Memorandum

To	Geoff Brown	File no	4-61M-125452.01.2
	Oregon DEQ	cc	RueAnn Thomas
From	J Stephen Barnett, Michelle Peterson		
	AMEC Environment & Infrastructure, Inc.		
Date	February 19, 2014		

Subject **Revised Baseline Human Health Risk Assessment Addendum**

This technical memorandum presents an addendum to the Revised Baseline Human Health Risk Assessment (Baxter, 2006), dated July 28, 2006. This Addendum summarizes the updates to the 2006 risk assessment to reflect recent and more representative groundwater data, soil ingestion rates, new soil background concentrations, and updated risk screening levels, as requested and approved by the Oregon Department of Environmental Quality (DEQ). These results will be incorporated into a Revised Feasibility Study for the Site that will be submitted to DEQ.

Revised risk assessment tables are provided in Attachment A (updates are highlighted in yellow). Materials supporting the revised tables are provided in Attachments B through D.

UPDATES TO THE QUANTITATIVE EVALUATION

Four updates were made to the quantitative evaluation, summarized as follows:

1. The child ingestion rate for soil and sediment was reduced from 400 milligrams/day (mg/day) to 200 mg/day for the off-site soil residential exposure scenario (Table 7-4) and the off-Site sediment recreational exposure scenario (Table 7-10), to be consistent with DEQ's current approach.
2. Arsenic was screened out from further evaluation in the off-Site residential exposure scenario (Table 7-4), because the maximum detected arsenic concentration of 6.9 milligrams/kilogram (mg/kg) is below the naturally occurring background level of arsenic for the Willamette Valley (17 mg/kg) (DEQ, 2013).
3. Dioxins/furans were screened out of the off-Site residential exposure scenario (Table 7-4) because the estimated risk for each congener was below 1×10^{-6} and the cumulative risk for all congeners was below 1×10^{-5}, as illustrated on the table provided in Attachment B.

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This assessment was approved by DEQ on July 24, 2013 (e-mail approval provided in Attachment B).

4. The groundwater data set for the future off-Site irrigation and swimming exposure scenarios was updated, as agreed with DEQ, as follows:

   - The most recent data (2009 to 2012) from off-Site monitoring wells and on-Site perimeter wells was used to develop new exposure point concentrations (EPCs) for arsenic, pentachlorophenol (PCP), and selected polynuclear aromatic hydrocarbons (PAHs). These PAHs included benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and naphthalene. Wells included in the EPC calculations are:

     – On-Site perimeter wells – W-11S; W-11I; W-13S; W-13I; W-18AS; W-18AI; W-20I and W-23

     Off-Site monitoring wells – W-16AS; W-16AI; W-17AS; W-17AI; W-17BI; W-24; W-25; W-26; W-29; W-32; W-34; W-35; W-36; and Zipolog.

     No wells from the interior portion of the JH Baxter property were included. No residential wells were included because there are no recent data from residential wells.

   - EPCs were calculated for each detected compound using ProUCL (version 4.1 and version 5.0 for updated naphthalene and PCP EPCs) and a 2-step process. In the first step, the 95% upper confidence limit (UCL) was calculated to allow ProUCL to recommend the appropriate statistical method based on the distribution of the data set. In the second step, the 90% confidence level was specified to calculate 90% UCLs. The UCLs used as the EPCs in the updated quantitative evaluation (Tables 7-7 and 7-8) are those generated at the 90% confidence level using the statistical method recommended by ProUCL at the 95% confidence level. ProUCL printouts for arsenic (total and dissolved), PCP, and PAHs (90% and 95% UCLs), as well as tables of the analytical results, are provided in Attachments C1 through C4. The maximum method detection limit is conservatively used as the EPC for compounds that were not detected.

   - New dioxin/furan groundwater data were collected from the same wells as were originally sampled in 2002. The wells were re-sampled in 2013 using low-flow methods, which provide more representative data for dioxins in groundwater, as approved by DEQ. The toxic equivalence for each congener was calculated to determine the potential for unacceptable risk under future off-Site exposure scenarios using the water for irrigation and pool swimming (Tables 7-7 and 7-8). The calculated toxic equivalence, data quality review report, and analytical results are provided in Attachments D1 through D3.

UPDATES TO THE SUMMARY OF RISKS

The updates to estimated risks affect the following exposure scenarios as summarized in Table 7-13:

- Current Off-Site Residential Scenario (receptor exposed to soil) – There are no unacceptable risks estimated for this receptor. No further action for off-Site soil is warranted.
- Future off-Site residential Scenario (receptor exposed to irrigation and pool water) – Unacceptable risk from PCP increased because the detected concentrations in pumping wells W-13S and W-13I are included in the dataset (which were not included in the original risk assessment). In addition, a large set of non-detected pentachlorophenol concentrations in residential wells were not included in the current dataset, as residential sampling was completed prior to 2009. Unacceptable risk also was estimated for some PAHs and dioxin/furan congeners that were not detected, as the maximum method detection limit was used as a concentration in the risk calculation. These conservative assumptions as applied to the updated evaluation overestimate the risk to future off-Site residential receptors because the pumping well creates artificially high groundwater concentrations at the perimeter of the Site, and because the non-detect compounds may not be present at all. The proposed Site remedy will address PCP, PAHs, and dioxins/furans in groundwater; therefore no changes to the proposed remedy are warranted.
- Current/Future Recreational User Exposed to Sediments – There are no unacceptable risks estimated for this receptor. No further action for sediment is warranted.

REFERENCES

Baxter, 2006. Revised Baseline Human Health Risk Assessment. Prepared for Oregon Department of Environmental Quality by J.H. Baxter. July 28, 2006.

DEQ, 2013. Development of Oregon Background Metals Concentrations in Soil – Technical Report, Land Quality Division Cleanup Program, March 2013.

ATTACHMENT A

Revised Risk Calculations

TABLE 7-1a
Calculated Risk Estimates Due to Potential Soil Exposures
On-Site Worker Scenario

Parameter	Description	Units	Value	Reference
Dose	Dose of chemical	mg/kg-day	See below	Calculated
HI	Hazard index	unitless	See below	Calculated
Risk	Risk	unitless	See below	Calculated
EPCs	Exposure Point Concentration in soil	mg/kg	See below	Calculated
IRa	Adult Soil ingestion rate	mg/day	100	ODEQ, 1998
EF	Exposure frequency	days/year	250	ODEQ, 1998
EvD	Event frequency	event/day	1	ODEQ, 1998
ED	Exposure duration - adult	years	25	ODEQ, 1998
Bwa	Body weight - adult	kg	70	ODEQ, 1998
AP	Averaging period	days	See below	Calculated
VF	Volatilization factor	m^3/kg	See below	chemical-specific
PEF	Particulate emmission factor	m^3/kg	1.32E+09	USEPA, 1996a
SSAa	Skin surface area - adult	cm^2	4100	ODEQ, 1998
DAF	Dermal absorption factor	unitless	See below	chemical-specific
SARa	Soil adherence rate - adult	mg/cm^2 - ev	0.08	ODEQ, 1998
InhRa	Inhalation rate - adult	m^3/day	15.2	ODEQ, 1998
CF1	Conversion factor, mg to kg	kg/mg	1.00E-06	Calculated
RfDo	Oral reference dose	mg/kg-day	See below	chemical-specific
RfDi	Inhalation reference dose	mg/kg-day	See below	Calculated
CSFo	Oral cancer slope factor	$(mg/kg\text{-}day)^{-1}$	See below	Calculated
CSFi	Inhalation cancer slope factor	$(mg/kg\text{-}day)^{-1}$	See below	Calculated

TABLE 7-1a
Calculated Risk Estimates Due to Potential Soil Exposures
On-Site Worker Scenario

Carcinogens			*AP =*	*25,550 days*								**Total**
Compound	**EPCs**	**DAF**	**BAF**	**CSFo**	**CSFi**	**Dose$_{ing}$**	**Dose$_{der}$**	**Dose$_{inh}$**	**Risk$_{ing}$**	**Risk$_{der}$**	**Risk$_{inh}$**	**Total Risk**
Inorganics												
Arsenic	340.2	0.01	0.5	1.5E+00	1.5E+01	5.9E-05	3.9E-06	1.4E-08	9.E-05	6.E-06	2.E-07	1.E-04
SVOCs												
Benzo(a) anthracene	1.8	0.1	--	7.3E-01	7.3E-01	6.1E-07	2.0E-07	7.0E-11	4.E-07	1.E-07	5.E-11	6.E-07
Dibenz(a,h) anthracene	1.9	0.1	--	7.3E+00	7.3E+00	6.5E-07	2.1E-07	7.5E-11	5.E-06	2.E-06	5.E-10	6.E-06
Benzo(a) pyrene	1.0	0.1	--	7.3E+00	7.3E+00	3.4E-07	1.1E-07	4.0E-11	3.E-06	8.E-07	3.E-10	3.E-06
Benzo(b) fluoranthene	2.0	0.1	--	7.3E-01	7.3E-01	7.0E-07	2.3E-07	8.0E-11	5.E-07	2.E-07	6.E-11	7.E-07
Pentachloro-phenol (PCI	18.8	0.25	--	1.2E-01	1.2E-01	6.6E-06	5.4E-06	7.6E-10	8.E-07	6.E-07	9.E-11	1.E-06
Indeno(1,2,3-cd) pyrene	0.9	0.1	--	7.3E-01	7.3E-01	3.0E-07	9.7E-08	3.4E-11	2.E-07	7.E-08	2.E-11	3.E-07
Dioxin/Furans												
1,2,3,6,7,8-HxCDD	2.5E-05	0.03		1.5E+05	1.5E+05	8.8E-12	8.7E-13	1.0E-15	1.E-06	1.E-07	2.E-10	1.E-06
1,2,3,4,6,7,8-HpCDD (B-23	5.9E-05	0.03		1.5E+05	1.5E+05	2.1E-11	2.0E-12	2.4E-15	3.E-06	3.E-07	4.E-10	3.E-06
1,2,3,4,6,7,8-HpCDF	8.8E-06	0.03		1.5E+05	1.5E+05	3.1E-12	3.0E-13	3.5E-16	5.E-07	5.E-08	5.E-11	5.E-07
										Cumulative Risk		**1.E-04**

Noncarcinogens			*AP =*	*9.1E+03 days*								**Total**
Compound	**RBCs**	**DAF**	**BAF**	**RfDo**	**RfDi**	**Dose$_{ing}$**	**Dose$_{der}$**	**Dose$_{inh}$**	**HI$_{ing}$**	**HI$_{der}$**	**HI$_{inh}$**	**HI**
Inorganics												
Arsenic	340.2	0.01	0.5	3.0E-04	3.0E-04	1.7E-04	1.1E-05	3.8E-08	0.6	0.0	0.0	0.6
Chromium	70.6	0.01	--	1.5E+00	--	6.9E-05	2.3E-06	8.0E-09	0.0	0.0	--	0.0
Copper	484.9	0.01	--	4.0E-02	4.0E-02	4.7E-04	1.6E-05	5.5E-08	0.0	0.0	0.0	0.0
Iron	21123.0	0.01		3.0E-01	3.0E-01	2.1E-02	6.8E-04	2.4E-06	0.1	0.0	0.0	0.1
Manganese	547.7	0.01		2.4E-02	1.4E-05	5.4E-04	1.8E-05	6.2E-08	0.0	0.0	0.0	0.0
SVOCs												
Pentachlorophenol	18.8	0.25	--	3.0E-02	3.0E-02	1.8E-05	1.5E-05	2.1E-09	0.0	0.0	0.0	0.0
										Cumulative HI		**0.7**

BAF = Bioavailability Factor

TABLE 7-1b
Calculated Risk Estimates Due to Potential Soil Exposures - Undeveloped Area
On-Site Worker Scenario

Parameter	Description	Units	Value	Reference
Dose	Dose of chemical	mg/kg-day	See below	Calculated
HI	Hazard index	unitless	See below	Calculated
Risk	Risk	unitless	See below	Calculated
EPCs	Exposure Point Concentration in soil	mg/kg	See below	Calculated
IRa	Adult Soil ingestion rate	mg/day	100	ODEQ, 1998
EF	Exposure frequency	days/year	250	ODEQ, 1998
EvD	Event frequency	event/day	1	ODEQ, 1998
ED	Exposure duration - adult	years	25	ODEQ, 1998
Bwa	Body weight - adult	kg	70	ODEQ, 1998
AP	Averaging period	days	See below	Calculated
VF	Volatilization factor	m^3/kg	See below	chemical-specific
PEF	Particulate emmission factor	m^3/kg	1.32E+09	USEPA, 1996a
SSAa	Skin surface area - adult	cm^2	4100	ODEQ, 1998
DAF	Dermal absorption factor	unitless	See below	chemical-specific
SARa	Soil adherence rate - adult	mg/cm^2 - ev	0.08	ODEQ, 1998
InhRa	Inhalation rate - adult	m^3/day	15.2	ODEQ, 1998
CF1	Conversion factor, mg to kg	kg/mg	1.00E-06	Calculated
RfDo	Oral reference dose	mg/kg-day	See below	chemical-specific
RfDi	Inhalation reference dose	mg/kg-day	See below	Calculated
CSFo	Oral cancer slope factor	$(mg/kg\text{-}day)^{-1}$	See below	Calculated
CSFi	Inhalation cancer slope factor	$(mg/kg\text{-}day)^{-1}$	See below	Calculated

Carcinogens		*AP =*	*25,550 days*								**Total**
Compound	**EPCs**	**DAF**	**BAF**	**CSFo**	**CSFi**	**$Dose_{ing}$**	**$Dose_{der}$**	**$Dose_{inh}$**	**$Risk_{ing}$**	**$Risk_{der}$**	**$Risk_{inh}$**	**Risk**
Inorganics												
Arsenic	62.0	0.01	0.5	1.5E+00	1.5E+01	1.1E-05	7.1E-07	2.5E-09	2.E-05	1.E-06	4.E-08	2.E-05
SVOCs												
Benzo(a) pyrene	0.4	0.1	--	7.3E+00	7.3E+00	1.4E-07	4.7E-08	1.6E-11	1.E-06	3.E-07	1.E-10	1.E-06
Dioxin/Furans												
1,2,3,7,8-PeCDD	4.0E-05	0.03	--	1.5E+05	1.5E+05	1.4E-11	1.4E-12	1.6E-15	2.E-06	2.E-07	2.E-10	2.E-06
1,2,3,6,7,8-HxCDD	6.8E-05	0.03	--	1.5E+05	1.5E+05	2.4E-11	2.3E-12	2.7E-15	4.E-06	4.E-07	4.E-10	4.E-06
1,2,3,7,8,9-HxCDD	2.7E-05	0.03	--	1.5E+05	1.5E+05	9.4E-12	9.3E-13	1.1E-15	1.E-06	1.E-07	2.E-10	2.E-06
1,2,3,4,6,7,8-HpCDD	1.6E-04	0.03	--	1.5E+05	1.5E+05	5.6E-11	5.5E-12	6.4E-15	8.E-06	8.E-07	1.E-09	9.E-06
OCDD	2.1E-05	0.03	--	1.5E+05	1.5E+05	7.3E-12	7.2E-13	8.5E-16	1.E-06	1.E-07	1.E-10	1.E-06
2,3,4,7,8-PeCDF	3.7E-05	0.03	--	1.5E+05	1.5E+05	1.3E-11	1.3E-12	1.5E-15	2.E-06	2.E-07	2.E-10	2.E-06
1,2,3,4,7,8-HxCDF	2.2E-05	0.03	--	1.5E+05	1.5E+05	7.7E-12	7.6E-13	8.9E-16	1.E-06	1.E-07	1.E-10	1.E-06
1,2,3,4,6,7,8-HpCDF	4.4E-05	0.03	--	1.5E+05	1.5E+05	1.5E-11	1.5E-12	1.8E-15	2.E-06	2.E-07	3.E-10	3.E-06
										Cumulative Risk		4.E-05

Noncarcinogens			*AP =*	*9.1E+03 days*							**Total**
Compound	**RBCs**	**DAF**	**BAF**	**RfDo**	**RfDi**	**$Dose_{ing}$**	**$Dose_{der}$**	**$Dose_{inh}$**	**HI_{ing}**	**HI_{der}**	**HI_{inh}**	**HI**
Inorganics												
Arsenic	62.0	0.01	0.5	3.0E-04	3.0E-04	3.0E-05	2.0E-06	7.0E-09	0.1	0.0	0.0	0.1
										Cumulative HI		**0.1**

BAF = Bioavailability Factor

TABLE7-2a
Calculated Risk Estimates Due to Potential Soil Exposures
On-Site Trench Worker Scenario - Default Parameters

Parameter	Description	Units	Value	Reference
Dose	Dose of chemical	mg/kg-day	See below	Calculated
HI	Hazard index	unitless	See below	Calculated
Risk	Risk	unitless	See below	Calculated
RBCs	Risk-based concentration in soil	mg/kg	See below	Calculated
IRa	Adult Soil ingestion rate	mg/day	480	ODEQ, 1998
EF	Exposure frequency	days/year	9	ODEQ, 1998
EvD	Event frequency	event/day	2	ODEQ, 1998
ED	Exposure duration - adult	years	1	ODEQ, 1998
Bwa	Body weight - adult	kg	70	ODEQ, 1998
AP	Averaging period	days	See below	Calculated
VF	Volatilization factor	m^3/kg	See below	chemical-specific
PEF	Particulate emmission factor	m^3/kg	1.32E+09	USEPA, 1996a
SSAa	Skin surface area - adult	cm^2	4100	ODEQ, 1998
DAF	Dermal absorption factor	unitless	See below	chemical-specific
SARa	Soil adherence rate - adult	mg/cm^2 - ev	1	ODEQ, 1998
InhRa	Inhalation rate - adult	m^3/day	15.2	ODEQ, 1998
CF1	Conversion factor, mg to kg	kg/mg	1.00E-06	Calculated
RfDo	Oral reference dose	mg/kg-day	See below	chemical-specific
RfDi	Inhalation reference dose	mg/kg-day	See below	Calculated
CSFo	Oral cancer slope factor	$(mg/kg\text{-}day)^{-1}$	See below	Calculated
CSFi	Inhalation cancer slope factor	$(mg/kg\text{-}day)^{-1}$	See below	Calculated

TABLE7-2a
Calculated Risk Estimates Due to Potential Soil Exposures
On-Site Trench Worker Scenario - Default Parameters

Carcinogens			*AP =*	*25,550 days*								**Total**
Compound	**EPCs**	**DAF**	**BAF**	**CSFo**	**CSFi**	**$Dose_{ing}$**	**$Dose_{der}$**	**$Dose_{inh}$**	**$Risk_{ing}$**	**$Risk_{der}$**	**$Risk_{inh}$**	**Risk**
Inorganics												
Arsenic	203.9	0.01	0.5	1.5E+00	1.5E+01	2.5E-07	8.4E-08	9.8E-13	3.7E-07	1.3E-07	1.5E-11	5.0E-07
SVOCs												
Benzo(a) anthracene	1.6	0.1	--	7.3E-01	7.3E-01	3.8E-09	6.6E-09	9.2E-14	3.E-09	5.E-09	7.E-14	8.E-09
Dibenz(a,h) anthracene	1.2	0.1	--	7.3E+00	7.3E+00	2.9E-09	5.0E-09	7.0E-14	2.E-08	4.E-08	5.E-13	6.E-08
Benzo(a) pyrene	0.8	0.1	--	7.3E+00	7.3E+00	1.9E-09	3.3E-09	4.6E-14	1.E-08	2.E-08	3.E-13	4.E-08
Benzo(b) fluoranthene	1.9	0.1	--	7.3E-01	7.3E-01	4.6E-09	7.8E-09	1.1E-13	3.E-09	6.E-09	8.E-14	9.E-09
Pentachloro-phenol (PCP	21.7	0.25	--	1.2E-01	1.2E-01	5.2E-08	2.2E-07	1.3E-12	6.E-09	3.E-08	2.E-13	3.E-08
Indeno(1,2,3-cd) pyrene	0.7	0.1	--	7.3E-01	7.3E-01	1.8E-09	3.0E-09	4.3E-14	1.E-09	2.E-09	3.E-14	4.E-09
Dioxin/Furans												
1,2,3,6,7,8-HxCDD	2.5E-05	0.03		1.5E+05	1.5E+05	6.1E-14	3.1E-14	1.5E-18	9.E-09	5.E-09	2.E-13	1.E-08
1,2,3,4,6,7,8-HpCDD	1.4E-05	0.03		1.5E+05	1.5E+05	3.5E-14	1.8E-14	8.3E-19	5.E-09	3.E-09	1.E-13	8.E-09
1,2,3,4,6,7,8-HpCDF	8.8E-06	0.03		1.5E+05	1.5E+05	2.1E-14	1.1E-14	5.1E-19	3.E-09	2.E-09	8.E-14	5.E-09
										Cumulative Risk		**7.E-07**

Noncarcinogens			*AP =*	*3.7E+02 days*								**Total**
Compound	**RBCs**	**DAF**	**BAF**	**RfDo**	**RfDi**	**$Dose_{ing}$**	**$Dose_{der}$**	**$Dose_{inh}$**	**HI_{ing}**	**HI_{der}**	**HI_{inh}**	**HI**
Inorganics												
Arsenic	203.9	0.01	0.5	3.0E-04	3.0E-04	1.7E-05	5.9E-06	8.3E-10	6.E-02	2.E-02	3.E-06	8.E-02
Chromium	59.8	0.01	--	1.5E+00	--	1.0E-05	1.7E-06	2.4E-10	7.E-06	1.E-06	--	8.E-06
Iron	38806.0	0.01		3.0E-01	3.0E-01	6.6E-03	1.1E-03	1.6E-07	2.E-02	4.E-03	5.E-07	3.E-02
Manganese	984.3	0.01		2.4E-02	1.4E-05	1.7E-04	2.8E-05	4.0E-09	7.E-03	1.E-03	3.E-04	8.E-03
Copper	288.5	0.01	--	4.0E-02	--	4.9E-05	8.3E-06	1.2E-09	1.E-03	2.E-04	--	1.E-03
SVOCs												
Pentachlorophenol	21.7	0.25	--	3.0E-02	3.0E-02	3.7E-06	1.6E-05	8.8E-11	1.E-04	5.E-04	3.E-09	6.E-04
										Cumulative HI		**0.1**

TABLE 7-2b
Calculated Risk Estimates Due to Potential Soil Exposures - Undeveloped Area
On-Site Trench Worker Scenario - Undeveloped Area

Parameter	Description	Units	Value	Reference
Dose	Dose of chemical	mg/kg-day	See below	Calculated
HI	Hazard index	unitless	See below	Calculated
Risk	Risk	unitless	See below	Calculated
EPCs	Exposure Point Concentration in soil	mg/kg	See below	Calculated
IRa	Adult Soil ingestion rate	mg/day	480	ODEQ, 1998
EF	Exposure frequency	days/year	9	ODEQ, 1998
EvD	Event frequency	event/day	2	ODEQ, 1998
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AP	Averaging period	days	See below	Calculated
VF	Volatilization factor	m^3/kg	See below	chemical-specific
PEF	Particulate emmission factor	m^3/kg	1.32E+09	USEPA, 1996a
SSAa	Skin surface area - adult	cm^2	4100	ODEQ, 1998
DAF	Dermal absorption factor	unitless	See below	chemical-specific
SARa	Soil adherence rate - adult	mg/cm^2 - ev	0.08	ODEQ, 1998
InhRa	Inhalation rate - adult	m^3/day	15.2	ODEQ, 1998
CF1	Conversion factor, mg to kg	kg/mg	1.00E-06	Calculated
RfDo	Oral reference dose	mg/kg-day	See below	chemical-specific
RfDi	Inhalation reference dose	mg/kg-day	See below	Calculated
CSFo	Oral cancer slope factor	$(mg/kg\text{-}day)^{-1}$	See below	Calculated
CSFi	Inhalation cancer slope factor	$(mg/kg\text{-}day)^{-1}$	See below	Calculated

Carcinogens			*AP =*	*25,550 days*								**Total**
Compound	**EPCs**	**DAF**	**BAF**	**CSFo**	**CSFi**	**$Dose_{ing}$**	**$Dose_{der}$**	**$Dose_{inh}$**	**$Risk_{ing}$**	**$Risk_{der}$**	**$Risk_{inh}$**	**Risk**
Inorganics												
Arsenic	61.9	0.03	0.5	1.5E+00	1.5E+01	7.5E-08	6.1E-09	3.6E-12	1.E-07	9.E-09	5.E-11	1.E-07
SVOCs												
Benzo(a) pyrene	0.41	0.13	--	7.3E+00	7.3E+00	9.8E-10	1.7E-10	2.4E-14	7.E-09	1.E-09	2.E-13	8.E-09
Dioxin/Furans												
1,2,3,7,8-PeCDD	4.0E-05	0.03		1.5E+05	1.5E+05	9.7E-14	4.0E-15	2.3E-18	1.E-08	6.E-10	3.E-13	2.E-08
1,2,3,6,7,8-HxCDD	6.8E-05	0.03		1.5E+05	1.5E+05	1.6E-13	6.7E-15	3.9E-18	2.E-08	1.E-09	6.E-13	3.E-08
1,2,3,7,8,9-HxCDD	2.7E-05	0.03		1.5E+05	1.5E+05	6.5E-14	2.7E-15	1.6E-18	1.E-08	4.E-10	2.E-13	1.E-08
1,2,3,4,6,7,8-HpCDD	1.6E-04	0.03		1.5E+05	1.5E+05	3.9E-13	1.6E-14	9.3E-18	6.E-08	2.E-09	1.E-12	6.E-08
OCDD	2.1E-05	0.03		1.5E+05	1.5E+05	5.1E-14	2.1E-15	1.2E-18	8.E-09	3.E-10	2.E-13	8.E-09
2,3,4,7,8-PeCDF	3.7E-05	0.03		1.5E+05	1.5E+05	8.9E-14	3.7E-15	2.1E-18	1.E-08	5.E-10	3.E-13	1.E-08
1,2,3,4,7,8-HxCDF	2.2E-05	0.03		1.5E+05	1.5E+05	5.3E-14	2.2E-15	1.3E-18	8.E-09	3.E-10	2.E-13	8.E-09
1,2,3,4,6,7,8-HpCDF	4.4E-05	0.03		1.5E+05	1.5E+05	1.1E-13	4.4E-15	2.5E-18	2.E-08	7.E-10	4.E-13	2.E-08
										Cumulative Risk		**3.E-07**

Noncarcinogens			*AP =*	*3.7E+02 days*								**Total**
Compound	**RBCs**	**DAF**	**BAF**	**RfDo**	**RfDi**	**$Dose_{ing}$**	**$Dose_{der}$**	**$Dose_{inh}$**	**HI_{ing}**	**HI_{der}**	**HI_{inh}**	**HI**
Inorganics												
Arsenic	61.9	0.03	0.5	3.0E-04	3.0E-04	5.2E-06	4.3E-07	2.5E-10	1.7E-02	1.4E-03	8.4E-07	1.9E-02
										Cumulative HI		**0.02**

BAF = Bioavailability Factor

TABLE 7-3
Calculated Risk Estimates Due to Potential Groundwater Exposures
On-Site Trenchworker Scenario

Parameter	Description	Units	Value	Reference
Dose	Dose of chemical	mg/kg-day	See below	Calculated
HI	Hazard index	unitless	See below	Calculated
Risk	Risk	unitless	See below	Calculated
RBCw	Chemical concentration in water	mg/L	See below	Calculated
τ	Lag time	hr/event	2	ODEQ, 1998
InhRa	Inhalation Rate, adult	m3/day	15.2	ODEQ, 1998
IngRa	Adult Trenchwork'ser Water ingestion rate	L/day	0.05	ODEQ, 1998
EF	Exposure frequency	days/year	9	Site-specific
EvD	Event frequency	event/day	2	ODEQ, 1998
ED	Exposure duration - adult	years	1	ODEQ, 1998
Bwa	Body weight - adult	kg	70	ODEQ, 1998
AP	Averaging period	days	See below	Calculated
VF	Volatilization factor	m^3/kg	See below	chemical-specific
SSAa	Skin surface area - adult	cm^2	4,100	ODEQ, 1998
DAwater	Dermal Absorption dose	mg/cm^2-event	See below	chemical-specific
VF	Volitilization factor	L/m3	0.5	default (EPA, 1998)
CFhd	Conversion factor	hr/day	24	ODEQ, 1998
CF1	Conversion factor, L to cm3	L/cm3	1.00E-03	Calculated
RfDo	Oral reference dose	mg/kg-day	See below	Calculated
RfDi	Inhalation reference dose	mg/kg-day	See below	Calculated
CSFo	Oral cancer slope factor	$(mg/kg-day)^{-1}$	See below	Calculated
CSFi	Inhalation cancer slope factor	$(mg/kg-day)^{-1}$	See below	Calculated

DERMAL EXPOSURE PAI					DAevent		selected			
Chemical	Kp (cm/hr)	B (unitless)	tao (unitless)	t* (hour)	ET < t*	ET > t*	DAevent (mg/cm2-ev)	RAIS, 1/06	VDEQ	DA guidance
Arsenic	0.001									
Benzene	0.021	0.01	0.26	0.63	6.57E-07	8.27E-07	8.27E-07			0.021
Benzo(a)anthracene	0.81	46.00	2.20	10.00	1.15E-05	2.58E-05	1.15E-05			0.81
Dibenz(a,h) anthracene	2.700	690.00	4.40	21.00	2.83E-05	9.12E-02	2.83E-05			2.7
Benzo(a)pyrene	1.200	130.00	2.90	14.00	1.06E-05	2.77E-02	1.06E-05			1.2
Benzo(b)fluoranthene	1.200	130.00	3.00	14.00	9.10E-06	2.41E-02	9.10E-06			1.2
Benzo(k)fluoranthene	1.200	130.00	3.00	14.00	4.94E-06	1.31E-02	4.94E-06			
Carbazole	0.0797	0.26	0.91	2.18	1.65E-05	1.84E-02	1.65E-05			
Pentachloro-phenol	0.65	72.00	3.70	17.00	6.14E-03	1.80E+01	6.14E-03			0.65
Indeno(1,2,3-cd) pyrene	1.900	380.00	4.20	20.00	7.84E-06	2.46E-02	7.84E-06			1.9
2,4,6-Trichloro-phenol	0.060	0.49	1.40	9.20	3.22E-06	4.16E-03	3.22E-06			0.059
2,3,7,8-TCDD	1.4	630.00	8.10	38.00	3.51E-11	1.53E-07	3.51E-11			1.4
1,2,3,7,8-PeCDD	1.4	630.00	8.10	38.00	5.23E-11	2.28E-07	5.23E-11			
1,2,3,6,7,8-HxCDD	1.4	630.00	8.10	38.00	1.53E-11	6.66E-08	1.53E-11			
1,2,3,4,6,7,8-HpCDD (B-23)	1.4	630.00	8.10	38.00	1.71E-11	7.48E-08	1.71E-11			
2,3,4,7,8-PeCDF	1.4	630.00	8.10	38.00	1.31E-11	5.74E-08	1.31E-11			
1,2,3,4,6,7,8-HpCDF	1.4	630.00	8.10	38.00	1.26E-11	5.51E-08	1.26E-11			
Iron	0.001									
Manganese	0.001									
Acenaphthene	0.133	4.01E-01	0.77	1.84	2.82E-05	3.16E-02	2.82E-05			
Acenaphthylene	0.141	5.13E-01	0.75	1.79	1.51E-04	1.72E-01	1.51E-04			
Chrysene	0.810	46.00	2.20	10.00	1.50E-05	3.37E-05	1.50E-05			0.81
Fluorene	0.171	0.53	0.90	2.15	9.95E-06	1.17E-02	9.95E-06			
Naphthalene	0.069	0.20	0.53	2.20	1.76E-04	1.90E-01	1.76E-04			0.069
4,6-Dinitro-2-methyl-pheno	0.0381	0.02	1.35	3.24	7.68E-05	8.05E-02	7.68E-05			
Ethylbenzene	0.074	0.14	0.39	1.30	1.76E-05	1.96E-02	1.76E-05			0.074

TABLE 7-3
Calculated Risk Estimates Due to Potential Groundwater Exposures
On-Site Trenchworker Scenario

Carcinogens			*25,550 days*								**Total**
Compound	**RBCw**	**DAwater**	**CSFo**	**CSFi**	**$Dose_{ing}$**	**$Dose_{der}$**	**$Dose_{inh}$**	**$Risk_{ing}$**	**$Risk_{der}$**	**$Risk_{inh}$**	**Risk**
Inorganics											
Arsenic	3.1E-02	6.12E-08	1.5E+00	1.5E+01	7.7E-09	2.5E-09	--	1.E-08	4.E-09	--	2.E-08
SVOCs											
Benzo(a) anthracene	2.4E-03	1.15E-05	7.3E-01	7.3E-01	6.1E-10	4.7E-07	--	4.E-10	3.E-07	--	3.E-07
Dibenz(a,h) anthracene	1.3E-03	2.83E-05	7.3E+00	7.3E+00	3.2E-10	1.2E-06	--	2.E-09	9.E-06	--	9.E-06
Benzo(a) pyrene	1.3E-03	1.06E-05	7.3E+00	7.3E+00	3.3E-10	4.4E-07	--	2.E-09	3.E-06	--	3.E-06
Benzo(b) fluoranthene	1.1E-03	9.10E-06	7.3E-01	7.3E-01	2.8E-10	3.8E-07	--	2.E-10	3.E-07	--	3.E-07
Benzo(k) fluoranthene	6.1E-04	4.94E-06	7.3E-02	7.3E-02	1.5E-10	2.0E-07	--	1.E-11	1.E-08	--	1.E-08
Chrysene	3.2E-03	1.50E-05	7.3E-03	7.3E-03	8.0E-10	6.2E-07		6.E-12	5.E-09	--	5.E-09
Naphthalene	8.9E-01	1.76E-04	1.2E-01	1.2E-01	2.2E-07	7.2E-06		3.E-08	9.E-07		9.E-07
Carbazole	5.6E-02	1.65E-05	2.0E-02	2.0E-02	1.4E-08	6.8E-07	--	3.E-10	1.E-08	--	1.E-08
Pentachlorophenol	1.3E+00	6.14E-03	1.2E-01	1.2E-01	3.2E-07	2.5E-04	--	4.E-08	3.E-05	--	3.E-05
Indeno(1,2,3-cd) pyrene	5.2E-04	7.84E-06	7.3E-01	7.3E-01	1.3E-10	3.2E-07	--	9.E-11	2.E-07	--	2.E-07
2,4,6-Trichloro-phenol	1.2E-02	3.22E-06	1.1E-02	1.1E-02	2.9E-09	2.7E-07	--	3.E-11	3.E-09	--	3.E-09
VOCs											
Benzene	1.6E-02	1.15E-05	5.5E-02	2.7E-02	4.0E-09	3.4E-08		2.E-10	2.E-09		2.E-09
Dioxin/Furans											
2,3,7,8-TCDD	2.3E-09	3.51E-11	1.50E+05	1.50E+05	5.7E-16	1.4E-12	--	9.E-11	2.E-07	--	2.E-07
1,2,3,7,8-PeCDD	3.4E-09	5.23E-11	1.50E+05	1.50E+05	8.4E-16	2.2E-12		1.E-10	3.E-07	--	3.E-07
1,2,3,6,7,8-HxCDD	9.8E-10	1.53E-11	1.50E+05	1.50E+05	2.5E-16	6.3E-13		4.E-11	9.E-08	--	9.E-08
1,2,3,4,6,7,8-HpCDD (B-23)	1.1E-09	1.71E-11	1.50E+05	1.50E+05	2.8E-16	7.1E-13		4.E-11	1.E-07	--	1.E-07
2,3,4,7,8-PeCDF	8.4E-10	1.31E-11	1.50E+05	1.50E+05	2.1E-16	5.4E-13		3.E-11	8.E-08	--	8.E-08
1,2,3,4,6,7,8-HpCDF	8.1E-10	1.26E-11	1.50E+05	1.50E+05	2.0E-16	5.2E-13		3.E-11	8.E-08	--	8.E-08
								Cumulative Risk			**4.E-05**

Noncarcinogens			*3.7E+02 days*								**Total**
Compound	**Cw**	**DAwater**	**RfDo**	**RfDi**	**$Dose_{ing}$**	**$Dose_{der}$**	**$Dose_{inh}$**	**HI_{ing}**	**HI_{der}**	**HI_{inh}**	**HI**
Inorganics											
Arsenic	3.1E-02	6.12E-08	3.0E-04	3.0E-04	5.4E-07	1.8E-07	--	1.8E-03	5.9E-04	--	2.4E-03
Iron	9.7E+00	1.94E-05	3.0E-01	3.0E-01	1.7E-04	5.6E-05	--	5.7E-04	1.9E-04	--	7.6E-04
Manganese	5.6E+00	1.12E-05	2.4E+02	1.4E-05	9.9E-05	3.2E-05	--	4.1E-07	1.4E-07	--	5.5E-07
SVOCs											
Acenaphthene	6.2E-02	2.82E-05	6.0E-02	6.0E-02	1.1E-06	8.1E-05	--	1.8E-05	1.4E-03	--	1.4E-03
Acenaphthylene	3.2E-01	1.51E-04	6.0E-02	6.0E-02	5.6E-06	4.4E-04	--	9.3E-05	7.3E-03	--	7.4E-03
Fluorene	1.6E-02	9.95E-06	4.0E-02	4.0E-02	2.8E-07	2.9E-05	--	6.9E-06	7.2E-04	--	7.3E-04
Naphthalene	8.9E-01	1.76E-04	2.0E-02	8.6E-04	1.6E-05	5.1E-04	--	7.8E-04	2.5E-02		2.6E-02
Pentachlorophenol	1.3E+00	6.14E-03	3.0E-02	3.0E-02	2.2E-05	1.8E-02	--	7.4E-04	5.9E-01	--	5.9E-01
2,4,6-Trichloro-phenol	1.2E-02	3.22E-06	1.0E-04	1.0E-04	2.0E-07	2.3E-05		2.0E-03	2.3E-01	--	2.3E-01
VOCs											
Benzene	1.6E-02	1.15E-05	4.0E-03	8.6E-03	2.8E-07	2.4E-06		6.9E-05	6.0E-04	0.0E+00	6.7E-04
Ethylbenzene	9.8E-02	1.76E-05	1.0E-01	2.9E-01	1.7E-06	5.1E-05		1.7E-05	5.1E-04	0.0E+00	5.3E-04
								Cumulative Hazard Index			**0.6**

TABLE 7-3
Calculated Risk Estimates Due to Potential Groundwater Exposures Via Inhalation
On-Site Trenchworker Scenario

