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SHANNON & WILSON, INC.

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

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**HILTON SEATTLE HOTEL
FOURTH QUARTER GROUNDWATER MONITORING REPORT
SEATTLE, WASHINGTON**

1.0 INTRODUCTION

This report summarizes the status of groundwater-monitoring activities at the Hilton Seattle Hotel in Seattle, Washington (the Site), facility number 56642815. Cleanup of gasoline-contaminated groundwater is being conducted in response to the rescission of No Further Action (NFA) determination by the Washington State Department of Ecology (Ecology). The cleanup action is being conducted on behalf of the former property owner, R.C. Hedreen Company of Seattle, Washington, as part of a real estate transaction agreement with the purchaser, Stonebridge Companies of Englewood, Colorado. Cleanup activities have been performed in general accordance with our Cleanup Action Plan (CAP), dated July 18, 2012. Cleanup activities have included the installation of a single-phase skimmer pump to recover free-floating petroleum product to the extent practicable from one monitoring well located in the sidewalk right-of-way (ROW) adjacent east of the Site and in situ groundwater treatment using oxygen release compounds. This report summarizes monitoring activities performed for the period February 2014 to May 2014, considered to be the fourth quarter of monitoring.

2.0 BACKGROUND

The Site is located at 1301 Sixth Avenue in downtown Seattle, Washington (Figure 1). The hotel was built over a parking structure in approximately 1970. Two 2,000-gallon gasoline underground storage tanks (USTs) were installed along the eastern property line during construction of the hotel (Figure 2). Approximately two years after installation, it was reported that one of the two USTs developed a leak and was replaced. The two tanks were abandoned in place in 1985 by filling with cement slurry. Although a service station occupied the main level of the parking structure that occupied the site prior to the hotel's construction, no other fuel tanks are known to be present beneath the property.

In the early 1990s, gasoline vapors were encountered in an excavation to extend the hotel's elevator shaft down to the depth of the pedestrian concourse leading toward Rainier Tower (refer, Figure 2). In 1994, Environmental Associates, Inc., drilled a boring adjacent to the abandoned USTs and confirmed the presence of gasoline-related contamination in soil samples from the boring. In 1997 and 1998, Shannon & Wilson conducted site investigations and data evaluations related to closure of the two former USTs beneath the hotel. At the time, no soil contamination was detected in borings advanced at the hotel, but more than a foot of gasoline-

range petroleum product was observed floating in the upgradient monitoring well MW-5. Gasoline-range hydrocarbons; benzene, toluene, ethylbenzene, and xylenes (BTEX); and lead were detected in groundwater at down-gradient monitoring wells MW-2, MW-3, and MW-4 above the Washington Model Toxics Cleanup Act (MTCA) Method A cleanup levels established at the time.

Because groundwater flow was interpreted to be to the west-northwest at a relatively steep gradient, and a relatively impermeable layer of clay and silt was observed in borings advanced at the Site, the floating product encountered up-gradient of the abandoned USTs was attributed to an offsite source. In 1998, Shannon & Wilson also assessed risks and found no complete exposure pathways exist at the Site. Based on the available site information, Ecology issued an NFA letter in October 1998.

In a periodic review conducted in February 2010, Ecology rescinded the NFA, citing the presence of floating petroleum product at monitoring well MW-5 as a risk to environmental health. In response to Ecology's concern, an investigation was conducted by Shannon & Wilson in August 2011 to assess current groundwater conditions at the Site. The investigation confirmed the presence of approximately 2.3 feet of relatively unweathered floating petroleum product at monitoring well MW-5 and gasoline-range hydrocarbons, BTEX, and lead in groundwater at down-gradient monitoring wells MW-2, MW-3, and MW-4. Vacuum extraction using an eductor truck was attempted as an interim cleanup action on January 24 and February 21, 2012; however, the effort had limited success and resulted in the removal of approximately 3 gallons of free product.

In June 2012, the hotel re-entered Ecology's Voluntary Cleanup Program (VCP), and Shannon & Wilson was retained to implement groundwater cleanup action with the goal of re-obtaining NFA determination from Ecology. The preferred cleanup action included the installation of a single-phase product recovery system at monitoring well MW-5 to remove source product and in situ groundwater treatment at monitoring wells MW-2, MW-3, MW-4, and MW-5 using oxygen release compounds to facilitate the degradation of residual contamination in groundwater under the Site. The overall objective is to remove source contamination and achieve cleanup levels through monitored natural attenuation.

3.0 GEOLOGIC AND HYDROGEOLOGIC SETTING

3.1 Regional and Site Geologic Conditions

The Site is situated on the Seattle Drift Plain, a gently rolling, elevated plain that formed approximately 13,500 years ago during the last period of continental glaciations. Geologic maps

for the site vicinity suggest that much of the material underlying the subject site has been modified extensively by excavation, filling, and/or construction. The Site is situated on a west-facing slope at approximately 175 above mean sea level. An arbitrary site datum was established with the sidewalk elevation at monitoring well MW-5 at 175.6 feet in elevation. This elevation was estimated using King County iMap.

