and polynuclear aromatic hydrocarbons (PAHs) by EPA Method 8270C-SIM. Gasoline is not a contaminant of interest for this site based on initial assessment findings (EES, August 2014).

Field-measured groundwater parameters are presented on Table 2. Analytical testing results are summarized below, on Tables 3 and 4, and illustrated on Figures 3 and 4. Laboratory analytical reports are provided in Attachment A.

- **Diesel:** No diesel-range hydrocarbons were detected at concentrations exceeding the default MTCA Method A cleanup level (500 micrograms per liter [ug/L]) among the five groundwater samples except for MW-1. Consistent with the November 2014 and May 2015 monitoring events, a low level of hydrocarbons in the diesel range was detected in the sample collected from well MW-1 (575 ug/L). However, the laboratory chromatographic pattern for the sample did not resemble the petroleum hydrocarbon standard, and was typical of a mixture of biogenic (naturally-occurring) compounds. As observed in November 2014 and May 2015, follow-up analytical testing using silica-gel cleanup methodology resulted in no detections of diesel-range hydrocarbons in the same sample collected from MW-1, which supports chromatographic evidence that the initial diesel-range hydrocarbon detection is not consistent with a petroleum source. Laboratory chromatograms from the MW-1 hydrocarbon analyses are provided in Attachment B.
- **Oil:** No oil-range hydrocarbons were detected in any of the five groundwater samples collected in August 2015, consistent with the three previous monitoring events (Table 3).
- **PAHs:** No PAHs were detected at concentrations exceeding default MTCA Method A or Method B cleanup levels in any of the samples including MW-4 (where low levels of PAHs have been observed during the last year).

CONCLUSIONS AND RECOMMENDATIONS

Quarterly groundwater monitoring has been conducted at this site by MC Marine, LLC for a period of one year, in accordance with an approach discussed and approved by Ecology in 2014. Monitoring results during this monitoring period are generally consistent with prior assessment findings, and confirm no extensive or obvious source of groundwater contamination by non-gasoline hydrocarbons. Recent findings and overall trends are summarized below.

- August 2015 quarterly monitoring results indicate no exceedances of published MTCA groundwater cleanup levels among any of the five site wells for hydrocarbons and related chemicals.
- During the past year, low-concentration diesel-range detections at wells MW-1 and MW-6 (located in the former bulk petroleum storage yard area) are periodically observed but

appear dissimilar to typical hydrocarbon signatures and may be biogenic in origin. These detections are flagged by the laboratory as not representative of typical diesel fuel, and are not accompanied by PAH compounds which would otherwise be expected for a fuel or oil source. In every case, follow-up analysis using silica-gel cleanup indicates that diesel fuel is not identified in these same samples (see Table 3).

- Low PAH concentrations are identified at well MW-4 and occasionally well MW-5, both located in the unpaved north parking lot area near Lake River. This area may have been used historically as a pond or for dredged materials dewatering, but no specific contaminant source other than random fill and possible buried river piling debris has been identified in this area.
  - During the August 2015 monitoring event, PAHs decreased to trace concentrations and did not exceed published MTCA groundwater cleanup levels at either well.
  - PAH concentrations at well MW-4 slightly exceeded published MTCA groundwater cleanup levels between November 2014 and May 2015, and only during February 2015 for well MW-5. Fuel and oil hydrocarbons in groundwater have not been identified at either well location.

Where identified, hydrocarbon and PAH concentrations are present at relatively low concentrations that in some cases slightly exceed MTCA groundwater cleanup levels. The identified impacts are not indicative of an obvious Property-related source or other release of fuels, oils, or other known contaminants.

These quarterly monitoring findings will be discussed and evaluated with Ecology.

Tables
Table 1: Groundwater Elevation Data
Table 2: Groundwater Field Parameters
Table 3: Groundwater Analytical Results – Fuels
Table 4: Groundwater Analytical Results – PAHs

Figures
Figure 1: Vicinity Map
Figure 2: Monitoring Well Locations and Water Table Elevations (8/26/2015)
Figure 3: Diesel and Oil Concentrations in Groundwater (8/26/2015)
Figure 4: PAH Concentrations in Groundwater (8/26/2015)

Attachments
Attachment A: Laboratory Analytical Data
Attachment B: Chromatograms for Selected Sample

TABLES

TABLE 1
Groundwater Elevations
R.J. Frank Site
Ridgefield, Washington

Well Identification	TOC Elevation (feet)	Date Measured	Depth to Water (feet below TOC)	Groundwater Elevation (feet)
MW-1	20.55	11/10/2014	6.72	13.83
		12/16/2015	6.72	13.83
		02/11/2015	4.31	16.24
		05/06/2015	7.96	12.59
		08/26/2015	9.21	11.34
MW-2	21.31	11/10/2014	6.39	14.92
		12/16/2015	7.08	14.23
		02/11/2015	5.23	16.08
		05/06/2015	6.89	14.42
		08/26/2015	9.00	12.31
MW-3	24.02	11/10/2014	13.27	10.75
		12/16/2015	12.23	11.79
		02/11/2015	10.25	13.77
		05/06/2015	13.89	10.13
		08/26/2015	16.05	7.97
MW-4	21.94	11/10/2014	8.86	13.08
		12/16/2015	7.86	14.08
		02/11/2015	6.41	15.53
		05/06/2015	8.05	13.89
		08/26/2015	11.44	10.50
MW-5	20.88	11/10/2014	9.66	11.22
		12/16/2015	8.62	12.26
		02/11/2015	4.97	15.91
		05/06/2015	9.78	11.10
		08/26/2015	12.90	7.98
MW-6	21.18	11/10/2014	4.87	16.31
		12/16/2015	8.64	12.54
		02/11/2015	3.01	18.17
		05/06/2015	7.94	13.24
		08/26/2015	10.67	10.51

Notes:

Wells MW-1 through -6 were surveyed in October and November 2014 by Minister-Glaeser Surveying, Inc. Elevations were established using a trimble R8 receiver operating in a real time kinematic mode (RTK), receiving GPS corrections from the Washington State Reference Network (WSRN). (NAVD 88)

TOC = Top of casing

TABLE 2
Groundwater Field Parameters
R.J. Frank Site
Ridgefield, Washington

Location	Date	Dissolved Oxygen (mg/L) DRI [a]	Oxidation Reduction Potential (mV) DRI [a]	Ferrous Iron (Fe 2+) (mg/L) HACH [b]	pH (unitless) DRI [a]	Specific Conductance (ms/cm) DRI [a]
MW-1	11/10/2014	2.1	172	0.5	5.8	0.53
	02/11/2015	1.2	79	2.0[c]	6.3	0.44
	05/06/2015	0.81	53	0.5	6.5	0.48
	08/26/2015	1.6	50	1.0	6.6	0.36
MW-3	11/10/2014	1.1	154	0.5	6.1	0.39
	02/11/2015	1.0	81	4.0[c]	6.0	0.44
	05/06/2015	0.82	40	0.0	6.2	0.48
	08/26/2015	0.56	34	1.0	6.5	0.36
MW-4	11/10/2014	0.95	159	6.0[c]	6.1	1.3
	02/11/2015	0.97	9.0	3.0[c]	6.1	0.96
	05/06/2015	1.3	-51	2.5	5.9	1.2
	08/26/2015	0.68	-40	6.0[c]	6.6	0.86
MW-5	11/10/2014	0.87	131	3.5[c]	6.0	0.76
	02/11/2015	1.2	74	2.0[c]	5.9	0.37
	05/06/2015	0.90	-52	3.5	6.1	0.99
	08/26/2015	0.80	-34	3.3[c]	6.4	0.83
MW-6	11/10/2014	1.0	122	3.0[c]	6.1	-
	02/11/2015	1.4	53	2.5[c]	5.7	0.51
	05/06/2015	0.80	-65	2.0	6.4	0.76
	08/26/2015	0.86	-11	2.0[c]	6.7	0.56

NOTES:

[a] DRI = Direct-Read Instrument

[b] HACH = Colorimetric "Hach" Field Kit

[c] = Sample was field filtered. Result indicates dissolved ferrous iron

mg/L = Milligrams per liter

mV = Millivolts

ms/cm = Millisiemens per centimeter

- = not collected

TABLE 3
Water Analytical Results - Fuels (ug/L)
R.J. Frank Site
Ridgefield, Washington

Sample Location	Collection Date	Gasoline NWTPH-Gx	Diesel NWTPH-Dx	Diesel NWTPH-Dx w/cleanup[1]	Lube Oil NWTPH-Dx	Lube Oil NWTPH-Dx w/cleanup[1]
Site Assessment						
EES-1 (W)	04/16/2014	100 U	**752** X	245 U	392 U	490 U
EES-2 (W)	04/16/2014	239 X[2]	**786** X	**535** X	396 U	495 U
EES-3 (W)	04/16/2014	100 U	202 U	-	404 U	-
EES-4 (W)	04/16/2014	100 U	222 U	-	444 U	-
EES-5 (W)	04/17/2014	100 U	213 U	-	426 U	-
EES-7 (W)	04/18/2014	100 U	**1,340** X	*833 U*	*1,330 U*	*1,670 U*
EES-8 (W)	04/18/2014	100 U	246 X	-	385 U	
EES-9 (W)	04/17/2014	100 U	374 X	-	404 U	
EES-10 (W)	04/17/2014	100 U	**547** X	278 U	444 U	*556 U*
EES-11 (W)	04/16/2014	100 U	200 U	-	400 U	-
EES-12 (W)	04/16/2014	-	200 U	-	400 U	-
EES-13 (W)	04/16/2014	-	204 U	-	408 U	-
EES-14 (W)	04/17/2014	100 U	204 X	-	400 U	-
EES-15 (W)	04/18/2014	100 U	192 U	-	385 U	-
Quarterly Monitoring						
MW-1	11/10/2014	-	**733** X[3],J	258 U	412 U	*515 U*
	02/11/2015	-	194 U	-	388 U	-
	05/06/2015	-	352 X[3],J	250 U	400 U	500 U
	08/26/2015	-	**575** X[3]	238 U	381 U	476 U
MW-3	11/10/2014	-	194 U	-	388 U	-
	02/11/2015	-	189 U	-	377 U	-
	05/06/2015	-	194 U	-	388 U	-
	08/26/2015	-	194 U	-	388 U	-
MW-4	11/10/2014	-	192 U	-	385 U	-
	02/11/2015	-	211 U	-	421 U	-
	05/06/2015	-	196 U	-	392 U	-
	08/26/2015	-	194 U	-	388 U	-
MW-5	11/10/2014	-	194 U	-	388 U	-
	02/11/2015	-	192 U	-	385 U	-
	05/06/2015	-	211 U	-	421 U	-
	08/26/2015	-	194 U	-	388 U	-
MW-6	11/10/2014	-	**1,050** X[3],J	238 U	*1,900 U*	476 U
	02/11/2015	-	190 U	-	381 U	-
	05/06/2015	-	497 X[3],J	238 U	381 U	476 U
	08/26/2015	-	196 U	-	392 U	-
Preliminary Screening						
Method A Cleanup Levels for Ground Water[a]		800/1,000[b]	500	500	500	500
Method B Cleanup Levels for Ground Water[c]		NA	NA	NA	NA	NA