Parameter	Description	Units	Value	Reference
Dose	Dose of chemical	mg/kg-day	See below	Calculated
HI	Hazard index	unitless	See below	Calculated
Risk	Risk	unitless	See below	Calculated
RBCw	Chemical concentration in water	mg/L	See below	Calculated
τ	Lag time	hr/event	2	ODEQ, 1998
InhRa	Inhalation Rate, adult	m3/day	15.2	ODEQ, 1998
IngRa	Adult Trenchwork'ser Water ingestion rate	L/day	0.05	ODEQ, 1998
EF	Exposure frequency	days/year	9	Site-specific
EvD	Event frequency	event/day	2	ODEQ, 1998
ED	Exposure duration - adult	years	1	ODEQ, 1998
Bwa	Body weight - adult	kg	70	ODEQ, 1998
AP	Averaging period	days	See below	Calculated
VF	Volatilization factor	m^3/kg	See below	chemical-specific
SSAa	Skin surface area - adult	cm^2	4,100	ODEQ, 1998
DAwater	Dermal Absorption dose	mg/cm^2-event	See below	chemical-specific
VF	Volitilization factor	L/m3	0.5	default (EPA, 1998)
CFhd	Conversion factor	hr/day	24	ODEQ, 1998
CF1	Conversion factor, L to cm3	L/cm3	1.00E-03	Calculated
RfDo	Oral reference dose	mg/kg-day	See below	Calculated
RfDi	Inhalation reference dose	mg/kg-day	See below	Calculated
CSFo	Oral cancer slope factor	$(mg/kg\text{-}day)^{-1}$	See below	Calculated
CSFi	Inhalation cancer slope factor	$(mg/kg\text{-}day)^{-1}$	See below	Calculated

TABLE 7-3
Calculated Risk Estimates Due to Potential Groundwater Exposures Via Inhalation
On-Site Trenchworker Scenario

Carcinogens			*25,550 days*								**Total**
Compound	**RBCw**	**DAwater**	**CSFo**	**CSFi**	**$Dose_{ing}$**	**$Dose_{der}$**	**$Dose_{inh}$**	**$Risk_{ing}$**	**$Risk_{der}$**	**$Risk_{inh}$**	**Risk**
SVOCs											
Naphthalene	8.9E-01	1.76E-04	1.2E-01	1.2E-01	--	--	2.8E-06	--	--	3.E-07	3.E-07
VOCs											
Benzene	1.6E-02	1.15E-05	5.5E-02	2.7E-02	--	--	5.0E-08	--	--	1.E-09	1.E-09
								Cumulative Risk			**3.E-07**

Noncarcinogens			*3.7E+02 days*								**Total**
Compound	**Cw**	**DAwater**	**RfDo**	**RfDi**	**$Dose_{ing}$**	**$Dose_{der}$**	**$Dose_{inh}$**	**HI_{ing}**	**HI_{der}**	**HI_{inh}**	**HI**
SVOCs											
Naphthalene	8.9E-01	1.76E-04	2.0E-02	8.6E-04			4.2E-03	--	--		0.0E+00
VOCs											
Benzene	1.6E-02	1.15E-05	4.0E-03	8.6E-03			1.0E-04	--	--	1.2E-02	1.2E-02
Ethylbenzene	9.8E-02	1.76E-05	1.0E-01	2.9E-01			5.6E-04	--	--	1.9E-03	1.9E-03
								Cumulative Hazard Index			**0.01**

TABLE 7-4
Calculated Risk Estimates Due to Potential Soil Exposures
Current Off-Site Residential Scenario

Parameter	Description	Units	Value	Reference	
Dose	Dose of chemical	mg/kg-day	See below	Calculated	
HI	Hazard index	unitless	See below	Calculated	
Risk	Risk	unitless	See below	Calculated	
RBCs	Risk-based concentration in soil	mg/kg	See below	Calculated	
IRar	Adult Residents's Soil ingestion rate	mg/day	100	ODEQ, 1998	
IRc	Child Soil ingestion rate	mg/day	200	ODEQ, 1998	Changed from 400
EF	Exposure frequency	days/year	350	ODEQ, 1998	
EvD	Event frequency	event/day	1	ODEQ, 1998	
ED	Exposure duration - adult	years	30	ODEQ, 1998	
EDc	Exposure duration - child	years	6	ODEQ, 1998	
Bwa	Body weight - adult	kg	70	chemical-specific	
BWc	Body weight - child	kg	15	ODEQ, 1998	
AP	Averaging period	days	See below	Calculated	
VF	Volatilization factor	m^3/kg	See below	chemical-specific	
PEF	Particulate emmission factor	m^3/kg	1.32E+09	USEPA, 1996a	
SSAa	Skin surface area - adult	cm^2	6900	ODEQ, 1998	
SSAc	Skin surface area - child	cm^2	5000	ODEQ, 1998	
DAF	Dermal absorption factor	unitless	See below	chemical-specific	
SARa	Soil adherence rate - adult	mg/cm^2 - ev	0.08	ODEQ, 1998	
SARc	Soil adherence rate - child	mg/cm^2 - ev	1	ODEQ, 1998	
InhRa	Inhalation rate - adult	m^3/day	15.2	ODEQ, 1998	
InhRc	Inhalation rate - child	m^3/day	8.3	ODEQ, 1998	
CF1	Conversion factor, mg to kg	kg/mg	1.00E-06	Calculated	
RfDo	Oral reference dose	mg/kg-day	See below	Calculated	
RfDi	Inhalation reference dose	mg/kg-day	See below	Calculated	
CSFo	Oral cancer slope factor	$(mg/kg\text{-}day)^{-1}$	See below	Calculated	
CSFi	Inhalation cancer slope factor	$(mg/kg\text{-}day)^{-1}$	See below	Calculated	

TABLE 7-4
Calculated Risk Estimates Due to Potential Soil Exposures
Current Off-Site Residential Scenario

Carcinogens			*AP =*	*25,550 days*								**Total**
Compound	**EPCs**	**DAF**	**BAF**	**CSFo**	**CSFi**	**$Dose_{ing}$**	**$Dose_{der}$**	**$Dose_{inh}$**	**$Risk_{ing}$**	**$Risk_{der}$**	**$Risk_{inh}$**	**Risk**
Inorganics												
Arsenic	5.0											
(EPC below DEQ Background of 17 mg/kg)												
SVOCs												
Benzo(a) pyrene	0.03	0.13	--	7.3E+00	7.3E+00	4.5E-08	1.1E-07	2.6E-12	3.E-07	8.E-07	2.E-11	1.E-06
Dioxin/Furans												
All congeners below DEQ's RSLs. Combined risk for all congeners below 10-5												
										Cumulative Risk		**1.E-06**

Noncarcinogens			*AP =*	*2,190 days*								**Total**
Compound	**RBCs**	**DAF**	**BAF**	**RfDo**	**RfDi**	**$Dose_{ing}$**	**$Dose_{der}$**	**$Dose_{inh}$**	**HI_{ing}**	**HI_{der}**	**HI_{inh}**	**HI**
Inorganics												
Iron	30091	0.01		3.00E-01	3.00E-01	3.8E-01	9.6E-02	1.2E-05	1.3E+00	3.2E-01	4.0E-05	1.6E+00
										Cumulative HI		**1.6**

BAF = Bioavailability Factor

TABLE 7-5
Calculated Risk Estimates Due to Potential Groundwater Exposures- Incidental Ingestion and Dermal Contact during Irrigation
Current Off-Site Residential Scenario

Parameter	Description	Units	Value	Reference
Dose	Dose of chemical	mg/kg-day	See below	Calculated
HI	Hazard index	unitless	See below	Calculated
Risk	Risk	unitless	See below	Calculated
EPCw	Chemical concentration in water	mg/L	See below	Calculated
Et	hour per event	hr/event	2	ODEQ (verbal)
IRar	Adult Residents's Water ingestion rate	L/day	0.05	ODEQ, 1998
IRc	Child Water ingestion rate	L/day	0.05	ODEQ, 1998
EF	Exposure frequency	days/year	60	Site-specific
EvD	Event frequency	event/day	1	ODEQ, 1998
ED	Exposure duration - adult	years	30	ODEQ, 1998
EDc	Exposure duration - child	years	6	ODEQ, 1998
Bwa	Body weight - adult	kg	70	ODEQ, 1998
BWc	Body weight - child	kg	15	ODEQ, 1998
AP	Averaging period	days	See below	Calculated
VF	Volatilization factor	m^3/kg	See below	chemical-specific
SSA	Skin surface area - adult's hands	cm^2	1,840	ODEQ, 1998
SSAc	Skin surface area - child	cm^2	6,600	ODEQ, 1998
DAwater	Dermal Absorption dose	mg/cm^2-event	See below	chemical-specific
CF1	Conversion factor, L to cm3	L/cm3	1.00E-03	Calculated
RfDo	Oral reference dose	mg/kg-day	See below	Calculated
RfDi	Inhalation reference dose	mg/kg-day	See below	Calculated
CSFo	Oral cancer slope factor	$(mg/kg\text{-}day)^{-1}$	See below	Calculated
CSFi	Inhalation cancer slope factor	$(mg/kg\text{-}day)^{-1}$	See below	Calculated

DERMAL EXPOSURE PAR					DAevent		selected
Chemical	Kp (cm/hr)	B (unitless)	tao (unitless)	t* (hour)	ET < t*	ET > t*	DAevent (mg/cm2-ev)
Copper	0.001						

Noncarcinogens			*2,190 days*								**Total**
Compound	**Cw**		**RfDo**	**RfDi**	**$Dose_{ing}$**	**$Dose_{der}$**	**$Dose_{inh}$**	**HI_{ing}**	**HI_{der}**	**HI_{inh}**	**HI**
Inorganics											
Copper	9.0E-02		4.00E-02	4.00E-02	4.9E-05	1.3E-05	--	1.2E-03	3.3E-04	--	**0.002**

TABLE 7-6
Calculated Risk Estimates Due to Residential Swimming Exposures
Off-Site Current Residential Scenario

Parameter	Description	Units	Value	Reference
Dose	Dose of chemical	mg/kg-day	See below	Calculated
HI	Hazard index	unitless	See below	Calculated
Risk	Risk	unitless	See below	Calculated
EPCw	Chemical concentration in water	mg/L	See below	Calculated
Et	hour per event	hr/event	2	ODEQ (verbal)
IRar	Adult Residents's Water ingestion rate	L/day	0.05	ODEQ, 1998
IRc	Child Water ingestion rate	L/day	0.05	ODEQ, 1998
EF	Exposure frequency	days/year	60	Site-specific
EvD	Event frequency	event/day	1	ODEQ, 1998
ED	Exposure duration - adult	years	30	ODEQ, 1998
EDc	Exposure duration - child	years	6	ODEQ, 1998
Bwa	Body weight - adult	kg	70	ODEQ, 1998
BWc	Body weight - child	kg	15	ODEQ, 1998
AP	Averaging period	days	See below	Calculated
VF	Volatilization factor	m^3/kg	See below	chemical-specific
SSA	Skin surface area - adult's hands	cm^2	22,000	ODEQ, 1998
SSAc	Skin surface area - child	cm^2	7,300	ODEQ, 1998
DAwater	Dermal Absorption dose	mg/cm^2-event	See below	chemical-specific
CF1	Conversion factor, L to cm3	L/cm3	1.00E-03	Calculated
RfDo	Oral reference dose	mg/kg-day	See below	Calculated
RfDi	Inhalation reference dose	mg/kg-day	See below	Calculated
CSFo	Oral cancer slope factor	$(mg/kg\text{-}day)^{-1}$	See below	Calculated
CSFi	Inhalation cancer slope factor	$(mg/kg\text{-}day)^{-1}$	See below	Calculated

DERMAL EXPOSURE PAI					DAevent		selected
Chemical	Kp (cm/hr)	B (unitless)	tao (unitless)	t* (hour)	ET < t*	ET > t*	DAevent (mg/cm2-ev)
Copper	0.001						

Noncarcinogens					*2,190 days*						Total
Compound	**Cw**		**RfDo**	**RfDi**	**$Dose_{ing}$**	**$Dose_{der}$**	**$Dose_{inh}$**	**HI_{ing}**	**HI_{der}**	**HI_{inh}**	**HI**
Inorganics											
Copper	9.0E-02		4.00E-02	4.00E-02	4.9E-05	1.4E-05	--	1.2E-03	3.6E-04	--	0.002
								Cumulative Hazard Index			**0.002**

TABLE 7-7
Calculated Risk Estimates Due to Potential Groundwater Exposures- Incidental Ingestion and Dermal Contact during Irrigation
Future Off-Site Residential Scenario

Parameter	Description	Units	Value	Reference
Dose	Dose of chemical	mg/kg-day	See below	Calculated
HI	Hazard index	unitless	See below	Calculated
Risk	Risk	unitless	See below	Calculated
EPCw	Chemical concentration in water	mg/L	See below	Calculated
Et	hour per event	hr/event	1	ODEQ (verbal)
IRar	Adult Residents's Water ingestion rate	L/day	0.05	ODEQ, 1998
IRc	Child Water ingestion rate	L/day	0.05	ODEQ, 1998
EF	Exposure frequency	days/year	60	Site-specific
EvD	Event frequency	event/day	1	ODEQ, 1998
ED	Exposure duration - adult	years	30	ODEQ, 1998
EDc	Exposure duration - child	years	6	ODEQ, 1998
Bwa	Body weight - adult	kg	70	ODEQ, 1998
BWc	Body weight - child	kg	15	ODEQ, 1998
AP	Averaging period	days	See below	Calculated
VF	Volatilization factor	m^3/kg	See below	chemical-specific
SSA	Skin surface area - adult's hands	cm^2	1,840	ODEQ, 1998
SSAc	Skin surface area - child	cm^2	6,600	ODEQ, 1998
DAwater	Dermal Absorption dose	mg/cm^2-event	See below	chemical-specific
CF1	Conversion factor, L to cm3	L/cm3	1.00E-03	Calculated
RfDo	Oral reference dose	mg/kg-day	See below	Calculated
RfDi	Inhalation reference dose	mg/kg-day	See below	Calculated
CSFo	Oral cancer slope factor	$(mg/kg-day)^{-1}$	See below	Calculated
CSFi	Inhalation cancer slope factor	$(mg/kg-day)^{-1}$	See below	Calculated

DERMAL EXPOSURE PARAMETERS					DAevent		selected	
Chemical	Kp (cm/hr)	B (unitless)	tao (unitless)	t* (hour)	ET < t*	ET > t*	DAevent (mg/cm2-ev)	DA guidance
Arsenic	0.001							
Benzo(a)anthracene	0.948	46.00	2.20	10.00	3.73E-08	1.19E-07	3.73E-08	0.81
Dibenz(a,h) anthracene	1.680	690.00	4.40	21.00	9.35E-08	4.25E-04	9.35E-08	2.7
Benzo(a)pyrene	1.240	130.00	2.90	14.00	5.60E-08	2.06E-04	5.60E-08	1.2
Benzo(b)fluoranthene	0.699	130.00	3.00	14.00	3.21E-08	1.20E-04	3.21E-08	1.2
Pentachloro-phenol	0.65	72.00	3.70	17.00	1.02E-03	4.23E+00	1.02E-03	0.65
Indeno(1,2,3-cd) pyrene	2.230	380.00	4.20	20.00	1.21E-04	5.39E-01	1.21E-04	1.9
2,3,7,8-TCDD TEQ (WHO)	1.4	630.00	8.10	38.00	1.95E-11	1.20E-07	1.95E-11	1.4
1,2,3,7,8-PeCDD	1.4	630.00	8.10	38.00	1.12E-11	6.93E-08	1.12E-11	
1,2,3,4,7,8-HxCDD	1.4	630.00	8.10	38.00	8.51E-13	5.25E-09	8.51E-13	
1,2,3,6,7,8-HxCDD	1.4	630.00	8.10	38.00	9.96E-13	6.14E-09	9.96E-13	
1,2,3,7,8,9-HxCDD	1.4	630.00	8.10	38.00	8.68E-13	5.36E-09	8.68E-13	
1,2,3,4,6,7,8-HpCDD	1.4	630.00	8.10	38.00	3.87E-13	2.39E-09	3.87E-13	
1,2,3,7,8-PeCDF	1.4	630.00	8.10	38.00	3.16E-13	1.95E-09	3.16E-13	
2,3,4,7,8-PeCDF	1.4	630.00	8.10	38.00	2.68E-12	1.65E-08	2.68E-12	
1,2,3,4,7,8-HxCDF	1.4	630.00	8.10	38.00	6.84E-13	4.22E-09	6.84E-13	
1,2,3,6,7,8-HxCDF	1.4	630.00	8.10	38.00	5.44E-13	3.36E-09	5.44E-13	
1,2,3,7,8,9-HxCDF	1.4	630.00	8.10	38.00	9.72E-13	6.00E-09	9.72E-13	
2,3,4,6,7,8-HxCDF	1.4	630.00	8.10	38.00	5.98E-13	3.69E-09	5.98E-13	
1,2,3,4,6,7,8-HpCDF	1.4	630.00	8.10	38.00	1.50E-13	9.24E-10	1.50E-13	
Iron	0.001							
Manganese	0.001							
Acenaphthene	0.133	4.01E-01	0.77	1.84	1.99E-08	2.57E-05	1.99E-08	
Acenaphthylene	0.141	5.13E-01	0.75	1.79	1.07E-07	1.42E-04	1.07E-07	
Chrysene	1.030	46.00	2.20	10.00	1.35E-08	4.28E-05	1.35E-08	0.81
Fluorene	0.171	0.53	0.90	2.15	7.04E-09	9.91E-06	7.04E-09	
Naphthalene	0.069	0.20	0.53	2.20	1.30E-08	1.45E-05	1.30E-08	0.069

TABLE 7-7
Calculated Risk Estimates Due to Potential Groundwater Exposures- Incidental Ingestion and Dermal Contact during Irrigation
Future Off-Site Residential Scenario

Carcinogens			*25,550 days*								**Total**	
Compound	**EPCw**	**DAwater**	**CSFo**	**CSFi**	**$Dose_{ing}$**	**$Dose_{der}$**	**$Dose_{inh}$**	**$Risk_{ing}$**	**$Risk_{der}$**	**$Risk_{inh}$**	**Risk**	
Inorganics												
Arsenic	2.53E-03		1.50E+00	1.50E+01	2.2E-07	1.9E-08	--	3E-07	3E-08	--	4E-07	UCL90 for total As with W13i/W13s
SVOCs												
Benzo(a) anthracene	9.6E-03	3.73E-08	7.30E-01	7.30E-01	8.4E-07	2.9E-07	--	6E-07	2E-07	--	8E-07	No Detections - use max MDL
Dibenz(a,h) anthracene	9.6E-03	9.35E-08	7.30E+00	7.30E+00	8.4E-07	7.2E-07	--	6E-06	5E-06	--	1E-05	No Detections - use max MDL
Benzo(a) pyrene	9.6E-03	5.60E-08	7.30E+00	7.30E+00	8.4E-07	4.3E-07	--	6E-06	3E-06	--	9E-06	No Detections - use max MDL
Benzo(b) fluoranthene	9.6E-03	3.21E-08	7.30E-01	7.30E-01	8.4E-07	2.5E-07	--	6E-07	2E-07	--	8E-07	No Detections - use max MDL
Pentachlorophenol	2.96E-01	1.02E-03	1.20E-01	1.20E-01	2.6E-05	7.9E-03	--	3E-06	9E-04	--	9E-04	UCL90 with W13i/W13s
Indeno(1,2,3-cd) pyrene	9.6E-03	1.21E-04	7.30E-01	7.30E-01	8.4E-07	9.3E-04	--	6E-07	7E-04	--	7E-04	No Detections - use max MDL
Naphthalene	9.3E-05	1.30E-08	1.20E-01	1.20E-01	8.1E-09	1.0E-07	--	1E-09	1E-08	--	1E-08	UCL90 with W13i/W13s
Dioxin/Furans												
2,3,7,8-TCDD	1.8E-09	1.95E-11	1.50E+05	1.50E+05	1.5E-13	1.5E-10	--	2E-08	2E-05	--	2E-05	No detections use max MDL
1,2,3,7,8-PeCDD	1.0E-09	1.12E-11	1.50E+05	1.50E+05	8.9E-14	8.6E-11	--	1E-08	1E-05	--	1E-05	No detections use max MDL
1,2,3,4,7,8-HxCDD	7.7E-11	8.51E-13	1.50E+05	1.50E+05	6.7E-15	6.5E-12	--	1E-09	1E-06	--	1E-06	No detections use max MDL
1,2,3,6,7,8-HxCDD	9.0E-11	9.96E-13	1.50E+05	1.50E+05	7.9E-15	7.6E-12	--	1E-09	1E-06	--	1E-06	No detections use max MDL
1,2,3,7,8,9-HxCDD	7.9E-11	8.68E-13	1.50E+05	1.50E+05	6.9E-15	6.7E-12	--	1E-09	1E-06	--	1E-06	No detections use max MDL
1,2,3,4,6,7,8-HpCDD	3.5E-11	3.87E-13	1.50E+05	1.50E+05	3.1E-15	3.0E-12	--	5E-10	4E-07	--	4E-07	Detected congener / Below RSL
OCDD	1.1E-11	3.16E-13	1.50E+05	1.50E+05	9.6E-16	2.4E-12	--	1E-10	4E-07	--	4E-07	No detections use max MDL
2,3,7,8-TCDF	1.2E-10	3.87E-13	1.50E+05	1.50E+05	1.0E-14	3.0E-12	--	2E-09	4E-07	--	4E-07	No detections use max MDL
1,2,3,7,8-PeCDF	2.9E-11	3.16E-13	1.50E+05	1.50E+05	2.5E-15	2.4E-12	--	4E-10	4E-07	--	4E-07	No detections use max MDL
2,3,4,7,8-PeCDF	2.4E-10	2.68E-12	1.50E+05	1.50E+05	2.1E-14	2.1E-11	--	3E-09	3E-06	--	3E-06	No detections use max MDL
1,2,3,4,7,8-HxCDF	6.2E-11	6.84E-13	1.50E+05	1.50E+05	5.4E-15	5.3E-12	--	8E-10	8E-07	--	8E-07	No detections use max MDL
1,2,3,6,7,8-HxCDF	4.9E-11	5.44E-13	1.50E+05	1.50E+05	4.3E-15	4.2E-12	--	6E-10	6E-07	--	6E-07	No detections use max MDL
1,2,3,7,8,9-HxCDF	8.8E-11	9.72E-13	1.50E+05	1.50E+05	7.7E-15	7.5E-12	--	1E-09	1E-06	--	1E-06	No detections use max MDL
2,3,4,6,7,8-HxCDF	5.4E-11	5.98E-13	1.50E+05	1.50E+05	4.7E-15	4.6E-12	--	7E-10	7E-07	--	7E-07	No detections use max MDL
1,2,3,4,6,7,8-HpCDF	1.4E-11	1.50E-13	1.50E+05	1.50E+05	1.2E-15	1.2E-12	--	2E-10	2E-07	--	2E-07	Detected congener / Below RSL
1,2,3,4,6,7,8,9-HpCDF	9.7E-12	0.00E+00	1.50E+05	1.50E+05	8.5E-16	0.0E+00	--	1E-10	0E+00	--	1E-10	No detections use max MDL
OCDF	8.9E-13	0.00E+00	1.50E+05	1.50E+05	7.8E-17	0.0E+00	--	1E-11	0E+00	--	1E-11	Detected congener / Below RSL
									Cumulative Risk		**2E-03**	
									Cumulative Risk (detected analytes only)		**9E-04**	

Noncarcinogens			*2,190 days*								**Total**
Compound	**Cw**	**DAwater**	**RfDo**	**RfDi**	**$Dose_{ing}$**	**$Dose_{der}$**	**$Dose_{inh}$**	**HI_{ing}**	**HI_{der}**	**HI_{inh}**	**HI**
Inorganics											
Arsenic	2.5E-03		3.00E-04	3.00E-04	1.4E-06	1.8E-07	--	4.6E-03	6.1E-04	--	5.2E-03
SVOCs											
Naphthalene	9.3E-05	1.30E-08	2.00E-02	8.60E-04	5.1E-08	9.4E-07	--	3.E-06	5.E-05	--	4.9.E-05
Pentachlorophenol	3.0E-01	1.02E-03	3.00E-02	3.00E-02	1.6E-04	7.4E-02	--	5.E-03	2.E+00	--	2.5.E+00
									Cumulative Hazard Index		**2.5**

TABLE 7-8
Calculated Risk Estimates Due to Potential Groundwater Exposures- Incidental Ingestion and Dermal Contact during Swimming
Future Off-Site Residential Scenario

Parameter	Description	Units	Value	Reference
Dose	Dose of chemical	mg/kg-day	See below	Calculated
HI	Hazard index	unitless	See below	Calculated
Risk	Risk	unitless	See below	Calculated
EPCw	Chemical concentration in water	mg/L	See below	Calculated
Et	hour per event	hr/event	1	ODEQ (verbal)
IRar	Adult Residents's Water ingestion rate	L/day	0.05	ODEQ, 1998
IRc	Child Water ingestion rate	L/day	0.05	ODEQ, 1998
EF	Exposure frequency	days/year	60	Site-specific
EvD	Event frequency	event/day	1	ODEQ, 1998
ED	Exposure duration - adult	years	30	ODEQ, 1998
EDc	Exposure duration - child	years	6	ODEQ, 1998
Bwa	Body weight - adult	kg	70	ODEQ, 1998
BWc	Body weight - child	kg	15	ODEQ, 1998
AP	Averaging period	days	See below	Calculated
VF	Volatilization factor	m^3/kg	See below	chemical-specific
SSA	Skin surface area - adult's hands	cm^2	22,000	ODEQ, 1998
SSAc	Skin surface area - child	cm^2	7,300	ODEQ, 1998
DAwater	Dermal Absorption dose	mg/cm^2-event	See below	chemical-specific
CF1	Conversion factor, L to cm3	L/cm3	1.00E-03	Calculated
RfDo	Oral reference dose	mg/kg-day	See below	Calculated
RfDi	Inhalation reference dose	mg/kg-day	See below	Calculated
CSFo	Oral cancer slope factor	$(mg/kg\text{-}day)^{-1}$	See below	Calculated
CSFi	Inhalation cancer slope factor	$(mg/kg\text{-}day)^{-1}$	See below	Calculated

DERMAL EXPOSURE PA					DAevent		selected	
Chemical	Kp (cm/hr)	B (unitless)	tao (unitless)	t* (hour)	ET < t*	ET > t*	DAevent (mg/cm2-ev)	DA guidance
Arsenic	0.001							
Benzo(a)anthracene	0.948	46.00	2.20	10.00	3.73E-08	1.19E-07	3.73E-08	0.81
Dibenz(a,h) anthracene	1.680	690.00	4.40	21.00	9.35E-08	4.25E-04	9.35E-08	2.7
Benzo(a)pyrene	1.240	130.00	2.90	14.00	5.60E-08	2.06E-04	5.60E-08	1.2
Benzo(b)fluoranthene	0.699	130.00	3.00	14.00	3.21E-08	1.20E-04	3.21E-08	1.2
Pentachloro-phenol	0.65	72.00	3.70	17.00	1.02E-03	4.23E+00	1.02E-03	0.65
Indeno(1,2,3-cd) pyrene	2.230	380.00	4.20	20.00	1.21E-04	5.39E-01	1.21E-04	1.9
2,3,7,8-TCDD TEQ (WHO)	1.4	630.00	8.10	38.00	1.95E-11	1.20E-07	1.95E-11	1.4
1,2,3,7,8-PeCDD	1.4	630.00	8.10	38.00	1.12E-11	6.93E-08	1.12E-11	
1,2,3,4,7,8-HxCDD	1.4	630.00	8.10	38.00	8.51E-13	5.25E-09	8.51E-13	
1,2,3,6,7,8-HxCDD	1.4	630.00	8.10	38.00	9.96E-13	6.14E-09	9.96E-13	
1,2,3,7,8,9-HxCDD	1.4	630.00	8.10	38.00	8.68E-13	5.36E-09	8.68E-13	
1,2,3,4,6,7,8-HpCDD	1.4	630.00	8.10	38.00	3.87E-13	2.39E-09	3.87E-13	
1,2,3,7,8-PeCDF	1.4	630.00	8.10	38.00	3.16E-13	1.95E-09	3.16E-13	
2,3,4,7,8-PeCDF	1.4	630.00	8.10	38.00	2.68E-12	1.65E-08	2.68E-12	
1,2,3,4,7,8-HxCDF	1.4	630.00	8.10	38.00	6.84E-13	4.22E-09	6.84E-13	
1,2,3,6,7,8-HxCDF	1.4	630.00	8.10	38.00	5.44E-13	3.36E-09	5.44E-13	
1,2,3,7,8,9-HxCDF	1.4	630.00	8.10	38.00	9.72E-13	6.00E-09	9.72E-13	
2,3,4,6,7,8-HxCDF	1.4	630.00	8.10	38.00	5.98E-13	3.69E-09	5.98E-13	
1,2,3,4,6,7,8-HpCDF	1.4	630.00	8.10	38.00	1.50E-13	9.24E-10	1.50E-13	
Iron	0.001							
Manganese	0.001							
Acenaphthene	0.133	4.01E-01	0.77	1.84	1.99E-08	2.57E-05	1.99E-08	
Acenaphthylene	0.141	5.13E-01	0.75	1.79	1.07E-07	1.42E-04	1.07E-07	
Chrysene	1.030	46.00	2.20	10.00	1.35E-08	4.28E-05	1.35E-08	0.81
Fluorene	0.171	0.53	0.90	2.15	7.04E-09	9.91E-06	7.04E-09	
Naphthalene	0.069	0.20	0.53	2.20	1.30E-08	1.45E-05	1.30E-08	0.069

TABLE 7-8
Calculated Risk Estimates Due to Potential Groundwater Exposures- Incidental Ingestion and Dermal Contact during Swimming
Future Off-Site Residential Scenario

Carcinogens				*25,550 days*							**Total**	
Compound	**EPCw**	**DAwater**	**CSFo**	**CSFi**	**Dose$_{ing}$**	**Dose$_{der}$**	**Dose$_{inh}$**	**Risk$_{ing}$**	**Risk$_{der}$**	**Risk$_{inh}$**	**Risk**	
Inorganics												
Arsenic	2.53E-03		1.50E+00	1.50E+01	2.2E-07	6.2E-08	--	3E-07	9E-08	--	4E-07	UCL90 for total As with W13i/W13s
SVOCs												
Benzo(a) anthracene	9.6E-03	3.73E-08	7.30E-01	7.30E-01	8.4E-07	9.2E-07	--	6E-07	7E-07	--	1E-06	No Detections - use max MDL
Dibenz(a,h) anthracene	9.6E-03	9.35E-08	7.30E+00	7.30E+00	8.4E-07	2.3E-06	--	6E-06	2E-05	--	2E-05	No Detections - use max MDL
Benzo(a) pyrene	9.6E-03	5.60E-08	7.30E+00	7.30E+00	8.4E-07	1.4E-06	--	6E-06	1E-05	--	2E-05	No Detections - use max MDL
Benzo(b) fluoranthene	9.6E-03	3.21E-08	7.30E-01	7.30E-01	8.4E-07	7.9E-07	--	6E-07	6E-07	--	1E-06	No Detections - use max MDL
Pentachlorophenol	2.96E-01	1.02E-03	1.20E-01	1.20E-01	2.6E-05	2.5E-02	--	3E-06	3E-03	--	3E-03	UCL90 with W13i/W13s
Indeno(1,2,3-cd) pyrene	9.6E-03	1.21E-04	7.30E-01	7.30E-01	8.4E-07	3.0E-03	--	6E-07	2E-03	--	2E-03	No Detections - use max MDL
Naphthalene	9.3E-05	1.30E-08	1.20E-01	1.20E-01	8.1E-09	3.2E-07	--	1E-09	4E-08	--	4E-08	UCL90 with W13i/W13s
Dioxin/Furans												
2,3,7,8-TCDD	1.8E-09	1.95E-11	1.50E+05	1.50E+05	1.5E-13	4.8E-10	--	2E-08	7E-05	--	7E-05	No detections use max MDL
1,2,3,7,8-PeCDD	1.0E-09	1.12E-11	1.50E+05	1.50E+05	8.9E-14	2.8E-10	--	1E-08	4E-05	--	4E-05	No detections use max MDL
1,2,3,4,7,8-HxCDD	7.7E-11	8.51E-13	1.50E+05	1.50E+05	6.7E-15	2.1E-11	--	1E-09	3E-06	--	3E-06	No detections use max MDL
1,2,3,6,7,8-HxCDD	9.0E-11	9.96E-13	1.50E+05	1.50E+05	7.9E-15	2.4E-11	--	1E-09	4E-06	--	4E-06	No detections use max MDL
1,2,3,7,8,9-HxCDD	7.9E-11	8.68E-13	1.50E+05	1.50E+05	6.9E-15	2.1E-11	--	1E-09	3E-06	--	3E-06	No detections use max MDL
1,2,3,4,6,7,8-HpCDD	3.5E-11	3.87E-13	1.50E+05	1.50E+05	3.1E-15	9.5E-12	--	5E-10	1E-06	--	1E-06	Detected congener / Below RSL
OCDD	1.1E-11	3.16E-13	1.50E+05	1.50E+05	9.6E-16	7.8E-12	--	1E-10	1E-06	--	1E-06	No detections use max MDL
2,3,7,8-TCDF	1.2E-10	2.68E-12	1.50E+05	1.50E+05	1.0E-14	6.6E-11	--	2E-09	1E-05	--	1E-05	No detections use max MDL
1,2,3,7,8-PeCDF	2.9E-11	3.16E-13	1.50E+05	1.50E+05	2.5E-15	7.8E-12	--	4E-10	1E-06	--	1E-06	No detections use max MDL
2,3,4,7,8-PeCDF	2.4E-10	2.68E-12	1.50E+05	1.50E+05	2.1E-14	6.6E-11	--	3E-09	1E-05	--	1E-05	No detections use max MDL
1,2,3,4,7,8-HxCDF	6.2E-11	6.84E-13	1.50E+05	1.50E+05	5.4E-15	1.7E-11	--	8E-10	3E-06	--	3E-06	No detections use max MDL
1,2,3,6,7,8-HxCDF	4.9E-11	5.44E-13	1.50E+05	1.50E+05	4.3E-15	1.3E-11	--	6E-10	2E-06	--	2E-06	No detections use max MDL
1,2,3,7,8,9-HxCDF	8.8E-11	9.72E-13	1.50E+05	1.50E+05	7.7E-15	2.4E-11	--	1E-09	4E-06	--	4E-06	No detections use max MDL
2,3,4,6,7,8-HxCDF	5.4E-11	5.98E-13	1.50E+05	1.50E+05	4.7E-15	1.5E-11	--	7E-10	2E-06	--	2E-06	No detections use max MDL
1,2,3,4,6,7,8-HpCDF	1.4E-11	1.50E-13	1.50E+05	1.50E+05	1.2E-15	3.7E-12	--	2E-10	6E-07	--	6E-07	Detected congener / Below RSL
1,2,3,4,6,7,8,9-HpCDF	9.7E-12	0.00E+00	1.50E+05	1.50E+05	8.5E-16	0.0E+00	--	1E-10	0E+00	--	1E-10	No detections use max MDL
OCDF	8.9E-13	0.00E+00	1.50E+05	1.50E+05	7.8E-17	0.0E+00	--	1E-11	0E+00	--	1E-11	Detected congener / Below RSL
									Cumulative Risk		**5E-03**	
									Cumulative Risk (detected analytes only)		**3E-03**	

Noncarcinogens				*2,190 days*							**Total**
Compound	**Cw**	**DAwater**	**RfDo**	**RfDi**	**Dose$_{ing}$**	**Dose$_{der}$**	**Dose$_{inh}$**	**HI$_{ing}$**	**HI$_{der}$**	**HI$_{inh}$**	**HI**
Inorganics											
Arsenic	2.5E-03		3.00E-04	3.00E-04	1.4E-06	2.0E-07	--	4.6E-03	6.7E-04	--	5.3E-03
SVOCs											
Naphthalene	9.3E-05	1.30E-08	2.00E-02	8.60E-04	5.1E-08	1.0E-06	--	2.5E-06	5.2E-05	--	5.4E-05
Pentachlorophenol	3.0E-01	1.02E-03	3.00E-02	3.00E-02	1.6E-04	8.2E-02	--	5.4E-03	2.7E+00	--	2.7E+00
									Cumulative Hazard Index		**2.7**

TABLE 7-9
Calculated Risk Estimates Due to Potential Surface Water Exposures
Off-Site Recreational Scenario - Roosevelt Channel

Parameter	Description	Units	Value	Reference
Dose	Dose of chemical	mg/kg-day	See below	Calculated
HI	Hazard index	unitless	See below	Calculated
Risk	Risk	unitless	See below	Calculated
EPCw	Chemical concentration in water	mg/L	See below	Calculated
Et	hour per event	hr/event	1	ODEQ (verbal)
IRc	Child Water ingestion rate	L/day	0.05	ODEQ, 1998
EF	Exposure frequency	days/year	60	Site-specific
EvD	Event frequency	event/day	1	ODEQ, 1998
EDc	Exposure duration - child	years	6	ODEQ, 1998
Bwa	Body weight - adult	kg	70	ODEQ, 1998
BWc	Body weight - child	kg	15	ODEQ, 1998
AP	Averaging period	days	See below	Calculated
VF	Volatilization factor	m^3/kg	See below	chemical-specific
SSAc	Skin surface area - child	cm^2	2,717	ODEQ, 1998
DAwater	Dermal Absorption dose	mg/cm^2-event	See below	chemical-specific
CF1	Conversion factor, L to cm3	L/cm3	1.00E-03	Calculated
RfDo	Oral reference dose	mg/kg-day	See below	Calculated
RfDi	Inhalation reference dose	mg/kg-day	See below	Calculated
CSFo	Oral cancer slope factor	$(mg/kg\text{-}day)^{-1}$	See below	Calculated
CSFi	Inhalation cancer slope factor	$(mg/kg\text{-}day)^{-1}$	See below	Calculated

DERMAL EXPOSURE PARAMETERS					DAevent		selected	
Chemical	Kp (cm/hr)	B (unitless)	tao (unitless)	t* (hour)	ET < t*	ET > t*	DAevent (mg/cm2-ev)	DA guidance
Arsenic	0.001							
Benzo(a)anthracene	0.948	46.00	2.20	10.00	3.26E-09	1.04E-08	3.26E-09	0.81
Dibenz(a,h) anthracene	1.680	690.00	4.40	21.00	3.02E-09	1.37E-05	3.02E-09	2.7
Benzo(a)pyrene	1.240	130.00	2.90	14.00	4.32E-09	1.59E-05	4.32E-09	1.2
Benzo(b)fluoranthene	0.699	130.00	3.00	14.00	1.31E-09	4.88E-06	1.31E-09	1.2
Pentachloro-phenol	0.65	72.00	3.70	17.00	3.80E-06	1.57E-02	3.80E-06	0.65
Indeno(1,2,3-cd) pyrene	2.230	380.00	4.20	20.00	7.71E-09	3.42E-05	7.71E-09	1.9
2,3,7,8-TCDD TEQ (WHO)	1.4	630.00	8.10	38.00	3.41E-13	2.11E-09	3.41E-13	1.4
Naphthalene	0.069	0.20	0.53	2.20	1.45E-07	1.62E-04	1.45E-07	0.069