Based on borings advanced by Shannon & Wilson in 1997, the Site is underlain by fill and then layers of silty sand, clayey silt, and silty fine sand. Below the fill, the soil is generally dense and hard, having been glacially overridden. The fill thickness ranges from approximately 3 to 12 feet beneath the basement and sidewalk at the Site. The fill layer is underlain by a silty sand/sandy silt layer that ranges from 1 to 12 feet thick. A hard, silty clay/clayey silt underlies the silty sand layer, ranging from 3 to 15 feet thick. The clayey silt layer was absent in the boring at monitoring well MW-5 but appears to be continuous beneath the basement and UST area. The clayey silt layer is underlain by a medium- to very dense, silty, fine sand layer.

3.2 Groundwater Conditions

Groundwater is present beneath the Site in the lower silty sand layer, below the clayey silt layer. Water level measurements collected at the four monitoring wells indicate that groundwater is at an elevation of approximately 140 feet and flows to the west-northwest. The groundwater level at monitoring well MW-5 was adjusted to account for the floating product layer, when necessary. Groundwater is approximately 34 feet below ground surface (bgs) at the sidewalk along Sixth Avenue and ranges from approximately 15 to 22 feet bgs in the basement garage levels. Estimated flow gradients from previous groundwater monitoring events are presented below:

- 0.017 foot/foot in February 2014,
- 0.017 foot/foot in November 2013,
- 0.015 foot/foot in August 2013,
- 0.018 foot/foot in August 2011,
- 0.026 foot/foot in January 1998.

4.0 GROUNDWATER REMEDIATION ACTIVITIES

4.1 Conceptual Site Model

Based on measured water levels, monitoring well MW-5 is up-gradient of the location of the closed USTs, monitoring well MW-2 is cross-gradient, and monitoring wells MW-3 and MW-4 are down-gradient. When present, floating petroleum product had been observed at monitoring well MW-5 but not at monitoring wells MW-2, MW-3, or MW-4. Because floating petroleum product was not observed in what are believed to be hydraulically connected wells, the product

observed at monitoring well MW-5 appears to be isolated. While the observed dense clayey silt layer is absent at monitoring well MW-5, an unknown boundary condition exists that prevents the floating product plume from migrating to down-gradient locations. The material underlying the subject site has been extensively modified by excavation, filling, and/or construction and has likely created a local subsurface depression that contains the product plume. This is further supported by the condition of the leaded gasoline petroleum product, which, based on a laboratory chromatogram of a collected sample, was relatively unweathered after being released into the environment more than 40 years ago.

Contaminants of concern (COCs) include gasoline-range hydrocarbons, BTEX, and lead. The contamination plume is approximately 34 feet bgs at monitoring well MW-5, and dissolved groundwater contamination is approximately 15 to 22 feet bgs in the basement garage levels. The depth of the contamination below the built environment prevents exposure to contaminated soil and groundwater by human and environmental receptors. Groundwater under downtown Seattle is not likely to be used for drinking water and is not considered a complete exposure pathway. A vapor survey was conducted during our 1998 site evaluation, and gasoline vapors were not measured in the hotel's parking garage, suggesting that this exposure pathway is also incomplete.

4.2 Status of Product Recovery System

A product recovery system was installed in general accordance with our CAP and features a pneumatic, single-phase skimmer pump installed in monitoring well MW-5, with air supply and product-extraction tubing routed under the sidewalk ROW to an equipment compound inside the hotel's parking garage. The system was started on November 6, 2012, and operated until August 14, 2013, when the results of a second rebound test showed petroleum product was no longer accumulating in monitoring well MW-5. Product was not observed through the third quarter monitoring event, but 0.36 feet was observed in monitoring well MW-5 during fourth quarter sampling. To date, approximately 125 total gallons of product have been removed by the system, and 128 total gallons have been removed when including interim cleanup actions. Additional system performance details can be found in our *First Quarter Groundwater Monitoring Report* (Shannon & Wilson, 2013).

4.3 Status of In Situ Groundwater Treatment

In situ groundwater treatment using oxygen release compounds (ORC) was initiated on May 28, 2013, at monitoring wells MW-2, MW-3, and MW-4 and on September 12, 2013, at monitoring well MW-5 to enhance biodegradation of contamination. RegenesiS ORC Advanced™ well

socks, containing a mixture of calcium oxyhydroxide and calcium hydroxide, were installed in the wells to deliver oxygen as electron acceptors for the biodegradation of the petroleum compounds. An oil-absorbent sock was also deployed at monitoring well MW-5 to remove any minor amounts of free product from the groundwater surface as treatment continued; however, the sock was removed at the time product was observed in the well.

5.0 GROUNDWATER MONITORING

5.1 Monitoring Program

Quarterly monitoring is being conducted to document groundwater conditions during cleanup actions at the Site. Monitoring events are generally scheduled for the months of February, May, August, and November. While up-gradient of the closed USTs, floating product had been confined to the vicinity of monitoring well MW-5, and the well is considered to be within the contamination source. Monitoring wells MW-2, MW-3, and MW-4 are considered to be down-gradient of the source, within the contaminated groundwater plume. Third quarter monitoring was performed at monitoring wells MW-2, MW-3, MW-4, and MW-5. Groundwater monitoring parameters include the following.