TABLE 3

Water Analytical Results - Fuels (ug/L)

R.J. Frank Site

Ridgefield, Washington

Notes:

[1] Diesel and Lube Oil range hydrocarbons analyzed by the NWTPH-Dx with silica-gel cleanup method

[a] Washington Department of Ecology, Model Toxics Control Act (MTCA) Method A Groundwater Cleanup levels, Table 720-1 (August 2015)

[b] If no benzene is present in groundwater use 1,000 ug/L cleanup level. If benzene is present use 800 ug/L.

[c] MTCA Method B cleanup levels do not exist in the CLARC database

ug/L = Micrograms per liter

U = Undetected at method reporting limit shown

X = The chromatographic pattern does not resemble the fuel standard used for quantitation.

X^2 = The result for this hydrocarbon range is primarily due to the presence of individual analyte peaks in the quantitation range. No fuel pattern detected.

X^3 = The hydrocarbon pattern indicates possible weathered diesel, or a contribution from a related component.

J = Data Validation Qualifier. Reported result is an estimated value. See Data Validation report for further information.

Bolded values exceed default screening level based on MTCA Method A.

Italicized values indicate laboratory method reporting limit (MRL) exceeds default screening level based on MTCA Method A.

NA = Not Available

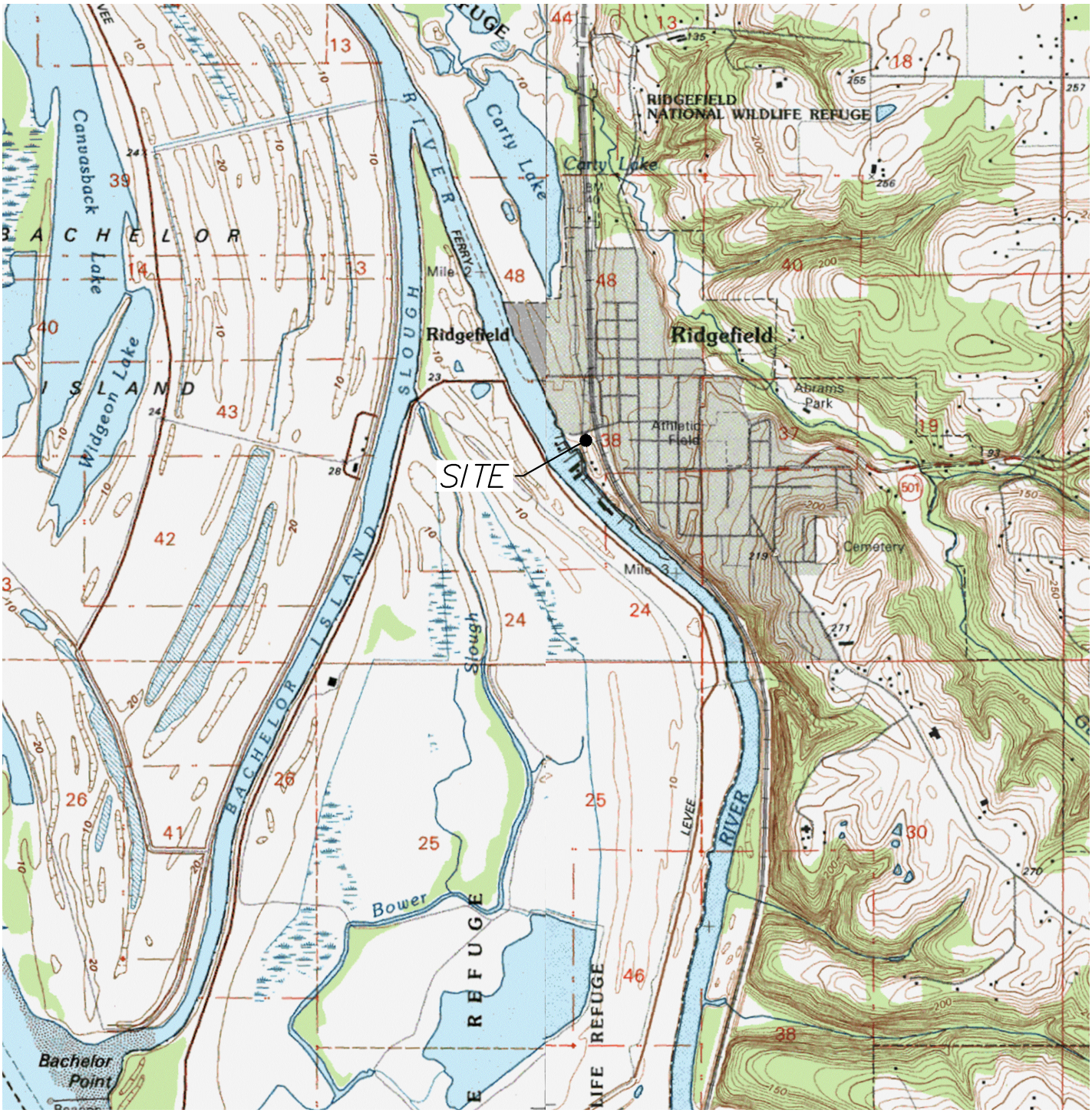
- = not analyzed

TABLE 4
Water Analytical Results - Polynuclear Aromatic Compounds and Pentachlorophenol (ug/L)
R.J. Frank Site
Ridgefield, Washington