TABLE 7-9
Calculated Risk Estimates Due to Potential Surface Water Exposures
Off-Site Recreational Scenario - Roosevelt Channel

Carcinogens			*25,550 days*								**Total**
Compound	**EPCw**	**DAwater**	**CSFo**	**CSFi**	**$Dose_{ing}$**	**$Dose_{der}$**	**$Dose_{inh}$**	**$Risk_{ing}$**	**$Risk_{der}$**	**$Risk_{inh}$**	**Risk**
Inorganics											
Arsenic	7.0E-03		1.50E+00	1.50E+01	3.3E-07	1.8E-08	--	5.E-07	3.E-08	--	5.E-07
Pentachlorophenol	1.1E-03	3.80E-06	1.20E-01	1.20E-01	5.2E-08	9.7E-06	--	6.E-09	1.E-06	--	1.E-06
								Cumulative Risk			**2.E-06**

Noncarcinogens			*2,190 days*								**Total**
Compound	**Cw**	**DAwater**	**RfDo**	**RfDi**	**$Dose_{ing}$**	**$Dose_{der}$**	**$Dose_{inh}$**	**HI_{ing}**	**HI_{der}**	**HI_{inh}**	**HI**
Inorganics											
Arsenic	7.0E-03		3.00E-04	3.00E-04	3.8E-06	2.1E-07	--	1.3E-02	6.9E-04	--	1.3E-02
SVOCs											
Pentachlorophenol	1.1E-03	3.80E-06	3.00E-02	3.00E-02	6.0E-07	1.1E-04	--	2.0E-05	3.8E-03	--	3.8E-03
								Cumulative Hazard Index			**0.02**

TABLE 7-10
Calculated Risk Estimates Due to Potential Sediment Exposures
Off-Site Recreational Scenario

Parameter	Description	Units	Value	Reference	
Dose	Dose of chemical	mg/kg-day	See below	Calculated	
HI	Hazard index	unitless	See below	Calculated	
Risk	Risk	unitless	See below	Calculated	
EPCsed	Exposure Point Concentration in sediment	mg/kg	See below	Calculated	
IRa	Child Sediment ingestion rate	mg/day	200	ODEQ, 1998	Changed from 400
EF	Exposure frequency	days/year	13	ODEQ, 1998	
EvD	Event frequency	event/day	1	ODEQ, 1998	
ED	Exposure duration	years	5	ODEQ, 1998	
Bwc	Body weight - child	kg	28	ODEQ, 1998	
AP	Averaging period	days	See below	Calculated	
VF	Volatilization factor	m^3/kg	See below	chemical-specific	
PEF	Particulate emmission factor	m^3/kg	1.32E+09	USEPA, 1996a	
SSAc	Skin surface area - child	cm^2	2717	ODEQ, 1998	10 - 15 yrs old
DAF	Dermal absorption factor	unitless	See below	chemical-specific	
SARa	Sediment adherence rate - child	mg/cm^2 - ev	1	ODEQ, 1998	
InhRa	Inhalation rate - child	m^3/day	8.3	ODEQ, 1998	
CF1	Conversion factor, mg to kg	kg/mg	1.00E-06	Calculated	
RfDo	Oral reference dose	mg/kg-day	See below	chemical-specific	
RfDi	Inhalation reference dose	mg/kg-day	See below	Calculated	
CSFo	Oral cancer slope factor	$(mg/kg\text{-}day)^{-1}$	See below	Calculated	
CSFi	Inhalation cancer slope factor	$(mg/kg\text{-}day)^{-1}$	See below	Calculated	

Carcinogens			*AP =*	*25,550 days*								**Total**
Compound	**EPCsed**	**DAF**	**VF**	**CSFo**	**CSFi**	**$Dose_{ing}$**	**$Dose_{der}$**	**$Dose_{inh}$**	**$Risk_{ing}$**	**$Risk_{der}$**	**$Risk_{inh}$**	**Risk**
Inorganics												
Arsenic	26.0	0.03	--	1.50E+00	1.50E+01	4.7E-07	1.9E-07	1.5E-11	7E-07	3E-07	2E-10	1E-06
SVOCs												
Dibenz(a,h) anthracene	0.2	0.13	--	7.30E+00	7.30E+00	4.0E-09	7.1E-09	1.3E-13	3E-08	5E-08	9E-13	8E-08
Benzo(a) pyrene	0.5	0.13	--	7.30E+00	7.30E+00	9.4E-09	1.7E-08	3.0E-13	7E-08	1E-07	2E-12	2E-07
Benzo(b) fluoranthene	0.9	0.13	--	7.30E-01	7.30E-01	1.6E-08	2.8E-08	5.0E-13	1E-08	2E-08	4E-13	3E-08
Dioxin/Furans												
2,3,7,8-TCDD	6.2E-06	0.03		7.30E-01	7.30E-01	1.1E-13	4.6E-14	3.6E-18	8E-14	3E-14	3E-18	1E-13
1,2,3,7,8-PeCDD	3.3E-05	0.03		7.30E-01	7.30E-01	5.9E-13	2.4E-13	1.9E-17	4E-13	2E-13	1E-17	6E-13
1,2,3,4,7,8-HxCDD	7.7E-06	0.03		7.30E-01	7.30E-01	1.4E-13	5.7E-14	4.4E-18	1E-13	4E-14	3E-18	1E-13
1,2,3,6,7,8-HxCDD	4.5E-05	0.03		7.30E-01	7.30E-01	8.2E-13	3.3E-13	2.6E-17	6E-13	2E-13	2E-17	8E-13
1,2,3,7,8,9-HxCDD	2.0E-05	0.03		7.30E-01	7.30E-01	3.7E-13	1.5E-13	1.2E-17	3E-13	1E-13	8E-18	4E-13
1,2,3,4,6,7,8-HpCDD	1.2E-04	0.03		7.30E-01	7.30E-01	2.2E-12	9.0E-13	7.0E-17	2E-12	7E-13	5E-17	2E-12
OCDD	8.7E-06	0.03		7.30E-01	7.30E-01	1.6E-13	6.5E-14	5.0E-18	1E-13	5E-14	4E-18	2E-13
2,3,4,7,8-PeCDF	7.5E-06	0.03		7.30E-01	7.30E-01	1.4E-13	5.6E-14	4.3E-18	1E-13	4E-14	3E-18	1E-13
1,2,3,4,7,8-HxCDF	8.2E-06	0.03		7.30E-01	7.30E-01	1.5E-13	6.1E-14	4.7E-18	1E-13	4E-14	3E-18	2E-13
1,2,3,6,7,8-HxCDF	4.4E-06	0.03		7.30E-01	7.30E-01	8.1E-14	3.3E-14	2.5E-18	6E-14	2E-14	2E-18	8E-14
2,3,4,6,7,8-HxCDF	8.3E-06	0.03		7.30E-01	7.30E-01	1.5E-13	6.2E-14	4.8E-18	1E-13	5E-14	3E-18	2E-13
1,2,3,4,6,7,8-HpCDF	5.9E-07	0.03		7.30E-01	7.30E-01	1.1E-14	4.3E-15	3.4E-19	8E-15	3E-15	2E-19	1E-14
									Cumulative Risk			**1E-06**

Noncarcinogens			*AP =*	*1,825 days*								**Total**
Compound	**RBCs**	**DAF**	**VF**	**RfDo**	**RfDi**	**$Dose_{ing}$**	**$Dose_{der}$**	**$Dose_{inh}$**	**HI_{ing}**	**HI_{der}**	**HI_{inh}**	**HI**
Inorganics												
Arsenic	26.0	0.03		3.00E-04	3.00E-04	6.6E-06	2.7E-06	2.1E-10	2.2E-02	9.0E-03	6.9E-07	3.1E-02
										Cumulative HI		**0.03**

TABLE 7-11
Calculated Risk Estimates Due to Potential Groundwater Exposures
Off-Site Current Industrial Scenario

Parameter	Description	Units	Value		Reference	
Dose	Dose of chemical	mg/kg-day	See below		Calculated	
HI	Hazard index	unitless	See below		Calculated	
Risk	Risk	unitless	See below		Calculated	
RBCw	Chemical concentration in water	mg/L	See below		Calculated	
Et	hour per event	hr/event	1		ODEQ (verbal)	
EF	Exposure frequency	days/year	32	90	Site-specific	2x/wk, 4 wks/mo, 4 mos
EvD	Event frequency	event/day	1		ODEQ, 1998	
ED	Exposure duration - adult	years	25		ODEQ, 1998	
Bwa	Body weight - adult	kg	70		ODEQ, 1998	
AP	Averaging period	days	See below		Calculated	
SSA	Skin surface area	cm^2	4,100		ODEQ, 1998	
DAwater	Dermal Absorption dose	mg/cm^2-event	See below		chemical-specific	5 days/wk, 7 mos.
CF1	Conversion factor, L to cm3	L/cm3	1.00E-03		Calculated	
RfDo	Oral reference dose	mg/kg-day	See below		Calculated	
RfDi	Inhalation reference dose	mg/kg-day	See below		Calculated	
CSFo	Oral cancer slope factor	$(mg/kg\text{-}day)^{-1}$	See below		Calculated	
CSFi	Inhalation cancer slope factor	$(mg/kg\text{-}day)^{-1}$	See below		Calculated	

DERMAL EXPOSURE PAI					DAevent		selected		
Chemical	Kp (cm/hr)	B (unitless)	tao (unitless)	t* (hour)	ET < t*	ET > t*	DAevent (mg/cm2-ev)		DA guidance
Pentachloro-phenol	0.195	72.00	3.70	17.00	2.77E-06	1.15E-02	2.77E-06		0.65

Carcinogens			*25,550 days*								**Total**
Compound	**RBCw**	**DAwater**	**CSFo**	**CSFi**	**$Dose_{ing}$**	**$Dose_{der}$**	**$Dose_{inh}$**	**$Risk_{ing}$**	**$Risk_{der}$**	**$Risk_{inh}$**	**Risk**
SVOCs											
Pentachloro-phenol	2.7E-03	2.77E-06	1.20E-01	1.20E-01	--	5.1E-06	--	--	6.E-07	--	6.E-07
								Cumulative Risk			**6.E-07**

Noncarcinogens			*2,190 days*								**Total**
Compound	**Cw**	**DAwater**	**RfDo**	**RfDi**	**$Dose_{ing}$**	**$Dose_{der}$**	**$Dose_{inh}$**	**HI_{ing}**	**HI_{der}**	**HI_{inh}**	**HI**
SVOCs											
Pentachlorophenol	2.7E-03	2.77E-06	3.00E-02	3.00E-02	--	5.9E-05	--	--	2.0E-03	--	2.0E-03
								Cumulative Hazard Index			**2.0E-03**

TABLE 7-12
Calculated Risk Estimates Based on Consumption of Homegrown Produce
Current Residential Scenario - Based on Residential and Industrial Groundwater Data

Parameter	Description	Units	Value	Reference
Dose	Dose of chemical	mg/kg-day	See below	Calculated
HI	Hazard index	unitless	See below	Calculated
Risk	Risk	unitless	See below	Calculated
CP	Concentration in produce	mg/kg	See below	Calculated
CPF	Contaminated plant fraction	unitless	0.25	
IRfa	Adult fruit ingestion rate	g/kg-day	5.1	
IRfc	Child fruit ingestion rate	g/kg-day	19.3	
IRva	Adult vegetable ingestion rate	g/kg-day	6.4	
IRvc	Child vegetable ingestion rate	g/kg-day	13.9	
EF	Exposure frequency	days/year	350	Site-specific
ED	Exposure duration - adult	years	30	ODEQ, 1998
EDc	Exposure duration - child	years	6	ODEQ, 1998
Bwa	Body weight - adult	kg	70	ODEQ, 1998
BWc	Body weight - child	kg	15	ODEQ, 1998
AP	Averaging period	days	See below	Calculated
CF	Conversion factor	kg/g	0.001	chemical-specific
RfDo	Oral reference dose	mg/kg-day	See below	Calculated
CSFo	Oral cancer slope factor	$(mg/kg\text{-}day)^{-1}$	See below	Calculated

Noncarcinogens			*2,190*					**Total**
Compound	**EPCw**	**CP**	**RfDo**	**$Dose_{ing}$**		**$Dose_{inh}$**	**HI_{ing}**	**HI_{inh}**	**HI**
Inorganics									
Copper	9.0E-02	4.6E+00	4.00E-02	2.4E-03			6.1E-02		6.1E-02
							Cumulative Hazard Ind		**6.1E-02**

Kp = dermal permeability coefficient in water
B = dimensionless ratio of the permeability coefficient of a chemical through the stratum corneum relative to its permeability coefficient across the viable epidermis.
tao = lag time per event
t* = time to reach steady state
Hi - Hazard Index

TABLE 7-12 (Attachment)
Calculated Concentration in Produce
Current Residential Scenario - Based on Residential and Industrial Groundwater Data

Parameter	Description	Units	Value	Reference
Cw	Concentration in water	mg/L	See below	
IRRrup	Root uptake from irrigation	L/kg	See below	Calculated
IRRres	Resuspension from irrigation	L/kg	See below	Calculated
IRRdep	Aerial deposition from irrigation	L/kg	See below	Calculated
F	Irrigation period	unitless	0.25	RAIS
Bv_{wet}	soil to plant uptake wet weight	kg/kg	chemical-specific	
λE	decay for removal on produce	1/day	0.0495	
λi	decay	1/day	0	
Yv	plant yield (wet)	kg/m2	2	
tw	weathering half-life	day	14	
p	area density for root zone	kg/m2	240	
Ir	Irrigation rate	L/m2-day	3.63	
If	Interception fraction	unitless	0.42	
MLF	Plant mass loading factor	unitless	0.26	
λB	effective rate for removal	1/day	0.000027	
$\lambda \ HI$	soil leaching rate	1/day	0.000027	
tb	long-term deposition and buildup	days	10950	
T	Translocation factor	unitless	1	
tv	aboveground exposure time	days	60	
CP	concentration in produce	mg/kg	calculated	
IF_f	fruit age-adjusted ingestion factor	kg/day	0.0479	
Ifv	vegetable age-adjusted ingestion factor	kg/day	0.0249	
CPF	contaminated plant fraction		0.25	
AP	Averaging period	days	See below	
VF	Volatilization factor	m3/kg	See below	

COPCs	Cw	Bv_{wet}	IRRrup	IRRres	IRRdep	CP
Copper	9.00E-02	8.00E-02	11.20	36.41	3.65	4.6E+00

Table 7-13
Summary of Estimated Risks and Hazard Indices
J.H. Baxter & Co, Eugene Facility

Exposure Scenario	Estimated Cumulative Cancer Risks	Chemicals of Concern	Individual Compounds >1x10 E-06 Estimated Cancer Risk	Estimated Hazard Index
On-Site Worker				
Soil	1.E-04	Arsenic	1E-04	0.70
		Benzo(a)pyrene	3E-06	
		Dibenz(a,h)anthracene	6E-06	
		1,2,3,4,6,7,8-HpCDD (at B-23)	3E-06	
Undeveloped Area	4.E-05	Arsenic	2E-05	0.1
		1,2,3,7,8-PeCDD	2E-06	
		1,2,3,6,7,8-HxCDD	4E-06	
		1,2,3,7,8,9-HxCDD	2E-06	
		1,2,3,4,6,7,8-HpCDD	9E-06	
		2,3,4,7,8-PeCDF	2E-06	
		1,2,3,4,6,7,8-HpCDF	3E-06	
Trench Worker				
On-Site Soil	7.E-07	None	None	0.1
Undeveloped Area	3.E-07	None	None	0.02
On-Site Groundwater (direct contact)	4.E-05	Dibenz(a,h) anthracene	9E-06	0.6
		Benzo(a) pyrene	3E-06	
		Pentachlorophenol	3E-05	
On-Site Groundwater (inhalation)	3.E-07	None	None	0.01
Current Off-site Resident				
Off-site Soil [1]	1.E-06	None	None	1.6
Incidental Ingestion and dermal contact with Irrigation Water	No carcinogenic COPCs	None	None	0.002
Incidental Ingestion and dermal contact while swimming	No carcinogenic COPCs	None	None	0.002
Consumption of homegrown produce	No carcinogenic COPCs	None	None	0.06
Future Off-site Resident [2]				
Incidental Ingestion and Dermal Contact with Irrigation Water	2.E-03	Pentachlorophenol (cumulative risk includes non-detected compounds)	9E-04	2.5
Swimming scenario	5.E-03	Pentachlorophenol (cumulative risk includes non-detected compounds)	3E-03	2.7
Consumption of homegrown produce	No carcinogenic COPCs	None	None	0.1
Recreational User				
Surface Water	2.E-06	None	None	0.02
Sediment	1E-06	None	None	0.03
Off-site Industrial Worker				
Groundwater	6.E-07	None	None	0.002

Notes:
[1] Hazard index of 1.6 for off-site soil pathway based on iron, which is not a site-related consitituent.
[2] Future off-site residential pathway is based on exposure to groundwater from selected on-Site and off-Site industrial wells, including active groundwater remediation wells. All residences are connected to City water supply, therefore risks associated with this scenario represent worse-case scenario.

ATTACHMENT B

Off-Site Dioxins in Soil

From: Barnett, Steve
Sent: Wednesday, July 24, 2013 12:22 PM
To: 'BROWN Geoff'; TURNBLOM Susan
Cc: RueAnn Thomas
Subject: RE: JHBaxter Eugene - Updated Off-site Soil TEQ

Thank you.

From: BROWN Geoff [mailto:BROWN.Geoff@deq.state.or.us]
Sent: Wednesday, July 24, 2013 10:17 AM
To: Barnett, Steve; TURNBLOM Susan
Cc: RueAnn Thomas
Subject: RE: JHBaxter Eugene - Updated Off-site Soil TEQ

Hi Steve. DEQ independently verified your analysis and we concur with your conclusion. Therefore dioxins may be screened out of the risk assessment for the off-site residential soil exposure scenario.

Geoffrey Brown, R.G.
Project Manager
Oregon DEQ
541-686-7819

From: Barnett, Steve [mailto:steve.barnett@amec.com]
Sent: Monday, July 01, 2013 2:18 PM
To: BROWN Geoff; TURNBLOM Susan
Cc: RueAnn Thomas
Subject: JHBaxter Eugene - Updated Off-site Soil TEQ

Geoff and Susan:

Please find attached a table with the updated TEQ calculations for soil samples using WHO 2005 TEFs. The last sample (SS-4 – highlighted in yellow) is one of two off-site (residential) samples analyzed for PCDDs/PCDFs. SS-4 was used for the EPC, and drove the dioxin risk in the 2006 BHHRA based on 3.3 pg/g of 1,2,3,4,6,7,8-HpCDD in the off-site residential scenario.

None of the congeners exceed the DEQ's Regional Screening Level (RSL) of 4.4 pg/g (4.4E-06 mg/kg). Combined results for all congeners (including the non-detects at ½ MRL) total 11.77 pg/g (TEQ), for a cumulative risk of 2.7E-06.

Based on these results and TEQ calculations, it appears that all dioxin congeners can be screened out for the off-site residential soil scenario.

J Stephen Barnett
AMEC Environment & Infrastructure
7376 SW Durham Road
Portland, Oregon 97224
office: 503-639-3400
mobile: 503-805-3395
steve.barnett@amec.com

Please consider the environment before printing this email.

	WHO TEF (2005)	B-7 1/26/1994	1/2 reporting limit	TEQ calc	B-17 1/27/1994	1/2 reporting limit	TEQ calc	B-23 1/26/1994	1/2 reporting limit	TEQ calc	COMP_S1 8/27/2001	1/2 reporting limit	TEQ calc	COMP_S2 8/27/2001	1/2 reporting limit	TEQ calc	SS_4 9/8/96	1/2 reporting limit	TEQ calc	Off-site Residential Est. Risk based on RSL RSL = 4.4 pg/g (=E10-6)
Upper Depth (feet)		0			0.5			0			0			0			0			
Lower Depth (feet)		1.5			2			1			0.5			0.5			-9			
2,3,7,8-TCDD	1.0	2.3 U	1.15	1.15	6.8 U	3.4	3.4	1.9 U	0.95	0.95	3	-	3	6.2	-	6.2	<0.6	0.3	0.3	6.8E-08
1,2,3,7,8-PeCDD	1.0	4.7 U	2.35	2.35	18.4 U	9.2	9.2	3.5 U	1.75	1.75	19	-	19	40	-	40	<1.6	0.8	0.8	1.8E-07
1,2,3,4,7,8-HxCDD	0.1	6.3 U	3.15	0.315	27.8 U	13.9	1.39	30.4	-	3.04	36	-	3.6	110	-	11	<1.2	0.6	0.06	1.4E-08
1,2,3,6,7,8-HxCDD	0.1	6.2 U	3.1	0.31	20.4 U	10.2	1.02	251.6	-	25.16	290	-	29	680	-	68	25.1	-	2.51	5.7E-07
1,2,3,7,8,9-HxCDD	0.1	43.4	-	4.34	3.2 U	1.6	0.16	143.4	-	14.34	110	-	11	270	-	27	6.9	-	0.69	1.6E-07
1,2,3,4,6,7,8-HpCDD	0.01	764	-	7.64	613	-	6.13	5894.1	-	58.941	6700	-	67	16000	-	160	333.3	-	3.333	7.6E-07
OCDD	**0.0003**	7112.9	-	2.13387	7064.3	-	2.11929	35325.5	-	10.59765	91000	-	27.3	210000	-	63	2324.6	-	0.69738	1.6E-07
2,3,7,8-TCDF	0.1	1.2 U	0.6	0.06	8 U	4	0.4	2.9	-	0.29	2.9	-	0.29	10	-	1	<0.7	0.35	0.035	8.0E-09
1,2,3,7,8-PeCDF	**0.03**	2.6 U	1.3	0.039	11.6 U	5.8	0.174	9.4	-	0.282	8	-	0.24	32	-	0.96	2.9	-	0.087	2.0E-08
2,3,4,7,8-PeCDF	**0.3**	2.6 U	1.3	0.39	9.7 U	4.85	1.455	2.1 U	1.05	0.315	27	-	8.1	74	-	22.2	2.4	-	0.72	1.6E-07
1,2,3,4,7,8-HxCDF	0.1	2 U	1	0.1	16.3 U	8.15	0.815	4.5 U	2.25	0.225	40	-	4	220	-	22	4.9	-	0.49	1.1E-07
1,2,3,6,7,8-HxCDF	0.1	1.8 U	0.9	0.09	15.5 U	7.75	0.775	4.5 U	2.25	0.225	27	-	2.7	63	-	6.3	6.3	-	0.63	1.4E-07
1,2,3,7,8,9-HxCDF	0.1	1.7 U	0.85	0.085	14 U	7	0.7	3.5 U	1.75	0.175	51	-	5.1	120	-	12	<1.6	0.8	0.08	1.8E-08
2,3,4,6,7,8-HxCDF	0.1	1.7 U	0.85	0.085	12.9 U	6.45	0.645	3.1 U	1.55	0.155	48	-	4.8	130	-	13	7.1	-	0.71	1.6E-07
1,2,3,4,6,7,8-HpCDF	0.01	128.9	-	1.289	38.4	-	0.384	878.8	-	8.788	1800	-	18	4400	-	44	61.4	-	0.614	1.4E-07
1,2,3,4,7,8,9-HpCDF	0.01	2.3 U	1.15	0.0115	14.2 U	7.1	0.071	1.8 U	0.9	0.009	120	-	1.2	300	-	3	<0.8	0.4	0.004	9.1E-10
OCDF	**0.0003**	626.1	-	0.18783	100	-	0.03	2928.8	-	0.87864	6000	-	1.8	12000	-	3.6	40.3	-	0.01209	2.7E-09
Total TEQ				**20.5762**			**28.86829**			**126.12129**			**206.13**			**503.26**			**11.77247**	**2.7E-06**
Total TCDD		2.3 U			6.8 U			1.9 U			140			260			64.1			
Total PeCDD		4.7 U			18.4 U			3.5 U			320			620			<1.6			
Total HxCDD		366.6			27.8 U			1680.7			2400			6000			36			
Total HpCDD		3310.7			1075.4			12974.7			20000			48000			600			
Total TCDF		1.2 U			8 U			2.9			43			130			<.7			
Total PeCDF		2.6 U			11.6 U			177			280			920			46.5			
Total HxCDF		2 U			16.3 U			1254.9			2600			7100			198.9			
Total HpCDF		589.5			144.2			3329			7200			17000			173.8			
Added Descriptor		**On-site**			**On-site**			**On-site**			**On-site**			**On-site**			**Off-site Residential**			**Off-site residential Risk**

Notes:
U -- The analyte was not detected at or above the associated reporting limit.
UJ -- Estimated reporting limit.
J -- Estimated value.
B -- The analyte was detected in the associated laboratory blank in addition to the sample.
EMPC -- Estimated maximum possible concentration.

ATTACHMENT C1

Off-Site Future Groundwater Scenario – 90% UCL Calculations

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	2/13/2014 4:19:36 PM
From File	Offsite_future_GW_exposure_2_13_14.xls
Full Precision	OFF
Confidence Coefficient	90%
Number of Bootstrap Operations	2000

Naphthalene

General Statistics

Total Number of Observations	105	Number of Distinct Observations	22
Number of Detects	14	Number of Non-Detects	91
Number of Distinct Detects	12	Number of Distinct Non-Detects	13
Minimum Detect	4.8000E-5	Minimum Non-Detect	4.7000E-5
Maximum Detect	0.0011	Maximum Non-Detect	0.0096
Variance Detects	6.6895E-8	Percent Non-Detects	86.67%
Mean Detects	2.2629E-4	SD Detects	2.5864E-4
Median Detects	1.6000E-4	CV Detects	1.143
Skewness Detects	3.395	Kurtosis Detects	12.14
Mean of Logged Detects	-8.686	SD of Logged Detects	0.693

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.518	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.874	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.336	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.237	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	7.6686E-5	Standard Error of Mean	1.2603E-5
SD	1.1619E-4	90% KM (BCA) UCL	1.0063E-4
90% KM (t) UCL	9.2940E-5	90% KM (Percentile Bootstrap) UCL	9.6446E-5
90% KM (z) UCL	9.2837E-5	90% KM Bootstrap t UCL	1.1177E-4
90% KM Chebyshev UCL	1.1449E-4	95% KM Chebyshev UCL	1.3162E-4
97.5% KM Chebyshev UCL	1.5539E-4	99% KM Chebyshev UCL	2.0208E-4

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.27	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.747	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.252	**Kolmogrov-Smirnoff GOF**	
5% K-S Critical Value	0.232	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.861	k star (bias corrected MLE)	1.51
Theta hat (MLE)	1.2162E-4	Theta star (bias corrected MLE)	1.4990E-4
nu hat (MLE)	52.1	nu star (bias corrected)	42.27
MLE Mean (bias corrected)	2.2629E-4	MLE Sd (bias corrected)	1.8418E-4

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.436	nu hat (KM)	91.47
Approximate Chi Square Value (91.47, α)	74.62	Adjusted Chi Square Value (91.47, β)	74.45
90% Gamma Approximate KM-UCL (use when n>=50)	9.4002E-5	90% Gamma Adjusted KM-UCL (use when n<50)	9.4217E-5

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	4.8000E-5	Mean	0.0087
Maximum	0.01	Median	0.01
SD	0.00334	CV	0.384
k hat (MLE)	1.379	k star (bias corrected MLE)	1.346
Theta hat (MLE)	0.00631	Theta star (bias corrected MLE)	0.00646
nu hat (MLE)	289.6	nu star (bias corrected)	282.7
MLE Mean (bias corrected)	0.0087	MLE Sd (bias corrected)	0.0075
		Adjusted Level of Significance (β)	0.0975
Approximate Chi Square Value (282.67, α)	252.7	Adjusted Chi Square Value (282.67, β)	252.3
90% Gamma Approximate UCL (use when n>=50)	0.00973	90% Gamma Adjusted UCL (use when n<50)	0.00974

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.879	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.874	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.19	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.237	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	5.4890E-5	Mean in Log Scale	-10.55
SD in Original Scale	1.1609E-4	SD in Log Scale	1.157
90% t UCL (assumes normality of ROS data)	6.9501E-5	90% Percentile Bootstrap UCL	7.0277E-5
90% BCA Bootstrap UCL	7.7080E-5	90% Bootstrap t UCL	8.6201E-5
90% H-UCL (Log ROS)	6.2447E-5		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-9.74	90% H-UCL (KM -Log)	7.3630E-5
KM SD (logged)	0.544	90% Critical H Value (KM-Log)	1.429
KM Standard Error of Mean (logged)	0.0619		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	5.8124E-4	Mean in Log Scale	-9.12
SD in Original Scale	0.00143	SD in Log Scale	1.432
90% t UCL (Assumes normality)	7.6181E-4	90% H-Stat UCL	4.0492E-4

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

Recommendation Provided only for 95% Confidence Coefficient

Pentachlorophenol

General Statistics

Total Number of Observations	162	Number of Distinct Observations	114
Number of Detects	119	Number of Non-Detects	43
Number of Distinct Detects	110	Number of Distinct Non-Detects	5
Minimum Detect	2.4000E-4	Minimum Non-Detect	2.0000E-4
Maximum Detect	1.8	Maximum Non-Detect	0.019
Variance Detects	0.109	Percent Non-Detects	26.54%
Mean Detects	0.204	SD Detects	0.33
Median Detects	0.052	CV Detects	1.618
Skewness Detects	2.058	Kurtosis Detects	4.417
Mean of Logged Detects	-3.287	SD of Logged Detects	2.336

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.644	**Normal GOF Test on Detected Observations Only**
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.348	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.0812	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.15	Standard Error of Mean	0.0233
SD	0.295	90% KM (BCA) UCL	0.182
90% KM (t) UCL	0.18	90% KM (Percentile Bootstrap) UCL	0.18
90% KM (z) UCL	0.18	90% KM Bootstrap t UCL	0.184
90% KM Chebyshev UCL	0.22	95% KM Chebyshev UCL	0.252
97.5% KM Chebyshev UCL	0.296	99% KM Chebyshev UCL	0.382

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	3.016	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.846	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.16	**Kolmogrov-Smirnoff GOF**
5% K-S Critical Value	0.0907	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.389	k star (bias corrected MLE)	0.385
Theta hat (MLE)	0.523	Theta star (bias corrected MLE)	0.529
nu hat (MLE)	92.7	nu star (bias corrected)	91.69
MLE Mean (bias corrected)	0.204	MLE Sd (bias corrected)	0.328

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.258	nu hat (KM)	83.62
Approximate Chi Square Value (83.62, α)	67.53	Adjusted Chi Square Value (83.62, β)	67.43
90% Gamma Approximate KM-UCL (use when n>=50)	0.186	90% Gamma Adjusted KM-UCL (use when n<50)	0.186

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	2.4000E-4	Mean	0.152
Maximum	1.8	Median	0.022
SD	0.295	CV	1.937
k hat (MLE)	0.378	k star (bias corrected MLE)	0.375
Theta hat (MLE)	0.403	Theta star (bias corrected MLE)	0.406
nu hat (MLE)	122.5	nu star (bias corrected)	121.6
MLE Mean (bias corrected)	0.152	MLE Sd (bias corrected)	0.249
		Adjusted Level of Significance (β)	0.0984
Approximate Chi Square Value (121.60, α)	102.1	Adjusted Chi Square Value (121.60, β)	102
90% Gamma Approximate UCL (use when n>=50)	0.181	90% Gamma Adjusted UCL (use when n<50)	0.182

Lognormal GOF Test on Detected Observations Only

Lilliefors Test Statistic	0.159	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.0812	Detected Data Not Lognormal at 5% Significance Level

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.15	Mean in Log Scale	-4.48
SD in Original Scale	0.296	SD in Log Scale	2.928
90% t UCL (assumes normality of ROS data)	0.18	90% Percentile Bootstrap UCL	0.18
90% BCA Bootstrap UCL	0.183	90% Bootstrap t UCL	0.185
90% H-UCL (Log ROS)	1.758		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.151	Mean in Log Scale	-4.325
SD in Original Scale	0.296	SD in Log Scale	2.827
90% t UCL (Assumes normality)	0.181	90% H-Stat UCL	1.465

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

Recommendation Provided only for 95% Confidence Coefficient

ATTACHMENT C2

Off-Site Future Groundwater Scenario – 95% UCL Calculations

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	2/13/2014 4:26:35 PM
From File	Offsite_future_GW_exposure_2_13_14.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Naphthalene

General Statistics

Total Number of Observations	105	Number of Distinct Observations	22
Number of Detects	14	Number of Non-Detects	91
Number of Distinct Detects	12	Number of Distinct Non-Detects	13
Minimum Detect	4.8000E-5	Minimum Non-Detect	4.7000E-5
Maximum Detect	0.0011	Maximum Non-Detect	0.0096
Variance Detects	6.6895E-8	Percent Non-Detects	86.67%
Mean Detects	2.2629E-4	SD Detects	2.5864E-4
Median Detects	1.6000E-4	CV Detects	1.143
Skewness Detects	3.395	Kurtosis Detects	12.14
Mean of Logged Detects	-8.686	SD of Logged Detects	0.693

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.518	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.336	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.237	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	7.6686E-5	Standard Error of Mean	1.2603E-5
SD	1.1619E-4	95% KM (BCA) UCL	1.2061E-4
95% KM (t) UCL	9.7602E-5	95% KM (Percentile Bootstrap) UCL	1.1001E-4
95% KM (z) UCL	9.7416E-5	95% KM Bootstrap t UCL	1.2216E-4
90% KM Chebyshev UCL	1.1449E-4	95% KM Chebyshev UCL	1.3162E-4
97.5% KM Chebyshev UCL	1.5539E-4	99% KM Chebyshev UCL	2.0208E-4

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.27	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.747	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.252	**Kolmogrov-Smirnoff GOF**
5% K-S Critical Value	0.232	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.861	k star (bias corrected MLE)	1.51
Theta hat (MLE)	1.2162E-4	Theta star (bias corrected MLE)	1.4990E-4
nu hat (MLE)	52.1	nu star (bias corrected)	42.27
MLE Mean (bias corrected)	2.2629E-4	MLE Sd (bias corrected)	1.8418E-4

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.436	nu hat (KM)	91.47
Approximate Chi Square Value (91.47, α)	70.42	Adjusted Chi Square Value (91.47, β)	70.16
95% Gamma Approximate KM-UCL (use when n>=50)	9.9615E-5	95% Gamma Adjusted KM-UCL (use when n<50)	9.9978E-5

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	4.8000E-5	Mean	0.0087
Maximum	0.01	Median	0.01
SD	0.00334	CV	0.384
k hat (MLE)	1.379	k star (bias corrected MLE)	1.346
Theta hat (MLE)	0.00631	Theta star (bias corrected MLE)	0.00646
nu hat (MLE)	289.6	nu star (bias corrected)	282.7
MLE Mean (bias corrected)	0.0087	MLE Sd (bias corrected)	0.0075
		Adjusted Level of Significance (β)	0.0477
Approximate Chi Square Value (282.67, α)	244.7	Adjusted Chi Square Value (282.67, β)	244.2
95% Gamma Approximate UCL (use when n>=50)	0.01	95% Gamma Adjusted UCL (use when n<50)	0.0101

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.879	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.19	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.237	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	5.4890E-5	Mean in Log Scale	-10.55
SD in Original Scale	1.1609E-4	SD in Log Scale	1.157
95% t UCL (assumes normality of ROS data)	7.3692E-5	95% Percentile Bootstrap UCL	7.5835E-5
95% BCA Bootstrap UCL	8.6006E-5	95% Bootstrap t UCL	9.4233E-5
95% H-UCL (Log ROS)	6.6534E-5		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-9.74	95% H-UCL (KM -Log)	7.5331E-5
KM SD (logged)	0.544	95% Critical H Value (KM-Log)	1.857
KM Standard Error of Mean (logged)	0.0619		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	5.8124E-4	Mean in Log Scale	-9.12
SD in Original Scale	0.00143	SD in Log Scale	1.432
95% t UCL (Assumes normality)	8.1360E-4	95% H-Stat UCL	4.4245E-4

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	9.7602E-5	95% KM (% Bootstrap) UCL	1.1001E-4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Pentachlorophenol

General Statistics

Total Number of Observations	162	Number of Distinct Observations	114
Number of Detects	119	Number of Non-Detects	43
Number of Distinct Detects	110	Number of Distinct Non-Detects	5
Minimum Detect	2.4000E-4	Minimum Non-Detect	2.0000E-4
Maximum Detect	1.8	Maximum Non-Detect	0.019
Variance Detects	0.109	Percent Non-Detects	26.54%
Mean Detects	0.204	SD Detects	0.33
Median Detects	0.052	CV Detects	1.618
Skewness Detects	2.058	Kurtosis Detects	4.417
Mean of Logged Detects	-3.287	SD of Logged Detects	2.336

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.644	**Normal GOF Test on Detected Observations Only**
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.348	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.0812	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.15	Standard Error of Mean	0.0233
SD	0.295	95% KM (BCA) UCL	0.189
95% KM (t) UCL	0.189	95% KM (Percentile Bootstrap) UCL	0.189
95% KM (z) UCL	0.188	95% KM Bootstrap t UCL	0.195
90% KM Chebyshev UCL	0.22	95% KM Chebyshev UCL	0.252
97.5% KM Chebyshev UCL	0.296	99% KM Chebyshev UCL	0.382

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	3.016	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.846	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.16	**Kolmogrov-Smirnoff GOF**
5% K-S Critical Value	0.0907	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.389	k star (bias corrected MLE)	0.385
Theta hat (MLE)	0.523	Theta star (bias corrected MLE)	0.529
nu hat (MLE)	92.7	nu star (bias corrected)	91.69
MLE Mean (bias corrected)	0.204	MLE Sd (bias corrected)	0.328

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.258	nu hat (KM)	83.62
Approximate Chi Square Value (83.62, α)	63.54	Adjusted Chi Square Value (83.62, β)	63.39
95% Gamma Approximate KM-UCL (use when n>=50)	0.197	95% Gamma Adjusted KM-UCL (use when n<50)	0.198