- COCs
 - Gasoline-Range Hydrocarbons
 - BTEX
 - Total Lead
- Primary Geochemical Indicators
 - Dissolved Oxygen (DO)
 - Oxidation-Reduction Potential (ORP)
 - pH
 - Specific Conductance
 - Temperature
- Secondary Geochemical Indicators
 - Ferrous Iron
 - Nitrate
 - Sulfate

5.2 Groundwater Sampling

On May 30, 2014, groundwater samples were collected from monitoring wells MW-2, MW-3, and MW-4 using a peristaltic pump and low-flow sampling techniques, and from monitoring well MW-5 using a high-density polyethylene bailer. The bailer was used at monitoring well MW-5 due to the limitations of the peristaltic pump as well as to better evaluate the presence of potential floating product or sheen. ORC socks in these wells were removed one

month prior to sampling, and the groundwater was allowed to equilibrate. The absorbent sock was also removed from monitoring well MW-5 prior to sampling.

Monitoring wells MW-2, MW-3, and MW-4 were purged at a low-flow (less than 500 milliliter per minute) pumping rate prior to sampling. The purge water was monitored using a YSI water quality meter until the measured groundwater quality parameters (pH, conductivity, temperature, etc.) stabilized to ± 5 percent for three consecutive readings taken at three- to five-minute intervals. Monitoring well MW-5 was purged by bailing three well volumes, and water quality parameters were not monitored. The purge water was collected in a bucket and transferred to the storage tank at the equipment compound for future disposal.

Following purging, groundwater samples were collected in clean, laboratory-supplied containers and placed in a cooler with ice for transport to the laboratory. Purging and sampling data are presented in Table 1.

5.3 Laboratory Analyses

Groundwater samples were submitted under chain-of-custody procedures to Fremont Analytical in Seattle, Washington. The collected samples were analyzed for COCs as well as geochemical indicators to evaluate the potential for natural attenuation. Analyses for COCs included gasoline-range hydrocarbons by the Northwest Total Petroleum Hydrocarbons-Gasoline Method (NWTPH-Gx), BTEX by Environmental Protection Agency (EPA) Method 8021B, and total lead by EPA Method 6020/200.8. Analyses for geochemical indicators included ferrous iron by Standard Method 3500B and nitrate and sulfate by EPA Method 300.0.

5.4 Monitoring Results

The fourth quarter groundwater monitoring results for COCs are shown in Table 2. The data are presented along with previous quarterly results and two historical datasets for comparison. One of the historical datasets is from our initial site assessment in 1997, and the other is from our evaluation of groundwater conditions prior to cleanup activities in 2011. Similarly, fourth quarter results for geochemical indicators are shown in Table 3, with available historical results shown for comparison. The analytical laboratory report for the fourth quarter results is provided in Appendix A.

5.4.1 Contaminants of Concern

In the fourth quarter, the samples collected from the monitoring wells had detectable concentrations of gasoline, BTEX, and/or lead. Source well MW-5 and down-gradient

monitoring well MW-2 had detections of all COCs. Except for toluene and lead, the detected concentrations at source well MW-5 were above their respective MTCA Method A groundwater cleanup criteria. Only the gasoline concentration at monitoring well MW-2 was above the MTCA Method A groundwater cleanup criterion of 800 micrograms per liter ($\mu\text{g/L}$) for gasoline. Gasoline, xylenes, and lead were detected at monitoring well MW-3 and lead at monitoring well MW-4, but the concentrations were below the MTCA cleanup criteria.

The concentrations of gasoline and BTEX in the groundwater at source well MW-5 increased from the third quarter to the fourth quarter. Lead concentration in source well MW-5 decreased over the third quarter result. In monitoring well MW-2, concentrations of gasoline, toluene, ethylbenzene, and xylenes increased over third quarter results, while benzene and lead decreased. Except for the increases in gasoline and ethylbenzene, detected concentrations stayed relatively stable at monitoring well MW-2. The gasoline detection at monitoring well MW-3 increased over the third quarter results but remain relatively stable. The xylenes and lead detections in monitoring well MW-3 and the lead detection in monitoring well MW-4 were the first since remediation began.

The estimated extents of gasoline and benzene in groundwater for the four quarters of site monitoring are shown in Figures 3 and 4, respectively. The leading edge of groundwater contaminated with gasoline extended past monitoring well MW-4 prior to cleanup; however, despite the slight expansion observed in the fourth quarter, the plume has receded in response to remediation (Figure 3). The estimated extent of gasoline at concentrations above its MTCA cleanup criterion (i.e., 800 micrograms per liter [$\mu\text{g/L}$]) is relatively stable in the central portion of the Site. The leading edge of groundwater contaminated with benzene at concentrations above its MTCA cleanup criterion (i.e., 5 $\mu\text{g/L}$) has receded significantly from levels observed historically and remains stable with the fourth quarter result (Figure 4).

5.4.2 Geochemical Indicators

Geochemical indicators are categorized as primary or secondary. Primary indicators were measured in the field during purging using a YSI water quality meter (except at monitoring well MW-5), and the secondary indicators were analyzed by the laboratory. Low DO concentrations (e.g., 0 to 1.0 milligrams per liter [mg/L]), measurable ferrous iron, and depleted nitrate and sulfate concentrations generally suggest that active biodegradation of hydrocarbons is occurring. ORP values are a measure of the reducing conditions present and can be correlated to the presence or absence of secondary geochemical indicators to support the identification of biodegradation processes.