Sample Location	Collection Date	PCP	Acenaphthylene	Acenaphthene	Anthracene	Benzo(a) anthracene	Benzo(a) pyrene	Benzo(b) fluoranthene	Benzo(k) fluoranthene	Benzo(g,h,i) perylene	Chrysene	Dibenzo(a,h) anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d) pyrene	Naphthalene	Phenanthrene	Pyrene	1-Methyl naphthalene	2-Methyl naphthalene
Site Assessment																				
EES-1(W)	04/16/2014	0.86 U[1,2]	0.14 J[2]	0.42 [2]	0.20 [2]	0.086 U[1,2]	*0.13 U[1,2]*	*0.13 U[1,2]*	0.13 U[1,2]	0.086 U[1,2]	0.086 U[1,2]	*0.086 U[1,2]*	0.21 [2]	0.43 [2]	0.086 U[1,2]	5.9 [2]	1.0 [2]	0.17 [2]	0.42	0.54
EES-2(W)	04/16/2014	0.79 U[1]	0.50	48	4.8	**0.23**	**0.15 J**	**0.17 J**	0.12 U[1]	0.087 J	0.22	*0.079 U[1]*	4.2	33	0.079 U[1]	18	34	2.7	38	47
EES-7(W)	04/18/2014	-	0.27 U[1]	0.27 U[1]	0.27 U[1]	0.27 U[1]	*0.40 U[1]*	*0.40 U[1]*	0.40 U[1]	0.27 U[1]	0.27 U[1]	*0.27 U[1]*	0.27 U[1]	0.27 U[1]	*0.27 U[1]*	0.53 U[1]	0.27 U[1]	0.27 U[1]	0.53 U[1]	0.53 U[1]
EES-10(W)	04/17/2014	-	0.089 U[1]	0.089 U[1]	0.089 U[1]	0.089 U[1]	*0.13 U[1]*	*0.13 U[1]*	0.13 U[1]	0.089 U[1]	0.089 U[1]	*0.089 U[1]*	0.089 U[1]	0.089 U[1]	0.089 U[1]	0.18 U[1]	0.089 U[1]	0.089 U[1]	0.18 U[1]	0.18 U[1]
Quarterly Monitoring																				
MW-1	11/10/2014	-	0.040 U	0.040 U	0.040 U	0.040 U	*0.020 U[1]*	0.040 U	0.040 U	0.040 U	0.040 U	*0.020 U[1]*	0.040 U	0.040 U	0.040 U	0.079 U	0.040 U	0.040 U	0.079 U	0.079 U
	02/11/2015	-	0.039 U	0.039 U	0.039 U	0.039 U	*0.039 U*	0.039 U	0.039 U	0.039 U	0.039 U	*0.039 U*	0.039 U	0.039 U	0.039 U	0.078 U	0.039 U	0.039 U	0.078 U	0.078 U
	05/06/2015	-	0.041 U	0.041 U	0.041 U	0.041 U	*0.041 U*	0.041 U	0.041 U	0.041 U	0.041 U	*0.041 U*	0.041 U	0.041 U	0.041 U	0.083 U	0.041 U	0.041 U	0.083 U	0.083 U
	08/26/2015	-	0.095 U[4]	0.095 U[4]	0.095 U[4]	0.095 U[4]	*0.095 U[4]*	0.095 U[4]	0.095 U[4]	0.095 U[4]	0.095 U[4]	*0.095 U[4]*	0.095 U[4]	0.095 U[4]	0.095 U[4]	0.19 U[4]	0.095 U[4]	0.095 U[4]	0.19 U[4]	0.19 U[4]
MW-3	11/10/2014	-	0.041 U	0.041 U	0.041 U	0.041 U	*0.020 U[1]*	0.041 U	0.041 U	0.041 U	0.041 U	*0.020 U[1]*	0.041 U	0.041 U	0.041 U	0.082 U	0.041 U	0.041 U	0.082 U	0.082 U
	02/11/2015	-	0.039 U	0.039 U	0.039 U	0.039 U	*0.039 U*	0.039 U	0.039 U	0.039 U	0.039 U	*0.039 U*	0.039 U	0.039 U	0.039 U	0.078 U	0.039 U	0.039 U	0.078 U	0.078 U
	05/06/2015	-	0.041 U	0.041 U	0.041 U	0.041 U	*0.041 U*	0.041 U	0.041 U	0.041 U	0.041 U	*0.041 U*	0.041 U	0.041 U	0.041 U	0.083 U	0.041 U	0.041 U	0.083 U	0.083 U
	08/26/2015	-	0.040 U	0.040 U	0.040 U	0.040 U	*0.040 U*	0.040 U	0.040 U	0.040 U	0.040 U	*0.040 U*	0.040 U	0.040 U	0.040 U	0.080 U	0.040 U	0.040 U	0.080 U	0.080 U
MW-4	11/10/2014	-	0.10	1.4	0.42	**0.31**	**0.29**	**0.44 [3]**	-	0.13	0.33	**0.020 J**	0.81	1.3	**0.15**	3.6	2.0	0.79	2.1	1.8
	02/11/2015	-	0.14	1.0	0.61	**0.81**	**0.79**	**1.3 [3]**	-	0.40	0.94	**0.12**	2.0	0.94	**0.45**	1.7	2.7	2.0	0.96 J[1]	0.72
	05/06/2015	-	0.043 U	0.84	0.21	**0.13**	**0.11**	**0.18 [3]**	-	0.058	0.14	*0.043 U*	0.38	0.60	0.068	0.47	1.1	0.35	0.39	0.24
	08/26/2015	-	0.041 U	0.32	0.062	0.041 U	*0.041 U*	0.041 U	0.041 U	0.041 U	0.041 U	*0.041 U*	0.067	0.21	0.041 U	0.23	0.35	0.054	0.19	0.14
MW-5	11/10/2014	-	0.039 U	0.046	0.039 U	0.039 U	*0.020 U[1]*	0.039 U	0.039 U	0.039 U	0.039 U	*0.020 U[1]*	0.039 U	0.045	0.039 U	0.078 U	0.12	0.039 U	0.078 U	0.078 U
	02/11/2015	-	0.040 U	0.21	0.077	**0.13**	**0.12**	**0.19 [3]**	-	0.066	0.14	*0.040 U*	0.27	0.15	0.076	0.079 U	0.20	0.28	0.21 J[1]	0.079 U
	05/06/2015	-	0.043 U	0.043 U	0.043 U	0.043 U	*0.043 U*	0.086 U[3]	-	0.043 U	0.043 U	*0.043 U*	0.050	0.043 U	0.043 U	0.086 U	0.043 U	0.054	0.086 U	0.086 U
	08/26/2015	-	0.044 U	0.044 U	0.044 U	0.044 U	*0.044 U*	0.044 U	0.044 U	0.044 U	0.044 U	*0.044 U*	0.044 U	0.044 U	0.044 U	0.089 U	0.069	0.044 U	0.089 U	0.089 U
MW-6	11/10/2014	-	0.039 U	0.039 U	0.039 U	0.039 U	*0.019 U[1]*	0.039 U	0.039 U	0.039 U	0.039 U	*0.019 U[1]*	0.039 U	0.084	0.039 U	0.078 U	0.039 U	0.039 U	0.078 U	0.078 U
	02/11/2015	-	0.039 U	0.039 U	0.039 U	0.039 U	*0.039 U*	0.039 U	0.039 U	0.039 U	0.039 U	*0.039 U*	0.039 U	0.071	0.039 U	0.077 U	0.039 U	0.040	0.077 U	0.077 U
	05/06/2015	-	0.041 U	0.041 U	0.041 U	0.041 U	*0.041 U*	0.041 U	0.041 U	0.041 U	0.041 U	*0.041 U*	0.041 U	0.041 U	0.041 U	0.084 U	0.041 U	0.041 U	0.084 U	0.084 U
	08/26/2015	-	0.044 U	0.044 U	0.044 U	0.044 U	*0.044 U*	0.044 U	0.044 U	0.044 U	0.044 U	*0.044 U*	0.044 U	0.044 U	0.044 U	0.088 U	0.044 U	0.044 U	0.088 U	0.088 U
Preliminary Screening																				
Method A Cleanup Levels[a]		NA	NA	NA	NA	NA	0.1[c]	NA	NA	NA	NA	NA	NA	NA	NA	160	NA	NA	NA	NA
Method B Cleanup Levels[b]		0.22	NA	NA	NA	0.12	0.012	0.12	1.2	NA	12	0.012	NA	NA	0.12	NA	NA	NA	NA	NA

Notes:
Polynuclear Aromatic Hydrocarbons (PAHs) and Pentachlorophenol analyzed by EPA Method 8270 SIM
[a] Washington Department of Ecology (WDOE), Model Toxics Control Act (MTCA) Method A Groundwater Cleanup levels, Table 720-1 (August 2015)
[b] WDOE, MTCA Method B, Carcinogen, Standard Formula Value, Groundwater values from CLARC database
[c] Cleanup level shown is for total B(a)P toxic equivalent concentration of all carcinogenic Polynuclear Aromatic Hydrocarbons (PAHs)
[1] Result was reported down to the laboratory method detection limit (MDL)
[2] Sample was extracted past the recommended holding time.
[3] Peak separation for Benzo(b) and Benzo(k)fluoranthenes does not meet method specified criteria. Reported result includes the combined area of the two isomers and should be considered the total of Benzo(b+k)fluoranthenes.
[4] Analysis was performed on NWTPH-Dx Silica gel/acid cleaned extract. Results are estimated values.
ug/L = Micrograms per liter
PCP = Pentachlorophenol
U = Undetected at method reporting limit shown
NA = Not Available
- = not analyzed
J = Estimated concentration. The detection was below the method reporting limit, but above the method detection limit.
J[1] = Data validation qualifier. Estimated concentration. See corresponding data validation report for further information.
Bolded values exceed default screening based on MTCA Method A/B Cleanup Levels for Groundwater.
Italicized values indicate laboratory method reporting and/or detection limit exceeds default screening based on MTCA Method A/B.

FIGURES



SOURCE:
USGS, RIDGEFIELD QUADRANGLE
WASHINGTON–OREGON
7.5 MINUTE SERIES (TOPOGRAPHIC)

N

APPROXIMATE SCALE IN FEET

0 1000 2000 4000

EES
ENVIRONMENTAL CONSULTING, INC.
240 N Broadway #203, Portland, OR 97227
(503) 847-2740
www.ees-environmental.com

SITE VICINITY MAP

RJ FRANK SITE
5 MILL STREET
RIDGEFIELD, WA.

DATE:	1–27–14	PROJECT NO.	
FILE:	2001–01	2001–01	
DRAWN:	JJT	FIGURE NO.	
APPROVED:	CR	1	

LEGEND

- Subject Boundary Line (Approximate Location)
- Railroad Siding
- Historic AST Area
- Port of Ridgefield Property (Former Subject Property Area)
- EES–1 — Sample Locations (EES 2014)
- MW–1 — Monitoring Well Locations (EES 2014)
- 12.31 — Groundwater Elevations
- Approximate Groundwater Flow Direction
- SITE FEATURES ARE APPROXIMATE.

PIONEER STREET
MAIN STREET
SARGENT S

APPROXIMATE GROUNDWATER FLOW DIRECTION

FORMER VERTICAL ABOVE GROUND STORAGE TANKS
FORMER FUEL DISPENSER AND STORAGE AREA
GRAVEL ROAD
EES–15
EES–24
EES–16
EES–10
EES–7
12.31
MW–2
MW–1
11.34
MW–6
10.51
EES–21
EES–8
EES–14
EES–14A
EES–22
EES–9
EES–18
EES–17
EES–23
EES–25
EES–5
EES–3
EES–11
MW–3
7.97
EES–6
EES–4
BURLINGTON NORTHERN RAILROAD
CITY OF RIDGEFIELD PUMP STATION
FORMER ABOVE GROUND STORAGE TANK AREAS
MILL STREET
MW–08
EES–13
EES–12
EES–1
MW–4
10.50
EES–2A
EES–2
MW–5
7.98
RIDGEFIELD MARINA
FORMER ABOVE GROUND STORAGE TANK AREAS
POSSIBLE DREDGE SPOIL DEWATERING PONDS (1980s)
LAKE RIVER

APPROXIMATE SCALE IN FEET
0 50 100 200

DATE:	9–15–15
FILE:	2001–01
DRAWN:	JJT
APPROVED:	AG
PROJECT NO.	2001–01
FIGURE NO.	2

MONITORING WELL LOCATIONS AND WATER TABLE ELEVATIONS (8/26/2015)

RJ FRANK SITE
5 MILL STREET
RIDGEFIELD, WA.

EES
ENVIRONMENTAL CONSULTING, INC.
240 N Broadway #203, Portland, OR 97227
(503) 847-2740
www.ees-environmental.com

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LEGEND

- Subject Boundary Line (Approximate Location)
- Railroad Siding
- Historic AST Area
- Port of Ridgefield Property (Former Subject Property Area)
- EES–1 — Sample Locations (EES 2014)
- MW–1 — Monitoring Well Locations (EES 2014)
- Approximate Groundwater Flow Direction
- D= Diesel Range Hydrocarbons
- O= Oil Range Hydrocarbons
- U= Not Detected Above Method Reporting Limit
- *= Results Without/With Silica–Gel Cleanup Reported
- X= The Hydrocarbon Pattern Indicates Possible Weathered Diesel, or a Contribution from a related Component
- –– = Not Analyzed

Results in Micrograms per Liter (ug/L)

SITE FEATURES ARE APPROXIMATE.