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	2.4000E-4	Mean	0.152
Maximum	1.8	Median	0.022
SD	0.295	CV	1.937
k hat (MLE)	0.378	k star (bias corrected MLE)	0.375
Theta hat (MLE)	0.403	Theta star (bias corrected MLE)	0.406
nu hat (MLE)	122.5	nu star (bias corrected)	121.6
MLE Mean (bias corrected)	0.152	MLE Sd (bias corrected)	0.249
		Adjusted Level of Significance (β)	0.0485
Approximate Chi Square Value (121.60, α)	97.14	Adjusted Chi Square Value (121.60, β)	96.94
95% Gamma Approximate UCL (use when n>=50)	0.191	95% Gamma Adjusted UCL (use when n<50)	0.191

Lognormal GOF Test on Detected Observations Only

Lilliefors Test Statistic	0.159	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.0812	Detected Data Not Lognormal at 5% Significance Level	

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.15	Mean in Log Scale	-4.48
SD in Original Scale	0.296	SD in Log Scale	2.928
95% t UCL (assumes normality of ROS data)	0.189	95% Percentile Bootstrap UCL	0.191
95% BCA Bootstrap UCL	0.19	95% Bootstrap t UCL	0.194
95% H-UCL (Log ROS)	2.225		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.151	Mean in Log Scale	-4.325
SD in Original Scale	0.296	SD in Log Scale	2.827
95% t UCL (Assumes normality)	0.189	95% H-Stat UCL	1.828

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

97.5% KM (Chebyshev) UCL	0.296

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

ATTACHMENT C3

Off-Site Future Groundwater Scenario – Metals Data

Total & Dissolved Metals Results (2009 - 2012)

All results in milligrams per liter (mg/L)

Well Name	Sample Date	Diss Arsenic		Total Arsenic		Diss Chromium		Total Chromium		Diss Copper		Total Copper		Diss Zinc		Total Zinc	
W-11S	9/29/2009	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-11S	9/28/2010	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-11S	9/28/2011	**0.0024**	**J**	**0.0024**	**J**	0.00088	U	0.00088	U	**0.00031**	**J**	**0.00031**	**J**	0.002	U	0.002	U
W-11S	9/6/2012	**0.0014**	**J**	**0.0018**	**J**	0.00088	U	0.00088	U	0.0002	U	**0.0003**	**J**	**0.0032**	**J**	**0.0023**	**J**
W-13I	3/16/2009	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-13I	6/3/2009	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-13I	6/3/2009	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-13I	9/28/2009	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-13I	12/8/2009	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-13I	12/8/2009	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-13I	4/1/2010	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-13I	6/23/2010	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-13I	9/27/2010	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-13I	12/14/2010	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-13I	3/29/2011	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-13I	6/23/2011	0.005	U	**0.00088**	**J**	**0.0013**	**J**	**0.0012**	**J**	0.002	U	0.002	U	0.01	U	0.01	U
W-13I	6/23/2011	0.005	U	**0.001**	**J**	**0.0014**	**J**	**0.0014**	**J**	0.002	U	0.002	U	**0.0026**	**J**	**0.0053**	**J**
W-13I	9/26/2011	**0.0013**	**J**	**0.0012**	**J**	0.00088	U	0.00088	U	**0.0004**	**J**	0.0002	U	0.002	U	0.002	U
W-13I	12/27/2011	0.0005	U	**0.00068**	**J**	0.00088	U	0.0002	U	0.0005	U	**0.00048**	**J**	0.002	U	0.002	U
W-13I	3/9/2012	**0.0005**	**J**	**0.00055**	**J**	0.00088	U	0.00088	U	0.0002	U	0.0002	U	0.002	U	0.002	U
W-13I	6/27/2012	**0.0012**	**J**	**0.0011**	**J**	0.003	U	0.003	U	**0.002**		**0.0018**	**J**	**0.0022**	**J**	0.01	U
W-13I	9/6/2012	0.0005	U	**0.00052**	**J**	0.00088	U	0.00088	U	0.0002	U	0.0002	U	0.002	U	**0.0026**	**J**
W-13I	12/27/2012	0.0005	U	0.0005	U	0.00088	U	0.00088	U	0.0002	U	0.0002	U	0.002	U	0.002	U
W-13S	3/16/2009	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-13S	6/3/2009	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-13S	9/28/2009	0.005	U	**0.035**		0.005	U	**0.025**		0.02	U	**0.093**		0.02	U	**0.178**	
W-13S	12/8/2009	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-13S	4/1/2010	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-13S	6/23/2010	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-13S	9/27/2010	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-13S	12/14/2010	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-13S	3/29/2011	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-13S	3/29/2011	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-13S	6/23/2011	**0.0014**	**J**	**0.0021**	**J**	**0.0013**	**J**	**0.0011**	**J**	**0.0026**		**0.003**		**0.0041**	**J**	0.01	U
W-13S	9/27/2011	**0.003**	**J**	**0.0028**	**J**	0.00088	U	0.00088	U	**0.0023**		**0.0022**		**0.0026**	**J**	**0.0051**	**J**
W-13S	12/27/2011	**0.0005**	**J**	**0.0012**	**J**	0.00088	U	0.00088	U	**0.0039**	**J**	**0.0018**	**J**	**0.00054**	**J**	**0.0023**	**J**
W-13S	3/9/2012	**0.00097**	**J**	**0.0011**	**J**	0.00088	U	0.00088	U	**0.0016**	**J**	**0.0014**	**J**	0.002	U	0.002	U
W-13S	6/27/2012	**0.00058**	**J**	**0.00062**	**J**	0.003	U	0.003	U	**0.0002**	**J**	0.0002	U	**0.0033**	**J**	0.01	U
W-13S	9/6/2012	**0.001**	**J**	**0.0013**	**J**	0.00088	U	0.00088	U	**0.0014**	**J**	**0.0019**	**J**	**0.004**	**J**	**0.0028**	**J**
W-13S	12/27/2012	**0.0007**	**J**	0.0005	U	0.00088	U	0.00088	U	**0.0012**	**J**	**0.0012**	**J**	0.002	U	0.002	U
W-13S	12/27/2012	**0.0006**	**J**	**0.00052**	**J**	0.00088	U	0.00088	U	**0.0014**	**J**	**0.0014**	**J**	0.002	U	**0.002**	**J**
W-16A(I)	9/29/2009	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	**0.026**	
W-16A(I)	9/28/2010	0.005	U	**0.0398**		0.005	U	**0.0232**		0.02	U	**0.027**		**0.024**		**2.22**	
W-16A(I)	9/27/2011	**0.0013**	**J**	**0.0019**	**J**	**0.00094**	**J**	**0.017**		**0.00031**	**J**	**0.0022**		**0.03**		**0.15**	
W-16A(I)	3/9/2012	NT		NT		0.003	U	0.003	U	NT		NT		NT		0.01	U
W-16A(I)	9/5/2012	**0.00055**	**J**	**0.0017**	**J**	0.00088	U	**0.0036**		**0.0005**	**J**	**0.003**		**0.071**		**0.37**	
W-17A(I)	9/29/2009	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-17A(I)	9/28/2010	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-17A(I)	9/27/2011	**0.0013**	**J**	**0.0013**	**J**	**0.0012**	**J**	**0.0012**	**J**	0.0002	U	**0.00029**	**J**	**0.0022**	**J**	**0.0037**	**J**
W-17A(I)	3/9/2012	NT		NT		0.003	U	0.003	U	NT		NT		NT		0.01	U
W-17A(I)	9/5/2012	0.0005	U	0.0005	U	0.00088	U	0.00088	U	0.0002	U	**0.00049**	**J**	0.002	U	**0.0064**	**J**
W-17A(S)	9/29/2009	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-17A(S)	9/28/2010	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-17A(S)	9/27/2011	**0.0017**	**J**	**0.0014**	**J**	**0.0019**	**J**	**0.0017**	**J**	**0.00039**	**J**	**0.00037**	**J**	**0.0024**	**J**	0.002	U

Total & Dissolved Metals Results (2009 - 2012)

All results in milligrams per liter (mg/L)

Well Name	Sample Date	Diss Arsenic		Total Arsenic		Diss Chromium		Total Chromium		Diss Copper		Total Copper		Diss Zinc		Total Zinc	
W-17A(S)	3/9/2012	NT		NT		0.003	U	0.003	U	NT		NT		NT		0.01	U
W-17A(S)	9/5/2012	**0.00069**	**J**	**0.00088**	**J**	0.00088	U	**0.0011**	**J**	**0.00056**	**J**	**0.0015**	**J**	**0.0022**	**J**	**0.0044**	**J**
W-17B(I)	3/9/2012	NT		NT		0.003	U	0.003	U	NT		NT		NT		0.01	U
W-18A(I)	3/9/2012	NT		NT		0.003	U	0.003	U	NT		NT		NT		0.01	U
W-18A(S)	9/28/2009	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-18A(S)	9/28/2009	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-18A(S)	9/27/2010	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-18A(S)	9/28/2011	**0.0016**	**J**	**0.0015**	**J**	**0.001**	**J**	**0.00094**	**J**	**0.00047**	**J**	**0.00044**	**J**	0.002	U	0.002	U
W-18A(S)	3/9/2012	NT		NT		0.003	U	0.003	U	NT		NT		NT		0.01	U
W-18A(S)	9/6/2012	**0.00087**	**J**	**0.00088**	**J**	0.00088	U	0.00088	U	**0.00028**	**J**	**0.00039**	**J**	0.002	U	**0.0025**	**J**
W-18A(S)	9/6/2012	**0.00089**	**J**	**0.00083**	**J**	0.00088	U	0.00088	U	0.0002	U	**0.00041**	**J**	0.002	U	**0.0039**	**J**
W-20I	3/16/2009	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-20I	3/16/2009	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-20I	6/3/2009	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-20I	9/28/2009	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-20I	12/8/2009	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-20I	4/1/2010	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-20I	4/1/2010	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-20I	6/23/2010	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-20I	6/23/2010	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-20I	9/27/2010	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-20I	12/14/2010	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-20I	12/14/2010	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-20I	3/29/2011	0.005	U	0.005	U	0.005	U	**0.005**		0.02	U	0.02	U	0.02	U	0.02	U
W-20I	6/23/2011	0.005	U	**0.00099**	**J**	**0.0015**	**J**	**0.0013**	**J**	**0.00022**	**J**	0.002	U	0.01	U	0.01	U
W-20I	9/26/2011	**0.0012**	**J**	**0.0012**	**J**	**0.00098**	**J**	**0.00088**	**J**	**0.00021**	**J**	0.0002	U	**0.004**	**J**	0.002	U
W-20I	12/27/2011	0.0005	U	**0.00067**	**J**	0.00088	U	0.00088	U	0.0002	U	**0.00028**	**J**	0.002	U	0.002	U
W-20I	12/27/2011	0.005	U	**0.00075**	**J**	0.00088	U	0.00088	U	0.0002	U	**0.0004**	**J**	0.002	U	0.002	U
W-20I	3/9/2012	0.0005	U	**0.00058**	**J**	0.00088	U	0.00088	U	0.0002	U	0.0002	U	0.002	U	0.002	U
W-20I	6/27/2012	**0.00065**	**J**	**0.00062**	**J**	0.003	U	0.003	U	0.0002	U	0.0002	U	0.002	U	0.01	U
W-20I	6/27/2012	**0.00054**	**J**	**0.00067**	**J**	0.00088	U	0.00088	U	0.0002	U	0.0002	U	0.002	U	0.002	U
W-20I	9/6/2012	0.0005	U	0.0005	U	0.00088	U	0.00088	U	0.0002	U	0.0002	U	**0.0033**	**J**	0.002	U
W-20I	12/27/2012	**0.00059**	**J**	0.0005	U	0.00088	U	0.00088	U	0.0002	U	0.0002	U	0.002	U	0.002	U
W-23	9/28/2009	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-23	9/27/2010	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-23	9/27/2010	0.005	U	0.005	U	0.005	U	0.005	U	0.02	U	0.02	U	0.02	U	0.02	U
W-23	9/28/2011	**0.0022**	**J**	**0.0018**	**J**	**0.0009**	**J**	**0.00091**	**J**	**0.00061**	**J**	**0.00051**	**J**	**0.0041**	**J**	0.002	U
W-23	3/9/2012	NT		NT		0.003	U	0.003	U	NT		NT		NT		0.01	U
W-23	9/6/2012	**0.0011**	**J**	**0.0015**	**J**	0.00088	U	0.00088	U	**0.00058**	**J**	**0.00052**	**J**	**0.0046**	**J**	**0.0047**	**J**
W-24	3/8/2012	**0.00088**	**J**	0.0005	U	0.00088	U	0.00088	U	**0.0006**	**J**	**0.00093**	**J**	**0.0021**	**J**	0.002	U
W-25	3/8/2012	**0.001**	**J**	**0.00059**	**J**	**0.0032**		**0.0028**	**J**	**0.00039**	**J**	**0.00074**	**J**	0.002	U	0.002	U
W-26	3/8/2012	**0.0011**	**J**	**0.00056**	**J**	0.00088	U	0.00088	U	**0.0023**		**0.00033**	**J**	**0.0095**	**J**	**0.0067**	**J**
W-26	3/8/2012	**0.00086**	**J**	**0.00056**	**J**	0.00088	U	0.00088	U	**0.00042**	**J**	**0.00036**	**J**	**0.0062**	**J**	0.002	U
W-29	3/8/2012	**0.0012**	**J**	**0.00052**	**J**	0.00088	U	**0.0023**	**J**	**0.00037**	**J**	**0.0013**	**J**	**0.0084**	**J**	**0.01**	
W-32	3/8/2012	**0.0012**	**J**	**0.0011**	**J**	**0.0025**	**J**	**0.0024**	**J**	**0.00079**	**J**	**0.0015**	**J**	0.002	U	0.002	U
W-34	3/8/2012	**0.00094**	**J**	**0.0007**	**J**	0.00088	U	0.00088	U	**0.00059**	**J**	**0.0012**	**J**	0.002	U	0.002	U
W-35	3/9/2012	NT		NT		0.003	U	0.003	U	NT		NT		NT		0.01	U
W-36	3/9/2012	NT		NT		0.003	U	0.003	U	NT		NT		NT		0.01	U
Zipolog	3/9/2012	NT		NT		0.003	U	0.003	U	NT		NT		NT		0.01	U

Notes: Arsenic is the only compound evaluated in the 2013 risk assessment revision.

Data reported to method detection limit

BOLD = detection

NT = not tested

U = not detected at or above the stated level

ATTACHMENT C4

Off-Site Future Groundwater Scenario – SVOC Data

Semi-Volatile Organic Compounds Results in Groundwater (2009-2012)
All results in milligrams per lite (mg/L)

Well Name	Sample Date	2,3,4,6-Tetrachlorophenol	2,3,5,6-Tetrachlorophenol	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,4-Dichlorophenol	2,4-Dimethylphenol	2,4-Dinitrophenol	2,6-Dichlorophenol	2-Chlorophenol	2-Methyl-4,6-Dinitrophenol	2-Methylphenol	2-Nitrophenol	3 & 4 Methylphenol
W-11I	9/29/2009	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U	0.005 U	0.005 U	0.02 U	NT	0.005 U	NT
W-11I	9/27/2010	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.002 U	0.0005 U	0.0005 U	0.002 U	NT	0.0005 U	NT
W-11I	9/28/2011	0.0019 U	NT	0.00043 U	0.00028 U	0.00061 U	0.00055 U	0.0095 U	0.0013 U	0.0019 U	0.0038 U	0.00093 U	0.00037 U	0.00024 U
W-11I	9/6/2012	NT	NT	0.000066 U	0.0001 U	0.000047 U	0.00038 U	0.0019 U	0.0001 U	0.000089 U	NT	0.000047 U	0.00024 U	0.000095 U
W-11S	9/29/2009	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.002 U	0.0005 U	0.0005 U	0.002 U	NT	0.0005 U	NT
W-11S	9/28/2010	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.002 U	0.0005 U	0.0005 U	0.002 U	NT	0.0005 U	NT
W-11S	9/28/2011	0.0019 U	NT	0.00043 U	0.00028 U	0.00061 U	0.00055 U	0.0095 U	0.0013 U	0.0019 U	0.0038 U	0.00093 U	0.00037 U	0.00024 U
W-11S	9/6/2012	NT	NT	0.000066 U	0.0001 U	0.000047 U	0.00038 U	0.0019 U	0.0001 U	0.000089 U	NT	0.000047 U	0.00024 U	0.000095 U
W-13I	3/16/2009	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.2 U	0.05 U	0.05 U	0.2 U	NT	0.05 U	NT
W-13I	6/3/2009	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.2 U	0.05 U	0.05 U	0.2 U	NT	0.05 U	NT
W-13I	6/3/2009	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.2 U	0.05 U	0.05 U	0.2 U	NT	0.05 U	NT
W-13I	9/28/2009	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.2 U	0.05 U	0.05 U	0.2 U	NT	0.05 U	NT
W-13I	12/8/2009	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.4 U	0.1 U	0.1 U	0.4 U	NT	0.1 U	NT
W-13I	12/8/2009	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.4 U	0.1 U	0.1 U	0.4 U	NT	0.1 U	NT
W-13I	4/1/2010	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.4 U	0.1 U	0.1 U	0.4 U	NT	0.1 U	NT
W-13I	6/23/2010	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.2 U	0.05 U	0.05 U	0.2 U	NT	0.05 U	NT
W-13I	9/27/2010	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.4 U	0.1 U	0.1 U	0.4 U	NT	0.1 U	NT
W-13I	12/14/2010	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.2 U	0.05 U	0.05 U	0.2 U	NT	0.05 U	NT
W-13I	3/29/2011	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.8 U	0.2 U	0.2 U	0.8 U	NT	0.2 U	NT
W-13I	6/23/2011	**0.023 J**	NT	0.095 U	0.095 U	0.095 U	0.095 U	0.29 U	0.095 U	0.095 U	0.48 U	0.095 U	0.095 U	0.095 U
W-13I	6/23/2011	**0.023 J**	NT	0.096 U	0.096 U	0.096 U	0.096 U	0.29 U	0.096 U	0.096 U	0.48 U	0.096 U	0.096 U	0.096 U
W-13I	9/26/2011	**0.034 J**	NT	0.0034 U	0.0022 U	0.0049 U	0.0044 U	0.076 U	0.01 U	0.015 U	0.03 U	0.0074 U	0.003 U	0.0019 U
W-13I	12/27/2011	**0.03 J**	NT	0.00043 U	0.00028 U	0.00061 U	0.00055 U	0.0095 U	0.0013 U	0.0019 U	0.0038 U	0.00093 U	0.00037 U	0.00024 U
W-13I	3/9/2012	**0.025 J**	NT	0.00042 U	0.00027 U	0.0006 U	0.00055 U	0.0094 U	0.0013 U	0.0019 U	0.0038 U	0.00092 U	0.00037 U	0.00024 U
W-13I	6/27/2012	NT	NT	**0.00036 J**	**0.00012 J**	**0.00017 J**	0.00038 U	0.0019 U	0.0001 U	0.000089 U	NT	0.000047 U	0.00024 U	0.000095 U
W-13I	9/6/2012	NT	NT	0.00066 U	0.001 U	0.00047 U	0.0038 U	0.019 U	0.001 U	0.00089 U	NT	0.00047 U	0.0024 U	0.00095 U
W-13I	12/27/2012	NT	NT	**0.00019 J**	0.00011 U	0.000048 U	0.00038 U	0.0019 U	0.00011 U	0.00009 U	NT	0.000048 U	0.00024 U	0.000096 U
W-13S	3/16/2009	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.002 U	0.0005 U	0.0005 U	0.002 U	NT	0.0005 U	NT
W-13S	6/3/2009	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.002 U	0.0005 U	0.0005 U	0.002 U	NT	0.0005 U	NT
W-13S	9/28/2009	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.004 U	0.001 U	0.001 U	0.004 U	NT	0.001 U	NT
W-13S	12/8/2009	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U	0.005 U	0.005 U	0.02 U	NT	0.005 U	NT
W-13S	4/1/2010	**0.0032**	**0.0032**	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.002 U	0.0005 U	0.0005 U	0.002 U	NT	0.0005 U	NT
W-13S	6/23/2010	0.005 U	**0.0053**	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U	0.005 U	0.005 U	0.02 U	NT	0.005 U	NT
W-13S	9/27/2010	0.0005 U	**0.00057**	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.002 U	0.0005 U	0.0005 U	0.002 U	NT	0.0005 U	NT
W-13S	12/14/2010	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.04 U	0.01 U	0.01 U	0.04 U	NT	0.01 U	NT
W-13S	3/29/2011	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.4 U	0.1 U	0.1 U	0.4 U	NT	0.1 U	NT
W-13S	3/29/2011	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.4 U	0.1 U	0.1 U	0.4 U	NT	0.1 U	NT
W-13S	6/23/2011	**0.0059 J**	NT	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.029 U	0.0095 U	0.0095 U	0.048 U	0.0095 U	0.0095 U	0.0095 U
W-13S	9/27/2011	**0.015 J**	NT	0.0017 U	0.0011 U	0.0024 U	0.0022 U	0.038 U	0.0051 U	0.0076 U	0.015 U	0.0037 U	0.0015 U	0.00095 U
W-13S	12/27/2011	**0.013 J**	NT	0.00043 U	0.00028 U	0.00061 U	0.00055 U	0.0095 U	0.0013 U	0.0019 U	0.0038 U	0.00093 U	0.00037 U	0.00024 U
W-13S	3/9/2012	**0.02 J**	NT	0.00042 U	0.00027 U	0.0006 U	0.00055 U	0.0094 U	0.0013 U	0.0019 U	0.0038 U	0.00092 U	0.00037 U	0.00024 U
W-13S	6/27/2012	NT	NT	**0.00017 J**	0.0001 U	**0.0001 J**	0.00038 U	0.0019 U	0.0001 U	0.000089 U	NT	0.000047 U	0.00024 U	0.000095 U
W-13S	9/6/2012	NT	NT	0.00033 U	0.00052 U	0.00024 U	0.0019 U	0.0095 U	0.00052 U	0.00044 U	NT	0.00024 U	0.0012 U	0.00047 U
W-13S	12/27/2012	NT	NT	**0.00022 J**	**0.00011 J**	0.000048 U	0.00038 U	0.0019 U	0.00011 U	0.00009 U	NT	0.000048 U	0.00024 U	0.000096 U
W-13S	12/27/2012	NT	NT	**0.00023 J**	0.00011 U	0.000048 U	0.00039 U	0.0019 U	0.00011 U	0.00009 U	NT	0.000048 U	0.00024 U	0.000096 U
W-16A(I)	9/29/2009	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.002 U	0.0005 U	0.0005 U	0.002 U	NT	0.0005 U	NT
W-16A(I)	9/28/2010	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.002 U	0.0005 U	0.0005 U	0.002 U	NT	0.0005 U	NT
W-16A(I)	9/27/2011	0.0019 U	NT	0.00043 U	0.00028 U	0.00061 U	0.00055 U	0.0095 U	0.0013 U	0.0019 U	0.0038 U	0.00093 U	0.00037 U	0.00024 U
W-16A(I)	3/9/2012	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-16A(I)	9/5/2012	NT	NT	0.000066 U	0.0001 U	0.000047 U	0.00038 U	0.0019 U	0.0001 U	0.000089 U	NT	0.000047 U	0.00024 U	0.000095 U
W-17A(I)	9/29/2009	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.002 U	0.0005 U	0.0005 U	0.002 U	NT	0.0005 U	NT
W-17A(I)	9/28/2010	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.002 U	0.0005 U	0.0005 U	0.002 U	NT	0.0005 U	NT
W-17A(I)	9/27/2011	0.0019 U	NT	0.00043 U	0.00028 U	0.00061 U	0.00055 U	0.0095 U	0.0013 U	0.0019 U	0.0038 U	0.00093 U	0.00037 U	0.00024 U
W-17A(I)	3/9/2012	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-17A(I)	9/5/2012	NT	NT	0.000066 U	0.0001 U	0.000047 U	0.00038 U	0.0019 U	0.0001 U	0.000089 U	NT	0.000047 U	0.00024 U	0.000095 U
W-17A(S)	9/29/2009	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.002 U	0.0005 U	0.0005 U	0.002 U	NT	0.0005 U	NT
W-17A(S)	9/28/2010	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.002 U	0.0005 U	0.0005 U	0.002 U	NT	0.0005 U	NT
W-17A(S)	9/27/2011	0.0019 U	NT	0.00043 U	0.00028 U	0.00061 U	0.00055 U	0.0095 U	0.0013 U	0.0019 U	0.0038 U	0.00093 U	0.00037 U	0.00024 U
W-17A(S)	3/9/2012	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-17A(S)	9/5/2012	NT	NT	0.000066 U	0.0001 U	0.000047 U	0.00038 U	0.0019 U	0.0001 U	0.000089 U	NT	0.000047 U	0.00024 U	0.000095 U
W-17B(I)	10/1/2009	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.002 U	0.0005 U	0.0005 U	0.002 U	NT	0.0005 U	NT
W-17B(I)	9/28/2010	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.002 U	0.0005 U	0.0005 U	0.002 U	NT	0.0005 U	NT
W-17B(I)	9/27/2011	0.0019 U	NT	0.00043 U	0.00028 U	0.00061 U	0.00055 U	0.0095 U	0.0013 U	0.0019 U	0.0038 U	0.00093 U	0.00037 U	0.00024 U
W-17B(I)	3/9/2012	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-17B(I)	9/5/2012	NT	NT	0.000066 U	0.0001 U	0.000047 U	0.00038 U	0.0019 U	0.0001 U	0.000089 U	NT	0.000047 U	0.00024 U	0.000095 U
W-18A(I)	3/17/2009	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U	0.005 U	0.005 U	0.02 U	NT	0.005 U	NT
W-18A(I)	9/28/2009	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U	0.005 U	0.005 U	0.02 U	NT	0.005 U	NT
W-18A(I)	3/30/2010	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.04 U	0.01 U	0.01 U	0.04 U	NT	0.01 U	NT
W-18A(I)	9/27/2010	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.002 U	0.0005 U	0.0005 U	0.002 U	NT	0.0005 U	NT
W-18A(I)	3/28/2011	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.002 U	0.0005 U	0.0005 U	0.002 U	NT	0.0005 U	NT
W-18A(I)	9/28/2011	0.0019 U	NT	0.00043 U	0.00028 U	0.00061 U	0.00055 U	0.0095 U	0.0013 U	0.0019 U	0.0038 U	0.00093 U	0.00037 U	0.00024 U
W-18A(I)	3/9/2012	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-18A(I)	9/6/2012	NT	NT	0.000066 U	0.0001 U	0.000047 U	0.00038 U	0.0019 U	0.0001 U	0.000089 U	NT	0.000047 U	0.00024 U	0.000095 U
W-18A(S)	9/28/2009	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.002 U	0.0005 U	0.0005 U	0.002 U	NT	0.0005 U	NT
W-18A(S)	9/28/2009	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.002 U	0.0005 U	0.0005 U	0.002 U	NT	0.0005 U	NT
W-18A(S)	9/27/2010	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.002 U	0.0005 U	0.0005 U	0.002 U	NT	0.0005 U	NT
W-18A(S)	9/28/2011	0.0019 U	NT	0.00043 U	0.00028 U	0.00061 U	0.00055 U	0.0095 U	0.0013 U	0.0019 U	0.0038 U	0.00093 U	0.00037 U	0.00024 U
W-18A(S)	3/9/2012	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-18A(S)	9/6/2012	NT	NT	0.000066 U	0.0001 U	0.000047 U	0.00038 U	0.0019 U	0.0001 U	0.000089 U	NT	0.000047 U	0.00024 U	0.000095 U
W-18A(S)	9/6/2012	NT	NT	0.000067 U	0.0001 U	0.000048 U	0.00038 U	0.0019 U	0.0001 U	0.00009 U	NT	0.000048 U	0.00024 U	0.000095 U

Semi-Volatile Organic Compounds Results in Groundwater (2009-2012)
All results in milligrams per lite (mg/L)

Well Name	Sample Date	2,3,4,6-Tetrachlorophenol	2,3,5,6-Tetrachlorophenol	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,4-Dichlorophenol	2,4-Dimethylphenol	2,4-Dinitrophenol	2,6-Dichlorophenol	2-Chlorophenol	2-Methyl-4,6-Dinitrophenol	2-Methylphenol	2-Nitrophenol	3 & 4 Methylphenol
W-20I	3/16/2009	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.04 U	0.01 U	0.01 U	0.04 U	NT	0.01 U	NT
W-20I	3/16/2009	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.04 U	0.01 U	0.01 U	0.04 U	NT	0.01 U	NT
W-20I	6/3/2009	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U	0.005 U	0.005 U	0.02 U	NT	0.005 U	NT
W-20I	9/28/2009	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U	0.005 U	0.005 U	0.02 U	NT	0.005 U	NT
W-20I	12/8/2009	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U	0.005 U	0.005 U	0.02 U	NT	0.005 U	NT
W-20I	4/1/2010	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.04 U	0.01 U	0.01 U	0.04 U	NT	0.01 U	NT
W-20I	4/1/2010	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.04 U	0.01 U	0.01 U	0.04 U	NT	0.01 U	NT
W-20I	6/23/2010	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.01 U	0.0025 U	0.0025 U	0.01 U	NT	0.0025 U	NT
W-20I	6/23/2010	0.0025 U	**0.0027**	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.01 U	0.0025 U	0.0025 U	0.01 U	NT	0.0025 U	NT
W-20I	9/27/2010	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.01 U	0.0025 U	0.0025 U	0.01 U	NT	0.0025 U	NT
W-20I	12/14/2010	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U	0.005 U	0.005 U	0.02 U	NT	0.005 U	NT
W-20I	12/14/2010	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.002 U	0.0005 U	0.0005 U	0.002 U	NT	0.0005 U	NT
W-20I	3/29/2011	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.1 U	0.025 U	0.025 U	0.1 U	NT	0.025 U	NT
W-20I	6/23/2011	0.048 U	NT	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.029 U	0.0095 U	0.0095 U	0.048 U	0.0095 U	0.0095 U	0.0095 U
W-20I	9/26/2011	0.0019 U	NT	0.00043 U	0.00028 U	0.00061 U	0.00055 U	0.0095 U	0.0013 U	0.0019 U	0.0038 U	0.00093 U	0.00037 U	0.00024 U
W-20I	12/27/2011	0.0019 U	NT	0.00043 U	0.00028 U	0.00061 U	0.00055 U	0.0095 U	0.0013 U	0.0019 U	0.0038 U	0.00093 U	0.00037 U	0.00024 U
W-20I	12/27/2011	0.0019 U	NT	0.00043 U	0.00028 U	0.00061 U	0.00055 U	0.0095 U	0.0013 U	0.0019 U	0.0038 U	0.00093 U	0.00037 U	0.00024 U
W-20I	3/9/2012	0.0019 U	NT	0.00043 U	0.00028 U	0.00061 U	0.00055 U	0.0095 U	0.0013 U	0.0019 U	0.0038 U	0.00093 U	0.00037 U	0.00024 U
W-20I	6/27/2012	NT	NT	0.000067 U	0.0001 U	0.000048 U	0.00038 U	0.0019 U	0.0001 U	0.00009 U	NT	0.000048 U	0.00024 U	0.000095 U
W-20I	6/27/2012	NT	NT	0.000066 U	0.0001 U	0.000047 U	0.00038 U	0.0019 U	0.0001 U	0.000089 U	NT	0.000047 U	0.00024 U	0.000095 U
W-20I	9/6/2012	NT	NT	0.000067 U	0.0001 U	0.000048 U	0.00038 U	0.0019 U	0.0001 U	0.000089 U	NT	0.000048 U	0.00024 U	0.000095 U
W-20I	12/27/2012	NT	NT	0.000067 U	0.00011 U	0.000048 U	0.00038 U	0.0019 U	0.00011 U	0.00009 U	NT	0.000048 U	0.00024 U	0.000096 U
W-23	9/28/2009	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U	0.005 U	0.005 U	0.02 U	NT	0.005 U	NT
W-23	9/27/2010	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.002 U	0.0005 U	0.0005 U	0.002 U	NT	0.0005 U	NT
W-23	9/27/2010	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.002 U	0.0005 U	0.0005 U	0.002 U	NT	0.0005 U	NT
W-23	9/28/2011	0.0019 U	NT	0.00043 U	0.00028 U	0.00061 U	0.00055 U	0.0095 U	0.0013 U	0.0019 U	0.0038 U	0.00093 U	0.00037 U	0.00024 U
W-23	3/9/2012	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-23	9/6/2012	NT	NT	0.000066 U	0.0001 U	0.000047 U	0.00038 U	0.0019 U	0.0001 U	0.000089 U	NT	0.000047 U	0.00024 U	0.000095 U
W-24	3/18/2009	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U	0.005 U	0.005 U	0.02 U	NT	0.005 U	NT
W-24	10/1/2009	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U	0.005 U	0.005 U	0.02 U	NT	0.005 U	NT
W-24	3/31/2010	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.008 U	0.002 U	0.002 U	0.008 U	NT	0.002 U	NT
W-24	9/28/2010	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.1 U	0.025 U	0.025 U	0.1 U	NT	0.025 U	NT
W-24	3/28/2011	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U	0.005 U	0.005 U	0.02 U	NT	0.005 U	NT
W-24	9/27/2011	0.0019 U	NT	0.00043 U	0.00027 U	0.00061 U	0.00055 U	0.0095 U	0.0013 U	0.0019 U	0.0038 U	0.00093 U	0.00037 U	0.00024 U
W-24	3/8/2012	0.0019 U	NT	0.00043 U	0.00027 U	0.00061 U	0.00055 U	0.0095 U	0.0013 U	0.0019 U	0.0038 U	0.00093 U	0.00037 U	0.00024 U
W-24	9/5/2012	NT	NT	0.000066 U	0.0001 U	0.000047 U	0.00038 U	0.0019 U	0.0001 U	0.000089 U	NT	0.000047 U	0.00024 U	0.000095 U
W-25	3/17/2009	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U	0.005 U	0.005 U	0.02 U	NT	0.005 U	NT
W-25	9/30/2009	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U	0.005 U	0.005 U	0.02 U	NT	0.005 U	NT
W-25	3/30/2010	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.04 U	0.01 U	0.01 U	0.04 U	NT	0.01 U	NT
W-25	9/28/2010	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U	0.005 U	0.005 U	0.02 U	NT	0.005 U	NT
W-25	3/28/2011	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U	0.005 U	0.005 U	0.02 U	NT	0.005 U	NT
W-25	9/28/2011	0.0019 U	NT	0.00043 U	0.00028 U	0.00061 U	0.00055 U	0.0095 U	0.0013 U	0.0019 U	0.0038 U	0.00093 U	0.00037 U	0.00024 U
W-25	3/8/2012	0.0019 U	NT	0.00043 U	0.00028 U	0.00061 U	0.00055 U	0.0095 U	0.0013 U	0.0019 U	0.0038 U	0.00093 U	0.00037 U	0.00024 U
W-25	9/5/2012	NT	NT	0.000067 U	0.0001 U	0.000048 U	0.00038 U	0.0019 U	0.0001 U	0.000089 U	NT	0.000048 U	0.00024 U	0.000095 U
W-26	3/18/2009	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.04 U	0.01 U	0.01 U	0.04 U	NT	0.01 U	NT
W-26	10/1/2009	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U	0.005 U	0.005 U	0.02 U	NT	0.005 U	NT
W-26	3/31/2010	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.04 U	0.01 U	0.01 U	0.04 U	NT	0.01 U	NT
W-26	9/28/2010	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.004 U	0.001 U	0.001 U	0.004 U	NT	0.001 U	NT
W-26	3/28/2011	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.04 U	0.01 U	0.01 U	0.04 U	NT	0.01 U	NT
W-26	9/28/2011	0.0019 U	NT	0.00043 U	0.00028 U	0.00061 U	0.00055 U	0.0095 U	0.0013 U	0.0019 U	0.0038 U	0.00093 U	0.00037 U	0.00024 U
W-26	3/8/2012	0.0019 U	NT	0.00043 U	0.00027 U	0.00061 U	0.00055 U	0.0095 U	0.0013 U	0.0019 U	0.0038 U	0.00093 U	0.00037 U	0.00024 U
W-26	3/8/2012	0.047 U	NT	0.00043 U	0.0095 U	0.00061 U	0.00055 U	0.0095 U	0.0013 U	0.0019 U	0.0038 U	0.00093 U	0.00037 U	0.00024 U
W-26	9/5/2012	NT	NT	0.000067 U	0.0001 U	0.000048 U	0.00038 U	0.0019 U	0.0001 U	0.000089 U	NT	0.000048 U	0.00024 U	0.000095 U
W-29	3/19/2009	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.01 U	0.0025 U	0.0025 U	0.01 U	NT	0.0025 U	NT
W-29	10/1/2009	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.01 U	0.0025 U	0.0025 U	0.01 U	NT	0.0025 U	NT
W-29	3/31/2010	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.008 U	0.002 U	0.002 U	0.008 U	NT	0.002 U	NT
W-29	9/28/2010	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.002 U	0.0005 U	0.0005 U	0.002 U	NT	0.0005 U	NT
W-29	3/28/2011	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.004 U	0.001 U	0.001 U	0.004 U	NT	0.001 U	NT
W-29	9/28/2011	0.0019 U	NT	0.00043 U	0.00028 U	0.00061 U	0.00055 U	0.0095 U	0.0013 U	0.0019 U	0.0038 U	0.00093 U	0.00037 U	0.00024 U
W-29	3/8/2012	0.047 U	NT	0.000033 U	0.000052 U	0.000024 U	0.00019 U	0.00095 U	0.000052 U	0.000044 U	0.0038 U	0.000024 U	0.00012 U	0.000047 U
W-29	9/5/2012	NT	NT	0.000067 U	0.00011 U	0.000048 U	0.00038 U	0.0019 U	0.00011 U	0.00009 U	NT	0.000048 U	0.00024 U	0.000096 U
W-32	3/17/2009	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.002 U	0.0005 U	0.0005 U	0.002 U	NT	0.0005 U	NT
W-32	9/30/2009	**0.00059**	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.002 U	0.0005 U	0.0005 U	0.002 U	NT	0.0005 U	NT
W-32	3/30/2010	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.002 U	0.0005 U	0.0005 U	0.002 U	NT	0.0005 U	NT
W-32	9/28/2010	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.002 U	0.0005 U	0.0005 U	0.002 U	NT	0.0005 U	NT
W-32	3/28/2011	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.002 U	0.0005 U	0.0005 U	0.002 U	NT	0.0005 U	NT
W-32	9/27/2011	0.0019 U	NT	0.00043 U	0.00028 U	0.00061 U	0.00055 U	0.0095 U	0.0013 U	0.0019 U	0.0038 U	0.00093 U	0.00037 U	0.00024 U
W-32	3/8/2012	0.048 U	NT	0.000033 U	0.000052 U	0.000024 U	0.00019 U	0.00095 U	0.000052 U	0.000045 U	0.0038 U	0.000024 U	0.00012 U	0.000048 U
W-32	9/5/2012	NT	NT	0.000066 U	0.0001 U	0.000047 U	0.00038 U	0.0019 U	0.0001 U	0.000089 U	NT	0.000047 U	0.00024 U	0.000095 U
W-34	3/17/2009	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.002 U	0.0005 U	0.0005 U	0.002 U	NT	0.0005 U	NT
W-34	9/30/2009	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.002 U	0.0005 U	0.0005 U	0.002 U	NT	0.0005 U	NT
W-34	3/30/2010	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.002 U	0.0005 U	0.0005 U	0.002 U	NT	0.0005 U	NT
W-34	9/28/2010	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.04 U	0.01 U	0.01 U	0.04 U	NT	0.01 U	NT
W-34	3/28/2011	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.002 U	0.0005 U	0.0005 U	0.002 U	NT	0.0005 U	NT
W-34	9/27/2011	0.0019 U	NT	0.00043 U	0.00028 U	0.00061 U	0.00055 U	0.0095 U	0.0013 U	0.0019 U	0.0038 U	0.00093 U	0.00037 U	0.00024 U
W-34	3/8/2012	0.047 U	NT	0.000033 U	0.000052 U	0.000024 U	0.00019 U	0.00095 U	0.000052 U	**0.000099 J**	0.0038 U	0.000024 U	0.000047 U	0.000047 U
W-34	9/5/2012	NT	NT	0.000066 U	0.0001 U	0.000047 U	0.00038 U	0.0019 U	0.0001 U	0.000089 U	NT	0.000047 U	0.00024 U	0.000095 U
W-35	9/30/2009	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.002 U	0.0005 U	0.0005 U	0.002 U	NT	0.0005 U	NT
W-35	9/29/2010	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.002 U	0.0005 U	0.0005 U	0.002 U	NT	0.0005 U	NT
W-35	9/28/2011	0.0019 U	NT	0.00043 U	0.00028 U	0.00061 U	0.00055 U	0.0095 U	0.0013 U	0.0019 U	0.0038 U	0.00093 U	0.00037 U	0.00024 U