In the third quarter, DO ranged from 0.14 to 0.41 mg/L in the sampled wells. Measurable ferrous iron was observed in all wells, with the highest concentration (3,180 µg/L) at monitoring well MW-3 and the lowest concentration (600 µg/L) at monitoring well MW-4. Nitrate concentrations were non-detect at all locations. Sulfate was detected in all wells except at monitoring well MW-3. Sulfate was detected at a concentration of 304 mg/L at monitoring well MW-2, 31,800 mg/L at monitoring well MW-4, and 2,360 mg/L at monitoring well MW-5. The negative ORP values measured correlate well with the observed detections. Additionally, elevated groundwater temperatures were observed in all wells (Table 1). The elevated temperatures, ranging from 17.9 to 19.3 degrees Celsius, are likely attributable to the hotel's underground electrical vault in the immediate vicinity of the monitoring wells and may be beneficial to microbial growth.

5.5 Water Level Monitoring

Table 4 presents water level data for the fourth quarter monitoring event and historical sampling events. Figure 5 shows approximate groundwater elevation contours for the fourth quarter data. The measurements show the groundwater flow direction to the west-northwest, with a calculated groundwater flow gradient of approximately 0.023 foot/foot. The calculated flow gradient has historically ranged from approximately 0.015 foot/foot to 0.026 foot/foot.

5.6 Investigation-Derived Waste

Investigation-derived waste during the fourth quarter monitoring event included purge water from groundwater monitoring and disposable sampling equipment (nitrile gloves, bailers, etc.). Approximately 5.8 gallons of purge water was added to the system storage tank. There is approximately 250 gallons of mixed waste (recovered petroleum and purged groundwater) in the storage tank pending disposal. Shannon & Wilson will coordinate disposal during the fifth quarter to accommodate additional waste. Disposable sampling equipment was placed in a plastic bag and disposed as solid waste.

6.0 DATA ANALYSIS

Groundwater monitoring data was analyzed using Ecology's natural attenuation guidance for petroleum-contaminated groundwater (Ecology, 2005a,b). The technical guidance package provides six computational tools, or modules, for evaluating the feasibility and performance of natural attenuation as a cleanup action for groundwater. Available data were analyzed using modules that do not incorporate groundwater flow models, including *Module 1: Non-Parametric Analysis for Plume Stability Test*, *Module 2: Graphical and Regression Analysis for Plume*

Stability & Restoration Time Calculation, and Module 3: Evaluation of Geochemical Indicators. The computational module output is provided in Appendix B.

The data analysis results for Modules 1 and 2 are summarized in Table 5. Module 1 evaluates plume stability using the Mann-Kendall non-parametric statistical method, while Module 2 evaluates plume stability using linear regression. Both evaluations provide evidence that gasoline and BTEX concentrations at monitoring well MW-2 are stable and/or shrinking at relatively high levels of confidence. The linear regression result for ethylbenzene at monitoring well MW-2 changed from stable to underdetermined due to the compound's fourth quarter increase in concentration at this location. The Mann-Kendall method shows gasoline concentrations as stable at monitoring well MW-3 and undetermined for BTEX. Xylenes had been considered shrinking at this location in previous quarters, but the fourth quarter detection reduced the certainty of the model result. Concentrations of benzene, toluene, and ethylbenzene at monitoring well MW-3 are undetermined by the Mann-Kendall method, but the parameters have been non-detect for the past four sampling events and therefore do not show a strong decreasing trend. However, linear regression for the data at monitoring well MW-3 indicates that gasoline and BTEX concentrations are shrinking at high levels of confidence. Trend analyses are again limited in their application at monitoring well MW-4 because parameter concentrations are predominantly non-detect. At monitoring well MW-4, the Mann-Kendall method shows gasoline as undetermined and BTEX as stable, while linear regression shows gasoline as undetermined and BTEX as not applicable.

Point decay rates and half-life results at 50- and 85-percent confidence levels were determined using linear regression (Table 5). While the module calculates values for both stable and shrinking plumes as shown, the regression analysis is only appropriate for shrinking plumes. Because of this, the estimated time to meet cleanup criterion for gasoline at monitoring well MW-2 (the only down-gradient location with a concentration in exceedance of cleanup criteria in the third quarter) cannot be determined.

Module 3 calculates assimilative capacity and plots geochemical indicators. Assimilative capacity is the potential capacity of groundwater to biodegrade contaminants, and the calculation is based on background concentrations of electron acceptors (i.e., DO, nitrate, sulfate, etc.). Background geochemical values for downtown Seattle groundwater have not been established for this project; therefore, the assimilative capacities calculated by the module are not usable. However, the plots of geochemical indicators provide evidence that biodegradation is occurring. Biodegradation proceeds according to reactions that are energetically preferred by microbes. Electron acceptors evaluated for this project, from most preferred to least preferred, are oxygen, nitrate, ferric iron, and sulfate. DO and nitrate were depleted at all locations measured. Ferrous

iron, a metabolic by-product of reactions involving ferric iron, was detected at relatively elevated levels in source monitoring well MW-5 and in down-gradient monitoring wells MW-2 and MW-3. Monitoring well MW-4, the furthest down-gradient well, typically has minor detections of ferrous iron, but the fourth quarter detection was relatively elevated. Overall, though, concentrations of ferrous iron generally decreased with distance from the source well. Sulfate was depleted in the source well MW-5 and monitoring wells MW-2 and MW-3, but was elevated in monitoring wells MW-4. Additionally, ORP and pH field measurements correlate well with the observed detections.