PIONEER STREET
MAIN STREET
SARGENT S
APPROXIMATE GROUNDWATER FLOW DIRECTION
FORMER VERTICAL ABOVE GROUND STORAGE TANKS
FORMER FUEL DISPENSER AND STORAGE AREA
GRAVEL ROAD
GTON NORTHERN RAILROAD
STORAGE TANK AREAS
L STREET
RIDGEFIELD MARINA
FORMER ABOVE GROUND STORAGE TANK AREAS
POSSIBLE DREDGE SPOIL DEWATERING PONDS (1980s)
LAKE RIVER

EES–15, EES–16, EES–7, EES–24, MW–2, EES–10, MW–1, MW–6, EES–21, EES–8, EES–14, EES–14A, EES–22, EES–9, EES–18, EES–17, EES–23, EES–25, EES–5, EES–3, EES–11, MW–3, EES–6, EES–4, MW–08, EES–13, EES–12, EES–1, MW–4, EES–2A, EES–2, MW–5

MW–6		
DATE	D	O
*11/10/14	1,050X/238U	1,900U/476U
2/11/15	190U	381U
*5/6/15	497X/238U	381U/476U
8/26/15	196U	392U

MW–1		
DATE	D	O
*11/10/14	733X/258U	412U/515U
2/11/15	194U	388U
*5/6/15	352X/250U	400U/500U
*8/26/15	575X/238U	381U/476U

MW–3		
DATE	D	O
11/10/14	194U	388U
2/11/15	189U	377U
5/6/15	194U	388U
8/26/15	194U	388U

MW–4		
DATE	D	O
11/10/14	192U	388U
2/11/15	211U	421U
5/6/15	196U	392U
8/26/15	194U	388U

MW–5		
DATE	D	O
11/10/14	194U	388U
2/11/15	192U	385U
5/6/15	211U	421U
8/26/15	194U	388U

APPROXIMATE SCALE IN FEET
0 50 100 200

DATE:	9–15–15
FILE:	2001–01
DRAWN:	JJT
APPROVED:	AG
PROJECT NO.	2001–01
FIGURE NO.	3

DIESEL AND OIL CONCENTRATIONS IN GROUNDWATER (8/26/2015)

RJ FRANK SITE
5 MILL STREET
RIDGEFIELD, WA.

EES
ENVIRONMENTAL CONSULTING, INC.
240 N Broadway #203, Portland, OR 97227
(503) 847-2740
www.ees-environmental.com

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LEGEND

- Subject Boundary Line (Approximate Location)
- Railroad Siding
- Historic AST Area
- Port of Ridgefield Property (Former Subject Property Area)
- EES–1 — Sample Locations (EES 2014)
- MW–1 — Monitoring Well Locations (EES 2014)
- Approximate Groundwater Flow Direction
- B(a)A= Benzo(a)anthracene
- B(a)P= Benzo(a)pyrene
- B(b+k)F= Benzo(b+k)fluoranthene
- IP= Indeno(1,2,3–c,d)pyrene
- Results in Micrograms per Liter (ug/L)
- SITE FEATURES ARE APPROXIMATE.

APPROXIMATE GROUNDWATER FLOW DIRECTION

PIONEER STREET
MAIN STREET
SARGENT S
FORMER VERTICAL ABOVE GROUND STORAGE TANKS
FORMER FUEL DISPENSER AND STORAGE AREA
GRAVEL ROAD
EES–15
EES–10
BURLINGTON NORTHERN RAILROAD
CITY OF RIDGEFIELD PUMP STATION
EES–24
MW–2
MW–6
EES–21
EES–14
EES–22
EES–18
EES–8
EES–14A
EES–9
EES–17
EES–23
EES–25
MW–1
FORMER ABOVE GROUND STORAGE TANK AREAS
MW–3
EES–5
EES–3
EES–11
EES–6
EES–4
MW–08
EES–13
EES–12
RIDGEFIELD MARINA
FORMER ABOVE GROUND STORAGE TANK AREAS
MW–4
EES–2A
EES–2
MW–5
POSSIBLE DREDGE SPOIL DEWATERING PONDS (1980s)
LAKE RIVER

MW–6

DATE	B(a)A	B(a)P	B(b+k)F	IP
11/10/14	0.039U	0.019U	0.078U	0.039U
2/11/15	0.039U	0.039U	0.078U	0.039U
5/6/15	0.041U	0.041U	0.082U	0.041U
8/26/15	0.044U	0.044U	0.088U	0.044U

MW–1

DATE	B(a)A	B(a)P	B(b+k)F	IP
11/10/14	0.040U	0.020U	0.080U	0.040U
2/11/15	0.039U	0.039U	0.078U	0.039U
5/6/15	0.041U	0.041U	0.082U	0.041U
8/26/15	0.095U	0.095U	0.190U	0.095U

MW–3

DATE	B(a)A	B(a)P	B(b+k)F	IP
11/10/14	0.041U	0.020U	0.082U	0.041U
2/11/15	0.039U	0.039U	0.078U	0.039U
5/6/15	0.041U	0.041U	0.082U	0.041U
8/26/15	0.040U	0.040U	0.080U	0.040U

MW–4

DATE	B(a)A	B(a)P	B(b+k)F	IP
11/10/14	0.31	0.29	0.44	0.15
2/11/15	0.81	0.79	1.3	0.45
5/6/15	0.13	0.11	0.18	0.068
8/26/15	0.041U	0.041U	0.082U	0.041U

MW–5

DATE	B(a)A	B(a)P	B(b+k)F	IP
11/10/14	0.039U	0.020U	0.078U	0.039U
2/11/15	0.13	0.12	0.19	0.076
5/6/15	0043U	0.043U	0.086U	0.043U
8/26/15	0.044U	0.044U	0.088U	0.044U

APPROXIMATE SCALE IN FEET
0 50 100 200

DATE:	9–15–15
FILE:	2001–01
DRAWN:	JJT
APPROVED:	AG
PROJECT NO.	2001–01
FIGURE NO.	4

PAH CONCENTRATIONS IN GROUNDWATER (8/26/2015)

RJ FRANK SITE
5 MILL STREET
RIDGEFIELD, WA.

EES
ENVIRONMENTAL CONSULTING, INC.
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www.ees-environmental.com

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Attachment A

Apex Labs

12232 S.W. Garden Place
Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

Wednesday, September 9, 2015

Paul Ecker
EES Environmental Inc
240 N Broadway Ste 203
Portland, OR 97227

RE: RJ Frank / 2001-01

Enclosed are the results of analyses for work order A5H0721, which was received by the laboratory on 8/27/2015 at 1:00:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: pnerenberg@apex-labs.com, or by phone at 503-718-2323.

Apex Labs

12232 S.W. Garden Place
Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

EES Environmental Inc	Project: **RJ Frank**	
240 N Broadway Ste 203	Project Number: 2001-01	**Reported:**
Portland, OR 97227	Project Manager: Paul Ecker	09/09/15 09:54

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1	A5H0721-01	Water	08/26/15 11:20	08/27/15 13:00
MW-3	A5H0721-02	Water	08/26/15 13:25	08/27/15 13:00
MW-4	A5H0721-03	Water	08/26/15 14:30	08/27/15 13:00
MW-5	A5H0721-04	Water	08/26/15 15:30	08/27/15 13:00
MW-6	A5H0721-05	Water	08/26/15 12:25	08/27/15 13:00

Apex Laboratories

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Labs

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503-718-2323 Phone
503-718-0333 Fax

EES Environmental Inc	Project: **RJ Frank**	
240 N Broadway Ste 203	Project Number: 2001-01	**Reported:**
Portland, OR 97227	Project Manager: Paul Ecker	09/09/15 09:54

ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
MW-1 (A5H0721-01RE1)			**Matrix: Water**		**Batch: 5080772**			
Diesel	**0.575**	---	0.190	mg/L	1	08/29/15 18:17	NWTPH-Dx	F-11
Oil	ND	---	0.381	"	"	"	"	
Surrogate: o-Terphenyl (Surr)			*Recovery: 88 %*	*Limits: 50-150 %*	"	"	"	
MW-3 (A5H0721-02RE1)			**Matrix: Water**		**Batch: 5080772**			
Diesel	ND	---	0.194	mg/L	1	08/29/15 18:42	NWTPH-Dx	
Oil	ND	---	0.388	"	"	"	"	
Surrogate: o-Terphenyl (Surr)			*Recovery: 86 %*	*Limits: 50-150 %*	"	"	"	
MW-4 (A5H0721-03RE1)			**Matrix: Water**		**Batch: 5080772**			
Diesel	ND	---	0.194	mg/L	1	08/29/15 17:26	NWTPH-Dx	
Oil	ND	---	0.388	"	"	"	"	
Surrogate: o-Terphenyl (Surr)			*Recovery: 94 %*	*Limits: 50-150 %*	"	"	"	
MW-5 (A5H0721-04RE1)			**Matrix: Water**		**Batch: 5080772**			
Diesel	ND	---	0.194	mg/L	1	08/29/15 17:51	NWTPH-Dx	
Oil	ND	---	0.388	"	"	"	"	
Surrogate: o-Terphenyl (Surr)			*Recovery: 95 %*	*Limits: 50-150 %*	"	"	"	
MW-6 (A5H0721-05RE1)			**Matrix: Water**		**Batch: 5080772**			
Diesel	ND	---	0.196	mg/L	1	08/29/15 18:17	NWTPH-Dx	
Oil	ND	---	0.392	"	"	"	"	
Surrogate: o-Terphenyl (Surr)			*Recovery: 98 %*	*Limits: 50-150 %*	"	"	"	

Apex Laboratories

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Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Labs

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503-718-2323 Phone
503-718-0333 Fax

EES Environmental Inc	Project: **RJ Frank**	
240 N Broadway Ste 203	Project Number: 2001-01	**Reported:**
Portland, OR 97227	Project Manager: Paul Ecker	09/09/15 09:54

ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx with Acid/Silica Gel Cleanup

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
MW-1 (A5H0721-01)			**Matrix: Water**		**Batch: 5090064**			
Diesel	ND	---	0.238	mg/L	1	09/02/15 12:12	NWTPH-Dx/SG	
Oil	ND	---	0.476	"	"	"	"	
Surrogate: o-Terphenyl (Surr)			*Recovery: 88 %*	*Limits: 50-150 %*	"	"	"	

Apex Laboratories

Philip Nerenberg, Lab Director

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503-718-2323 Phone
503-718-0333 Fax

EES Environmental Inc	Project: **RJ Frank**	
240 N Broadway Ste 203	Project Number: 2001-01	**Reported:**
Portland, OR 97227	Project Manager: Paul Ecker	09/09/15 09:54