Semi-Volatile Organic Compounds Results in Groundwater (2009-2012)
All results in milligrams per lite (mg/L)

Well Name	Sample Date	2,3,4,6-Tetrachlorophenol		2,3,5,6-Tetrachlorophenol		2,4,5-Trichlorophenol		2,4,6-Trichlorophenol		2,4-Dichlorophenol		2,4-Dimethylphenol		2,4-Dinitrophenol		2,6-Dichlorophenol		2-Chlorophenol		2-Methyl-4,6-Dinitrophenol		2-Methylphenol		2-Nitrophenol		3 & 4 Methylphenol	
W-35	3/9/2012	NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT	
W-35	9/5/2012	NT		NT		0.000067	U	0.0001	U	0.000048	U	0.00038	U	0.0019	U	0.0001	U	0.00009	U	NT		0.000048	U	0.00024	U	0.000095	U
W-36	9/30/2009	0.0005	U	0.0005	U	0.0005	U	0.0005	U	0.0005	U	0.0005	U	0.002	U	0.0005	U	0.0005	U	0.002	U	NT		0.0005	U	NT	
W-36	9/29/2010	0.0005	U	0.0005	U	0.0005	U	0.0005	U	0.0005	U	0.0005	U	0.002	U	0.0005	U	0.0005	U	0.002	U	NT		0.0005	U	NT	
W-36	9/27/2011	0.0019	U	NT		0.00043	U	0.00028	U	0.00061	U	0.00055	U	0.0095	U	0.0013	U	0.0019	U	0.0038	U	0.00093	U	0.00037	U	0.00024	U
W-36	3/9/2012	NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT	
W-36	9/5/2012	NT		NT		0.000067	U	0.0001	U	0.000048	U	0.00038	U	0.0019	U	0.0001	U	0.00009	U	NT		0.000048	U	0.00024	U	0.000095	U
Zipolog	9/30/2009	0.0005	U	0.0005	U	0.0005	U	0.0005	U	0.0005	U	0.0005	U	0.002	U	0.0005	U	0.0005	U	0.002	U	NT		0.0005	U	NT	
Zipolog	9/28/2010	0.0005	U	0.0005	U	0.0005	U	0.0005	U	0.0005	U	0.0005	U	0.002	U	0.0005	U	0.0005	U	0.002	U	NT		0.0005	U	NT	
Zipolog	9/28/2011	0.0019	U	NT		0.00043	U	0.00028	U	0.00061	U	0.00055	U	0.0095	U	0.0013	U	0.0019	U	0.0038	U	0.00093	U	0.00037	U	0.00024	U
Zipolog	3/9/2012	NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT	
Zipolog	9/5/2012	NT		NT		0.000066	U	0.0001	U	0.000047	U	0.00038	U	0.0019	U	0.0001	U	0.000089	U	NT		0.000047	U	0.00024	U	0.000095	U

Semi-Volatile Organic Compounds Results in Groundwater (2009-2012)
All results in milligrams per lite (mg/L)

Well Name	Sample Date	3-Methylphenol	4-Chloro-3-Methylphenol	4-Methylphenol (p-Cresol)	4-Nitrophenol	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)athhracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Carbofuran phenol
W-11I	9/29/2009	NT	0.005 U	NT	0.01 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-11I	9/27/2010	NT	0.0005 U	NT	0.001 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-11I	9/28/2011	0.00024 U	0.0023 U	0.00024 U	0.0012 U	NT	NT	NT	NT	NT	NT	NT	NT	0.0095 U
W-11I	9/6/2012	NT	0.00026 U	0.000095 U	0.00095 U	0.000095 U	0.0001 U	0.000076 U	0.0001 U	0.000068 U	0.000072 U	0.00019 U	0.00015 U	NT
W-11S	9/29/2009	NT	0.0005 U	NT	0.001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-11S	9/28/2010	NT	0.0005 U	NT	0.001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-11S	9/28/2011	0.00024 U	0.0023 U	0.00024 U	0.0012 U	0.00027 U	0.00046 U	0.0004 U	0.00033 U	0.00029 U	0.0005 U	0.00047 U	0.00044 U	0.0095 U
W-11S	9/6/2012	NT	0.00026 U	0.000095 U	0.00095 U	0.000095 U	0.0001 U	0.000076 U	0.0001 U	0.000068 U	0.000072 U	0.00019 U	0.00015 U	NT
W-13I	3/16/2009	NT	0.05 U	NT	0.1 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-13I	6/3/2009	NT	0.05 U	NT	0.1 U	0.0001 U	0.0001 U	**0.00012**	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-13I	6/3/2009	NT	0.05 U	NT	0.1 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-13I	9/28/2009	NT	0.05 U	NT	0.1 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-13I	12/8/2009	NT	0.1 U	NT	0.2 U	0.0001 U	0.0001 U	**0.00013**	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-13I	12/8/2009	NT	0.1 U	NT	0.2 U	0.0001 U	0.0001 U	**0.00013**	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-13I	4/1/2010	NT	0.1 U	NT	0.2 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-13I	6/23/2010	NT	0.05 U	NT	0.1 U	0.0001 U	0.0001 U	**0.00022**	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-13I	9/27/2010	NT	0.1 U	NT	0.2 U	0.0001 U	0.0001 U	0.00017 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-13I	12/14/2010	NT	0.05 U	NT	0.1 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-13I	3/29/2011	NT	0.2 U	NT	0.4 U	0.0001 U	0.0001 U	**0.0001**	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-13I	6/23/2011	0.095 U	0.095 U	0.095 U	0.095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.48 U
W-13I	6/23/2011	0.096 U	0.096 U	0.096 U	0.096 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.48 U
W-13I	9/26/2011	0.0019 U	0.018 U	0.0019 U	0.0093 U	0.00027 U	0.00046 U	0.0004 U	0.00033 U	0.00029 U	0.0005 U	0.00047 U	0.00044 U	0.076 U
W-13I	12/27/2011	0.00024 U	0.0023 U	0.00024 U	0.0012 U	0.00026 U	0.00046 U	0.0004 U	0.00033 U	0.00029 U	0.0005 U	0.00047 U	0.00043 U	0.0095 U
W-13I	3/9/2012	0.00024 U	0.0023 U	0.00024 U	0.0012 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0094 U
W-13I	6/27/2012	NT	0.00026 U	0.000095 U	0.0012 U	0.000095 U	0.0001 U	**0.00012 J**	0.000099 U	0.000068 U	0.000072 U	0.00019 U	0.00015 U	0.0095 U
W-13I	9/6/2012	NT	0.0026 U	0.00095 U	0.0095 U	0.00095 U	0.001 U	0.00076 U	0.001 U	0.00068 U	0.00072 U	0.0019 U	0.0015 U	NT
W-13I	12/27/2012	NT	0.00026 U	0.000096 U	0.00096 U	0.000096 U	0.0001 U	**0.0001 J**	0.0001 U	0.000069 U	0.000073 U	0.00019 U	0.00015 U	NT
W-13S	3/16/2009	NT	0.0005 U	NT	0.001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-13S	6/3/2009	NT	0.0005 U	NT	0.001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-13S	9/28/2009	NT	0.001 U	NT	0.002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	NT
W-13S	12/8/2009	NT	0.005 U	NT	0.01 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-13S	4/1/2010	NT	0.0005 U	NT	0.001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-13S	6/23/2010	NT	0.005 U	NT	0.01 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-13S	9/27/2010	NT	0.0005 U	NT	0.001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-13S	12/14/2010	NT	0.01 U	NT	0.02 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-13S	3/29/2011	NT	0.1 U	NT	0.2 U	0.0001 U	0.0001 U	**0.0001**	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-13S	3/29/2011	NT	0.1 U	NT	0.2 U	0.0001 U	0.0001 U	**0.0001**	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-13S	6/23/2011	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.048 U
W-13S	9/27/2011	0.00095 U	0.0091 U	0.00095 U	0.0047 U	0.00027 U	0.00047 U	0.0004 U	0.00033 U	0.00029 U	0.0005 U	0.00048 U	0.00044 U	0.038 U
W-13S	12/27/2011	0.00024 U	0.0023 U	0.00024 U	0.0012 U	0.00027 U	0.00046 U	0.0004 U	0.00033 U	0.00029 U	0.0005 U	0.00047 U	0.00044 U	0.0095 U
W-13S	3/9/2012	0.00024 U	0.0023 U	0.00024 U	0.0012 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0094 U
W-13S	6/27/2012	NT	0.00026 U	0.000095 U	0.0012 U	0.000095 U	0.0001 U	**0.000086 J**	0.0001 U	0.000068 U	0.000072 U	0.00019 U	0.00015 U	0.0095 U
W-13S	9/6/2012	NT	0.0013 U	0.00047 U	0.0047 U	0.00047 U	0.0005 U	0.00038 U	0.0005 U	0.00034 U	0.00036 U	0.00095 U	0.00075 U	NT
W-13S	12/27/2012	NT	0.00026 U	0.000096 U	0.00096 U	0.000096 U	0.0001 U	**0.00016 J**	0.0001 U	0.000069 U	0.000073 U	0.00019 U	0.00015 U	NT
W-13S	12/27/2012	NT	0.00026 U	0.000096 U	0.00096 U	0.000096 U	0.0001 U	**0.00017 J**	0.0001 U	0.000069 U	0.000073 U	0.00019 U	0.00015 U	NT
W-16A(I)	9/29/2009	NT	0.0005 U	NT	0.001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-16A(I)	9/28/2010	NT	0.0005 U	NT	0.001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-16A(I)	9/27/2011	0.00024 U	0.0023 U	0.00024 U	0.0012 U	0.00027 U	0.00047 U	0.0004 U	0.00033 U	0.00029 U	0.00051 U	0.00048 U	0.00044 U	0.0095 U
W-16A(I)	3/9/2012	NT	NT	NT	0.0012 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-16A(I)	9/5/2012	NT	0.00026 U	0.000095 U	0.00095 U	0.000095 U	0.0001 U	0.000076 U	0.0001 U	0.000068 U	0.000072 U	0.00019 U	0.00015 U	NT
W-17A(I)	9/29/2009	NT	0.0005 U	NT	0.001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-17A(I)	9/28/2010	NT	0.0005 U	NT	0.001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-17A(I)	9/27/2011	0.00024 U	0.0023 U	0.00024 U	0.0012 U	0.00027 U	0.00047 U	0.0004 U	0.00033 U	0.00029 U	0.0005 U	0.00048 U	0.00044 U	0.0095 U
W-17A(I)	3/9/2012	NT	NT	NT	0.0012 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-17A(I)	9/5/2012	NT	0.00026 U	0.000095 U	0.00095 U	0.000095 U	0.0001 U	0.000076 U	0.0001 U	0.000068 U	0.000072 U	0.00019 U	0.00015 U	NT
W-17A(S)	9/29/2009	NT	0.0005 U	NT	0.001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-17A(S)	9/28/2010	NT	0.0005 U	NT	0.001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-17A(S)	9/27/2011	0.00024 U	0.0023 U	0.00024 U	0.0012 U	0.00027 U	0.00047 U	0.0004 U	0.00033 U	0.00029 U	0.0005 U	0.00047 U	0.00044 U	0.0095 U
W-17A(S)	3/9/2012	NT	NT	NT	0.0012 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-17A(S)	9/5/2012	NT	0.00026 U	0.000095 U	0.00095 U	0.000095 U	0.0001 U	0.000076 U	0.0001 U	0.000068 U	0.000072 U	0.00019 U	0.00015 U	NT
W-17B(I)	10/1/2009	NT	0.0005 U	NT	0.001 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-17B(I)	9/28/2010	NT	0.0005 U	NT	0.001 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-17B(I)	9/27/2011	0.00024 U	0.0023 U	0.00024 U	0.0012 U	NT	NT	NT	NT	NT	NT	NT	NT	0.0095 U
W-17B(I)	3/9/2012	NT	NT	NT	0.0012 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-17B(I)	9/5/2012	NT	0.00026 U	0.000095 U	0.00095 U	0.000095 U	0.0001 U	0.000076 U	0.0001 U	0.000068 U	0.000072 U	0.00019 U	0.00015 U	NT
W-18A(I)	3/17/2009	NT	0.005 U	NT	0.01 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-18A(I)	9/28/2009	NT	0.005 U	NT	0.01 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-18A(I)	3/30/2010	NT	0.01 U	NT	0.02 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-18A(I)	9/27/2010	NT	0.0005 U	NT	0.001 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-18A(I)	3/28/2011	NT	0.0005 U	NT	0.001 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-18A(I)	9/28/2011	0.00024 U	0.0023 U	0.00024 U	0.0012 U	NT	NT	NT	NT	NT	NT	NT	NT	0.0095 U
W-18A(I)	3/9/2012	NT	NT	NT	0.0012 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-18A(I)	9/6/2012	NT	0.00026 U	0.000095 U	0.00095 U	0.000095 U	0.0001 U	0.000076 U	0.0001 U	0.000068 U	0.000072 U	0.00019 U	0.00015 U	NT
W-18A(S)	9/28/2009	NT	0.0005 U	NT	0.001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-18A(S)	9/28/2009	NT	0.0005 U	NT	0.001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-18A(S)	9/27/2010	NT	0.0005 U	NT	0.001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-18A(S)	9/28/2011	0.00024 U	0.0023 U	0.00024 U	0.0012 U	0.00027 U	0.00046 U	0.0004 U	0.00033 U	0.00029 U	0.0005 U	0.00047 U	0.00044 U	0.0095 U
W-18A(S)	3/9/2012	NT	NT	NT	0.0012 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-18A(S)	9/6/2012	NT	0.00026 U	0.000095 U	0.00095 U	0.000095 U	0.0001 U	0.000076 U	0.000099 U	0.000068 U	0.000072 U	0.00019 U	0.00015 U	NT
W-18A(S)	9/6/2012	NT	0.00026 U	0.000095 U	0.00095 U	0.000095 U	0.0001 U	0.000076 U	0.0001 U	0.000069 U	0.000073 U	0.00019 U	0.00015 U	NT

Semi-Volatile Organic Compounds Results in Groundwater (2009-2012)
All results in milligrams per lite (mg/L)

Well Name	Sample Date	3-Methylphenol	4-Chloro-3-Methylphenol	4-Methylphenol (p-Cresol)	4-Nitrophenol	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)athhracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Carbofuran phenol
W-20I	3/16/2009	NT	0.01 U	NT	0.02 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-20I	3/16/2009	NT	0.01 U	NT	0.02 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-20I	6/3/2009	NT	0.005 U	NT	0.01 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-20I	9/28/2009	NT	0.005 U	NT	0.01 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-20I	12/8/2009	NT	0.005 U	NT	0.01 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-20I	4/1/2010	NT	0.01 U	NT	0.02 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-20I	4/1/2010	NT	0.01 U	NT	0.02 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-20I	6/23/2010	NT	0.0025 U	NT	0.005 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-20I	6/23/2010	NT	0.0025 U	NT	0.005 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-20I	9/27/2010	NT	0.0025 U	NT	0.005 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-20I	12/14/2010	NT	0.005 U	NT	0.01 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-20I	12/14/2010	NT	0.0005 U	NT	0.001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-20I	3/29/2011	NT	0.025 U	NT	0.05 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-20I	6/23/2011	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0096 U	0.0096 U	0.0096 U	0.0096 U	0.0096 U	0.0096 U	0.0096 U	0.0096 U	0.048 U
W-20I	9/26/2011	0.00024 U	0.0023 U	0.00024 U	0.0012 U	0.00027 U	0.00047 U	0.0004 U	0.00033 U	0.00029 U	0.00051 U	0.00048 U	0.00044 U	0.0095 U
W-20I	12/27/2011	0.00024 U	0.0023 U	0.00024 U	0.0012 U	0.00027 U	0.00047 U	0.0004 U	0.00033 U	0.00029 U	0.0005 U	0.00047 U	0.00044 U	0.0095 U
W-20I	12/27/2011	0.00024 U	0.0023 U	0.00024 U	0.0012 U	0.00027 U	0.00047 U	0.0004 U	0.00033 U	0.0003 U	0.0005 U	0.00047 U	0.00044 U	0.0095 U
W-20I	3/9/2012	0.00024 U	0.0023 U	0.00024 U	0.0012 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
W-20I	6/27/2012	NT	0.00026 U	0.000095 U	0.0012 U	0.000095 U	0.0001 U	0.000076 U	0.0001 U	0.000069 U	0.000072 U	0.00019 U	0.00015 U	0.0095 U
W-20I	6/27/2012	NT	0.00026 U	0.000095 U	0.00095 U	0.000095 U	0.0001 U	0.000076 U	0.000099 U	0.000068 U	0.000072 U	0.00019 U	0.00015 U	NT
W-20I	9/6/2012	NT	0.00026 U	0.000095 U	0.00095 U	0.000095 U	0.0001 U	0.000076 U	0.0001 U	0.000068 U	0.000072 U	0.00019 U	0.00015 U	NT
W-20I	12/27/2012	NT	0.00026 U	0.000096 U	0.00096 U	0.000096 U	0.0001 U	0.000076 U	0.0001 U	0.000069 U	0.000073 U	0.00019 U	0.00015 U	NT
W-23	9/28/2009	NT	0.005 U	NT	0.01 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-23	9/27/2010	NT	0.0005 U	NT	0.001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-23	9/27/2010	NT	0.0005 U	NT	0.001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT
W-23	9/28/2011	0.00024 U	0.0023 U	0.00024 U	0.0012 U	0.00027 U	0.00046 U	0.0004 U	0.00033 U	0.00029 U	0.0005 U	0.00047 U	0.00044 U	0.0095 U
W-23	3/9/2012	NT	NT	NT	0.0012 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-23	9/6/2012	NT	0.00026 U	0.000095 U	0.00095 U	0.000095 U	0.0001 U	0.000076 U	0.000099 U	0.000068 U	0.000072 U	0.00019 U	0.00015 U	NT
W-24	3/18/2009	NT	0.005 U	NT	0.01 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-24	10/1/2009	NT	0.005 U	NT	0.01 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-24	3/31/2010	NT	0.002 U	NT	0.004 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-24	9/28/2010	NT	0.025 U	NT	0.05 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-24	3/28/2011	NT	0.005 U	NT	0.01 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-24	9/27/2011	0.00024 U	0.0023 U	0.00024 U	0.0012 U	NT	NT	NT	NT	NT	NT	NT	NT	0.0095 U
W-24	3/8/2012	0.00024 U	0.0023 U	0.00024 U	0.0012 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U
W-24	9/5/2012	NT	0.00026 U	0.000095 U	0.00095 U	0.000095 U	0.0001 U	0.000076 U	0.000099 U	0.000068 U	0.000072 U	0.00019 U	0.00015 U	NT
W-25	3/17/2009	NT	0.005 U	NT	0.01 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-25	9/30/2009	NT	0.005 U	NT	0.01 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-25	3/30/2010	NT	0.01 U	NT	0.02 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-25	9/28/2010	NT	0.005 U	NT	0.01 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-25	3/28/2011	NT	0.005 U	NT	0.01 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-25	9/28/2011	0.00024 U	0.0023 U	0.00024 U	0.0012 U	NT	NT	NT	NT	NT	NT	NT	NT	0.0095 U
W-25	3/8/2012	0.00024 U	0.0023 U	0.00024 U	0.0012 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U
W-25	9/5/2012	NT	0.00026 U	0.000095 U	0.00095 U	0.000095 U	0.0001 U	0.000076 U	0.0001 U	0.000068 U	0.000072 U	0.00019 U	0.00015 U	NT
W-26	3/18/2009	NT	0.01 U	NT	0.02 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-26	10/1/2009	NT	0.005 U	NT	0.01 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-26	3/31/2010	NT	0.01 U	NT	0.02 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-26	9/28/2010	NT	0.001 U	NT	0.002 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-26	3/28/2011	NT	0.01 U	NT	0.02 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-26	9/28/2011	0.00024 U	0.0023 U	0.00024 U	0.0012 U	NT	NT	NT	NT	NT	NT	NT	NT	0.0095 U
W-26	3/8/2012	0.00024 U	0.0023 U	0.00024 U	0.0012 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
W-26	3/8/2012	0.00024 U	0.0023 U	0.00024 U	0.0012 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U
W-26	9/5/2012	NT	0.00026 U	0.000095 U	0.00095 U	0.000095 U	0.0001 U	0.000076 U	0.0001 U	0.000068 U	0.000072 U	0.00019 U	0.00015 U	NT
W-29	3/19/2009	NT	0.0025 U	NT	0.005 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-29	10/1/2009	NT	0.0025 U	NT	0.005 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-29	3/31/2010	NT	0.002 U	NT	0.004 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-29	9/28/2010	NT	0.0005 U	NT	0.001 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-29	3/28/2011	NT	0.001 U	NT	0.002 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-29	9/28/2011	0.00024 U	0.0023 U	0.00024 U	0.0012 U	NT	NT	NT	NT	NT	NT	NT	NT	0.0095 U
W-29	3/8/2012	0.00024 U	0.00013 U	0.000047 U	0.00047 U	0.000047 U	0.00005 U	0.000038 U	0.00005 U	0.000034 U	0.000036 U	**0.00014 J**	0.000075 U	0.0095 U
W-29	9/5/2012	NT	0.00026 U	0.000096 U	0.00096 U	0.000096 U	0.0001 U	0.000076 U	0.0001 U	0.000069 U	0.000073 U	0.00019 U	0.00015 U	NT
W-32	3/17/2009	NT	0.0005 U	NT	0.001 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-32	9/30/2009	NT	0.0005 U	NT	0.001 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-32	3/30/2010	NT	0.0005 U	NT	0.001 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-32	9/28/2010	NT	0.0005 U	NT	0.001 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-32	3/28/2011	NT	0.0005 U	NT	0.001 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-32	9/27/2011	0.00024 U	0.0023 U	0.00024 U	0.0012 U	NT	NT	NT	NT	NT	NT	NT	NT	0.0095 U
W-32	3/8/2012	0.00024 U	0.00013 U	0.000048 U	0.00048 U	0.000048 U	0.00005 U	0.000038 U	0.00005 U	0.000034 U	0.000036 U	0.000095 U	0.000075 U	0.0095 U
W-32	9/5/2012	NT	0.00026 U	0.000095 U	0.00095 U	0.000095 U	0.0001 U	0.000076 U	0.000099 U	0.000068 U	0.000072 U	0.00019 U	0.00015 U	NT
W-34	3/17/2009	NT	0.0005 U	NT	0.001 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-34	9/30/2009	NT	0.0005 U	NT	0.001 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-34	3/30/2010	NT	0.0005 U	NT	0.001 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-34	9/28/2010	NT	0.01 U	NT	0.02 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-34	3/28/2011	NT	0.0005 U	NT	0.001 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-34	9/27/2011	0.00024 U	0.0023 U	0.00024 U	0.0012 U	NT	NT	NT	NT	NT	NT	NT	NT	0.0095 U
W-34	3/8/2012	0.00024 U	0.00013 U	0.000047 U	0.00047 U	0.000047 U	0.00005 U	0.000038 U	0.00005 U	0.000034 U	0.000036 U	0.000095 U	0.000075 U	0.0095 U
W-34	9/5/2012	NT	0.00026 U	0.000095 U	0.00095 U	0.000095 U	0.0001 U	0.000076 U	0.000099 U	0.000068 U	0.000072 U	0.00019 U	0.00015 U	NT
W-35	9/30/2009	NT	0.0005 U	NT	0.001 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-35	9/29/2010	NT	0.0005 U	NT	0.001 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-35	9/28/2011	0.00024 U	0.0023 U	0.00024 U	0.0012 U	NT	NT	NT	NT	NT	NT	NT	NT	0.0095 U

Semi-Volatile Organic Compounds Results in Groundwater (2009-2012)
All results in milligrams per lite (mg/L)

Well Name	Sample Date	3-Methylphenol	4-Chloro-3-Methylphenol	4-Methylphenol (p-Cresol)	4-Nitrophenol	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)athhracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Carbofuran phenol
W-35	3/9/2012	NT	NT	NT	0.0012 U	NT	NT	NT	NT	NT	NT	NT	NT	0.0095 U
W-35	9/5/2012	NT	0.00026 U	0.000095 U	0.00095 U	0.000095 U	0.0001 U	0.000076 U	0.0001 U	0.000069 U	0.000073 U	0.00019 U	0.00015 U	NT
W-36	9/30/2009	NT	0.0005 U	NT	0.001 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-36	9/29/2010	NT	0.0005 U	NT	0.001 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
W-36	9/27/2011	0.00024 U	0.0023 U	0.00024 U	0.0012 U	NT	NT	NT	NT	NT	NT	NT	NT	0.0095 U
W-36	3/9/2012	NT	NT	NT	0.0012 U	NT	NT	NT	NT	NT	NT	NT	NT	0.0095 U
W-36	9/5/2012	NT	0.00026 U	0.000095 U	0.00095 U	0.000095 U	0.0001 U	0.000076 U	0.0001 U	0.000069 U	0.000072 U	0.00019 U	0.00015 U	NT
Zipolog	9/30/2009	NT	0.0005 U	NT	0.001 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
Zipolog	9/28/2010	NT	0.0005 U	NT	0.001 U	NT	NT	NT	NT	NT	NT	NT	NT	NT
Zipolog	9/28/2011	0.00024 U	0.0023 U	0.00024 U	0.0012 U	NT	NT	NT	NT	NT	NT	NT	NT	0.0095 U
Zipolog	3/9/2012	NT	NT	NT	0.0012 U	NT	NT	NT	NT	NT	NT	NT	NT	0.0095 U
Zipolog	9/5/2012	NT	0.00026 U	0.000095 U	0.00095 U	0.000095 U	0.0001 U	0.000076 U	0.000099 U	0.000068 U	0.000072 U	0.00019 U	0.00015 U	NT

Semi-Volatile Organic Compounds Results in Groundwater (2009-2012)
All results in milligrams per lite (mg/L)

Well Name	Sample Date	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Methylphenol	Naphthalene	Pentachlorophenol	Phenanthrene	Phenol	Pyrene	Total PAHs (calculated)
W-11I	9/29/2009	NT	NT	NT	NT	NT	NT	NT	**0.0183**	NT	0.005 U	NT	NT
W-11I	9/27/2010	NT	NT	NT	NT	NT	NT	NT	**0.00184**	NT	0.0005 U	NT	NT
W-11I	9/28/2011	NT	NT	NT	NT	NT	0.00024 U	NT	0.019 U	NT	0.0019 U	NT	NT
W-11I	9/6/2012	0.000095 U	0.00019 U	0.000095 U	0.000047 U	0.00019 U	NT	0.000095 U	**0.0081 J**	0.000084 U	0.000095 U	0.000095 U	1 U
W-11S	9/29/2009	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	**0.00051**	**0.0001**	0.0005 U	0.0001 U	**0.0001**
W-11S	9/28/2010	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	0.0002 U	0.0001 U	0.0005 U	0.0001 U	1 U
W-11S	9/28/2011	0.00051 U	0.00048 U	0.00019 U	0.00029 U	0.00062 U	0.00024 U	0.00028 U	0.019 U	0.00025 U	0.0019 U	0.00035 U	1 U
W-11S	9/6/2012	0.000095 U	0.00019 U	0.000095 U	0.000047 U	0.00019 U	NT	0.000095 U	0.00076 U	0.000084 U	0.000095 U	0.000095 U	1 U
W-13I	3/16/2009	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	**0.00024**	**0.707**	**0.00028**	0.05 U	0.0001 U	**0.00052**
W-13I	6/3/2009	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	**0.00015**	**0.772**	0.0001 U	0.05 U	0.0001 U	**0.00027**
W-13I	6/3/2009	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	**0.00016**	**0.751**	0.0001 U	0.05 U	0.0001 U	**0.00016**
W-13I	9/28/2009	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	**0.664**	**0.00028**	0.05 U	0.0001 U	**0.00028**
W-13I	12/8/2009	0.0001 U	0.0001 U	**0.00015**	0.0001 U	0.0001 U	NT	**0.00017**	**0.892**	**0.00085**	0.1 U	0.0001 U	**0.0013**
W-13I	12/8/2009	0.0001 U	0.0001 U	**0.00014**	0.0001 U	0.0001 U	NT	**0.00016**	**0.86**	**0.00084**	0.1 U	0.0001 U	**0.00127**
W-13I	4/1/2010	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	**0.0002**	**0.686**	**0.0004**	0.1 U	0.0001 U	**0.006**
W-13I	6/23/2010	0.0001 U	0.0001 U	**0.00011**	0.0001 U	0.0001 U	NT	**0.00011**	**0.701**	**0.00031**	0.05 U	0.0001 U	**0.00075**
W-13I	9/27/2010	0.0001 U	0.0001 U	**0.00014**	0.0001 U	0.0001 U	NT	0.0001 U	**0.794**	**0.00035**	0.1 U	0.0001 U	**0.00066**
W-13I	12/14/2010	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	**0.713**	0.0001 U	0.05 U	0.0001 U	1 U
W-13I	3/29/2011	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	**1.8**	**0.0001**	0.2 U	0.0001 U	**0.0002**
W-13I	6/23/2011	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.095 U	0.0095 U	**0.81**	**0.0004 J**	0.095 U	0.0095 U	**0.0004**
W-13I	6/23/2011	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.096 U	0.0095 U	**0.78**	**0.00039 J**	0.096 U	0.0095 U	**0.00039**
W-13I	9/26/2011	0.00051 U	0.00048 U	0.00019 U	0.00029 U	0.00062 U	0.0019 U	0.00027 U	**1.2**	**0.00031 J**	**0.015**	0.00035 U	**0.00031**
W-13I	12/27/2011	0.00051 U	0.00048 U	**0.00021 J**	0.00029 U	0.00061 U	0.00024 U	0.00028 U	**0.76**	**0.00069 J**	0.0019 U	0.00035 U	**0.00069**
W-13I	3/9/2012	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.00024 U	0.0095 U	**0.81**	**0.00072 J**	0.0019 U	0.0095 U	**0.00072**
W-13I	6/27/2012	0.000095 U	0.00019 U	0.000095 U	0.00047 U	0.00019 U	0.00024 U	0.000095 U	**0.59**	0.000084 U	0.0019 U	0.000095 U	**0.00012**
W-13I	9/6/2012	0.00095 U	0.0019 U	0.00095 U	0.00047 U	0.0019 U	NT	0.00095 U	**0.99**	**0.00093 J**	0.00095 U	0.00095 U	**0.00093**
W-13I	12/27/2012	0.000096 U	0.00019 U	**0.00018 J**	**0.00007 J**	0.00019 U	NT	**0.0001 J**	**0.67**	**0.00084 J**	0.000096 U	0.000096 U	**0.00129**
W-13S	3/16/2009	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	**0.00184**	0.0001 U	0.0005 U	0.0001 U	1 U
W-13S	6/3/2009	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	**0.00088**	0.0001 U	0.0005 U	0.0001 U	1 U
W-13S	9/28/2009	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	NT	0.0002 U	**0.014**	0.0002 U	0.001 U	0.0002 U	1 U
W-13S	12/8/2009	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	**0.0718**	**0.00012**	0.005 U	0.0001 U	**0.00012**
W-13S	4/1/2010	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	**0.109**	0.0001 U	0.0005 U	0.0001 U	1 U
W-13S	6/23/2010	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	**0.077**	0.0001 U	0.005 U	0.0001 U	1 U
W-13S	9/27/2010	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	**0.00579**	0.0001 U	0.0005 U	0.0001 U	1 U
W-13S	12/14/2010	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	**0.113**	0.0001 U	0.01 U	0.0001 U	1 U
W-13S	3/29/2011	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	**0.818**	0.0001 U	0.1 U	0.0001 U	**0.0001**
W-13S	3/29/2011	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	**0.78**	0.0001 U	0.1 U	0.0001 U	**0.0001**
W-13S	6/23/2011	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	**0.11**	0.0095 U	0.0095 U	0.0095 U	1 U
W-13S	9/27/2011	0.00051 U	0.00049 U	0.00019 U	0.00029 U	0.00062 U	0.00095 U	0.00028 U	**0.2**	0.00025 U	**0.0076**	0.00035 U	1 U
W-13S	12/27/2011	0.00051 U	0.00048 U	0.00019 U	0.00029 U	0.00062 U	0.00024 U	0.00028 U	**0.16 J**	0.00025 U	0.0019 U	0.00035 U	1 U
W-13S	3/9/2012	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.00024 U	0.0095 U	**0.33**	0.0095 U	0.0019 U	0.0095 U	1 U
W-13S	6/23/2011	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	**0.11**	0.0095 U	0.0095 U	0.0095 U	1 U
W-13S	9/27/2011	0.00051 U	0.00049 U	0.00019 U	0.00029 U	0.00062 U	0.00095 U	0.00028 U	**0.2**	0.00025 U	**0.0076**	0.00035 U	1 U
W-13S	12/27/2011	0.00051 U	0.00048 U	0.00019 U	0.00029 U	0.00062 U	0.00024 U	0.00028 U	**0.16 J**	0.00025 U	0.0019 U	0.00035 U	1 U
W-13S	3/9/2012	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.00024 U	0.0095 U	**0.33**	0.0095 U	0.0019 U	0.0095 U	1 U
W-13S	6/27/2012	0.000095 U	0.00019 U	**0.00014 J**	0.00047 U	0.00019 U	0.00024 U	**0.00014 J**	**0.85**	**0.00072 J**	0.0019 U	0.000095 U	**0.001086**
W-13S	9/6/2012	0.00047 U	0.00095 U	0.00047 U	0.00024 U	0.00095 U	NT	0.00047 U	**0.37**	0.00042 U	0.00047 U	0.00047 U	1 U
W-13S	12/27/2012	0.000096 U	0.00019 U	0.000096 U	0.000048 U	0.00019 U	NT	0.000096 U	**0.42**	0.000086 U	0.000096 U	0.000096 U	**0.00016**
W-13S	12/27/2012	0.000096 U	0.00019 U	0.000096 U	0.000048 U	0.00019 U	NT	0.000096 U	**0.55**	0.000086 U	0.000096 U	0.000096 U	**0.00017**
W-16A(I)	9/29/2009	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	**0.00029**	**0.00087**	0.0001 U	0.0005 U	0.0001 U	**0.00029**
W-16A(I)	9/28/2010	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	0.0002 U	0.0001 U	0.0005 U	0.0001 U	1 U
W-16A(I)	9/27/2011	0.00051 U	0.00049 U	0.00019 U	0.00029 U	0.00062 U	0.00024 U	0.00028 U	0.019 U	0.00025 U	0.0019 U	0.00035 U	1 U
W-16A(I)	3/9/2012	NT	NT	NT	NT	NT	0.00024 U	NT	NT	NT	0.0019 U	NT	NT
W-16A(I)	9/5/2012	0.000095 U	0.00019 U	0.000095 U	0.000047 U	0.00019 U	NT	**0.00011 J**	0.00076 U	0.000084 U	0.000095 U	0.000095 U	**0.00011**
W-17A(I)	9/29/2009	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	**0.00157**	0.0001 U	0.0005 U	0.0001 U	1 U
W-17A(I)	9/28/2010	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	0.0005 U	0.0001 U	0.0005 U	0.0001 U	1 U
W-17A(I)	9/27/2011	0.00051 U	0.00049 U	0.00019 U	0.00029 U	0.00062 U	0.00024 U	0.00028 U	0.019 U	0.00025 U	0.0019 U	0.00035 U	1 U
W-17A(I)	3/9/2012	NT	NT	NT	NT	NT	0.00024 U	NT	NT	NT	0.0019 U	NT	NT
W-17A(I)	9/5/2012	0.000095 U	0.00019 U	0.000095 U	0.000047 U	0.00019 U	NT	0.000095 U	0.00076 U	0.000084 U	0.000095 U	0.000095 U	1 U
W-17A(S)	9/29/2009	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	**0.00197**	0.0001 U	0.0005 U	0.0001 U	1 U
W-17A(S)	9/28/2010	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	0.0002 U	0.0001 U	0.0005 U	0.0001 U	1 U
W-17A(S)	9/27/2011	0.00051 U	0.00048 U	0.00019 U	0.00029 U	0.00062 U	0.00024 U	0.00028 U	0.019 U	0.00025 U	0.0019 U	0.00035 U	1 U
W-17A(S)	3/9/2012	NT	NT	NT	NT	NT	0.00024 U	NT	NT	NT	0.0019 U	NT	NT
W-17A(S)	9/5/2012	0.000095 U	0.00019 U	0.000095 U	0.000047 U	0.00019 U	NT	0.000095 U	0.00076 U	0.000085 U	0.000095 U	0.000095 U	1 U
W-17B(I)	10/1/2009	NT	NT	NT	NT	NT	NT	NT	**0.00068**	NT	0.0005 U	NT	NT
W-17B(I)	9/28/2010	NT	NT	NT	NT	NT	NT	NT	0.0002 U	NT	0.0005 U	NT	NT
W-17B(I)	9/27/2011	NT	NT	NT	NT	NT	0.00024 U	NT	0.019 U	NT	0.0019 U	NT	NT
W-17B(I)	3/9/2012	NT	NT	NT	NT	NT	0.00024 U	NT	NT	NT	0.0019 U	NT	NT
W-17B(I)	9/5/2012	0.000095 U	0.00019 U	0.000095 U	0.000047 U	0.00019 U	NT	0.000095 U	0.00076 U	0.000084 U	0.000095 U	0.000095 U	1 U
W-18A(I)	3/17/2009	NT	NT	NT	NT	NT	NT	NT	**0.0153**	NT	0.005 U	NT	NT
W-18A(I)	9/28/2009	NT	NT	NT	NT	NT	NT	NT	**0.012**	NT	0.005 U	NT	NT
W-18A(I)	3/30/2010	NT	NT	NT	NT	NT	NT	NT	**0.0626**	NT	0.01 U	NT	NT
W-18A(I)	9/27/2010	NT	NT	NT	NT	NT	NT	NT	**0.0005**	NT	0.0005 U	NT	NT
W-18A(I)	3/28/2011	NT	NT	NT	NT	NT	NT	NT	0.0002 U	NT	0.0005 U	NT	NT
W-18A(I)	9/28/2011	NT	NT	NT	NT	NT	0.00024 U	NT	0.019 U	NT	0.0019 U	NT	NT
W-18A(I)	3/9/2012	NT	NT	NT	NT	NT	0.00024 U	NT	NT	NT	0.0019 U	NT	NT
W-18A(I)	9/6/2012	0.000095 U	0.00019 U	0.000095 U	0.000047 U	0.00019 U	NT	0.000095 U	0.00076 U	0.000085 U	0.000095 U	0.000095 U	1 U
W-18A(S)	9/28/2009	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	**0.00058**	0.0001 U	0.0005 U	0.0001 U	1 U
W-18A(S)	9/28/2009	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	**0.00129**	0.0001 U	0.0005 U	0.0001 U	1 U
W-18A(S)	9/27/2010	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	0.0002 U	0.0001 U	0.0005 U	0.0001 U	1 U
W-18A(S)	9/28/2011	0.00051 U	0.00048 U	0.00019 U	0.00029 U	0.00062 U	0.00024 U	0.00028 U	0.019 U	0.00025 U	0.0019 U	0.00035 U	1 U
W-18A(S)	3/9/2012	NT	NT	NT	NT	NT	0.00024 U	NT	NT	NT	0.0019 U	NT	NT
W-18A(S)	9/6/2012	0.000095 U	0.00019 U	0.000095 U	0.000047 U	0.00019 U	NT	0.000095 U	0.00076 U	0.000084 U	0.000095 U	0.000095 U	1 U
W-18A(S)	9/6/2012	0.000095 U	0.00019 U	0.000095 U	0.000048 U	0.00019 U	NT	0.000095 U	0.00076 U	0.000085 U	0.000095 U	0.000095 U	1 U