7.0 CONCLUSIONS

Based on our review and analysis of the fourth quarter monitoring results, we offer the following conclusions regarding remediation at the Site.

- Floating product was observed in source well MW-5 at a thickness of 0.36 feet. The source of the additional product is not known and is considered an anomalous event. The extraction pump should be reinstalled to remove the additional product.
- Source monitoring well MW-5 had detected concentrations of all COCs and, except for toluene and lead, the concentrations exceeded their respective MTCA Method A cleanup criterion. Concentrations of COCs, except for lead, increased over third quarter results. The increasing trend is likely due to the floating product observed and is considered to be a short term condition. Concentrations at this location are expected to return to a decreasing trend once the floating product is removed and treatment of the groundwater continues.
- Down-gradient monitoring well MW-2 had detected concentrations of gasoline, BTEX, and lead, with the gasoline concentration exceeding its MTCA Method A cleanup criterion. The concentrations of gasoline and ethylbenzene increased, but the concentrations of benzene, toluene, and xylenes remained stable. The increases are again likely associated with impacts caused by the floating product observed in the source well MW-5. Lead concentrations at this location have fluctuated between minor detections and non-detects.
- Gasoline, xylenes, and lead were detected below their respective cleanup criterion in down-gradient monitoring well MW-3. The gasoline detection represented a slight increase over the third quarter result, and xylenes and lead had been non-detect in previous quarters. The increases are again likely associated with impacts caused by the floating product observed in the source well MW-5.
- Only lead was detected at down-gradient monitoring well MW-4. The lead concentration was below its MTCA Method A cleanup criterion but represents an increase over non-

detect results in previous quarters. This minor increase may also be attributable to the influx of floating product in source well MW-5.

- Contamination is not migrating off-site, and an analysis of the data indicates that the contamination plume is stable and/or shrinking in response to remedial efforts.
- Geochemical indicators continue to suggest that biodegradation is occurring at the Site and monitored natural attenuation appears to be a viable long-term remediation alternative.

The fifth quarter groundwater monitoring event is scheduled to be conducted August 2014. These activities will be the subject of the next quarterly groundwater monitoring report.

8.0 LIMITATIONS

The findings and conclusions documented in this report have been prepared for specific application to this project and have been developed in a manner consistent with the level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area, and in accordance with the terms and conditions set forth in our agreement. The conclusions presented in this report are professional opinions based on interpretation of information currently available to us and are made within the operational scope, budget, and schedule constraints of this project. No warranty, express or implied, is made.

Shannon & Wilson, Inc., has prepared Appendix C, "Important Information About Your Geotechnical/Environmental Report." While not written specifically for this project, this enclosure should assist you and other in understanding the use and limitations of our reports.

We appreciate the opportunity to be of continued service on this project. If you have any questions, please contact the undersigned at (206) 632-8020.

SHANNON & WILSON, INC.

Sincerely,

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9.0 REFERENCES

- Environmental Associates, Inc., 1994, Soil and groundwater sampling and testing, Hilton Hotel – underground storage tanks, Sixth Avenue and University Street, Seattle, Washington, December 1.
- King County, 2011, King County iMap – Property Information, <http://www.metrokc.gov/GIS/iMap>, August 10.
- Shannon & Wilson, Inc., 1998a, Site assessment report, Seattle Hilton Hotel, Seattle, Washington, February.
- Shannon & Wilson, Inc., 1998b, Closure services related to Hilton USTs, Seattle Hilton Hotel, Seattle, Washington, July.
- Shannon & Wilson, Inc., 2011, Seattle Hilton Hotel groundwater current conditions sampling and analysis plan, Seattle, Washington, August 4.
- Shannon & Wilson, Inc., 2012, Cleanup action plan, Hilton Seattle Hotel, Seattle, Washington, July 18.
- Shannon & Wilson, Inc., 2013, First quarter groundwater monitoring report, Hilton Seattle Hotel, Seattle, Washington, September 30.
- Washington State Department of Ecology (Ecology), 1998, Seattle Hilton Hotel parking garage voluntary cleanup program no further action letter, October.
- Washington State Department of Ecology (Ecology), 2005a, Guidance on remediation of petroleum-contaminated ground water by natural attenuation: Olympia, Washington, Washington State Department of Ecology, Toxics Cleanup Program, Publication No. 05-09-091 (Version 1.0), July.
- Washington State Department of Ecology (Ecology), 2005b, User's manual: Natural attenuation analysis tool package for petroleum-contaminated ground water: Olympia, Washington, Washington State Department of Ecology, Toxics Cleanup Program, Publication No. 05-09-091A (Version 1.0), July.
- Washington State Department of Ecology (Ecology), 2007, The Model Toxics Control Act cleanup regulation, chapter 173-340 WAC: Olympia, Washington, Washington State Department of Ecology, October 12.
- Washington State Department of Ecology (Ecology), 2010, Periodic review, Hilton Hotel Parking Garage, Facility Site ID#: 56642815, February.