ANALYTICAL SAMPLE RESULTS

Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
MW-1 (A5H0721-01)			**Matrix: Water**		**Batch: 5080772**			A-01, Q-22
Acenaphthene	ND	---	0.0952	ug/L	1	09/03/15 15:39	EPA 8270D (SIM)	
Acenaphthylene	ND	---	0.0952	"	"	"	"	
Anthracene	ND	---	0.0952	"	"	"	"	
Benz(a)anthracene	ND	---	0.0952	"	"	"	"	
Benzo(a)pyrene	ND	---	0.0952	"	"	"	"	
Benzo(b)fluoranthene	ND	---	0.0952	"	"	"	"	
Benzo(k)fluoranthene	ND	---	0.0952	"	"	"	"	
Benzo(g,h,i)perylene	ND	---	0.0952	"	"	"	"	
Chrysene	ND	---	0.0952	"	"	"	"	
Dibenz(a,h)anthracene	ND	---	0.0952	"	"	"	"	
Dibenzofuran	ND	---	0.0952	"	"	"	"	
Fluoranthene	ND	---	0.0952	"	"	"	"	
Fluorene	ND	---	0.0952	"	"	"	"	
Indeno(1,2,3-cd)pyrene	ND	---	0.0952	"	"	"	"	
1-Methylnaphthalene	ND	---	0.190	"	"	"	"	
2-Methylnaphthalene	ND	---	0.190	"	"	"	"	
Naphthalene	ND	---	0.190	"	"	"	"	
Phenanthrene	ND	---	0.0952	"	"	"	"	
Pyrene	ND	---	0.0952	"	"	"	"	

Apex Laboratories

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Philip Nerenberg, Lab Director

Apex Labs

12232 S.W. Garden Place
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503-718-2323 Phone
503-718-0333 Fax

EES Environmental Inc	Project: **RJ Frank**	
240 N Broadway Ste 203	Project Number: 2001-01	**Reported:**
Portland, OR 97227	Project Manager: Paul Ecker	09/09/15 09:54

ANALYTICAL SAMPLE RESULTS

Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
MW-3 (A5H0721-02)			**Matrix: Water**		**Batch: 5090076**			
Acenaphthene	ND	---	0.0400	ug/L	1	09/03/15 13:23	EPA 8270D (SIM)	
Acenaphthylene	ND	---	0.0400	"	"	"	"	
Anthracene	ND	---	0.0400	"	"	"	"	
Benz(a)anthracene	ND	---	0.0400	"	"	"	"	
Benzo(a)pyrene	ND	---	0.0400	"	"	"	"	
Benzo(b)fluoranthene	ND	---	0.0400	"	"	"	"	
Benzo(k)fluoranthene	ND	---	0.0400	"	"	"	"	
Benzo(g,h,i)perylene	ND	---	0.0400	"	"	"	"	
Chrysene	ND	---	0.0400	"	"	"	"	
Dibenz(a,h)anthracene	ND	---	0.0400	"	"	"	"	
Dibenzofuran	ND	---	0.0400	"	"	"	"	
Fluoranthene	ND	---	0.0400	"	"	"	"	
Fluorene	ND	---	0.0400	"	"	"	"	
Indeno(1,2,3-cd)pyrene	ND	---	0.0400	"	"	"	"	
1-Methylnaphthalene	ND	---	0.0800	"	"	"	"	
2-Methylnaphthalene	ND	---	0.0800	"	"	"	"	
Naphthalene	ND	---	0.0800	"	"	"	"	
Phenanthrene	ND	---	0.0400	"	"	"	"	
Pyrene	ND	---	0.0400	"	"	"	"	
Surrogate: 2-Fluorobiphenyl (Surr)			*Recovery: 59 %*	*Limits: 44-120 %*	"	"	"	
p-Terphenyl-d14 (Surr)			*86 %*	*Limits: 50-133 %*	"	"	"	

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Philip Nerenberg, Lab Director

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EES Environmental Inc	Project: **RJ Frank**	
240 N Broadway Ste 203	Project Number: 2001-01	**Reported:**
Portland, OR 97227	Project Manager: Paul Ecker	09/09/15 09:54

ANALYTICAL SAMPLE RESULTS

Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
MW-4 (A5H0721-03)			**Matrix: Water**		**Batch: 5090076**			
Acenaphthene	**0.320**	---	0.0408	ug/L	1	09/03/15 13:51	EPA 8270D (SIM)	
Acenaphthylene	ND	---	0.0408	"	"	"	"	
Anthracene	**0.0620**	---	0.0408	"	"	"	"	
Benz(a)anthracene	ND	---	0.0408	"	"	"	"	
Benzo(a)pyrene	ND	---	0.0408	"	"	"	"	
Benzo(b)fluoranthene	ND	---	0.0408	"	"	"	"	
Benzo(k)fluoranthene	ND	---	0.0408	"	"	"	"	
Benzo(g,h,i)perylene	ND	---	0.0408	"	"	"	"	
Chrysene	ND	---	0.0408	"	"	"	"	
Dibenz(a,h)anthracene	ND	---	0.0408	"	"	"	"	
Dibenzofuran	**0.108**	---	0.0408	"	"	"	"	
Fluoranthene	**0.0669**	---	0.0408	"	"	"	"	
Fluorene	**0.209**	---	0.0408	"	"	"	"	
Indeno(1,2,3-cd)pyrene	ND	---	0.0408	"	"	"	"	
1-Methylnaphthalene	**0.185**	---	0.0816	"	"	"	"	
2-Methylnaphthalene	**0.144**	---	0.0816	"	"	"	"	
Naphthalene	**0.234**	---	0.0816	"	"	"	"	
Phenanthrene	**0.351**	---	0.0408	"	"	"	"	
Pyrene	**0.0539**	---	0.0408	"	"	"	"	
Surrogate: 2-Fluorobiphenyl (Surr)			*Recovery: 70 %*	*Limits: 44-120 %*	"	"	"	
p-Terphenyl-d14 (Surr)			*81 %*	*Limits: 50-133 %*	"	"	"	

Apex Laboratories

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Philip Nerenberg, Lab Director

Apex Labs

12232 S.W. Garden Place
Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

EES Environmental Inc	Project: **RJ Frank**	
240 N Broadway Ste 203	Project Number: 2001-01	**Reported:**
Portland, OR 97227	Project Manager: Paul Ecker	09/09/15 09:54

ANALYTICAL SAMPLE RESULTS

Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
MW-5 (A5H0721-04)			**Matrix: Water**		**Batch: 5090076**			
Acenaphthene	ND	---	0.0444	ug/L	1	09/03/15 14:18	EPA 8270D (SIM)	
Acenaphthylene	ND	---	0.0444	"	"	"	"	
Anthracene	ND	---	0.0444	"	"	"	"	
Benz(a)anthracene	ND	---	0.0444	"	"	"	"	
Benzo(a)pyrene	ND	---	0.0444	"	"	"	"	
Benzo(b)fluoranthene	ND	---	0.0444	"	"	"	"	
Benzo(k)fluoranthene	ND	---	0.0444	"	"	"	"	
Benzo(g,h,i)perylene	ND	---	0.0444	"	"	"	"	
Chrysene	ND	---	0.0444	"	"	"	"	
Dibenz(a,h)anthracene	ND	---	0.0444	"	"	"	"	
Dibenzofuran	ND	---	0.0444	"	"	"	"	
Fluoranthene	ND	---	0.0444	"	"	"	"	
Fluorene	ND	---	0.0444	"	"	"	"	
Indeno(1,2,3-cd)pyrene	ND	---	0.0444	"	"	"	"	
1-Methylnaphthalene	ND	---	0.0889	"	"	"	"	
2-Methylnaphthalene	ND	---	0.0889	"	"	"	"	
Naphthalene	ND	---	0.0889	"	"	"	"	
Phenanthrene	**0.0688**	---	0.0444	"	"	"	"	
Pyrene	ND	---	0.0444	"	"	"	"	
Surrogate: 2-Fluorobiphenyl (Surr)			*Recovery: 63 %*	*Limits: 44-120 %*	"	"	"	
p-Terphenyl-d14 (Surr)			*85 %*	*Limits: 50-133 %*	"	"	"	

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Philip Nerenberg, Lab Director

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12232 S.W. Garden Place
Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

EES Environmental Inc	Project: **RJ Frank**	
240 N Broadway Ste 203	Project Number: 2001-01	**Reported:**
Portland, OR 97227	Project Manager: Paul Ecker	09/09/15 09:54

ANALYTICAL SAMPLE RESULTS

Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
MW-6 (A5H0721-05)			**Matrix: Water**		**Batch: 5090076**			
Acenaphthene	ND	---	0.0440	ug/L	1	09/03/15 14:45	EPA 8270D (SIM)	
Acenaphthylene	ND	---	0.0440	"	"	"	"	
Anthracene	ND	---	0.0440	"	"	"	"	
Benz(a)anthracene	ND	---	0.0440	"	"	"	"	
Benzo(a)pyrene	ND	---	0.0440	"	"	"	"	
Benzo(b)fluoranthene	ND	---	0.0440	"	"	"	"	
Benzo(k)fluoranthene	ND	---	0.0440	"	"	"	"	
Benzo(g,h,i)perylene	ND	---	0.0440	"	"	"	"	
Chrysene	ND	---	0.0440	"	"	"	"	
Dibenz(a,h)anthracene	ND	---	0.0440	"	"	"	"	
Dibenzofuran	ND	---	0.0440	"	"	"	"	
Fluoranthene	ND	---	0.0440	"	"	"	"	
Fluorene	ND	---	0.0440	"	"	"	"	
Indeno(1,2,3-cd)pyrene	ND	---	0.0440	"	"	"	"	
1-Methylnaphthalene	ND	---	0.0879	"	"	"	"	
2-Methylnaphthalene	ND	---	0.0879	"	"	"	"	
Naphthalene	ND	---	0.0879	"	"	"	"	
Phenanthrene	ND	---	0.0440	"	"	"	"	
Pyrene	ND	---	0.0440	"	"	"	"	
Surrogate: 2-Fluorobiphenyl (Surr)			*Recovery: 75 %*	*Limits: 44-120 %*	"	"	"	
p-Terphenyl-d14 (Surr)			*85 %*	*Limits: 50-133 %*	"	"	"	