Semi-Volatile Organic Compounds Results in Groundwater (2009-2012)
All results in milligrams per lite (mg/L)

Well Name	Sample Date	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Methylphenol	Naphthalene	Pentachlorophenol	Phenanthrene	Phenol	Pyrene	Total PAHs (calculated)
W-20I	3/16/2009	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	**0.0364**	0.0001 U	0.01 U	0.0001 U	1 U
W-20I	3/16/2009	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	**0.037**	0.0001 U	0.01 U	0.0001 U	1 U
W-20I	6/3/2009	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	**0.0663**	0.0001 U	0.005 U	0.0001 U	1 U
W-20I	9/28/2009	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	**0.00019**	**0.0257**	0.0001 U	0.005 U	0.0001 U	**0.00019**
W-20I	12/8/2009	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	**0.0731**	0.0001 U	0.005 U	0.0001 U	1 U
W-20I	4/1/2010	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	**0.0396**	0.0001 U	0.01 U	0.0001 U	1 U
W-20I	4/1/2010	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	**0.037**	0.0001 U	0.01 U	0.0001 U	1 U
W-20I	6/23/2010	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	**0.0495**	0.0001 U	0.0025 U	0.0001 U	1 U
W-20I	6/23/2010	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	**0.0474**	0.0001 U	0.0025 U	0.0001 U	1 U
W-20I	9/27/2010	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	**0.0372**	0.0001 U	0.0025 U	0.0001 U	1 U
W-20I	12/14/2010	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	**0.0692**	0.0001 U	0.005 U	0.0001 U	1 U
W-20I	12/14/2010	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	**0.0768**	0.0001 U	0.0005 U	0.0001 U	1 U
W-20I	3/29/2011	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	**0.18**	0.0001 U	0.025 U	0.0001 U	1 U
W-20I	6/23/2011	0.0096 U	0.0096 U	0.0096 U	0.0096 U	0.0096 U	0.0095 U	0.0096 U	**0.05**	0.0096 U	0.0095 U	0.0096 U	1 U
W-20I	9/26/2011	0.00051 U	0.00049 U	0.00019 U	0.00029 U	0.00062 U	0.00024 U	0.00028 U	**0.045 J**	0.00025 U	0.0019 U	0.00035 U	1 U
W-20I	12/27/2011	0.00051 U	0.00048 U	0.00019 U	0.00029 U	0.00062 U	0.00024 U	0.00028 U	**0.043 J**	0.00025 U	0.0019 U	0.00035 U	1 U
W-20I	12/27/2011	0.00051 U	0.00049 U	0.00019 U	0.0003 U	0.00062 U	0.00024 U	0.00028 U	**0.045 J**	0.00025 U	0.0019 U	0.00035 U	1 U
W-20I	3/9/2012	0.0094 U	**0.00037 J**	0.0094 U	0.0094 U	0.0094 U	0.00024 U	0.0094 U	**0.047**	0.0094 U	0.0019 U	0.0094 U	**0.00037**
W-20I	6/27/2012	0.000095 U	0.00019 U	0.000095 U	0.00048 U	0.00019 U	0.00024 U	0.000095 U	**0.046**	0.000085 U	0.0019 U	0.000095 U	1 U
W-20I	6/27/2012	0.000095 U	0.00019 U	0.000095 U	0.00047 U	0.00019 U	NT	0.000095 U	**0.049**	0.000084 U	0.000095 U	0.000095 U	1 U
W-20I	9/6/2012	0.000095 U	0.00019 U	0.000095 U	0.000048 U	0.00019 U	NT	0.000095 U	**0.044**	0.000085 U	0.000095 U	0.000095 U	1 U
W-20I	12/27/2012	0.000096 U	0.00019 U	0.000096 U	0.000048 U	0.00019 U	NT	0.000096 U	**0.049**	0.000085 U	0.000096 U	0.000096 U	1 U
W-23	9/28/2009	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	**0.0011**	**0.0259**	0.0001 U	0.005 U	0.0001 U	**0.0011**
W-23	9/27/2010	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	**0.00084**	0.0001 U	0.0005 U	0.0001 U	1 U
W-23	9/27/2010	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NT	0.0001 U	**0.00057**	0.0001 U	0.0005 U	0.0001 U	1 U
W-23	9/28/2011	0.00051 U	0.00048 U	0.00019 U	0.00029 U	0.00062 U	0.00024 U	0.00028 U	0.019 U	0.00025 U	0.0019 U	0.00035 U	1 U
W-23	3/9/2012	NT	NT	NT	NT	NT	0.00024 U	NT	NT	NT	0.0019 U	NT	NT
W-23	9/6/2012	0.000095 U	0.00019 U	0.000095 U	0.000047 U	0.00019 U	NT	0.000095 U	**0.0014 J**	0.000084 U	0.000095 U	0.000095 U	1 U
W-24	3/18/2009	NT	NT	NT	NT	NT	NT	NT	**0.0927**	NT	0.005 U	NT	NT
W-24	10/1/2009	NT	NT	NT	NT	NT	NT	NT	**0.0985**	NT	0.005 U	NT	NT
W-24	3/31/2010	NT	NT	NT	NT	NT	NT	NT	**0.0155**	NT	0.002 U	NT	NT
W-24	9/28/2010	NT	NT	NT	NT	NT	NT	NT	**0.133**	NT	0.025 U	NT	NT
W-24	3/28/2011	NT	NT	NT	NT	NT	NT	NT	**0.0879**	NT	0.005 U	NT	NT
W-24	9/27/2011	NT	NT	NT	NT	NT	0.00024 U	NT	**0.07**	NT	0.0019 U	NT	NT
W-24	3/8/2012	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.00024 U	0.0095 U	**0.084**	0.0095 U	0.0019 U	0.0095 U	1 U
W-24	9/5/2012	0.000095 U	0.00019 U	0.000095 U	0.000047 U	0.00019 U	NT	0.000095 U	**0.074**	0.000084 U	**0.00011 J**	0.000095 U	1 U
W-25	3/17/2009	NT	NT	NT	NT	NT	NT	NT	**0.0824**	NT	0.005 U	NT	NT
W-25	9/30/2009	NT	NT	NT	NT	NT	NT	NT	**0.0485**	NT	0.005 U	NT	NT
W-25	3/30/2010	NT	NT	NT	NT	NT	NT	NT	**0.059**	NT	0.01 U	NT	NT
W-25	9/28/2010	NT	NT	NT	NT	NT	NT	NT	**0.0523**	NT	0.005 U	NT	NT
W-25	3/28/2011	NT	NT	NT	NT	NT	NT	NT	**0.0872**	NT	0.005 U	NT	NT
W-25	9/28/2011	NT	NT	NT	NT	NT	0.00024 U	NT	**0.046 J**	NT	0.0019 U	NT	NT
W-25	3/8/2012	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.00024 U	0.0095 U	**0.063**	0.0095 U	0.0019 U	0.0095 U	1 U
W-25	9/5/2012	0.000095 U	0.00019 U	0.000095 U	0.000048 U	0.00019 U	NT	0.000095 U	**0.052**	0.000085 U	**0.00019 J**	0.000095 U	1 U
W-26	3/18/2009	NT	NT	NT	NT	NT	NT	NT	**0.086**	NT	0.01 U	NT	NT
W-26	10/1/2009	NT	NT	NT	NT	NT	NT	NT	**0.0882**	NT	0.005 U	NT	NT
W-26	3/31/2010	NT	NT	NT	NT	NT	NT	NT	**0.0732**	NT	0.01 U	NT	NT
W-26	9/28/2010	NT	NT	NT	NT	NT	NT	NT	**0.0127**	NT	0.001 U	NT	NT
W-26	3/28/2011	NT	NT	NT	NT	NT	NT	NT	**0.139**	NT	0.01 U	NT	NT
W-26	9/28/2011	NT	NT	NT	NT	NT	0.00024 U	NT	**0.079**	NT	0.0019 U	NT	NT
W-26	3/8/2012	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.00024 U	0.0094 U	**0.049**	0.0094 U	0.0019 U	0.0094 U	1 U
W-26	3/8/2012	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.00024 U	0.0094 U	**0.072**	0.0094 U	0.0019 U	0.0094 U	1 U
W-26	9/5/2012	0.000095 U	0.00019 U	0.000095 U	0.000048 U	0.00019 U	NT	0.000095 U	**0.078**	0.000085 U	**0.00011 J**	0.000095 U	1 U
W-29	3/19/2009	NT	NT	NT	NT	NT	NT	NT	**0.0149**	NT	0.0025 U	NT	NT
W-29	10/1/2009	NT	NT	NT	NT	NT	NT	NT	**0.00665**	NT	0.0025 U	NT	NT
W-29	3/31/2010	NT	NT	NT	NT	NT	NT	NT	**0.0121**	NT	0.002 U	NT	NT
W-29	9/28/2010	NT	NT	NT	NT	NT	NT	NT	**0.00024**	NT	0.0005 U	NT	NT
W-29	3/28/2011	NT	NT	NT	NT	NT	NT	NT	**0.0156**	NT	0.001 U	NT	NT
W-29	9/28/2011	NT	NT	NT	NT	NT	0.00024 U	NT	0.019 U	NT	0.0019 U	NT	NT
W-29	3/8/2012	0.000047 U	0.000095 U	0.000047 U	0.000024 U	0.000095 U	0.00024 U	**0.000048 J**	**0.013**	0.000042 U	0.000047 U	0.000047 U	**0.000188**
W-29	9/5/2012	0.000096 U	0.00019 U	0.000096 U	0.000048 U	0.00019 U	NT	0.000096 U	**0.013**	0.000085 U	0.000096 U	0.000096 U	1 U
W-32	3/17/2009	NT	NT	NT	NT	NT	NT	NT	**0.00075**	NT	0.0005 U	NT	NT
W-32	9/30/2009	NT	NT	NT	NT	NT	NT	NT	**0.00116**	NT	0.0005 U	NT	NT
W-32	3/30/2010	NT	NT	NT	NT	NT	NT	NT	**0.0003**	NT	0.0005 U	NT	NT
W-32	9/28/2010	NT	NT	NT	NT	NT	NT	NT	0.0002 U	NT	0.0005 U	NT	NT
W-32	3/28/2011	NT	NT	NT	NT	NT	NT	NT	0.0002 U	NT	0.0005 U	NT	NT
W-32	9/27/2011	NT	NT	NT	NT	NT	0.00024 U	NT	0.019 U	NT	0.0019 U	NT	NT
W-32	3/8/2012	0.000048 U	0.000095 U	0.000048 U	0.000024 U	0.000095 U	0.00024 U	0.000048 U	0.00038 U	0.000042 U	0.000048 U	0.000048 U	1 U
W-32	9/5/2012	0.000095 U	0.00019 U	0.000095 U	0.000047 U	0.00019 U	NT	0.000095 U	0.00076 U	0.000084 U	0.000095 U	0.000095 U	1 U
W-34	3/17/2009	NT	NT	NT	NT	NT	NT	NT	**0.00041**	NT	0.0005 U	NT	NT
W-34	9/30/2009	NT	NT	NT	NT	NT	NT	NT	**0.00124**	NT	0.0005 U	NT	NT
W-34	3/30/2010	NT	NT	NT	NT	NT	NT	NT	0.0002 U	NT	0.0005 U	NT	NT
W-34	9/28/2010	NT	NT	NT	NT	NT	NT	NT	**0.0682**	NT	0.01 U	NT	NT
W-34	3/28/2011	NT	NT	NT	NT	NT	NT	NT	0.0002 U	NT	0.0005 U	NT	NT
W-34	9/27/2011	NT	NT	NT	NT	NT	0.00024 U	NT	0.019 U	NT	0.0019 U	NT	NT
W-34	3/8/2012	0.000047 U	0.000095 U	0.000047 U	0.000024 U	0.000095 U	0.00024 U	0.000047 U	0.00038 U	0.000042 U	0.000047 U	0.000047 U	1 U
W-34	9/5/2012	0.000095 U	0.00019 U	0.000095 U	0.000047 U	0.00019 U	NT	0.000095 U	0.00076 U	0.000084 U	**0.00011 J**	0.000095 U	1 U
W-35	9/30/2009	NT	NT	NT	NT	NT	NT	NT	0.0002 U	NT	0.0005 U	NT	NT
W-35	9/29/2010	NT	NT	NT	NT	NT	NT	NT	0.0002 U	NT	0.0005 U	NT	NT
W-35	9/28/2011	NT	NT	NT	NT	NT	0.00024 U	NT	0.019 U	NT	0.0019 U	NT	NT

Semi-Volatile Organic Compounds Results in Groundwater (2009-2012)
All results in milligrams per lite (mg/L)

Well Name	Sample Date	Chrysene		Dibenzo(a,h)anthracene		Fluoranthene		Fluorene		Indeno(1,2,3-cd)pyrene		Methylphenol		Naphthalene		Pentachlorophenol		Phenanthrene		Phenol		Pyrene		Total PAHs (calculated)	
W-35	3/9/2012	NT		NT		NT		NT		NT		0.00024	U	NT		NT		NT		0.0019	U	NT		NT	
W-35	9/5/2012	0.000095	U	0.00019	U	0.000095	U	0.000048	U	0.00019	U	NT		0.000095	U	0.00076	U	0.000085	U	**0.00014**	**J**	0.000095	U	1	U
W-36	9/30/2009	NT		NT		NT		NT		NT		NT		NT		**0.00028**		NT		0.0005	U	NT		NT	
W-36	9/29/2010	NT		NT		NT		NT		NT		NT		NT		0.0002	U	NT		0.0005	U	NT		NT	
W-36	9/27/2011	NT		NT		NT		NT		NT		0.00024	U	NT		0.019	U	NT		0.0019	U	NT		NT	
W-36	3/9/2012	NT		NT		NT		NT		NT		0.00024	U	NT		NT		NT		0.0019	U	NT		NT	
W-36	9/5/2012	0.000095	U	0.00019	U	0.000095	U	0.000048	U	0.00019	U	NT		0.000095	U	0.00076	U	0.000085	U	0.000095	U	0.000095	U	1	U
Zipolog	9/30/2009	NT		NT		NT		NT		NT		NT		NT		**0.00064**		NT		0.0005	U	NT		NT	
Zipolog	9/28/2010	NT		NT		NT		NT		NT		NT		NT		**0.00063**		NT		0.0005	U	NT		NT	
Zipolog	9/28/2011	NT		NT		NT		NT		NT		0.00024	U	NT		0.019	U	NT		0.0019	U	NT		NT	
Zipolog	3/9/2012	NT		NT		NT		NT		NT		0.00024	U	NT		NT		NT		0.0019	U	NT		NT	
Zipolog	9/5/2012	0.000095	U	0.00019	U	0.000095	U	0.000047	U	0.00019	U	NT		0.000095	U	**0.0019**	**J**	0.000084	U	**0.00012**	**J**	0.000095	U	1	U

Notes: The only semivolatile compounds evaluated in the 2013 risk assessment revisions are: pentachlorophenol, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and napthalene.

Data reported to method detection limit

BOLD = detection

NT = not tested

U = not detected at or above the stated level

J = estimated result

ATTACHMENT D1

Dioxin in Groundwater – TEQ Calculations

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by EPA Method 8290
J.H. Baxter Company
Eugene, Oregon Facility
Analytical Results

WHO 2005 TEFs		W11-S µg/L	W-23 µg/L	W-25 µg/L	W-24 µg/L	W-26 µg/L
1	2,3,7,8-TCDD	1.13E-06 U	1.59E-06 U	1.47E-06 U	1.77E-06 U	1.31E-06 U
1	1,2,3,7,8-PeCDD	6.49E-07 U	8.20E-07 U	8.17E-07 U	1.02E-06 U	8.69E-07 U
0.1	1,2,3,4,7,8-HxCDD	6.18E-07 U	6.99E-07 U	7.44E-07 U	7.73E-07 U	4.64E-07 U
0.1	1,2,3,6,7,8-HxCDD	6.96E-07 U	8.33E-07 U	8.67E-07 U	9.04E-07 U	5.56E-07 U
0.1	1,2,3,7,8,9-HxCDD	6.17E-07 U	7.21E-07 U	7.57E-07 U	7.88E-07 U	4.80E-07 U
0.01	1,2,3,4,6,7,8-HpCDD	**1.58E-06 J**	**3.51E-06 J**	1.17E-06 U	**1.16E-06 J**	2.27E-06 U
0.0003	OCDD	1.82E-05 U	3.67E-05 U	2.98E-05 U	2.07E-05 U	2.50E-05 U
0.1	2,3,7,8-TCDF	9.79E-07 U	7.85E-07 U	6.84E-07 U	1.15E-06 U	7.89E-07 U
0.03	1,2,3,7,8-PeCDF	7.08E-07 U	8.56E-07 U	7.86E-07 U	9.58E-07 U	7.25E-07 U
0.3	2,3,4,7,8-PeCDF	6.14E-07 U	7.21E-07 U	6.65E-07 U	8.11E-07 U	6.32E-07 U
0.1	1,2,3,4,7,8-HxCDF	6.21E-07 U	5.40E-07 U	5.53E-07 U	5.40E-07 U	5.17E-07 U
0.1	1,2,3,6,7,8-HxCDF	4.94E-07 U	4.28E-07 U	4.49E-07 U	4.39E-07 U	4.16E-07 U
0.1	2,3,4,6,7,8-HxCDF	8.83E-07 U	7.57E-07 U	7.77E-07 U	7.60E-07 U	7.16E-07 U
0.1	1,2,3,7,8,9-HxCDF	5.43E-07 U	4.73E-07 U	5.10E-07 U	4.78E-07 U	4.63E-07 U
0.01	1,2,3,4,6,7,8-HpCDF	**9.80E-07 J**	**1.36E-06 J**	5.29E-07 U	7.06E-07 U	5.96E-07 U
0.01	1,2,3,4,7,8,9-HpCDF	6.65E-07 U	7.01E-07 U	7.21E-07 U	9.69E-07 U	8.05E-07 U
0.0003	OCDF	**2.73E-06 J**	2.98E-06 U	**2.13E-06 J**	1.38E-06 U	**2.63E-06 J**

Notes:

µg/L = micrograms per liter

HpCDD = heptachlorodibenzo-p-dioxin
HxCDD = hexachlorodibenzo-p-dioxin
OCDD = octachlorodibenzo-p-dioxin
PeCDD = pentachlorodibenzo-p-dioxin
TCDD = tetrachlorodibenzo-p-dioxin

HpCDF = heptachlorodibenzofuran
HxCDD = hxachlorodibenzofuran
OCDF = octachlorodibenzofuran
PeCDF = pentachlorodibenzofuran
TCDF = tetrachlorodibenzofuran

WHO 2005 TEFs = World Health Organization Re-evaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Qualifier Definitions:

J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by EPA Method 8290
J.H. Baxter Company
Eugene, Oregon Facility
Toxic Equivalences to 2,3,7,8-TCDD Calculated with Nondetected Results Equal to Zero

	W11-S µg/L	W-23 µg/L	W-25 µg/L	W-24 µg/L	W-26 µg/L
2,3,7,8-TCDD	0	0	0	0	0
1,2,3,7,8-PeCDD	0	0	0	0	0
1,2,3,4,7,8-HxCDD	0	0	0	0	0
1,2,3,6,7,8-HxCDD	0	0	0	0	0
1,2,3,7,8,9-HxCDD	0	0	0	0	0
1,2,3,4,6,7,8-HpCDD	1.58E-08	3.51E-08	0	1.16E-08	0
OCDD	0	0	0	0	0
2,3,7,8-TCDF	0	0	0	0	0
1,2,3,7,8-PeCDF	0	0	0	0	0
2,3,4,7,8-PeCDF	0	0	0	0	0
1,2,3,4,7,8-HxCDF	0	0	0	0	0
1,2,3,6,7,8-HxCDF	0	0	0	0	0
2,3,4,6,7,8-HxCDF	0	0	0	0	0
1,2,3,7,8,9-HxCDF	0	0	0	0	0
1,2,3,4,6,7,8-HpCDF	9.8E-09	1.36E-08	0	0	0
1,2,3,4,7,8,9-HpCDF	0	0	0	0	0
OCDF	8.19E-10	0	6.39E-10	0	7.89E-10
Total WHO 2005 Dioxin TEQ	2.64E-08 µg/L	4.87E-08 µg/L	6.39E-10 µg/L	1.16E-08 µg/L	7.89E-10 µg/L

Notes:

µg/L = micrograms per liter

HpCDD = heptachlorodibenzo-p-dioxin
HxCDD = hexachlorodibenzo-p-dioxin
OCDD = octachlorodibenzo-p-dioxin
PeCDD = pentachlorodibenzo-p-dioxin
TCDD = tetrachlorodibenzo-p-dioxin

HpCDF = heptachlorodibenzofuran
HxCDD = hxachlorodibenzofuran
OCDF = octachlorodibenzofuran
PeCDF = pentachlorodibenzofuran
TCDF = tetrachlorodibenzofuran

WHO 2005 TEQ (Toxic Equivalency to 2,3,7,8-TCDD) calculated using the 2005 World Health Organization Re-evaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by EPA Method 8290
J.H. Baxter Company
Eugene, Oregon Facility
Toxic Equivalences to 2,3,7,8-TCDD Calculated with Nondetected Results Equal to Estimated Detection Limits

	W11-S µg/L	W-23 µg/L	W-25 µg/L	W-24 µg/L	W-26 µg/L
2,3,7,8-TCDD	1.13E-06	1.59E-06	1.47E-06	1.77E-06	1.31E-06
1,2,3,7,8-PeCDD	6.49E-07	8.20E-07	8.17E-07	1.02E-06	8.69E-07
1,2,3,4,7,8-HxCDD	6.18E-08	6.99E-08	7.44E-08	7.73E-08	4.64E-08
1,2,3,6,7,8-HxCDD	6.96E-08	8.33E-08	8.67E-08	9.04E-08	5.56E-08
1,2,3,7,8,9-HxCDD	6.17E-08	7.21E-08	7.57E-08	7.88E-08	4.80E-08
1,2,3,4,6,7,8-HpCDD	1.58E-08	3.51E-08	1.17E-08	1.16E-08	2.27E-08
OCDD	5.46E-09	1.10E-08	8.94E-09	6.21E-09	7.50E-09
2,3,7,8-TCDF	9.79E-08	7.85E-08	6.84E-08	1.15E-07	7.89E-08
1,2,3,7,8-PeCDF	2.12E-08	2.57E-08	2.36E-08	2.87E-08	2.18E-08
2,3,4,7,8-PeCDF	1.84E-07	2.16E-07	2.00E-07	2.43E-07	1.90E-07
1,2,3,4,7,8-HxCDF	6.21E-08	5.40E-08	5.53E-08	5.40E-08	5.17E-08
1,2,3,6,7,8-HxCDF	4.94E-08	4.28E-08	4.49E-08	4.39E-08	4.16E-08
2,3,4,6,7,8-HxCDF	8.83E-08	7.57E-08	7.77E-08	7.60E-08	7.16E-08
1,2,3,7,8,9-HxCDF	5.43E-08	4.73E-08	5.10E-08	4.78E-08	4.63E-08
1,2,3,4,6,7,8-HpCDF	9.80E-09	1.36E-08	5.29E-09	7.06E-09	5.96E-09
1,2,3,4,7,8,9-HpCDF	6.65E-09	7.01E-09	7.21E-09	9.69E-09	8.05E-09
OCDF	8.19E-10	8.94E-10	6.39E-10	4.14E-10	7.89E-10
Total WHO 2005 Dioxin TEQ	2.57E-06 µg/L	3.24E-06 µg/L	3.08E-06 µg/L	3.68E-06 µg/L	2.88E-06 µg/L

Notes:

µg/L = micrograms per liter

HpCDD = heptachlorodibenzo-p-dioxin
HxCDD = hexachlorodibenzo-p-dioxin
OCDD = octachlorodibenzo-p-dioxin
PeCDD = pentachlorodibenzo-p-dioxin
TCDD = tetrachlorodibenzo-p-dioxin

HpCDF = heptachlorodibenzofuran
HxCDD = hxachlorodibenzofuran
OCDF = octachlorodibenzofuran
PeCDF = pentachlorodibenzofuran
TCDF = tetrachlorodibenzofuran

Maximum TEQ value used for risk calculations

WHO 2005 TEQ (Toxic Equivalency to 2,3,7,8-TCDD) calculated using the 2005 World Health Organization Re-evaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

ATTACHMENT D2

Dioxin in Groundwater – Data Quality Review

DIOXIN/FURAN DATA QUALITY REVIEW

J.H. Baxter & Company

Eugene, Oregon Facility

Prepared for:
J.H. Baxter & Co.
1700 S. El Camino Real, Suite 365
San Mateo, California 94402

Prepared by:

AMEC Environment & Infrastructure, Inc.
7376 SW Durham Road
Portland, Oregon 97224
(503) 639-3400

October 1, 2013

Project No. 361M125451.0001.2

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TABLES

ACRONYMS AND ABBREVIATIONS

ALS	ALS Environmental
AMEC	AMEC Environment & Infrastructure, Inc.
COC	chain of custody
EPA	United States Environmental Protection Agency
EMPC	estimated maximum possible concentration
HpCDD	heptachlorodibenzo-p-dioxin
HpCDF	heptachlorodibenzofuran
HxCDF	hexachlorodibenzofuran
ICAL	initial calibration
ID	identification
MDL	method detection limit
OCDD	octachlorodibenzo-p-dioxin
OCDF	octachlorodibenzofuran
OPR	ongoing precision and recovery sample
OPRD	ongoing precision and recovery duplicate sample
PCDD	polychlorinated dioxin
PCDF	polychlorinated dibenzofuran
pg/l	picograms per liter
QC	quality control

RL	reporting limit

DIOXIN/FURAN DATA QUALITY REVIEW
J.H. Baxter & Company
Eugene, Oregon Facility

1.0 INTRODUCTION

AMEC Environment & Infrastructure, Inc. (AMEC) collected five water samples from the J.H. Baxter & Company Eugene, Oregon facility on August 16, 2013. AMEC submitted the samples to ALS Environmental (ALS), located in Houston, Texas, where they were assigned sample delivery group K1308398, and were analyzed for polychlorinated dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) by United States Environmental Protection Agency (EPA) Method 8290. A list of samples by sample location and ALS sample identification (ID) is presented in Table 1.

Table 1: Field Samples Submitted to ALS Environmental

Field Sample ID	ALS Sample ID
W11-S	K1308398-001
W-23	K1308398-002
W-25	K1308398-003
W-24	K1308398-004
W-26	K1308398-005

2.0 DATA QUALITY REVIEW METHODOLOGY

Validation of these data followed the National Functional Guidelines for Chlorinated Dioxin/Furan Data Review (EPA, 2005) and the EPA Region 10 standard operating procedure for the Validation of PCDD and PCDF Data (EPA, 1996). The National Functional Guidelines were written specifically for the Contract Laboratory Program, and have been modified for the purposes of this data validation where they differ from EPA Method 8290A (EPA, 2007). These data underwent Level III data quality review, which included review of sample-specific and instrument-specific quality control (QC) parameters, but did not include review or validation of the raw analytical data. This data quality review included assessment of the following:

- Data package and electronic deliverables completeness
- Chain of custody (COC) compliance

- Sample receipt condition
- Holding time compliance
- Initial calibration (ICAL)
- Calibration verification
- Presence or absence of laboratory contamination as demonstrated by method blanks
- Labeled internal standard recoveries
- Accuracy and bias as demonstrated by recovery of ongoing precision and recovery samples (OPRs)
- Laboratory duplicate precision
- Insofar as possible, the degree of conformance to method requirements and good laboratory practices

It is important to recognize that no analytical data are guaranteed to be correct, even if all QC audits are passed. Strict QC serves to increase confidence in data, but reported values may potentially contain error.

3.0 EXPLANATION OF DATA QUALITY INDICATORS

Summary explanations of the specific data quality indicators reviewed during this data validation are presented in the sections below.

3.1 OPR RECOVERIES

OPRs are aliquots of analyte-free matrix that are spiked with the analytes of interest for an analytical method, or a representative subset of those analytes. The spiked matrix is then processed through the same concentration and analytical procedures as the samples they accompany. OPR recovery is an indication of a laboratory's ability to successfully perform an analytical method in an interference-free matrix.

3.2 BLANK CONCENTRATIONS

Blank samples are aliquots of analyte free matrix that are used as negative controls to verify that the sample collection, storage, preparation, and analysis system does not produce false positive results. Laboratory blanks are processed by the laboratory using exactly the same procedures as the field samples. Target analytes should not be found in laboratory blanks.

When target analytes are detected in blanks, analyte concentrations in associated samples less than five times the concentration detected in the blank will be U qualified.

3.3 LABELED INTERNAL STANDARDS

Labeled internal standards are isotopically labeled compounds that are added to a sample or extract after all preparatory steps are completed and before instrumental analysis. These compounds serve as standards for qualitative analysis using relative retention time and quantitative analysis using relative response factors.

3.4 CALIBRATION

Instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. Calibration is verified at the beginning of the analytical run and on an ongoing basis.

4.0 DEFINITIONS OF QUALIFIERS THAT MAY BE ADDED DURING DATA QUALITY REVIEW

U The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.

NJ The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

5.0 QUALIFICATION REASON CODES USED IN THIS REPORT

DL The analyte concentration is between the method detection limit (MDL) and the reporting limit (RL)

EM The result is an estimated maximum possible concentration (EMPC).

MB The same analyte was detected in the field sample and the associated laboratory blank and the concentration detected in the sample is less than five times the concentration detected in the blank.

6.0 CHAIN OF CUSTODY AND SAMPLE RECEIPT CONDITION DOCUMENTATION

Samples were received by ALS intact and at a temperature less than the EPA-recommended maximum of 6 degrees Celsius.

7.0 PCDDS/PCDFS BY EPA METHOD 1613B

PCDD and PCDF data may be considered usable with the limitations and exceptions described in Sections 7.1 through 7.8.

7.1 HOLDING TIMES

The samples were extracted within the method-specified holding time of one year from sample collection until extraction, and the extracts were analyzed within the method-specified time of one year from extraction until analysis.

7.2 INITIAL CALIBRATION

Ion abundance ratios and percent relative standard deviation for all target compounds met EPA Method 8290A requirements for unqualified data.

7.3 CALIBRATION VERIFICATION

All compounds in the calibration verification standard associated with the PCDD/PCDF analysis of these samples met method requirements for unqualified data for percent drift in relative response and ion abundance ratios.

7.4 LABORATORY BLANKS

Octachlorodibenzo-p-dioxin (OCDD) and total heptachlorodibenzo-p-dioxin (HpCDD) were detected at concentrations of 8.55 picograms per liter (pg/L) and 7.37 pg/L, respectively, in the laboratory blank associated with these samples. Data limitations are summarized below.

- AMEC U qualified the detected OCDD and total HpCDD results from sample W11-S (18.2 pg/L and 3.80 pg/L, respectively), W-23 (36.7 pg/L and 6.49 pg/L, respectively), W-24 (20.7 pg/L and 1.16 pg/L, respectively), W-25 (29.8 pg/L and 1.55 pg/L, respectively), and W-26 (25.0 pg/l and 2.72 pg/L, respectively) because the concentrations detected in the samples were less than five times the concentrations detected in the blank. (U-MB)

7.5 RECOVERY OF C-13 LABELED ISOTOPE DILUTION STANDARDS USED AS INTERNAL STANDARDS

EPA Method 8290 uses an isotope dilution procedure to calculate analyte concentrations. Eighteen carbon- or chlorine-labeled PCDD and PCDF isomers are added to the sample or extract to monitor different aspects of the procedure. Of the 18 labeled isomers, 15 are added prior to extraction and are used as internal standards for calculation of analytical results. Internal standard recovery problems affect all analytical results that are calculated using the affected internal standard, not just the corresponding nonlabeled isomer. Internal standard recoveries outside the method-specified limits for unqualified data indicate uncertainty in all results quantified using that internal standard, with an unknown potential bias.

Recovery and performance of carbon-labeled isotope dilution standards used as internal standards in the field and QC samples were within the method-specified 40% to 135% limits, with the following exception:

- Recovery of the labeled internal standard $^{13}C_{12}$-OCDD was low at 39% in the OPR duplicate (OPRD) associated with the analysis of these samples. The low internal standard recovery would potentially result in an analytical bias for OCDD. OCDD recovery was acceptable in the OPRD and in AMEC's professional opinion data usability is not adversely affected.

7.6 ONGOING PRECISION AND RECOVERY SAMPLES

Analyte recoveries in the OPR and OPRD associated with the PCDD/PCDF analysis of these samples were within the laboratory's 70% to 130% limits and relative percent differences between OPR and OPRD results were less than the laboratory-specified maximum of 25%.

7.7 SECOND COLUMN CONFIRMATION

2,3,7,8-Tetrachlorodibenzofuran was not detected in these samples and second column confirmation was not required.

7.8 DATA REPORTING

ALS J qualified data when the detected analyte concentration was less than the instrument's lowest calibration level. All of ALS' J qualifiers are appropriate and have been applied to the final data. (J-DL)

According to the laboratory's notes, the ion abundance ratio for the OCDD detection in sample W11-S, the octachlorodibenzofuran (OCDF) detection in sample W-23, and the 1,2,3,4,6,7,8-HpCDD detections in samples W-25 and W-26 did not meet method-specified ion abundance ratio criteria and the reported concentrations should be considered EMPCs. AMEC U qualified these result because they did not meet all of the method-specified identification criteria. (U-EM)

8.0 SUMMARY

AMEC evaluated 125 data points during this data quality review. Out of these 125 points, 12 (9.6%) were J qualified as estimated values because the analyte concentrations were between the MDL and the RL and 12 (9.6%) were U qualified as being not detected because of analyte detections in the associated laboratory blanks or because the detections did not meet all method-specified identification criteria. No data were rejected and the data should be considered fully usable with the addition of the qualifiers summarized in Table 2.

Table 2: Qualifiers Added During Validation

Sample ID	Analyte	Concentration	Qualifier and Reason Code
W11-S	1,2,3,4,6,7,8-HpCDD	1.58 pg/L	J DL
	OCDD	18.2 pg/L	U MB
	1,2,3,4,6,7,8-HpCDF	0.980 pg/L	J DL
	OCDF	2.73 pg/L	J DL
	Total HpCDD	3.80 pg/L	U MB
	Total HpCDF	0.980 pg/L	J DL
W-23	1,2,3,4,6,7,8-HpCDD	3.51 pg/L	J DL
	OCDD	36.7 pg/L	J DL
	1,2,3,4,6,7,8-HpCDF	1.36 pg/L	J DL
	OCDF	2.98 pg/L	U EM
	Total HpCDD	6.49 pg/L	U MB
	Total HxCDF	1.19 pg/L	J DL
	Total HpCDF	3.34 pg/L	J DL
W-24	1,2,3,4,6,7,8-HpCDD	1.16 pg/L	J DL
	OCDD	20.7 pg/L	U MB
	Total HpCDD	1.16 pg/L	U MB
W-25	1,2,3,4,6,7,8-HpCDD	1.17 pg/L	U EM
	OCDD	29.8 pg/L	U MB
	OCDF	2.13 pg/L	J DL
	Total HpCDD	1.55 pg/L	U MB
W-26	1,2,3,4,6,7,8-HpCDD	2.27 pg/L	U EM
	OCDD	25.0 pg/L	U MB
	OCDF	2.63 pg/L	J DL
	Total HpCDD	2.72 pg/L	U MB

Notes:

HpCDF = heptachlorodibenzofuran

HxCDF = hexachlorodibenzofuran

REFERENCES

EPA, 1996. EPA Region 10 SOP for the Validation of PCDD and PCDF Data, Revision 2.0, January 31, 1996.