TABLE 1
GROUNDWATER SAMPLING LOG

	Monitoring Well			
	MW-2	MW-3	MW-4	MW-5
Water Level Measurement Data				
Date Water Level Measured	5/30/2014	5/30/2014	5/30/2014	5/30/2014
Time Water Level Measured	11:50	11:15	10:25	13:00
Measuring Point (MP) Elevation, Feet	162.55	161.24	154.30	175.63
Depth to Water Below MP, Feet	21.90	20.92	14.98	33.40 ^A
Water Level Elevation, Feet	140.65	140.32	139.32	142.23
Purging/Sampling Data				
Date Sampled	5/30/2014	5/30/2014	5/30/2014	5/30/2014
Time Sampled	12:20	11:45	11:10	13:30
Depth to Water Below MP, Feet	21.90	20.92	14.98	33.40
Total Depth of Well Below MP, Feet	35.00	30.00	20.50	39.50
Water Column in Well, Feet	13.10	9.08	5.52	6.10
Gallons per Foot	0.16	0.16	0.16	0.16
Gallons in Well	2.10	1.45	0.88	0.98
Total Gallons Pumped/Bailed	1.3	1.0	1.0	2.5
Purging Method	Peristaltic	Peristaltic	Peristaltic	Bailer
Sampling Method	Peristaltic	Peristaltic	Peristaltic	Bailer
Diameter of Well Casing	2-inch	2-inch	2-inch	2-inch
Water Quality Data^B				
Temperature, °C	17.9	18.4	19.3	--
Dissolved Oxygen, mg/L	0.19	0.14	0.41	--
Specific Conductance, µS/cm	0.840	0.728	0.675	--
pH, standard units	6.89	7.15	7.77	--
Oxidation-Reduction Potential, mV	-153.9	-149.2	-81.4	--
Remarks	No free product observed. Hydrocarbon odor.	No free product observed. Hydrocarbon odor.	No free product observed.	0.36 feet of free product observed. Water quality data not collected.

Notes:

^A water level was adjusted to account for free product observed.^B Water quality parameters were measured with YSI instruments.

-- = not applicable or not measured

°C = degrees Celsius

mg/L = milligram per liter

µS/cm = microsiemens per centimeter

mV = millivolt

TABLE 2
GROUNDWATER MONITORING RESULTS

Monitoring Well	Sample Date	Product Thickness (feet)	Sampling Results (µg/L)					
			Gasoline	Benzene	Toluene	Ethylbenzene	Xylenes	Lead
MW-2	9/25/1997	--	4,700	6,700	210	670	590	8.00
	8/25/2011	--	2,950	76.1	2.19	863	22.0	< 1.0
	8/22/2013	--	5,000	3.07	2.01	408	10.8	8.14
	11/21/2013	--	1,760	1.40	1.57	83.3	6.89	< 1.0
	2/21/2014	--	1,360	2.90	1.62	20.8	7.44	8.10
	5/30/2014	--	2,070	1.82	2.00	36.5	8.47	2.71
MW-3	9/25/1997	--	700	7,200	10.0	74.0	97.0	9.00
	8/25/2011	--	153	< 1.0	< 1.0	< 1.0	1.35	< 1.0
	8/22/2013	--	209	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0
	11/21/2013	--	235	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0
	2/21/2014	--	114	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0
	5/30/2014	--	187	< 1.0	< 1.0	< 1.0	3.59	3.42
MW-4	11/14/1997	--	< 50	< 1.0	< 1.0	< 1.0	< 3.0	< 4.0
	8/26/2011	--	135	< 1.0	< 1.0	< 1.0	< 2.0	5.57
	8/22/2013	--	< 50	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0
	11/21/2013	--	< 50	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0
	2/21/2014	--	< 50	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0
	5/30/2014	--	< 50	< 1.0	< 1.0	< 1.0	< 2.0	11.1
MW-5	12/22/1997	1.69	NS	NS	NS	NS	NS	NS
	8/11/2011	2.33	NS	NS	NS	NS	NS	NS
	8/22/2013	--	NS	NS	NS	NS	NS	NS
	11/21/2013	--	98,100	230	179	1,070	6,100	26.1
	2/21/2014	--	30,300	193	122	796	3,670	47.2
	5/30/2014	0.36	51,400	927	552	1,820	7,610	9.97
MTCA Method A Groundwater Cleanup Levels:			800	5	1,000	700	1,000	15

Notes:

Bold indicates analyte detected above method reporting limit.

Shaded cell indicates detection is above the groundwater cleanup criterion.