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503-718-2323 Phone
503-718-0333 Fax

EES Environmental Inc	Project: **RJ Frank**	
240 N Broadway Ste 203	Project Number: 2001-01	**Reported:**
Portland, OR 97227	Project Manager: Paul Ecker	09/09/15 09:54

QUALITY CONTROL (QC) SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5080772 - EPA 3510C (Fuels/Acid Ext.)									**Water**			
Blank (5080772-BLK1)					Prepared: 08/28/15 10:53 Analyzed: 08/28/15 20:51							
NWTPH-Dx												
Diesel	ND	---	0.182	mg/L	1	---	---	---	---	---	---	
Oil	ND	---	0.364	"	"	---	---	---	---	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 90 %*	*Limits: 50-150 %*			*Dilution: 1x*					
LCS (5080772-BS1)					Prepared: 08/28/15 10:53 Analyzed: 08/28/15 21:16							
NWTPH-Dx												
Diesel	1.11	---	0.200	mg/L	1	1.25	---	89	58-115%	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 92 %*	*Limits: 50-150 %*			*Dilution: 1x*					
LCS Dup (5080772-BSD1)					Prepared: 08/28/15 10:53 Analyzed: 08/28/15 21:42							Q-19
NWTPH-Dx												
Diesel	1.13	---	0.200	mg/L	1	1.25	---	90	58-115%	1	20%	
Surr: o-Terphenyl (Surr)			*Recovery: 89 %*	*Limits: 50-150 %*			*Dilution: 1x*					

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Philip Nerenberg, Lab Director

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12232 S.W. Garden Place
Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

EES Environmental Inc	Project: **RJ Frank**	
240 N Broadway Ste 203	Project Number: 2001-01	**Reported:**
Portland, OR 97227	Project Manager: Paul Ecker	09/09/15 09:54

QUALITY CONTROL (QC) SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx with Acid/Silica Gel Cleanup

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5090064 - EPA 3510C (Fuels/Acid Ext.) w/Silica Gel + Acid									**Water**			
Blank (5090064-BLK1)					Prepared: 08/28/15 10:53		Analyzed: 09/02/15 12:33					
NWTPH-Dx/SG												
Diesel	ND	---	0.227	mg/L	1	---	---	---	---	---	---	
Oil	ND	---	0.455	"	"	---	---	---	---	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 91 %*	*Limits: 50-150 %*			*Dilution: 1x*					
LCS (5090064-BS1)					Prepared: 08/28/15 10:53		Analyzed: 09/02/15 12:53					
NWTPH-Dx/SG												
Diesel	1.08	---	0.250	mg/L	1	1.25	---	87	58-115%	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 92 %*	*Limits: 50-150 %*			*Dilution: 1x*					
LCS Dup (5090064-BSD1)					Prepared: 08/28/15 10:53		Analyzed: 09/02/15 13:14					Q-19
NWTPH-Dx/SG												
Diesel	1.13	---	0.250	mg/L	1	1.25	---	90	58-115%	4	20%	
Surr: o-Terphenyl (Surr)			*Recovery: 91 %*	*Limits: 50-150 %*			*Dilution: 1x*					

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Philip Nerenberg, Lab Director

Apex Labs

12232 S.W. Garden Place
Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

EES Environmental Inc	Project: **RJ Frank**	
240 N Broadway Ste 203	Project Number: 2001-01	**Reported:**
Portland, OR 97227	Project Manager: Paul Ecker	09/09/15 09:54

QUALITY CONTROL (QC) SAMPLE RESULTS

Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5080772 - EPA 3510C (Fuels/Acid Ext.)									**Water**			
Blank (5080772-BLK2)					Prepared: 08/28/15 10:53 Analyzed: 09/03/15 15:12							A-01, Q-22
EPA 8270D (SIM)												
Acenaphthene	ND	---	0.0909	ug/L	1	---	---	---	---	---	---	
Acenaphthylene	ND	---	0.0909	"	"	---	---	---	---	---	---	
Anthracene	ND	---	0.0909	"	"	---	---	---	---	---	---	
Benz(a)anthracene	ND	---	0.0909	"	"	---	---	---	---	---	---	
Benzo(a)pyrene	ND	---	0.0909	"	"	---	---	---	---	---	---	
Benzo(b)fluoranthene	ND	---	0.0909	"	"	---	---	---	---	---	---	
Benzo(k)fluoranthene	ND	---	0.0909	"	"	---	---	---	---	---	---	
Benzo(g,h,i)perylene	ND	---	0.0909	"	"	---	---	---	---	---	---	
Chrysene	ND	---	0.0909	"	"	---	---	---	---	---	---	
Dibenz(a,h)anthracene	ND	---	0.0909	"	"	---	---	---	---	---	---	
Dibenzofuran	ND	---	0.0909	"	"	---	---	---	---	---	---	
Fluoranthene	ND	---	0.0909	"	"	---	---	---	---	---	---	
Fluorene	ND	---	0.0909	"	"	---	---	---	---	---	---	
Indeno(1,2,3-cd)pyrene	ND	---	0.0909	"	"	---	---	---	---	---	---	
1-Methylnaphthalene	ND	---	0.182	"	"	---	---	---	---	---	---	
2-Methylnaphthalene	ND	---	0.182	"	"	---	---	---	---	---	---	
Naphthalene	ND	---	0.182	"	"	---	---	---	---	---	---	
Phenanthrene	ND	---	0.0909	"	"	---	---	---	---	---	---	
Pyrene	ND	---	0.0909	"	"	---	---	---	---	---	---	

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

EES Environmental Inc	Project: **RJ Frank**	
240 N Broadway Ste 203	Project Number: 2001-01	**Reported:**
Portland, OR 97227	Project Manager: Paul Ecker	09/09/15 09:54

QUALITY CONTROL (QC) SAMPLE RESULTS

Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5090076 - EPA 3510C (Acid Extraction)									Water			
Blank (5090076-BLK1)					Prepared: 09/02/15 14:20 Analyzed: 09/03/15 11:59							
EPA 8270D (SIM)												
Acenaphthene	ND	---	0.0364	ug/L	1	---	---	---	---	---	---	
Acenaphthylene	ND	---	0.0364	"	"	---	---	---	---	---	---	
Anthracene	ND	---	0.0364	"	"	---	---	---	---	---	---	
Benz(a)anthracene	ND	---	0.0364	"	"	---	---	---	---	---	---	
Benzo(a)pyrene	ND	---	0.0364	"	"	---	---	---	---	---	---	
Benzo(b)fluoranthene	ND	---	0.0364	"	"	---	---	---	---	---	---	
Benzo(k)fluoranthene	ND	---	0.0364	"	"	---	---	---	---	---	---	
Benzo(g,h,i)perylene	ND	---	0.0364	"	"	---	---	---	---	---	---	
Chrysene	ND	---	0.0364	"	"	---	---	---	---	---	---	
Dibenz(a,h)anthracene	ND	---	0.0364	"	"	---	---	---	---	---	---	
Dibenzofuran	ND	---	0.0364	"	"	---	---	---	---	---	---	
Fluoranthene	ND	---	0.0364	"	"	---	---	---	---	---	---	
Fluorene	ND	---	0.0364	"	"	---	---	---	---	---	---	
Indeno(1,2,3-cd)pyrene	ND	---	0.0364	"	"	---	---	---	---	---	---	
1-Methylnaphthalene	ND	---	0.0727	"	"	---	---	---	---	---	---	
2-Methylnaphthalene	ND	---	0.0727	"	"	---	---	---	---	---	---	
Naphthalene	ND	---	0.0727	"	"	---	---	---	---	---	---	
Phenanthrene	ND	---	0.0364	"	"	---	---	---	---	---	---	
Pyrene	ND	---	0.0364	"	"	---	---	---	---	---	---	
Surr: 2-Fluorobiphenyl (Surr)			*Recovery: 49 %*	*Limits: 44-120 %*			*Dilution: 1x*					
p-Terphenyl-d14 (Surr)			*90 %*	*50-133 %*			*"*					
LCS (5090076-BS1)					Prepared: 09/02/15 14:20 Analyzed: 09/03/15 12:27							
EPA 8270D (SIM)												
Acenaphthene	6.54	---	0.0400	ug/L	1	8.00	---	82	47-122%	---	---	
Acenaphthylene	6.45	---	0.0400	"	"	"	---	81	41-130%	---	---	
Anthracene	7.95	---	0.0400	"	"	"	---	99	57-123%	---	---	
Benz(a)anthracene	7.40	---	0.0400	"	"	"	---	93	58-125%	---	---	
Benzo(a)pyrene	8.39	---	0.0400	"	"	"	---	105	54-128%	---	---	
Benzo(b)fluoranthene	7.77	---	0.0400	"	"	"	---	97	53-131%	---	---	
Benzo(k)fluoranthene	7.89	---	0.0400	"	"	"	---	99	57-129%	---	---	
Benzo(g,h,i)perylene	7.05	---	0.0400	"	"	"	---	88	50-134%	---	---	
Chrysene	7.62	---	0.0400	"	"	"	---	95	59-123%	---	---	
Dibenz(a,h)anthracene	7.77	---	0.0400	"	"	"	---	97	51-134%	---	---	

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Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Labs

12232 S.W. Garden Place
Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

EES Environmental Inc	Project: **RJ Frank**	
240 N Broadway Ste 203	Project Number: 2001-01	**Reported:**
Portland, OR 97227	Project Manager: Paul Ecker	09/09/15 09:54