EPA, 2005. National Functional Guidelines for Chlorinated Dioxin/Furan Data Review, Final, EPA 540 R 05 001, September 2005.

EPA, 2007. Method 8290A Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by High-Resolution Gas Chromatography/High-Resolution Mass Spectrometry, Revision1, February 2007.

LIMITATIONS

This report was prepared exclusively for J.H. Baxter & Company by AMEC Environment & Infrastructure, Inc. The quality of information, conclusions, and estimates contained herein is consistent with the level of effort involved in AMEC services and based on: i) information available at the time of preparation, ii) data supplied by outside sources, and iii) the assumptions, conditions, and qualifications set forth in this report. This data quality review is intended to be used by J.H. Baxter & Company for the Eugene, Oregon Facility only, subject to the terms and conditions of its contract with AMEC. Any other use of, or reliance on, this report by any third party is at that party's sole risk.

ATTACHMENT D3

Dioxin in Groundwater – Laboratory Results

September 9, 2013 Analytical Report for Service Request No: K1308398

Scott Thielke
JH Baxter & Company
85 N. Baxter Road
P.O. Box 10797
Eugene, OR 97440

RE: JH Baxter - Eugene

Dear Scott:

Enclosed are the results of the samples submitted to our laboratory on August 19, 2013. For your reference, these analyses have been assigned our service request number K1308398.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3275. You may also contact me via Email at Chris.Leaf@alsglobal.com.

Respectfully submitted,

ALS Group USA Corp. dba ALS Environmental

Chris Leaf
Project Manager

CL/ln

ADDRESS 1317 S. 13th Avenue, Kelso, WA 98626 USA | PHONE +1 360 577 7222 | FAX +1 360 636 1068
ALS Group USA, Corp. Part of the ALS Group An ALS Limited Company

Columbia Analytical Services, Inc. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEC UST	http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2286
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L12-28
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Georgia DNR	http://www.gaepd.org/Documents/techguide_pcb.html#cel	881
Hawaii DOH	Not available	-
Idaho DHW	http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx	-
Indiana DOH	http://www.in.gov/isdh/24859.htm	C-WA-01
ISO 17025	http://www.pjlabs.com/	L12-27
Louisiana DEQ	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	3016
Louisiana DHH	Not available	LA110003
Maine DHS	Not available	WA0035
Michigan DEQ	http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html	9949
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-368
Montana DPHHS	http://www.dphhs.mt.gov/publichealth/	CERT0047
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA35
New Jersey DEP	http://www.nj.gov/dep/oqa/	WA005
New Mexico ED	http://www.nmenv.state.nm.us/dwb/Index.htm	-
North Carolina DWQ	http://www.dwqlab.org/	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA200001
South Carolina DHEC	http://www.scdhec.gov/environment/envserv/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	4704427-08-TX
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C1203
Wisconsin DNR	http://dnr.wi.gov/	998386840
Wyoming (EPA Region 8)	http://www.epa.gov/region8/water/dwhome/wyomingdi.html	-
Kelso Laboratory Website	www.caslab.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.caslab.com or at the accreditation bodies web site

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

Columbia Analytical Services

41903 CHAIN OF CUSTODY

SR# K1303398

COC Set____ of____

Page 1 OF 1 COC#_____

1317 South 13th Ave, Kelso, WA 98626 | 360.577.7222 | 800.695.7222 | 360.636.1068 (fax)

Project Name: JH BAXTER - EUGENE
Project Number:
Project Manager: STEVE BARNETT
Company Name: AMEC
Comany Address: 7376 SW DURHAM RD
City/State/Zip: PORTLAND, OR 97224
E-Mail Address: steve.barnett@amec.com
Phone #: 503.639.3400 FAX #:
Sampler Signature:

	Sample ID	Date	Time	Lab ID	Matrix	Number of Containers	30D	8290 / PCDD PCDF				Remarks
1	W11-S	8/16	0935		W	2		X				1
2	W-23	8/16	1105		W	2		X				2
3	W-25	8/16	1235		W	2		X				3
4	W-24	8/16	1445		W	2		X				4
5	W-26	8/16	1605		W	2		X				5
6												6
7												7
8												8
9												9
10												10
11												11

Report Requirements

- ___ I. Routine Report: Method Blank, Surrogate, as required
- ___ II. Report Dup., MS, MSD as required
- X III. Data Validation Report (includes all raw data)
- ___ IV. CLP Deliverable Report
- ___ V. EDD

Invoice Information

P.O.#_____
Bill To: JH BAXTER

Turnaround Requirements

- ___ 24 hr. ___ 48 hr.
- ___ 5 Day
- ___ Standard (10-15 working days)
- ___ Provide Fax Results

Requested Report Date

Circle which metals are to be analyzed

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Special Instructions/Comments:

*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other____(Circle One)

DIRECT BILL TO J.H. BAXTER
CC: TO SCOTT THIELKE (JH BAXTER)

☐ Sample Shipment contains USDA regulated soil samples (check box if applicable)

Relinquished By:		Received By:		Relinquished By:		Received By:	
Signature	Date/Time	Signature	Date/Time	Signature	Date/Time	Signature	Date/Time
D STEPHEN BARNETT	8.19.2013 AMEC	[illegible]	8/19/13 1745 [illegible]				
Printed Name	Firm	Printed Name	Firm	Printed Name	Firm	Printed Name	Firm

PC CV

Cooler Receipt and Preservation Form

Client / Project: AMEC Service Request K13 08598

Received: 8/19/13 Opened: 8/19/13 By: [illegible] Unloaded: 8/19/13 By: [illegible]

1. Samples were received via? *Mail* *Fed Ex* *UPS* *DHL* *PDX* (*Courier*) *Hand Delivered*
2. Samples were received in: (circle) (*Cooler*) *Box* *Envelope* *Other* _____ *NA*
3. Were custody seals on coolers? NA (Y) N If yes, how many and where? one, front
   If present, were custody seals intact? (Y) N If present, were they signed and dated? (Y) N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID (NA)	Tracking Number (NA)	Filed
4.0	4.1	1.7	1.8	+0.1	342			

4. Packing material: (*Inserts*) *Baggies* *Bubble Wrap* (*Gel Packs*) *Wet Ice* *Dry Ice* *Sleeves* _____
5. Were custody papers properly filled out (ink, signed, etc.)? NA (Y) N
6. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* NA (Y) N
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA (Y) N
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA (Y) N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA (Y) N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA (Y) N
11. Were VOA vials received without headspace? *Indicate in the table below.* (NA) Y N
12. Was C12/Res negative? NA (Y) N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____

Page ____ *of* ____

September 03, 2013 Service Request No: K1308398

Chris Leaf

ALS Environmental
1317 South 13th Avenue
Kelso, WA 98626

Laboratory Results for: JB Baxter & Company.

Dear Chris:

Enclosed are the results of the sample(s) submitted to our laboratory on August 21, 2013. For your reference, these analyses have been assigned our service request number : **K1308398**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided.
All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report. In accordance to the NELAC 2003 Standard, a statement on the estimated uncertainty of measurement of any quantitative analysis will be supplied upon request.

Please contact me if you have any questions. My extension is 2959. You may also contact me via email at Arthi.Kodur@alsglobal.com

Respectfully submitted,

ALS Group USA Corp., dba ALS Environmental

Arthi Kodur
Project Manager

For

Page 1 of 326

For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com.

Certificate of Analysis

ALS Environmental - Houston HRMS
19408 Park Row, Suite 320, Houston, TX 77084
Phone (713)266-1599 Fax (713)266-0130
www.alsglobal.com

ALS ENVIRONMENTAL

Client:	JH Baxter & Company	**Service Request No.:**	K1308398
Project:	JH Baxter - Eugene	**Date Received:**	8/21/13
Sample Matrix:	Water		

ALS ENVIRONMENTAL NARRATIVE

All analyses were performed in adherence to the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier IV. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt

Five water samples were received for analysis at ALS Environmental on 8/21/13.

Please note the reporting forms are currently referencing the date ALS Environmental-Kelso received the samples (8/19/13) and not the date ALS Environmental-Houston received the samples (8/21/13).

The samples were received at 2°C in good condition and are consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

Data Validation Notes and Discussion

B flags – Method Blanks

The Method Blank EQ1300515-01 contained low levels of OCDD at or below the Method Reporting Limit (MRL).

The associated compounds in the samples are flagged with 'B' flags.

MS/MSD

EQ1300515: Laboratory Control Spike/Duplicate Laboratory Control Spike (LCS/DLCS) samples were analyzed and reported in lieu of an MS/MSD for this extraction batch. Insufficient sample volume was provided to perform MS/MSD. The batch quality control criteria were met.

K flags

EMPC - When the ion abundance ratios associated with a particular compound are outside the QC limits, samples are flagged with a 'K' flag. A 'K' flag indicates an estimated maximum possible concentration for the associated compound.

Mass Spectrometer Resolutions

The image for mass 430.9728 in the resolution check of the Initial Calibration for P121029 did not print-out due to an automatic print-out program error.

Detection Limits

Detection limits are calculated for each analyte in each sample by measuring the height of the noise level for each quantitation ion for the associated labeled standard. The concentration equivalent to 2.5 times the height of the noise is then calculated using the appropriate response factor and the weight of the sample. The calculated concentration equals the detection limit.

The TEQ Summary results for each sample have been calculated by ALS ENVIRONMENTAL/Houston to include:

- WHO-2005 TEFs, The 2005 World Health Organization Reevaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-Like Compounds (M. Van den Berg et al., Toxicological Sciences 93(2):223-241, 2006)
- Non-detected compounds are not included in the 'Total'

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS group USA Corp dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

Client: JH Baxter & Company
Project: JH Baxter - Eugene

Service Request: K1308398

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
K1308398-001	W11-S	8/16/13	09:35
K1308398-002	W-23	8/16/13	11:05
K1308398-003	W-25	8/16/13	12:35
K1308398-004	W-24	8/16/13	14:45
K1308398-005	W-26	8/16/13	16:05

Superset Summary

Service Request: K1308398 **SuperSet Reference:** 13-0000260451 rev 00

8290/PCDD PCDF

Calibrations: 10/29/12

Data Files:

Raw Data	*Begin CCAL*	*Method Blank*	*Lab ID*
P166224	P166221	P166224	EQ1300515-01
P166226	P166221	P166224	K1308398-001
P166227	P166221	P166224	K1308398-002
P166228	P166221	P166224	K1308398-003
P166229	P166221	P166224	K1308398-004
P166230	P166221	P166224	K1308398-005
P166232	P166221	P166224	EQ1300515-02
P166233	P166221	P166224	EQ1300515-03

Laboratory Certifications
2012-2013

STATE/PROGRAM	AGENCY	CERT#	EXP DATE	CERTIFIED?
ARIZONA	AZ-DHS	AZ0725	05/27/14	Yes
ARKANSAS	ADEQ	12-035-0	06/16/14	Yes
CALIFORNIA	CA-ELAP	2452	02/28/15	Yes
DOD ELAP	A2LA	2897.01	11/30/13	Yes
FLORIDA/NELAP	FL-DOHS	E87611	06/30/14	Yes
HAWAII	HI-DOH	N/A	06/30/14	Yes
ILLINOIS/NELAP	IL-EPA	003004	10/06/13	Yes
ISO 17025	A2LA	2897.01	11/30/13	Yes
KANSAS	KS-DHE	E-10406	01/31/14	Yes
LOUISIANA/NELAP	LELAP	03048	06/30/14	Yes
LOUISIANA/NELAP	LDHH	LA120014	12/31/13	Yes
MAINE	ME-DOHS	2012017	06/05/14	Yes
MARYLAND	MDE	343	06/30/14	Yes
MICHIGAN	MIDEQ	9971	06/30/13	Yes
MINNESOTA	MDH	048-999-427	12/31/13	Yes
NEVADA	NDEP	TX014112013A	07/31/13	Yes
NEW JERSEY	NJDEP	TX008	06/30/14	Yes
NEW MEXICO	NMED-DWB	N/A	06/30/13	Yes
NEW YORK/NELAP	NY-DOH	11707	04/01/14	Yes
OKLAHOMA	OKDEQ	2012-133	08/31/13	Yes
OREGON/NELAP	ORELAP	TX200002-009	03/24/14	Yes
PENNSYLVANIA/NELAP	PLAP	68-03441	06/30/14	Yes
SOIL IMPORT PERMIT	USDA	P330-12-00002	01/13/15	Yes
TENNESSEE	TNDEC	TN04016	06/30/14	Yes
TEXAS/NELAP	TCEQ	T104704216-12-3	06/30/14	Yes
UTAH/NELAP	UTELCP	TX014112013-2	06/30/13	Yes
WASHINGTON/NELAP	WA-Ecology	C819-12	11/14/13	Yes
WEST VIRGINIA	WVDEP	347	07/31/13	Yes

Abbreviations, Acronyms & Definitions

Cal	Calibration
Conc	CONCentration
Dioxin(s)	Polychlorinated dibenzo-p-dioxin(s)
EDL	Estimated Detection Limit
EMPC	Estimated Maximum Possible Concentration
Flags	Data qualifiers
Furan(s)	Polychlorinated dibenzofuran(s)
g	Grams
ICAL	Initial CALibration
ID	IDentifier
Ions	Masses monitored for the analyte during data acquisition
L	Liter (s)
LCS	Laboratory Control Sample
DLCS	Duplicate Laboratory Control Sample
MB	Method Blank
MCL	Method Calibration Limit
MDL	Method Detection Limit
mL	Milliliters
MS	Matrix Spiked sample
DMS	Duplicate Matrix Spiked sample
NO	Number of peaks meeting all identification criteria
PCDD(s)	Polychlorinated dibenzo-p-dioxin(s)
PCDF(s)	Polychlorinated dibenzofuran(s)
ppb	Parts per billion
ppm	Parts per million
ppq	Parts per quadrillion
ppt	Parts per trillion
QA	Quality Assurance
QC	Quality Control
Ratio	Ratio of areas from monitored ions for an analyte
% Rec.	Percent recovery
RPD	Relative Percent Difference
RRF	Relative Response Factor
RT	Retention Time
SDG	Sample Delivery Group
S/N	Signal-to-noise ratio
TEF	Toxicity Equivalence Factor
TEQ	Toxicity Equivalence Quotient

Data Qualifier Flags – Dioxin/Furans

B Indicates the associated analyte is found in the method blank, as well as in the sample

C 2378-TCDF is detected on the DB-5 column above the MRL, confirmation analysis was performed on a second column (DB-225.) The results from both the DB-5 column and the DB-225 column are included in this data package. The results from the DB-225 analyses should be used to evaluate the 2378-TCDF in the samples. The confirmed result are used in determining the TEQ value for TCDF.

E The reported result is above the instrument calibration range and is an estimated value.

J Indicates an estimated value – used when the analyte concentration is below the method reporting limit (MRL) and above the estimated detection limit (EDL)

K Ion abundance ratios between the primary and secondary ions were outside of theoretical acceptance limits. The reported result is an estimated maximum possible concentration (EMPC)

i The associated MRL/MDL has been elevated due to matrix interference.

U Indicates the compound was analyzed for, but not detected (ND)

Y C13-Labeled standard percent recoveries are outside of method acceptance limits

S Peak is saturated; data not reportable

P Indicates chlorodiphenyl ether interference present at the retention time of the target compound.

X See case narrative

ALS ENVIRONMENTAL – Houston
Data Processing/Form Production and Peer Review Signatures

SR# Unique ID: K1308398 | (DB-5) | DB-225 | SPB-Octyl

First Level - Data Processing - to be filled by person generating the forms

Date:	Analyst:	Samples:
09/03/13	JC	001-005

Second Level - Data Review – to be filled by person doing peer review

Date:	Analyst:	Samples:
09/03/13	UK	001-005

Analytical Results

ALS Environmental - Houston HRMS
19408 Park Row, Suite 320, Houston, TX 77084
Phone (713)266-1599 Fax (713)266-0130
www.alsglobal.com

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	JH Baxter & Company	**Service Request:**	K1308398
Project:	JH Baxter - Eugene	**Date Collected:**	8/16/13 0935
Sample Matrix:	Water	**Date Received:**	8/19/13
Sample Name:	W11-S	**Units:**	pg/L
Lab Code:	K1308398-001	**Basis:**	NA

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/30/13 1744
Prep Method:	Method Sep Funnel/Jar	**Date Extracted:**	8/23/13
Sample Amount:	1045mL	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P166226	**Blank File Name:**	P166224
ICAL Date:	10/29/12	**Cal Ver. File Name:**	P166221

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDD	ND	U	1.13	4.78			1
1,2,3,7,8-PeCDD	ND	U	0.649	23.9			1
1,2,3,4,7,8-HxCDD	ND	U	0.618	23.9			1
1,2,3,6,7,8-HxCDD	ND	U	0.696	23.9			1
1,2,3,7,8,9-HxCDD	ND	U	0.617	23.9			1
1,2,3,4,6,7,8-HpCDD	**1.58**	J	0.646	23.9	1.00	1.000	1
OCDD	**18.2**	BJK	1.64	47.8	1.05	1.000	1
2,3,7,8-TCDF	ND	U	0.979	4.78			1
1,2,3,7,8-PeCDF	ND	U	0.708	23.9			1
2,3,4,7,8-PeCDF	ND	U	0.614	23.9			1
1,2,3,4,7,8-HxCDF	ND	U	0.621	23.9			1
1,2,3,6,7,8-HxCDF	ND	U	0.494	23.9			1
1,2,3,7,8,9-HxCDF	ND	U	0.883	23.9			1
2,3,4,6,7,8-HxCDF	ND	U	0.543	23.9			1
1,2,3,4,6,7,8-HpCDF	**0.980**	J	0.491	23.9	1.07	1.001	1
1,2,3,4,7,8,9-HpCDF	ND	U	0.665	23.9			1
OCDF	**2.73**	J	1.17	47.8	0.88	1.004	1
Total Tetra-Dioxins	ND	U	1.13	4.78			1
Total Penta-Dioxins	ND	U	0.649	23.9			1
Total Hexa-Dioxins	ND	U	0.644	23.9			1
Total Hepta-Dioxins	**3.80**	J	0.646	23.9	0.89		1
Total Tetra-Furans	ND	U	0.979	4.78			1
Total Penta-Furans	ND	U	0.659	23.9			1
Total Hexa-Furans	ND	U	0.613	23.9			1
Total Hepta-Furans	**0.980**	J	0.573	23.9	1.07		1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	JH Baxter & Company	**Service Request:**	K1308398
Project:	JH Baxter - Eugene	**Date Collected:**	8/16/13 0935
Sample Matrix:	Water	**Date Received:**	8/19/13
Sample Name:	W11-S	**Units:**	Percent
Lab Code:	K1308398-001	**Basis:**	NA

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/30/13 1744
Prep Method:	Method Sep Funnel/Jar	**Date Extracted:**	8/23/13
Sample Amount:	1045mL	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P166226	**Blank File Name:**	P166224
ICAL Date:	10/29/12	**Cal Ver. File Name:**	P166221

Labeled Standard Results

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	%Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	2000	1415.576	71		40-135	0.77	1.007
13C-1,2,3,7,8-PeCDD	2000	1551.787	78		40-135	1.46	1.165
13C-1,2,3,4,7,8-HxCDD	2000	1361.688	68		40-135	1.30	0.990
13C-1,2,3,6,7,8-HxCDD	2000	1357.067	68		40-135	1.08	0.992
13C-1,2,3,4,6,7,8-HpCDD	2000	1566.571	78		40-135	1.05	1.068
13C-OCDD	4000	2810.489	70		40-135	0.86	1.148
13C-2,3,7,8-TCDF	2000	1572.481	79		40-135	0.72	0.979
13C-1,2,3,7,8-PeCDF	2000	1406.483	70		40-135	1.44	1.129
13C-2,3,4,7,8-PeCDF	2000	1529.042	76		40-135	1.45	1.153
13C-1,2,3,4,7,8-HxCDF	2000	1275.135	64		40-135	0.49	0.972
13C-1,2,3,6,7,8-HxCDF	2000	1491.162	75		40-135	0.50	0.974
13C-1,2,3,7,8,9-HxCDF	2000	1234.742	62		40-135	0.49	1.006
13C-2,3,4,6,7,8-HxCDF	2000	1435.556	72		40-135	0.49	0.987
13C-1,2,3,4,6,7,8-HpCDF	2000	1362.333	68		40-135	0.42	1.044
13C-1,2,3,4,7,8,9-HpCDF	2000	1508.725	75		40-135	0.42	1.079
37Cl-2,3,7,8-TCDD	800	619.098	77		40-135	NA	1.009

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	JH Baxter & Company	**Service Request:**	K1308398
Project:	JH Baxter - Eugene	**Date Collected:**	8/16/13 0935
Sample Matrix:	Water	**Date Received:**	8/19/13
Sample Name:	W11-S	**Units:**	pg/L
Lab Code:	K1308398-001	**Basis:**	NA

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method: 8290
Prep Method: Method Sep Funnel/Jar

Toxicity Equivalency Quotient

Analyte Name	Result	DL	MRL	Dilution Factor	TEF	TEF - Adjusted Concentration
2,3,7,8-TCDD	ND	1.13	4.78	1	1	
1,2,3,7,8-PeCDD	ND	0.649	23.9	1	1	
1,2,3,4,7,8-HxCDD	ND	0.618	23.9	1	0.1	
1,2,3,6,7,8-HxCDD	ND	0.696	23.9	1	0.1	
1,2,3,7,8,9-HxCDD	ND	0.617	23.9	1	0.1	
1,2,3,4,6,7,8-HpCDD	**1.58**	0.646	23.9	1	0.01	0.0158
OCDD	**18.2**	1.64	47.8	1	0.0003	0.00546
2,3,7,8-TCDF	ND	0.979	4.78	1	0.1	
1,2,3,7,8-PeCDF	ND	0.708	23.9	1	0.03	
2,3,4,7,8-PeCDF	ND	0.614	23.9	1	0.3	
1,2,3,4,7,8-HxCDF	ND	0.621	23.9	1	0.1	
1,2,3,6,7,8-HxCDF	ND	0.494	23.9	1	0.1	
1,2,3,7,8,9-HxCDF	ND	0.883	23.9	1	0.1	
2,3,4,6,7,8-HxCDF	ND	0.543	23.9	1	0.1	
1,2,3,4,6,7,8-HpCDF	**0.980**	0.491	23.9	1	0.01	0.00980
1,2,3,4,7,8,9-HpCDF	ND	0.665	23.9	1	0.01	
OCDF	**2.73**	1.17	47.8	1	0.0003	0.000819
		Total TEQ				0.0319

2005 WHO TEFs, ND = 0

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	JH Baxter & Company	**Service Request:**	K1308398
Project:	JH Baxter - Eugene	**Date Collected:**	8/16/13 1105
Sample Matrix:	Water	**Date Received:**	8/19/13
Sample Name:	W-23	**Units:**	pg/L
Lab Code:	K1308398-002	**Basis:**	NA

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/30/13 1833
Prep Method:	Method Sep Funnel/Jar	**Date Extracted:**	8/23/13
Sample Amount:	1050mL	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P166227	**Blank File Name:**	P166224
ICAL Date:	10/29/12	**Cal Ver. File Name:**	P166221

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDD	ND	U	1.59	4.76			1
1,2,3,7,8-PeCDD	ND	U	0.820	23.8			1
1,2,3,4,7,8-HxCDD	ND	U	0.699	23.8			1
1,2,3,6,7,8-HxCDD	ND	U	0.833	23.8			1
1,2,3,7,8,9-HxCDD	ND	U	0.721	23.8			1
1,2,3,4,6,7,8-HpCDD	**3.51**	J	0.625	23.8	1.04	1.000	1
OCDD	**36.7**	BJ	1.74	47.6	0.76	1.000	1
2,3,7,8-TCDF	ND	U	0.785	4.76			1
1,2,3,7,8-PeCDF	ND	U	0.856	23.8			1
2,3,4,7,8-PeCDF	ND	U	0.721	23.8			1
1,2,3,4,7,8-HxCDF	ND	U	0.540	23.8			1
1,2,3,6,7,8-HxCDF	ND	U	0.428	23.8			1
1,2,3,7,8,9-HxCDF	ND	U	0.757	23.8			1
2,3,4,6,7,8-HxCDF	ND	U	0.473	23.8			1
1,2,3,4,6,7,8-HpCDF	**1.36**	J	0.502	23.8	0.96	1.001	1
1,2,3,4,7,8,9-HpCDF	ND	U	0.701	23.8			1
OCDF	**2.98**	JK	1.04	47.6	0.73	1.003	1
Total Tetra-Dioxins	ND	U	1.59	4.76			1
Total Penta-Dioxins	ND	U	0.820	23.8			1
Total Hexa-Dioxins	ND	U	0.752	23.8			1
Total Hepta-Dioxins	**6.49**	J	0.625	23.8	1.10		1
Total Tetra-Furans	ND	U	0.785	4.76			1
Total Penta-Furans	ND	U	0.786	23.8			1
Total Hexa-Furans	**1.19**	J	0.529	23.8	1.15		1
Total Hepta-Furans	**3.34**	J	0.596	23.8	0.96		1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	JH Baxter & Company	**Service Request:**	K1308398
Project:	JH Baxter - Eugene	**Date Collected:**	8/16/13 1105
Sample Matrix:	Water	**Date Received:**	8/19/13
Sample Name:	W-23	**Units:**	Percent
Lab Code:	K1308398-002	**Basis:**	NA

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/30/13 1833
Prep Method:	Method Sep Funnel/Jar	**Date Extracted:**	8/23/13
Sample Amount:	1050mL	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P166227	**Blank File Name:**	P166224
ICAL Date:	10/29/12	**Cal Ver. File Name:**	P166221

Labeled Standard Results

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	%Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	2000	1404.746	70		40-135	0.78	1.008
13C-1,2,3,7,8-PeCDD	2000	1431.971	72		40-135	1.49	1.165
13C-1,2,3,4,7,8-HxCDD	2000	1446.136	72		40-135	1.17	0.990
13C-1,2,3,6,7,8-HxCDD	2000	1290.206	65		40-135	1.18	0.992
13C-1,2,3,4,6,7,8-HpCDD	2000	1575.320	79		40-135	1.04	1.068
13C-OCDD	4000	2721.306	68		40-135	0.85	1.148
13C-2,3,7,8-TCDF	2000	1561.871	78		40-135	0.72	0.979
13C-1,2,3,7,8-PeCDF	2000	1308.184	65		40-135	1.44	1.128
13C-2,3,4,7,8-PeCDF	2000	1429.254	71		40-135	1.44	1.154
13C-1,2,3,4,7,8-HxCDF	2000	1265.023	63		40-135	0.50	0.972
13C-1,2,3,6,7,8-HxCDF	2000	1480.657	74		40-135	0.50	0.974
13C-1,2,3,7,8,9-HxCDF	2000	1193.319	60		40-135	0.49	1.006
13C-2,3,4,6,7,8-HxCDF	2000	1421.521	71		40-135	0.51	0.987
13C-1,2,3,4,6,7,8-HpCDF	2000	1369.258	68		40-135	0.42	1.044
13C-1,2,3,4,7,8,9-HpCDF	2000	1501.035	75		40-135	0.42	1.079
37Cl-2,3,7,8-TCDD	800	604.833	76		40-135	NA	1.008

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	JH Baxter & Company	**Service Request:**	K1308398
Project:	JH Baxter - Eugene	**Date Collected:**	8/16/13 1105
Sample Matrix:	Water	**Date Received:**	8/19/13
Sample Name:	W-23	**Units:**	pg/L
Lab Code:	K1308398-002	**Basis:**	NA

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method: 8290
Prep Method: Method Sep Funnel/Jar

Toxicity Equivalency Quotient

Analyte Name	Result	DL	MRL	Dilution Factor	TEF	TEF - Adjusted Concentration
2,3,7,8-TCDD	ND	1.59	4.76	1	1	
1,2,3,7,8-PeCDD	ND	0.820	23.8	1	1	
1,2,3,4,7,8-HxCDD	ND	0.699	23.8	1	0.1	
1,2,3,6,7,8-HxCDD	ND	0.833	23.8	1	0.1	
1,2,3,7,8,9-HxCDD	ND	0.721	23.8	1	0.1	
1,2,3,4,6,7,8-HpCDD	**3.51**	0.625	23.8	1	0.01	0.0351
OCDD	**36.7**	1.74	47.6	1	0.0003	0.0110
2,3,7,8-TCDF	ND	0.785	4.76	1	0.1	
1,2,3,7,8-PeCDF	ND	0.856	23.8	1	0.03	
2,3,4,7,8-PeCDF	ND	0.721	23.8	1	0.3	
1,2,3,4,7,8-HxCDF	ND	0.540	23.8	1	0.1	
1,2,3,6,7,8-HxCDF	ND	0.428	23.8	1	0.1	
1,2,3,7,8,9-HxCDF	ND	0.757	23.8	1	0.1	
2,3,4,6,7,8-HxCDF	ND	0.473	23.8	1	0.1	
1,2,3,4,6,7,8-HpCDF	**1.36**	0.502	23.8	1	0.01	0.0136
1,2,3,4,7,8,9-HpCDF	ND	0.701	23.8	1	0.01	
OCDF	**2.98**	1.04	47.6	1	0.0003	0.000894
		Total TEQ				0.0606

2005 WHO TEFs, ND = 0

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	JH Baxter & Company	**Service Request:**	K1308398
Project:	JH Baxter - Eugene	**Date Collected:**	8/16/13 1235
Sample Matrix:	Water	**Date Received:**	8/19/13
Sample Name:	W-25	**Units:**	pg/L
Lab Code:	K1308398-003	**Basis:**	NA

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/30/13 1921
Prep Method:	Method Sep Funnel/Jar	**Date Extracted:**	8/23/13
Sample Amount:	1050mL	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P166228	**Blank File Name:**	P166224
ICAL Date:	10/29/12	**Cal Ver. File Name:**	P166221

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDD	ND	U	1.47	4.76			1
1,2,3,7,8-PeCDD	ND	U	0.817	23.8			1
1,2,3,4,7,8-HxCDD	ND	U	0.744	23.8			1
1,2,3,6,7,8-HxCDD	ND	U	0.867	23.8			1
1,2,3,7,8,9-HxCDD	ND	U	0.757	23.8			1
1,2,3,4,6,7,8-HpCDD	**1.17**	JK	0.646	23.8	1.54	1.000	1
OCDD	**29.8**	BJ	1.97	47.6	0.93	1.000	1
2,3,7,8-TCDF	ND	U	0.684	4.76			1
1,2,3,7,8-PeCDF	ND	U	0.786	23.8			1
2,3,4,7,8-PeCDF	ND	U	0.665	23.8			1
1,2,3,4,7,8-HxCDF	ND	U	0.553	23.8			1
1,2,3,6,7,8-HxCDF	ND	U	0.449	23.8			1
1,2,3,7,8,9-HxCDF	ND	U	0.777	23.8			1
2,3,4,6,7,8-HxCDF	ND	U	0.510	23.8			1
1,2,3,4,6,7,8-HpCDF	ND	U	0.529	23.8			1
1,2,3,4,7,8,9-HpCDF	ND	U	0.721	23.8			1
OCDF	**2.13**	J	1.29	47.6	0.88	1.005	1
Total Tetra-Dioxins	ND	U	1.47	4.76			1
Total Penta-Dioxins	ND	U	0.817	23.8			1
Total Hexa-Dioxins	ND	U	0.790	23.8			1
Total Hepta-Dioxins	**1.55**	J	0.646	23.8	1.09		1
Total Tetra-Furans	ND	U	0.684	4.76			1
Total Penta-Furans	ND	U	0.723	23.8			1
Total Hexa-Furans	ND	U	0.555	23.8			1
Total Hepta-Furans	ND	U	0.620	23.8			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	JH Baxter & Company	**Service Request:**	K1308398
Project:	JH Baxter - Eugene	**Date Collected:**	8/16/13 1235
Sample Matrix:	Water	**Date Received:**	8/19/13
Sample Name:	W-25	**Units:**	Percent
Lab Code:	K1308398-003	**Basis:**	NA

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/30/13 1921
Prep Method:	Method Sep Funnel/Jar	**Date Extracted:**	8/23/13
Sample Amount:	1050mL	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P166228	**Blank File Name:**	P166224
ICAL Date:	10/29/12	**Cal Ver. File Name:**	P166221

Labeled Standard Results

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	%Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	2000	1499.973	75		40-135	0.79	1.007
13C-1,2,3,7,8-PeCDD	2000	1663.044	83		40-135	1.45	1.165
13C-1,2,3,4,7,8-HxCDD	2000	1379.676	69		40-135	1.17	0.990
13C-1,2,3,6,7,8-HxCDD	2000	1460.806	73		40-135	1.18	0.992
13C-1,2,3,4,6,7,8-HpCDD	2000	1658.227	83		40-135	1.06	1.068
13C-OCDD	4000	2870.289	72		40-135	0.84	1.148
13C-2,3,7,8-TCDF	2000	1680.447	84		40-135	0.72	0.979
13C-1,2,3,7,8-PeCDF	2000	1518.103	76		40-135	1.43	1.128
13C-2,3,4,7,8-PeCDF	2000	1633.982	82		40-135	1.45	1.153
13C-1,2,3,4,7,8-HxCDF	2000	1360.925	68		40-135	0.49	0.972
13C-1,2,3,6,7,8-HxCDF	2000	1530.933	77		40-135	0.49	0.974
13C-1,2,3,7,8,9-HxCDF	2000	1297.882	65		40-135	0.49	1.006
13C-2,3,4,6,7,8-HxCDF	2000	1469.790	73		40-135	0.50	0.987
13C-1,2,3,4,6,7,8-HpCDF	2000	1423.379	71		40-135	0.43	1.044
13C-1,2,3,4,7,8,9-HpCDF	2000	1584.354	79		40-135	0.42	1.078
37Cl-2,3,7,8-TCDD	800	658.604	82		40-135	NA	1.008

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	JH Baxter & Company	**Service Request:**	K1308398
Project:	JH Baxter - Eugene	**Date Collected:**	8/16/13 1235
Sample Matrix:	Water	**Date Received:**	8/19/13
Sample Name:	W-25	**Units:**	pg/L
Lab Code:	K1308398-003	**Basis:**	NA

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method: 8290
Prep Method: Method Sep Funnel/Jar

Toxicity Equivalency Quotient

Analyte Name	Result	DL	MRL	Dilution Factor	TEF	TEF - Adjusted Concentration
2,3,7,8-TCDD	ND	1.47	4.76	1	1	
1,2,3,7,8-PeCDD	ND	0.817	23.8	1	1	
1,2,3,4,7,8-HxCDD	ND	0.744	23.8	1	0.1	
1,2,3,6,7,8-HxCDD	ND	0.867	23.8	1	0.1	
1,2,3,7,8,9-HxCDD	ND	0.757	23.8	1	0.1	
1,2,3,4,6,7,8-HpCDD	**1.17**	0.646	23.8	1	0.01	0.0117
OCDD	**29.8**	1.97	47.6	1	0.0003	0.00894
2,3,7,8-TCDF	ND	0.684	4.76	1	0.1	
1,2,3,7,8-PeCDF	ND	0.786	23.8	1	0.03	
2,3,4,7,8-PeCDF	ND	0.665	23.8	1	0.3	
1,2,3,4,7,8-HxCDF	ND	0.553	23.8	1	0.1	
1,2,3,6,7,8-HxCDF	ND	0.449	23.8	1	0.1	
1,2,3,7,8,9-HxCDF	ND	0.777	23.8	1	0.1	
2,3,4,6,7,8-HxCDF	ND	0.510	23.8	1	0.1	
1,2,3,4,6,7,8-HpCDF	ND	0.529	23.8	1	0.01	
1,2,3,4,7,8,9-HpCDF	ND	0.721	23.8	1	0.01	
OCDF	**2.13**	1.29	47.6	1	0.0003	0.000639
		Total TEQ				0.0213

2005 WHO TEFs, ND = 0

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	JH Baxter & Company	**Service Request:**	K1308398
Project:	JH Baxter - Eugene	**Date Collected:**	8/16/13 1445
Sample Matrix:	Water	**Date Received:**	8/19/13
Sample Name:	W-24	**Units:**	pg/L
Lab Code:	K1308398-004	**Basis:**	NA

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/30/13 2009
Prep Method:	Method Sep Funnel/Jar	**Date Extracted:**	8/23/13
Sample Amount:	1050mL	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P166229	**Blank File Name:**	P166224
ICAL Date:	10/29/12	**Cal Ver. File Name:**	P166221

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDD	ND	U	1.77	4.76			1
1,2,3,7,8-PeCDD	ND	U	1.02	23.8			1
1,2,3,4,7,8-HxCDD	ND	U	0.773	23.8			1
1,2,3,6,7,8-HxCDD	ND	U	0.904	23.8			1
1,2,3,7,8,9-HxCDD	ND	U	0.788	23.8			1
1,2,3,4,6,7,8-HpCDD	**1.16**	J	0.883	23.8	0.90	1.000	1
OCDD	**20.7**	BJ	1.99	47.6	1.01	1.000	1
2,3,7,8-TCDF	ND	U	1.15	4.76			1
1,2,3,7,8-PeCDF	ND	U	0.958	23.8			1
2,3,4,7,8-PeCDF	ND	U	0.811	23.8			1
1,2,3,4,7,8-HxCDF	ND	U	0.540	23.8			1
1,2,3,6,7,8-HxCDF	ND	U	0.439	23.8			1
1,2,3,7,8,9-HxCDF	ND	U	0.760	23.8			1
2,3,4,6,7,8-HxCDF	ND	U	0.478	23.8			1
1,2,3,4,6,7,8-HpCDF	ND	U	0.706	23.8			1
1,2,3,4,7,8,9-HpCDF	ND	U	0.969	23.8			1
OCDF	ND	U	1.38	47.6			1
Total Tetra-Dioxins	ND	U	1.77	4.76			1
Total Penta-Dioxins	ND	U	1.02	23.8			1
Total Hexa-Dioxins	ND	U	0.822	23.8			1
Total Hepta-Dioxins	**1.16**	J	0.883	23.8	0.90		1
Total Tetra-Furans	ND	U	1.15	4.76			1
Total Penta-Furans	ND	U	0.881	23.8			1
Total Hexa-Furans	ND	U	0.536	23.8			1
Total Hepta-Furans	ND	U	0.830	23.8			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	JH Baxter & Company	**Service Request:**	K1308398
Project:	JH Baxter - Eugene	**Date Collected:**	8/16/13 1445
Sample Matrix:	Water	**Date Received:**	8/19/13
Sample Name:	W-24	**Units:**	Percent
Lab Code:	K1308398-004	**Basis:**	NA