-- = no product observed

< = detection below reporting limit shown

µg/L = micrograms per liter

MTCA = Washington State Model Toxics Control Act

NS = not sampled

TABLE 3
GEOCHEMICAL INDICATORS

Monitoring Well	Sample Date	Primary Indicators					Secondary Indicators		
		Dissolved Oxygen (mg/L)	Oxidation- Reduction Potential (mV)	pH	Specific Conductance (μ S/cm)	Temperature (°C)	Nitrate (μ g/L)	Ferrous Iron (μ g/L)	Sulfate (μ g/L)
MW-2	9/25/1997	--	--	--	--	--	--	--	--
	8/25/2011	0.25	-86.0	6.94	0.701	20.5	--	--	--
	8/22/2013	0.10	40.8	8.33	0.833	22.4	< 100	980	970
	11/21/2013	0.29	-136.2	6.88	0.759	19.0	< 100	3,150	< 300
	2/21/2014	0.21	-154.1	6.95	0.845	17.8	< 100	5,100	< 300
	5/30/2014	0.19	-153.9	6.89	0.840	17.9	< 100	1,150	304
MW-3	9/25/1997	--	--	--	--	--	--	--	--
	8/25/2011	1.87	-92.8	6.95	0.718	20.5	--	--	--
	8/22/2013	0.27	-99.8	6.37	0.739	21.5	< 100	2,430	< 300
	11/21/2013	0.31	-152.1	6.91	0.717	20.0	< 100	4,900	< 300
	2/21/2014	0.23	-142.1	7.07	0.791	18.4	< 100	3,270	< 300
	5/30/2014	0.14	-149.2	7.15	0.728	18.4	< 100	600	< 300
MW-4	11/14/1997	--	--	--	--	--	--	--	--
	8/26/2011	1.26	-85.1	7.56	0.447	21.2	--	--	--
	8/22/2013	0.10	51.3	9.22	0.599	21.5	< 100	80	39,100
	11/21/2013	0.51	-150.2	7.69	0.602	20.8	< 100	80	30,900
	2/21/2014	0.39	-105.6	7.80	0.680	19.3	< 100	100	18,300
	5/30/2014	0.41	-81.4	7.77	0.675	19.3	< 100	2,380	31,500
MW-5	11/21/2013	--	--	--	--	--	< 100	5,300	3,860
	2/21/2014	--	--	--	--	--	< 100	7,100	16,300
	5/30/2014	--	--	--	--	--	< 100	3,180	2,360

Notes:

°C = degrees Celsius

mg/L = milligrams per liter

mV = millivolt

 μ g/L = micrograms per liter μ S/cm = microsiemens per centimeter

< = analyte not detected below reporting limit shown

-- = not tested

TABLE 4
WATER LEVEL DATA

Monitoring Well	Date	Top of Casing Elevation (feet)	Depth to Groundwater (feet)	Groundwater Elevation (feet)
MW-2	9/25/1997	162.55	21.36	141.19
	8/25/2011	162.55	22.09	140.46
	8/22/2013	162.55	22.20	140.35
	11/21/2013	162.55	22.85	139.70
	2/21/2014	162.55	22.67	139.88
	5/30/2014	162.55	21.90	140.65
MW-3	9/25/1997	161.24	20.49	140.75
	8/25/2011	161.24	21.08	140.16
	8/22/2013	161.24	21.10	140.14
	11/21/2013	161.24	21.72	139.52
	2/21/2014	161.24	21.60	139.64
	5/30/2014	161.24	20.92	140.32
MW-4	11/14/1997	154.30	15.31	138.99
	8/26/2011	154.30	15.43	138.87
	8/22/2013	154.30	15.26	139.04
	11/21/2013	154.30	16.25	138.05
	2/21/2014	154.30	16.20	138.10
	5/30/2014	154.30	14.98	139.32
MW-5	11/14/1997	175.38	32.79	142.59
	8/26/2011	175.38	34.21	141.17
	8/14/2013	174.35	33.51	140.84
	11/21/2013	174.35	34.17	140.18
	2/21/2014	174.35	34.10	140.25
	5/30/2014	174.35	33.40	140.95

Notes:

Elevations were estimated from King County iMap (Aug 2011).

Depth to groundwater in 1997, 2011, and May 2014 for MW-5 were adjusted to account for floating product.

Top of casing elevation for MW-5 modified during system installation in 2012.