QUALITY CONTROL (QC) SAMPLE RESULTS

Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5090076 - EPA 3510C (Acid Extraction)									**Water**			
LCS (5090076-BS1)					Prepared: 09/02/15 14:20		Analyzed: 09/03/15 12:27					
Dibenzofuran	7.03	---	0.0400	ug/L	"	"	---	88	53-120%	---	---	
Fluoranthene	7.59	---	0.0400	"	"	"	---	95	57-128%	---	---	
Fluorene	7.05	---	0.0400	"	"	"	---	88	52-124%	---	---	
Indeno(1,2,3-cd)pyrene	7.14	---	0.0400	"	"	"	---	89	52-133%	---	---	
1-Methylnaphthalene	5.47	---	0.0800	"	"	"	---	68	41-120%	---	---	
2-Methylnaphthalene	5.93	---	0.0800	"	"	"	---	74	40-121%	---	---	
Naphthalene	5.52	---	0.0800	"	"	"	---	69	"	---	---	
Phenanthrene	7.49	---	0.0400	"	"	"	---	94	59-120%	---	---	
Pyrene	7.56	---	0.0400	"	"	"	---	95	57-126%	---	---	
Surr: 2-Fluorobiphenyl (Surr)			*Recovery: 65 %*		*Limits: 44-120 %*				*Dilution: 1x*			
p-Terphenyl-d14 (Surr)			*91 %*		*50-133 %*				*"*			
LCS Dup (5090076-BSD1)					Prepared: 09/02/15 14:20		Analyzed: 09/03/15 12:56					Q-19
EPA 8270D (SIM)												
Acenaphthene	5.60	---	0.0400	ug/L	1	8.00	---	70	47-122%	16	30%	
Acenaphthylene	5.52	---	0.0400	"	"	"	---	69	41-130%	15	30%	
Anthracene	7.60	---	0.0400	"	"	"	---	95	57-123%	4	30%	
Benz(a)anthracene	7.26	---	0.0400	"	"	"	---	91	58-125%	2	30%	
Benzo(a)pyrene	8.25	---	0.0400	"	"	"	---	103	54-128%	2	30%	
Benzo(b)fluoranthene	7.32	---	0.0400	"	"	"	---	92	53-131%	6	30%	
Benzo(k)fluoranthene	7.64	---	0.0400	"	"	"	---	96	57-129%	3	30%	
Benzo(g,h,i)perylene	6.97	---	0.0400	"	"	"	---	87	50-134%	1	30%	
Chrysene	7.24	---	0.0400	"	"	"	---	90	59-123%	5	30%	
Dibenz(a,h)anthracene	7.60	---	0.0400	"	"	"	---	95	51-134%	2	30%	
Dibenzofuran	6.11	---	0.0400	"	"	"	---	76	53-120%	14	30%	
Fluoranthene	7.62	---	0.0400	"	"	"	---	95	57-128%	0.4	30%	
Fluorene	6.25	---	0.0400	"	"	"	---	78	52-124%	12	30%	
Indeno(1,2,3-cd)pyrene	7.02	---	0.0400	"	"	"	---	88	52-133%	2	30%	
1-Methylnaphthalene	4.62	---	0.0800	"	"	"	---	58	41-120%	17	30%	
2-Methylnaphthalene	5.01	---	0.0800	"	"	"	---	63	40-121%	17	30%	
Naphthalene	4.59	---	0.0800	"	"	"	---	57	"	18	30%	
Phenanthrene	7.07	---	0.0400	"	"	"	---	88	59-120%	6	30%	
Pyrene	7.59	---	0.0400	"	"	"	---	95	57-126%	0.3	30%	
Surr: 2-Fluorobiphenyl (Surr)			*Recovery: 52 %*		*Limits: 44-120 %*				*Dilution: 1x*			
p-Terphenyl-d14 (Surr)			*89 %*		*50-133 %*				*"*			

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Apex Labs

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Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

EES Environmental Inc	Project: **RJ Frank**	
240 N Broadway Ste 203	Project Number: 2001-01	**Reported:**
Portland, OR 97227	Project Manager: Paul Ecker	09/09/15 09:54

SAMPLE PREPARATION INFORMATION

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Prep: EPA 3510C (Fuels/Acid Ext.)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 5080772							
A5H0721-01RE1	Water	NWTPH-Dx	08/26/15 11:20	08/28/15 10:53	1050mL/5mL	1000mL/5mL	0.95
A5H0721-02RE1	Water	NWTPH-Dx	08/26/15 13:25	08/28/15 10:53	1030mL/5mL	1000mL/5mL	0.97
A5H0721-03RE1	Water	NWTPH-Dx	08/26/15 14:30	08/28/15 10:53	1030mL/5mL	1000mL/5mL	0.97
A5H0721-04RE1	Water	NWTPH-Dx	08/26/15 15:30	08/28/15 10:53	1030mL/5mL	1000mL/5mL	0.97
A5H0721-05RE1	Water	NWTPH-Dx	08/26/15 12:25	08/28/15 10:53	1020mL/5mL	1000mL/5mL	0.98

Diesel and/or Oil Hydrocarbons by NWTPH-Dx with Acid/Silica Gel Cleanup

Prep: EPA 3510C (Fuels/Acid Ext.) w/Silica Gel + Acid

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 5090064							
A5H0721-01	Water	NWTPH-Dx/SG	08/26/15 11:20	08/28/15 10:53	1050mL/5mL	1000mL/5mL	0.95

Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

Prep: EPA 3510C (Acid Extraction)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 5090076							
A5H0721-02	Water	EPA 8270D (SIM)	08/26/15 13:25	09/02/15 14:20	1000mL/2mL	1000mL/2mL	1.00
A5H0721-03	Water	EPA 8270D (SIM)	08/26/15 14:30	09/02/15 14:20	980mL/2mL	1000mL/2mL	1.02
A5H0721-04	Water	EPA 8270D (SIM)	08/26/15 15:30	09/02/15 14:20	900mL/2mL	1000mL/2mL	1.11
A5H0721-05	Water	EPA 8270D (SIM)	08/26/15 12:25	09/02/15 14:20	910mL/2mL	1000mL/2mL	1.10

Prep: EPA 3510C (Fuels/Acid Ext.)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 5080772							
A5H0721-01	Water	EPA 8270D (SIM)	08/26/15 11:20	08/28/15 10:53	1050mL/5mL	1000mL/2mL	2.38

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12232 S.W. Garden Place
Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

EES Environmental Inc	Project: **RJ Frank**	
240 N Broadway Ste 203	Project Number: 2001-01	**Reported:**
Portland, OR 97227	Project Manager: Paul Ecker	09/09/15 09:54

Notes and Definitions

Qualifiers:

A-01	Analysis performed on NWTPH-Dx Silica gel/acid cleaned extract. Laboratory has demonstrated no affect on PAH recoveries by extract clean up procedure.
F-11	The hydrocarbon pattern indicates possible weathered diesel, or a contribution from a related component.
Q-19	Blank Spike Duplicate (BSD) sample analyzed in place of Matrix Spike/Duplicate samples due to limited sample amount available for analysis.
Q-22	Due to limited sample volume or hold time restraints, the NWTPH-Dx extract was used for the 8270 SIM PAH analysis. Therefore no PAH Surrogates and/or Batch QC results are available. Results are Estimated Values.

Notes and Conventions:

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry'designation are not dry weight corrected.
RPD	Relative Percent Difference
MDL	If MDL is not listed, data has been evaluated to the Method Reporting Limit only.
WMSC	Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.
Batch QC	In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.
Blank Policy	Apex assesses blank data for potential high bias down to a level equal to ½ the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses. For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor. Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.
---	QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
***	Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Apex Laboratories

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

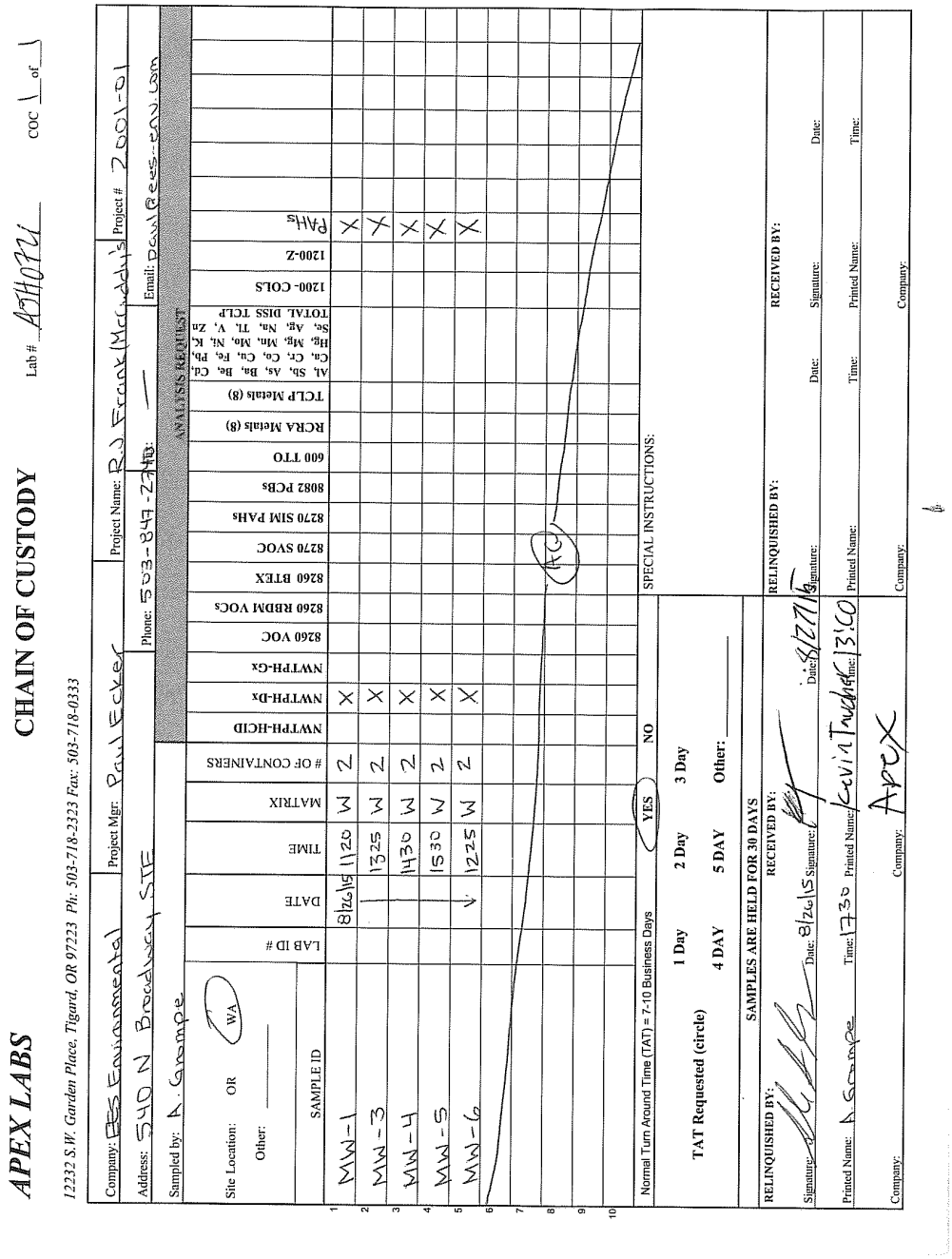
Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Labs