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/30/13 2009
Prep Method:	Method Sep Funnel/Jar	**Date Extracted:**	8/23/13
Sample Amount:	1050mL	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P166229	**Blank File Name:**	P166224
ICAL Date:	10/29/12	**Cal Ver. File Name:**	P166221

Labeled Standard Results

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	%Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	2000	1160.452	58		40-135	0.78	1.007
13C-1,2,3,7,8-PeCDD	2000	1243.948	62		40-135	1.44	1.165
13C-1,2,3,4,7,8-HxCDD	2000	1090.966	55		40-135	1.18	0.991
13C-1,2,3,6,7,8-HxCDD	2000	1148.258	57		40-135	1.18	0.992
13C-1,2,3,4,6,7,8-HpCDD	2000	1326.208	66		40-135	1.04	1.068
13C-OCDD	4000	2275.958	57		40-135	0.84	1.148
13C-2,3,7,8-TCDF	2000	1258.402	63		40-135	0.72	0.979
13C-1,2,3,7,8-PeCDF	2000	1140.252	57		40-135	1.44	1.128
13C-2,3,4,7,8-PeCDF	2000	1236.764	62		40-135	1.46	1.153
13C-1,2,3,4,7,8-HxCDF	2000	1025.280	51		40-135	0.49	0.972
13C-1,2,3,6,7,8-HxCDF	2000	1191.648	60		40-135	0.50	0.975
13C-1,2,3,7,8,9-HxCDF	2000	1004.106	50		40-135	0.49	1.006
13C-2,3,4,6,7,8-HxCDF	2000	1159.750	58		40-135	0.50	0.988
13C-1,2,3,4,6,7,8-HpCDF	2000	1137.342	57		40-135	0.42	1.044
13C-1,2,3,4,7,8,9-HpCDF	2000	1263.810	63		40-135	0.41	1.079
37Cl-2,3,7,8-TCDD	800	641.197	80		40-135	NA	1.008

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	JH Baxter & Company	**Service Request:**	K1308398
Project:	JH Baxter - Eugene	**Date Collected:**	8/16/13 1445
Sample Matrix:	Water	**Date Received:**	8/19/13
Sample Name:	W-24	**Units:**	pg/L
Lab Code:	K1308398-004	**Basis:**	NA

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method: 8290
Prep Method: Method Sep Funnel/Jar

Toxicity Equivalency Quotient

Analyte Name	Result	DL	MRL	Dilution Factor	TEF	TEF - Adjusted Concentration
2,3,7,8-TCDD	ND	1.77	4.76	1	1	
1,2,3,7,8-PeCDD	ND	1.02	23.8	1	1	
1,2,3,4,7,8-HxCDD	ND	0.773	23.8	1	0.1	
1,2,3,6,7,8-HxCDD	ND	0.904	23.8	1	0.1	
1,2,3,7,8,9-HxCDD	ND	0.788	23.8	1	0.1	
1,2,3,4,6,7,8-HpCDD	**1.16**	0.883	23.8	1	0.01	0.0116
OCDD	**20.7**	1.99	47.6	1	0.0003	0.00621
2,3,7,8-TCDF	ND	1.15	4.76	1	0.1	
1,2,3,7,8-PeCDF	ND	0.958	23.8	1	0.03	
2,3,4,7,8-PeCDF	ND	0.811	23.8	1	0.3	
1,2,3,4,7,8-HxCDF	ND	0.540	23.8	1	0.1	
1,2,3,6,7,8-HxCDF	ND	0.439	23.8	1	0.1	
1,2,3,7,8,9-HxCDF	ND	0.760	23.8	1	0.1	
2,3,4,6,7,8-HxCDF	ND	0.478	23.8	1	0.1	
1,2,3,4,6,7,8-HpCDF	ND	0.706	23.8	1	0.01	
1,2,3,4,7,8,9-HpCDF	ND	0.969	23.8	1	0.01	
OCDF	ND	1.38	47.6	1	0.0003	
		Total TEQ				0.0178

2005 WHO TEFs, ND = 0

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	JH Baxter & Company	**Service Request:**	K1308398
Project:	JH Baxter - Eugene	**Date Collected:**	8/16/13 1605
Sample Matrix:	Water	**Date Received:**	8/19/13
Sample Name:	W-26	**Units:**	pg/L
Lab Code:	K1308398-005	**Basis:**	NA

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/30/13 2057
Prep Method:	Method Sep Funnel/Jar	**Date Extracted:**	8/23/13
Sample Amount:	1050mL	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P166230	**Blank File Name:**	P166224
ICAL Date:	10/29/12	**Cal Ver. File Name:**	P166221

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDD	ND	U	1.31	4.76			1
1,2,3,7,8-PeCDD	ND	U	0.869	23.8			1
1,2,3,4,7,8-HxCDD	ND	U	0.464	23.8			1
1,2,3,6,7,8-HxCDD	ND	U	0.556	23.8			1
1,2,3,7,8,9-HxCDD	ND	U	0.480	23.8			1
1,2,3,4,6,7,8-HpCDD	**2.27**	JK	0.767	23.8	0.80	1.000	1
OCDD	**25.0**	BJ	1.44	47.6	0.88	1.000	1
2,3,7,8-TCDF	ND	U	0.789	4.76			1
1,2,3,7,8-PeCDF	ND	U	0.725	23.8			1
2,3,4,7,8-PeCDF	ND	U	0.632	23.8			1
1,2,3,4,7,8-HxCDF	ND	U	0.517	23.8			1
1,2,3,6,7,8-HxCDF	ND	U	0.416	23.8			1
1,2,3,7,8,9-HxCDF	ND	U	0.716	23.8			1
2,3,4,6,7,8-HxCDF	ND	U	0.463	23.8			1
1,2,3,4,6,7,8-HpCDF	ND	U	0.596	23.8			1
1,2,3,4,7,8,9-HpCDF	ND	U	0.805	23.8			1
OCDF	**2.63**	J	1.55	47.6	0.91	1.004	1
Total Tetra-Dioxins	ND	U	1.31	4.76			1
Total Penta-Dioxins	ND	U	0.869	23.8			1
Total Hexa-Dioxins	ND	U	0.501	23.8			1
Total Hepta-Dioxins	**2.72**	J	0.767	23.8	0.92		1
Total Tetra-Furans	ND	U	0.789	4.76			1
Total Penta-Furans	ND	U	0.678	23.8			1
Total Hexa-Furans	ND	U	0.511	23.8			1
Total Hepta-Furans	ND	U	0.695	23.8			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	JH Baxter & Company	**Service Request:**	K1308398
Project:	JH Baxter - Eugene	**Date Collected:**	8/16/13 1605
Sample Matrix:	Water	**Date Received:**	8/19/13
Sample Name:	W-26	**Units:**	Percent
Lab Code:	K1308398-005	**Basis:**	NA

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/30/13 2057
Prep Method:	Method Sep Funnel/Jar	**Date Extracted:**	8/23/13
Sample Amount:	1050mL	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P166230	**Blank File Name:**	P166224
ICAL Date:	10/29/12	**Cal Ver. File Name:**	P166221

Labeled Standard Results

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	%Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	2000	1406.836	70		40-135	0.78	1.007
13C-1,2,3,7,8-PeCDD	2000	1521.369	76		40-135	1.48	1.165
13C-1,2,3,4,7,8-HxCDD	2000	1387.518	69		40-135	1.18	0.991
13C-1,2,3,6,7,8-HxCDD	2000	1419.431	71		40-135	1.19	0.992
13C-1,2,3,4,6,7,8-HpCDD	2000	1630.332	82		40-135	1.06	1.068
13C-OCDD	4000	2858.854	71		40-135	0.85	1.148
13C-2,3,7,8-TCDF	2000	1551.948	78		40-135	0.71	0.979
13C-1,2,3,7,8-PeCDF	2000	1394.853	70		40-135	1.45	1.128
13C-2,3,4,7,8-PeCDF	2000	1484.505	74		40-135	1.45	1.153
13C-1,2,3,4,7,8-HxCDF	2000	1275.224	64		40-135	0.53	0.972
13C-1,2,3,6,7,8-HxCDF	2000	1541.928	77		40-135	0.48	0.975
13C-1,2,3,7,8,9-HxCDF	2000	1282.246	64		40-135	0.48	1.006
13C-2,3,4,6,7,8-HxCDF	2000	1450.429	73		40-135	0.51	0.988
13C-1,2,3,4,6,7,8-HpCDF	2000	1421.454	71		40-135	0.43	1.044
13C-1,2,3,4,7,8,9-HpCDF	2000	1567.216	78		40-135	0.42	1.079
37Cl-2,3,7,8-TCDD	800	614.572	77		40-135	NA	1.008

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	JH Baxter & Company	**Service Request:**	K1308398
Project:	JH Baxter - Eugene	**Date Collected:**	8/16/13 1605
Sample Matrix:	Water	**Date Received:**	8/19/13
Sample Name:	W-26	**Units:**	pg/L
Lab Code:	K1308398-005	**Basis:**	NA

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method: 8290
Prep Method: Method Sep Funnel/Jar

Toxicity Equivalency Quotient

Analyte Name	Result	DL	MRL	Dilution Factor	TEF	TEF - Adjusted Concentration
2,3,7,8-TCDD	ND	1.31	4.76	1	1	
1,2,3,7,8-PeCDD	ND	0.869	23.8	1	1	
1,2,3,4,7,8-HxCDD	ND	0.464	23.8	1	0.1	
1,2,3,6,7,8-HxCDD	ND	0.556	23.8	1	0.1	
1,2,3,7,8,9-HxCDD	ND	0.480	23.8	1	0.1	
1,2,3,4,6,7,8-HpCDD	**2.27**	0.767	23.8	1	0.01	0.0227
OCDD	**25.0**	1.44	47.6	1	0.0003	0.00750
2,3,7,8-TCDF	ND	0.789	4.76	1	0.1	
1,2,3,7,8-PeCDF	ND	0.725	23.8	1	0.03	
2,3,4,7,8-PeCDF	ND	0.632	23.8	1	0.3	
1,2,3,4,7,8-HxCDF	ND	0.517	23.8	1	0.1	
1,2,3,6,7,8-HxCDF	ND	0.416	23.8	1	0.1	
1,2,3,7,8,9-HxCDF	ND	0.716	23.8	1	0.1	
2,3,4,6,7,8-HxCDF	ND	0.463	23.8	1	0.1	
1,2,3,4,6,7,8-HpCDF	ND	0.596	23.8	1	0.01	
1,2,3,4,7,8,9-HpCDF	ND	0.805	23.8	1	0.01	
OCDF	**2.63**	1.55	47.6	1	0.0003	0.000789
		Total TEQ				0.0310

2005 WHO TEFs, ND = 0

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	JH Baxter & Company	**Service Request:**	K1308398
Project:	JH Baxter - Eugene	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	pg/L
Lab Code:	EQ1300515-01	**Basis:**	NA

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/30/13 1609
Prep Method:	Method Sep Funnel/Jar	**Date Extracted:**	8/23/13
Sample Amount:	1000mL	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P166224	**Blank File Name:**	P166224
ICAL Date:	10/29/12	**Cal Ver. File Name:**	P166221

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDD	ND	U	1.21	5.00			1
1,2,3,7,8-PeCDD	ND	U	1.08	25.0			1
1,2,3,4,7,8-HxCDD	ND	U	0.952	25.0			1
1,2,3,6,7,8-HxCDD	ND	U	1.13	25.0			1
1,2,3,7,8,9-HxCDD	ND	U	0.977	25.0			1
1,2,3,4,6,7,8-HpCDD	ND	U	1.83	25.0			1
OCDD	**8.55**	J	6.57	50.0	0.92	1.000	1
2,3,7,8-TCDF	ND	U	1.01	5.00			1
1,2,3,7,8-PeCDF	ND	U	1.03	25.0			1
2,3,4,7,8-PeCDF	ND	U	0.877	25.0			1
1,2,3,4,7,8-HxCDF	ND	U	0.648	25.0			1
1,2,3,6,7,8-HxCDF	ND	U	0.542	25.0			1
1,2,3,7,8,9-HxCDF	ND	U	0.917	25.0			1
2,3,4,6,7,8-HxCDF	ND	U	0.601	25.0			1
1,2,3,4,6,7,8-HpCDF	ND	U	1.40	25.0			1
1,2,3,4,7,8,9-HpCDF	ND	U	1.80	25.0			1
OCDF	ND	U	2.08	50.0			1
Total Tetra-Dioxins	ND	U	1.21	5.00			1
Total Penta-Dioxins	ND	U	1.08	25.0			1
Total Hexa-Dioxins	ND	U	1.02	25.0			1
Total Hepta-Dioxins	**7.37**	J	1.83	25.0	1.08		1
Total Tetra-Furans	ND	U	1.01	5.00			1
Total Penta-Furans	ND	U	0.947	25.0			1
Total Hexa-Furans	ND	U	0.656	25.0			1
Total Hepta-Furans	ND	U	1.59	25.0			1

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Analytical Report

Client:	JH Baxter & Company	**Service Request:**	K1308398
Project:	JH Baxter - Eugene	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	Percent
Lab Code:	EQ1300515-01	**Basis:**	NA

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/30/13 1609
Prep Method:	Method Sep Funnel/Jar	**Date Extracted:**	8/23/13
Sample Amount:	1000mL	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P166224	**Blank File Name:**	P166224
ICAL Date:	10/29/12	**Cal Ver. File Name:**	P166221

Labeled Standard Results

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	%Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	2000	1344.788	67		40-135	0.79	1.007
13C-1,2,3,7,8-PeCDD	2000	1464.207	73		40-135	1.46	1.165
13C-1,2,3,4,7,8-HxCDD	2000	1368.815	68		40-135	1.18	0.991
13C-1,2,3,6,7,8-HxCDD	2000	1326.963	66		40-135	1.19	0.992
13C-1,2,3,4,6,7,8-HpCDD	2000	1387.723	69		40-135	1.05	1.068
13C-OCDD	4000	2314.877	58		40-135	0.86	1.148
13C-2,3,7,8-TCDF	2000	1455.538	73		40-135	0.71	0.979
13C-1,2,3,7,8-PeCDF	2000	1314.330	66		40-135	1.44	1.128
13C-2,3,4,7,8-PeCDF	2000	1437.198	72		40-135	1.44	1.153
13C-1,2,3,4,7,8-HxCDF	2000	1188.175	59		40-135	0.49	0.972
13C-1,2,3,6,7,8-HxCDF	2000	1445.572	72		40-135	0.49	0.975
13C-1,2,3,7,8,9-HxCDF	2000	1204.368	60		40-135	0.50	1.006
13C-2,3,4,6,7,8-HxCDF	2000	1380.579	69		40-135	0.49	0.988
13C-1,2,3,4,6,7,8-HpCDF	2000	1196.191	60		40-135	0.43	1.044
13C-1,2,3,4,7,8,9-HpCDF	2000	1343.755	67		40-135	0.42	1.079
37Cl-2,3,7,8-TCDD	800	614.079	77		40-135	NA	1.008

Accuracy and Precision

ALS Environmental - Houston HRMS
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ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: JH Baxter & Company
Project: JH Baxter - Eugene
Sample Matrix: Water

Service Request: K1308398
Date Analyzed: 8/30/13

Lab Control Sample Summary
Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method: 8290
Prep Method: Method Sep Funnel/Jar

Units: pg/L
Basis: NA

Extraction Lot: 190126

	Lab Control Sample EQ1300515-02			Duplicate Lab Control Sample EQ1300515-03					
Analyte Name	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
2,3,7,8-TCDD	206	200	103	204	200	102	70 - 130	1	25
1,2,3,7,8-PeCDD	986	1000	99	1020	1000	102	70 - 130	3	25
1,2,3,4,7,8-HxCDD	890	1000	89	913	1000	91	70 - 130	3	25
1,2,3,6,7,8-HxCDD	1110	1000	111	1120	1000	112	70 - 130	1	25
1,2,3,7,8,9-HxCDD	1020	1000	102	1010	1000	101	70 - 130	2	25
1,2,3,4,6,7,8-HpCDD	929	1000	93	965	1000	97	70 - 130	4	25
OCDD	2290	2000	115	2370	2000	118	70 - 130	3	25
2,3,7,8-TCDF	196	200	98	196	200	98	70 - 130	<1	25
1,2,3,7,8-PeCDF	1150	1000	115	1160	1000	116	70 - 130	1	25
2,3,4,7,8-PeCDF	1000	1000	100	1010	1000	101	70 - 130	1	25
1,2,3,4,7,8-HxCDF	1080	1000	108	1130	1000	113	70 - 130	5	25
1,2,3,6,7,8-HxCDF	919	1000	92	931	1000	93	70 - 130	1	25
1,2,3,7,8,9-HxCDF	1110	1000	111	1060	1000	106	70 - 130	4	25
2,3,4,6,7,8-HxCDF	1010	1000	101	1030	1000	103	70 - 130	2	25
1,2,3,4,6,7,8-HpCDF	982	1000	98	1010	1000	101	70 - 130	3	25
1,2,3,4,7,8,9-HpCDF	979	1000	98	998	1000	100	70 - 130	2	25
OCDF	2250	2000	112	2490	2000	125	70 - 130	10	25

Results flagged with an asterisk (*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	JH Baxter & Company	**Service Request:**	K1308398
Project:	JH Baxter - Eugene	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Lab Control Sample	**Units:**	pg/L
Lab Code:	EQ1300515-02	**Basis:**	NA

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/30/13 2234
Prep Method:	Method Sep Funnel/Jar	**Date Extracted:**	8/23/13
Sample Amount:	1000mL	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P166232	**Blank File Name:**	P166224
ICAL Date:	10/29/12	**Cal Ver. File Name:**	P166221

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDD	**206**		0.847	5.00	0.76	1.001	1
1,2,3,7,8-PeCDD	**986**		0.552	25.0	1.59	1.000	1
1,2,3,4,7,8-HxCDD	**890**		0.592	25.0	1.36	1.000	1
1,2,3,6,7,8-HxCDD	**1110**		0.723	25.0	1.15	1.000	1
1,2,3,7,8,9-HxCDD	**1020**		0.619	25.0	1.22	1.008	1
1,2,3,4,6,7,8-HpCDD	**929**		0.689	25.0	1.05	1.000	1
OCDD	**2290**		1.71	50.0	0.90	1.000	1
2,3,7,8-TCDF	**196**		0.723	5.00	0.75	1.001	1
1,2,3,7,8-PeCDF	**1150**		0.823	25.0	1.54	1.001	1
2,3,4,7,8-PeCDF	**1000**		0.699	25.0	1.53	1.001	1
1,2,3,4,7,8-HxCDF	**1080**		0.465	25.0	1.22	1.000	1
1,2,3,6,7,8-HxCDF	**919**		0.375	25.0	1.23	1.000	1
1,2,3,7,8,9-HxCDF	**1110**		0.787	25.0	1.23	1.000	1
2,3,4,6,7,8-HxCDF	**1010**		0.421	25.0	1.22	1.000	1
1,2,3,4,6,7,8-HpCDF	**982**		3.64	25.0	1.00	1.000	1
1,2,3,4,7,8,9-HpCDF	**979**		5.02	25.0	1.02	1.000	1
OCDF	**2250**		1.63	50.0	0.89	1.004	1
Total Tetra-Dioxins	**207**		0.847	5.00	0.76		1
Total Penta-Dioxins	**986**		0.552	25.0	1.59		1
Total Hexa-Dioxins	**3020**		0.645	25.0	1.36		1
Total Hepta-Dioxins	**929**		0.689	25.0	1.05		1
Total Tetra-Furans	**198**		0.723	5.00	0.87		1
Total Penta-Furans	**2170**		0.759	25.0	1.54		1
Total Hexa-Furans	**4120**		0.481	25.0	1.22		1
Total Hepta-Furans	**1960**		4.29	25.0	1.00		1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	JH Baxter & Company	**Service Request:**	K1308398
Project:	JH Baxter - Eugene	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Lab Control Sample	**Units:**	Percent
Lab Code:	EQ1300515-02	**Basis:**	NA

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/30/13 2234
Prep Method:	Method Sep Funnel/Jar	**Date Extracted:**	8/23/13
Sample Amount:	1000mL	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P166232	**Blank File Name:**	P166224
ICAL Date:	10/29/12	**Cal Ver. File Name:**	P166221

Labeled Standard Results

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	%Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	2000	1389.566	69		40-135	0.77	1.008
13C-1,2,3,7,8-PeCDD	2000	1549.844	77		40-135	1.46	1.165
13C-1,2,3,4,7,8-HxCDD	2000	1399.079	70		40-135	1.30	0.990
13C-1,2,3,6,7,8-HxCDD	2000	1279.385	64		40-135	1.08	0.992
13C-1,2,3,4,6,7,8-HpCDD	2000	1342.936	67		40-135	1.06	1.068
13C-OCDD	4000	1843.694	46		40-135	0.85	1.148
13C-2,3,7,8-TCDF	2000	1525.068	76		40-135	0.72	0.979
13C-1,2,3,7,8-PeCDF	2000	1390.277	70		40-135	1.44	1.128
13C-2,3,4,7,8-PeCDF	2000	1530.989	77		40-135	1.45	1.153
13C-1,2,3,4,7,8-HxCDF	2000	1362.771	68		40-135	0.49	0.972
13C-1,2,3,6,7,8-HxCDF	2000	1518.776	76		40-135	0.49	0.974
13C-1,2,3,7,8,9-HxCDF	2000	1059.039	53		40-135	0.49	1.006
13C-2,3,4,6,7,8-HxCDF	2000	1448.608	72		40-135	0.49	0.987
13C-1,2,3,4,6,7,8-HpCDF	2000	1115.265	56		40-135	0.43	1.044
13C-1,2,3,4,7,8,9-HpCDF	2000	1241.685	62		40-135	0.42	1.078
37Cl-2,3,7,8-TCDD	800	611.295	76		40-135	NA	1.009

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	JH Baxter & Company	**Service Request:**	K1308398
Project:	JH Baxter - Eugene	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Duplicate Lab Control Sample	**Units:**	pg/L
Lab Code:	EQ1300515-03	**Basis:**	NA

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/30/13 2322
Prep Method:	Method Sep Funnel/Jar	**Date Extracted:**	8/23/13
Sample Amount:	1000mL	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P166233	**Blank File Name:**	P166224
ICAL Date:	10/29/12	**Cal Ver. File Name:**	P166221

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDD	**204**		1.46	5.00	0.77	1.001	1
1,2,3,7,8-PeCDD	**1020**		0.766	25.0	1.55	1.000	1
1,2,3,4,7,8-HxCDD	**913**		0.611	25.0	1.26	1.000	1
1,2,3,6,7,8-HxCDD	**1120**		0.733	25.0	1.26	1.000	1
1,2,3,7,8,9-HxCDD	**1010**		0.632	25.0	1.23	1.008	1
1,2,3,4,6,7,8-HpCDD	**965**		1.32	25.0	1.03	1.000	1
OCDD	**2370**		2.86	50.0	0.89	1.000	1
2,3,7,8-TCDF	**196**		0.836	5.00	0.73	1.001	1
1,2,3,7,8-PeCDF	**1160**		0.679	25.0	1.55	1.001	1
2,3,4,7,8-PeCDF	**1010**		0.579	25.0	1.52	1.000	1
1,2,3,4,7,8-HxCDF	**1130**		0.665	25.0	1.22	1.000	1
1,2,3,6,7,8-HxCDF	**931**		0.531	25.0	1.21	1.000	1
1,2,3,7,8,9-HxCDF	**1060**		1.02	25.0	1.19	1.000	1
2,3,4,6,7,8-HxCDF	**1030**		0.605	25.0	1.21	1.000	1
1,2,3,4,6,7,8-HpCDF	**1010**		4.43	25.0	1.00	1.000	1
1,2,3,4,7,8,9-HpCDF	**998**		6.40	25.0	1.01	1.000	1
OCDF	**2490**		2.74	50.0	0.89	1.004	1
Total Tetra-Dioxins	**204**		1.46	5.00	0.77		1
Total Penta-Dioxins	**1020**		0.766	25.0	1.55		1
Total Hexa-Dioxins	**3040**		0.659	25.0	1.26		1
Total Hepta-Dioxins	**965**		1.32	25.0	1.03		1
Total Tetra-Furans	**197**		0.836	5.00	0.85		1
Total Penta-Furans	**2180**		0.628	25.0	1.54		1
Total Hexa-Furans	**4160**		0.672	25.0	1.22		1
Total Hepta-Furans	**2010**		5.32	25.0	1.00		1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	JH Baxter & Company	**Service Request:**	K1308398
Project:	JH Baxter - Eugene	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Duplicate Lab Control Sample	**Units:**	Percent
Lab Code:	EQ1300515-03	**Basis:**	NA

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/30/13 2322
Prep Method:	Method Sep Funnel/Jar	**Date Extracted:**	8/23/13
Sample Amount:	1000mL	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P166233	**Blank File Name:**	P166224
ICAL Date:	10/29/12	**Cal Ver. File Name:**	P166221

Labeled Standard Results

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	%Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	2000	1409.584	70		40-135	0.79	1.007
13C-1,2,3,7,8-PeCDD	2000	1548.697	77		40-135	1.46	1.166
13C-1,2,3,4,7,8-HxCDD	2000	1459.687	73		40-135	1.16	0.990
13C-1,2,3,6,7,8-HxCDD	2000	1463.686	73		40-135	1.19	0.992
13C-1,2,3,4,6,7,8-HpCDD	2000	1363.763	68		40-135	1.05	1.068
13C-OCDD	4000	1557.239	39	Y	40-135	0.85	1.148
13C-2,3,7,8-TCDF	2000	1559.602	78		40-135	0.71	0.979
13C-1,2,3,7,8-PeCDF	2000	1408.225	70		40-135	1.45	1.128
13C-2,3,4,7,8-PeCDF	2000	1516.157	76		40-135	1.43	1.153
13C-1,2,3,4,7,8-HxCDF	2000	1377.201	69		40-135	0.52	0.972
13C-1,2,3,6,7,8-HxCDF	2000	1626.244	81		40-135	0.47	0.974
13C-1,2,3,7,8,9-HxCDF	2000	1238.257	62		40-135	0.48	1.006
13C-2,3,4,6,7,8-HxCDF	2000	1531.688	77		40-135	0.51	0.987
13C-1,2,3,4,6,7,8-HpCDF	2000	1248.041	62		40-135	0.43	1.044
13C-1,2,3,4,7,8,9-HpCDF	2000	1282.442	64		40-135	0.42	1.078
37Cl-2,3,7,8-TCDD	800	624.586	78		40-135	NA	1.009

Chain of Custody

ALS Environmental - Houston HRMS
19408 Park Row, Suite 320, Houston, TX 77084
Phone (713)266-1599 Fax (713)266-0130
www.alsglobal.com

Intra-Network Chain of Custody

1317 South 13th Avenue • Kelso, WA 98626 • 1-360-577-7222 • FAX 1-360-636-1068

ALS Contact: Chris Leaf

Project Name: JH Baxter - Eugene
Project Number:
Project Manager: Scott Thielke
Company: JH Baxter & Company

Lab Code	Client Sample ID	# of Cont.	Matrix	Sample Date	Sample Time	Date Received	Send To	PCDD PCDF 8290
K1308398-001	W11-S	2	Water	8/16/13	0935	8/19/13	HOUSTON	III
K1308398-002	W-23	↓	Water	8/16/13	1105	8/19/13	HOUSTON	III
K1308398-003	W-25	↓	Water	8/16/13	1235	8/19/13	HOUSTON	III
K1308398-004	W-24	↓	Water	8/16/13	1445	8/19/13	HOUSTON	III
K1308398-005	W-26	↓	Water	8/16/13	1605	8/19/13	HOUSTON	III

Special Instructions/Comments

Please provide the electronic (PDF and EDD) report to the following e-mail address: ALKLS.Data@alsglobal.com.

2°C opened @ 1055 1 coc seal intact, blue ice bubblewrap

CL 8/20/13

Turnaround Requirements

____ **RUSH** (Surcharges Apply)

PLEASE CIRCLE WORK DAYS

1 2 3 4 5

✓ **STANDARD** 15 Bda

Requested FAX Date: _____

Requested Report Date: 09/04/13

Report Requirements

____ I. Results Only

____ II. Results + QC Summaries

✓ III. Results + QC and Calibration Summaries

____ IV. Data Validation Report with Raw Data

PQL/MDL/J N

EDD N

Invoice Information

PO# K1308398 ✓

Bill to

Relinquished By: [signature] ALS 8/20/13

Received By: [signature] 8/21/13 1005

Airbill Number: 1Z9973659016492563O

K1308398

____ **Ship To: HOUSTON**
ALS Environmental
19408 Park Row
Suite 320
Houston, TX 77084

PC _____ Date 8/20/13
SMO _____ Date 8/20/13

Instructions: ✓

Ice _____
Dry Ice _____
No Ice _____

Shipping: ✓

Overnight _____
2nd Day _____
Ground _____

Bill to Client Account _____

Comments:

Cooler Receipt Form

Project Chemist: AK

Client/Project: JH Baxter & Company/JH Baxter - Eugene

Service Request: K1308398

Date/Time Received: 8/21/13 10:05:00

Date/Time Logged in: 8/21/13 12:30:00

Technician: AK

Technician: AK

1. Method of delivery: ○ US Mail ○ Fed Ex ◉ UPS ○ DHL ○ Courier ○ Client

2. Samples received in: ◉ Cooler ○ Box ○ Envelope ○ Other

3. Were custody seals on coolers? ◉ Yes ○ No ○ N/A

Were they intact? ◉ Yes ○ No ○ N/A

Were they signed and dated? ◉ Yes ○ No ○ N/A

If yes, how many and where? 1 front

4. Method of delivery: ☑ Inserts ○ Baggies ☑ Bubble Wrap ☑ Gel Packs ○ Wet Ice ○ Sleeves ○ Other

5. Foreign or Regulated Soil? ○ Yes ◉ No

Location of Sampling:

Cooler Tracking Number	COC ID	Date Opened	Time Opened	Opened By	Temp. °C	Temp Blank?	Filed
1z9736590164925630		Aug 21, 2013	1055	Ak	2	☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

6. Were custody papers properly filled out (ink, signed, dated, etc)? ◉ Yes ○ No ○ N/A

7. Did all bottles arrive in good condition (not broken, no signs of leakage)? ◉ Yes ○ No ○ N/A

8. Were all sample labels complete (i.e., sample ID, analysis, preservation, etc)? ◉ Yes ○ No ○ N/A

9. Were appropriate bottles/containers and volumes received for the requested tests? ◉ Yes ○ No ○ N/A

10. Did sample labels and tags agree with custody documents? ◉ Yes ○ No ○ N/A

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Broken	Date	Technician
			☐	☐		
			☐	☐		
			☐	☐		
			☐	☐		

Notes, Discrepancies, & Resolutions:

Print Form

Reset Form

SAMPLE ACCEPTANCE POLICY

This policy outlines the criteria samples must meet to be accepted by ALS Environmental – Houston HRMS.

Cooler Custody Seals (desirable, mandatory if specified in SAP):

- ✓ Intact on outside of cooler, signed and dated

Chain-of-Custody (COC) documentation (mandatory):

The following is required on each COC:

- ✓ Sample ID, the location, date and time of collection, collector's name, preservation type, sample type, and any other special remarks concerning the sample
- ✓ The COC must be completed in ink.
- ✓ Signature and date of relinquishing party.

In the absence of a COC at sample receipt, the COC will be requested from the client.

Sample Integrity (mandatory):

Samples are inspected upon arrival to ensure that sample integrity was not compromised during transfer to the laboratory.

- ✓ Sample containers must arrive in good condition (not broken or leaking).
- ✓ Samples must be labeled appropriately, including Sample IDs, and requested test using durable labels and indelible ink.
- ✓ The correct type of sample bottle must be used for the method requested.
- ✓ An appropriate sample volume, or weight, must be received.
- ✓ Sample IDs and number of containers must reconcile with the COC.
- ✓ Samples must be received within the method defined holding time.

Temperature Requirement (varies by sample matrix):

- ✓ Aqueous and Non-aqueous samples must be shipped and stored cold, at 0 to 6ºC.
- ✓ Tissue samples must be shipped and stored frozen, at -20 to -10ºC.
- ✓ Air samples are shipped and stored cold, at 0 to 6ºC
- ✓ The sample temperature must be recorded on the COC

All cooler inspections are documented on the Cooler Receipt Form (CRF). A separate CRF is completed for each service request. Any samples not meeting the above criteria are noted on the CRF and the Project Manager notified. The Project Manager must resolve any sample integrity issues with the client prior to proceeding with the analysis. Such resolutions are documented in writing and filed with the project folder. Data associated with samples received outside of this acceptance policy will be qualified on the case narrative of the final report.

Service Request Summary

Folder #: **K1308398**
Client Name: JH Baxter & Company
Project Name: JH Baxter - Eugene
Project Number:

Report To: Scott Thielke
JH Baxter & Company
85 N. Baxter Road
P.O. Box 10797
Eugene, OR 97440
Phone Number: 541-689-3801
Cell Number:
Fax Number:
E-mail: sthielke@jhbaxter.com

Project Chemist: Arthi Kodur
Originating Lab: KELSO
Logged By: SWOLF
Date Received: 8/19/13
Internal Due Date: 9/4/13
QAP: LAB QAP
Qualifier Set: CAS Standard
Formset: CAS Standard
Merged?: N
Report to MDL?: Y
P.O. Number:
EDD: No EDD Specified

10 - 1000 ml-Glass Bottle NM AMBER Teflon Liner Unpreserved

Location: E-Disposed, E-WIC01-D3

NPDES

CAS Samp No	Client Samp No.	Matrix	Collected		SVM 8290/ PCDD PCDF
K1308398-001	W11-S	Water	8/16/13	0935	III
K1308398-002	W-23	Water	8/16/13	1105	III
K1308398-003	W-25	Water	8/16/13	1235	III
K1308398-004	W-24	Water	8/16/13	1445	III
K1308398-005	W-26	Water	8/16/13	1605	III

Test Comments:

Group	Test/Method	Samples	Comments
Semivoa GCMS	PCDD PCDF/8290	1-5	full list (ak 8/21/13)

Preparation Information Benchsheet

Prep Run#: 190126 **Prep WorkFlow:** OrgExtDioxAq-30 **Status:** Prepped
Team: Semivoa GCMS/WMCDONOUGH **Prep Method:** Method Sep Funnel/Jar **Prep Date/Time:** 8/23/13 01:15 PM

#	Lab Code	Client ID	B#	Method /Test	pH	Matrix	Amt. Ext.	Sample Description
1	EQ1300515-01	MB		8290/PCDD PCDF	5	Liquid	1000mL	
2	EQ1300515-02	LCS		8290/PCDD PCDF	5	Liquid	1000mL	
3	EQ1300515-03	DLCS		8290/PCDD PCDF	5	Liquid	1000mL	
4	J1304753-001	BRW-2	.07	8290/PCDD PCDF	7	Water	976mL	Clear Liquid
5	K1308398-001	W11-S	.01	8290/PCDD PCDF	7	Water	1045mL	Clear Liquid
6	K1308398-002	W-23	.01	8290/PCDD PCDF	7	Water	1050mL	Clear Liquid
7	K1308398-003	W-25	.01	8290/PCDD PCDF	7	Water	1050mL	Clear Liquid
8	K1308398-004	W-24	.01	8290/PCDD PCDF	7	Water	1050mL	Clear Liquid
9	K1308398-005	W-26	.01	8290/PCDD PCDF	7	Water	1050mL	Clear Liquid

Spiking Solutions

Name: 1613B Matrix Working Standard Inventory ID 60793 Logbook Ref: 60793 HLEUNG 8/7/13 WT WM Expires On: 08/07/2014

EQ1300515-02	100.00µL	EQ1300515-03	100.00µL

Name: 8290/1613B Cleanup Working Standard Inventory ID 61212 Logbook Ref: 61212 HLEUNG 8/20/13 WT WM Expires On: 08/20/2014

EQ1300515-01	100.00µL	EQ1300515-02	100.00µL	EQ1300515-03	100.00µL	J1304753-001	100.00µL	K1308398-001	100.00µL	K1308398-002	100.00µL
K1308398-003	100.00µL	K1308398-004	100.00µL	K1308398-005	100.00µL						

Name: 1613B Labeled Working Standard Inventory ID 61311 Logbook Ref: 61311 WM 8/22/13 WT TL Expires On: 08/05/2014

EQ1300515-01	1,000.00µL	EQ1300515-02	1,000.00µL	EQ1300515-03	1,000.00µL	J1304753-001	1,000.00µL	K1308398-001	1,000.00µL	K1308398-002	1,000.00µL
K1308398-003	1,000.00µL	K1308398-004	1,000.00µL	K1308398-005	1,000.00µL						

Preparation Materials

Sensafe Free Chlorine WTR CHK	MR 8/12/13 (60902)	Carbon, High Purity	MR 7/8/13 (59697)	Ethyl Acetate 99.9% Minimum EtOAc	MR8/8/13 (60866)
Glass Wool	MR 6/7/13 (58778)	Sulfuric Acid Reagent Grade H2SO4	AL 07/18/13 (60058)	Hexanes 95%	AL 08/01/13 (60642)
Dichloromethane (Methylene Chloride) 99.9% MeCl2	AL 07/11/13 (59844)	Sodium Hydroxide Reagent Grade NaOH	C2-73-7 (53023)	Sodium Sulfate Anhydrous Reagent Grade Na2SO4	AL 08/13/13 (60956)
Tridecane (n-Tridecane)	MR7/31/13 (60562)	ColorpHast pH-Indicator Strips	6/14/13 MR (58995)	Silica Gel Reagent Grade	MR 7/8/13 (59698)
Toluene 99.9% Minimum	AL 08/15/13 (61035)				

Preparation Information Benchsheet

Prep Run#: 190126 **Prep WorkFlow:** OrgExtDioxAq-30 **Status:** Prepped
Team: Semivoa GCMS/WMCDONOUGH **Prep Method:** Method Sep Funnel/Jar **Prep Date/Time:** 8/23/13 01:15 PM

Preparation Steps

Step:	Extraction	Step:	Acid Clean	Step:	Silica Gel Clean	Step:	Final Volume
Started:	8/23/13 13:15	Started:	8/28/13 10:43	Started:	8/28/13 06:00	Started:	8/28/13 12:00
Finished:	8/23/13 14:30	Finished:	8/28/13 10:43	Finished:	8/28/13 08:10	Finished:	8/28/13 12:25
By:	WMCDONOUGH	By:	CDIAZ	By:	CDIAZ	By:	CDIAZ
Comments		Comments		Comments		Comments	

Comments: _____

Reviewed By: JWP 083013 Date: _____

Chain of Custody

Relinquished By: _____ Date: _____ Extracts Examined

Received By: _____ Date: _____ Yes No