12232 S.W. Garden Place
Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

EES Environmental Inc	Project: **RJ Frank**	
240 N Broadway Ste 203	Project Number: 2001-01	**Reported:**
Portland, OR 97227	Project Manager: Paul Ecker	09/09/15 09:54



Apex Laboratories

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Philip Nerenberg

Philip Nerenberg, Lab Director

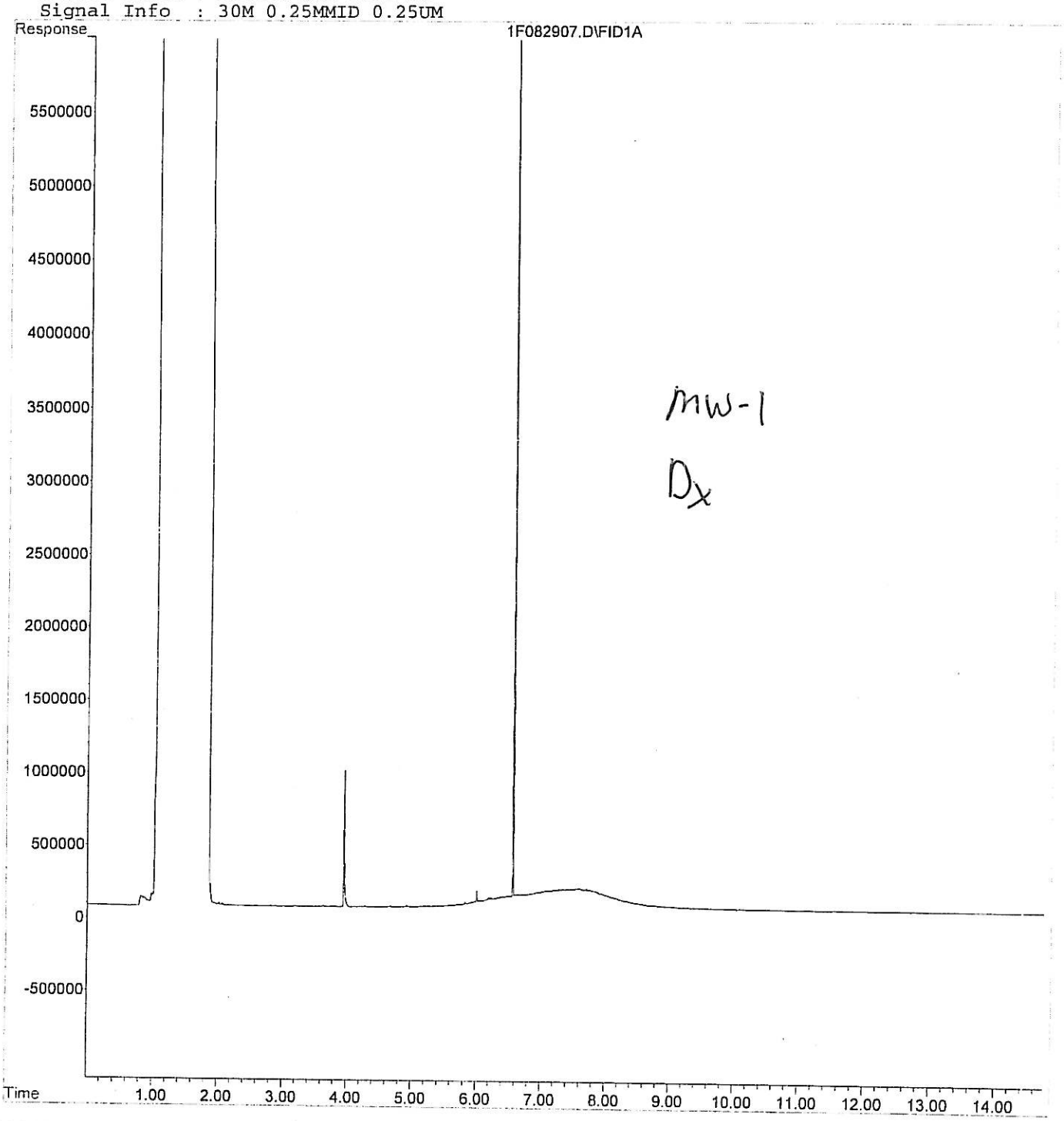
Attachment B

Quantitation Report (QT Reviewed)

Data File : E:\1\DATA\5H29003\1F082907.D
Acq On : 29 Aug 2015 18:17
Sample : A5H0721-01RE1
Misc :
IntFile : SUR.E
Vial: 4
Operator: KEH
Inst : HP G1530A
Multiplr: 1.00
Quant Time: Aug 31 9:03 2015 Quant Results File: 1F50610W.RES

Quant Method : E:\1\METHODS\1F50610W.M (Chemstation Integrator)
Title : DUALFID1F, NWTPH-Dx/TPH-8015m
Last Update : Mon Aug 31 08:45:27 2015
Response via : Multiple Level Calibration
DataAcq Meth : A1F40422.M

Volume Inj. : 1uL
Signal Phase : Restek Rxi-5Sil MS
Signal Info : 30M 0.25MMID 0.25UM



MW-1
Dx

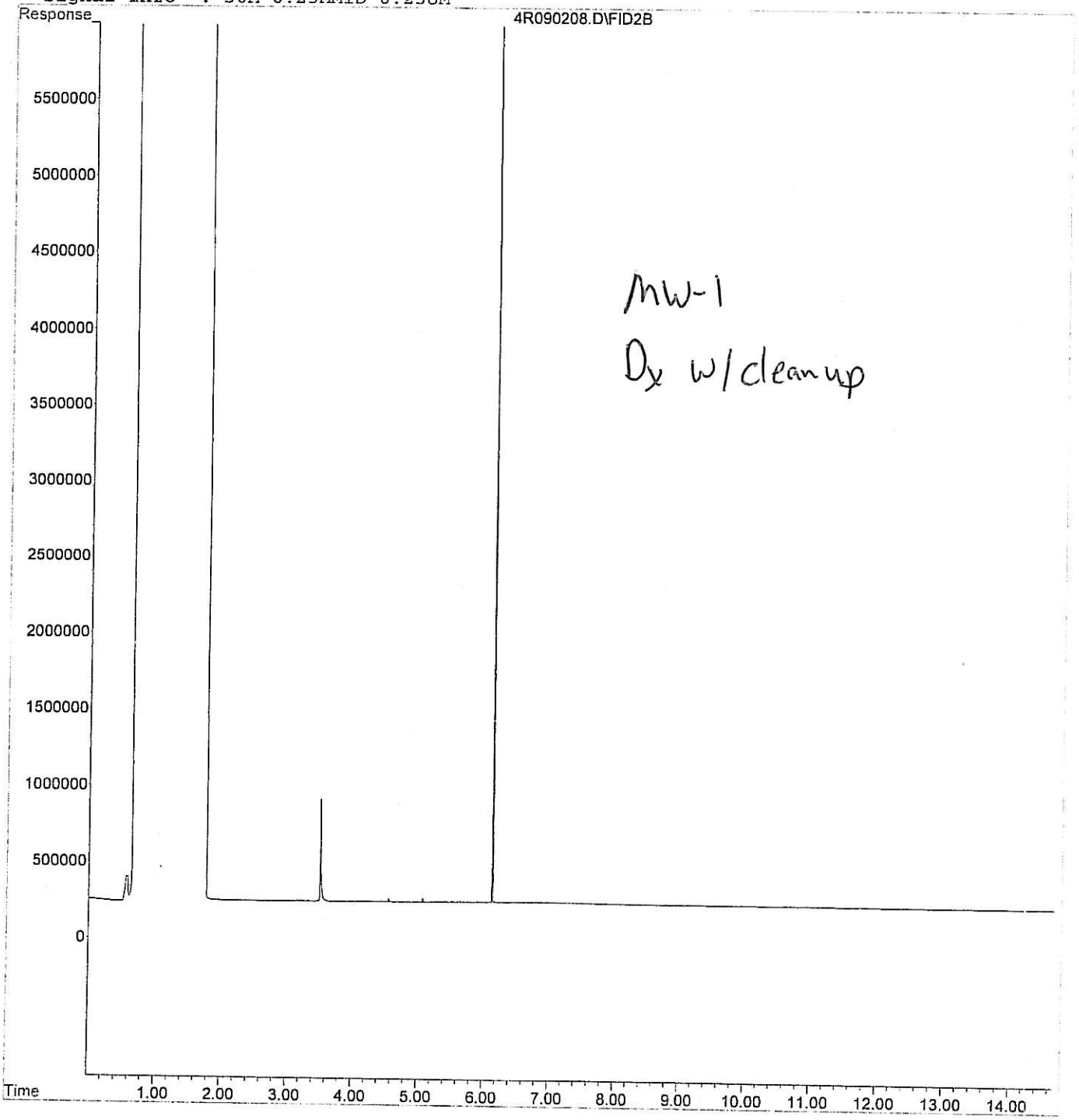
Quantitation Report (Not Reviewed)

Data File : G:\4\DATA\5I02014\4R090208.D
Acq On : 2 Sep 2015 12:12
Sample : A5H0721-01
Misc :
IntFile : SUR.E
Quant Time: Sep 2 14:27 2015 Quant Results File: 4R50829W.RES

Vial: 54
Operator: KEH
Inst : HP G1530A
Multiplr: 1.00

Quant Method : C:\HPCHEM\4\METHODS\4R50829W.M (Chemstation Integrator)
Title : DUALFID4R, NWTPH-Dx
Last Update : Wed Sep 02 12:32:58 2015
Response via : Multiple Level Calibration
DataAcq Meth : A4F40503.M

Volume Inj. : 1uL
Signal Phase : Restek Rxi-5Sil MS
Signal Info : 30M 0.25MMID 0.25UM



MW-1
Dx w/cleanup