TABLE 5
DATA ANALYSIS SUMMARY

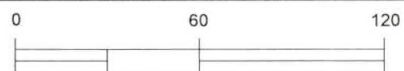
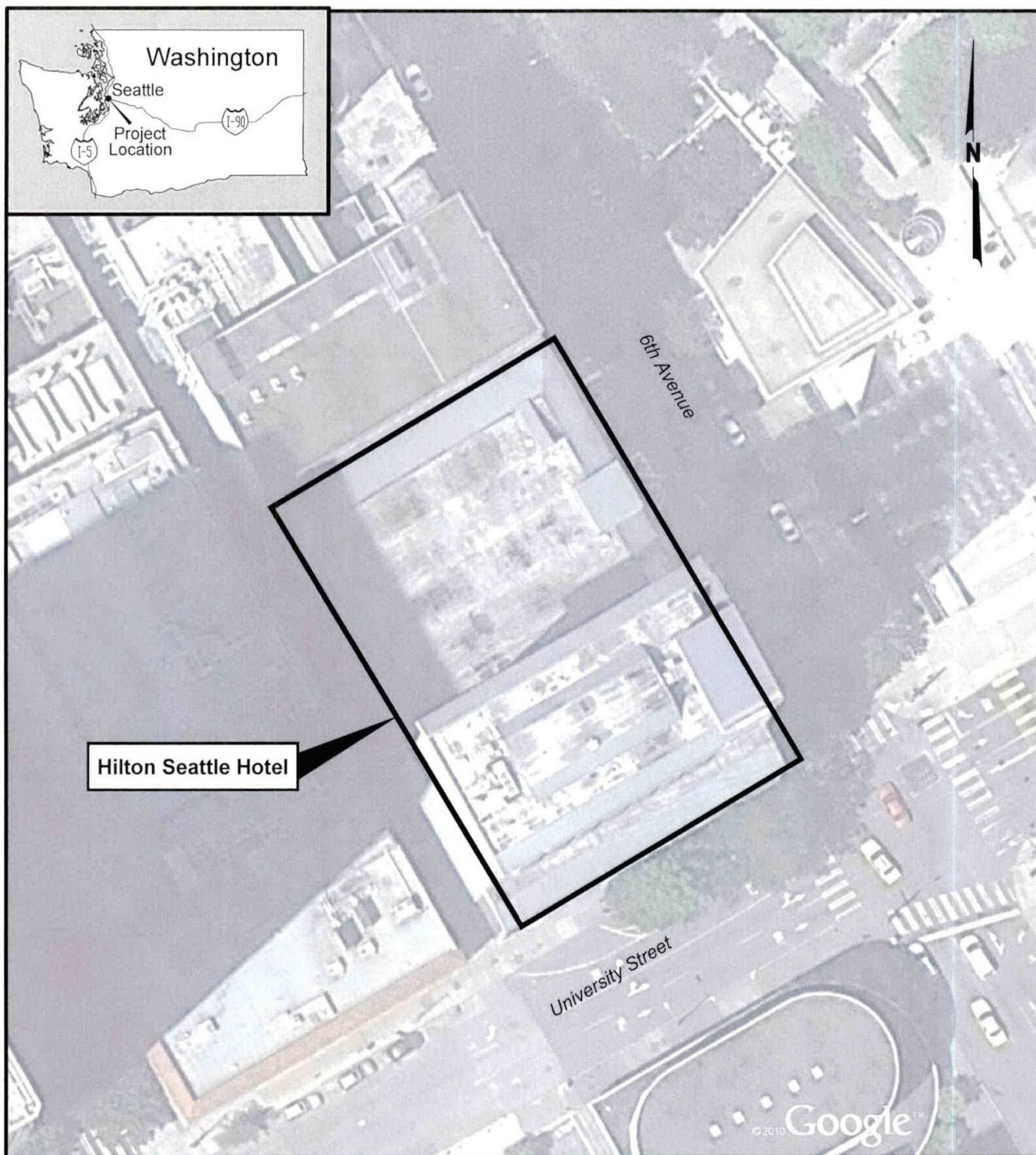
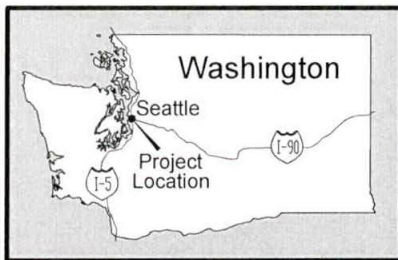
Monitoring Well	Analysis		Parameter				
			Gasoline	Benzene	Toluene	Ethylbenzene	Xylenes
MW-2	Mann-Kendall	Plume Stability	Shrinking	Shrinking	Shrinking	Shrinking	Shrinking
		CL	86.4%	97.2%	93.2%	97.2%	93.2%
	Linear Regression	Plume Stability	Stable	Shrinking	Shrinking	Undetermined	Shrinking
		CL	76.7%	99.7%	99.9%	74.9%	99.9%
		Point Decay Rate at 50% CL, yr ⁻¹	0.047	0.484	0.294	NA	0.261
		Point Decay Rate at 85% CL, yr ⁻¹	0.008	0.395	0.273	NA	0.243
		Half Life at 50% CL, yr	14.821	1.432	2.360	NA	2.660
		Half Life at 85% CL, yr	84.235	1.756	2.543	NA	2.855
MW-3	Mann-Kendall	Plume Stability	Stable	Undetermined	Undetermined	Undetermined	Undetermined
		CL	76.5%	76.5%	76.5%	76.5%	64.0%
	Linear Regression	Plume Stability	Shrinking	Shrinking	Shrinking	Shrinking	Shrinking
		CL	98.4%	99.9%	99.9%	99.9%	99.5%
		Point Decay Rate at 50% CL, yr ⁻¹	0.085	0.591	0.185	0.309	0.261
		Point Decay Rate at 85% CL, yr ⁻¹	0.060	0.539	0.169	0.281	0.207
		Half Life at 50% CL, yr	8.145	1.172	3.746	2.246	2.660
		Half Life at 85% CL, yr	11.481	1.285	4.108	2.462	3.352
MW-4	Mann-Kendall	Plume Stability	Undetermined	Stable	Stable	Stable	Stable
		CL	64.0%	-500.0%	-500.0%	-500.0%	-500.0%
	Linear Regression	Plume Stability	Undetermined	NA	NA	NA	NA
		CL	8.3%	NA	NA	NA	NA
		Point Decay Rate at 50% CL, yr ⁻¹	NA	NA	NA	NA	NA
		Point Decay Rate at 85% CL, yr ⁻¹	NA	NA	NA	NA	NA
		Half Life at 50% CL, yr	NA	NA	NA	NA	NA
		Half Life at 85% CL, yr	NA	NA	NA	NA	NA

Notes:

CL = confidence level

NA = not applicable

yr = year



Approximate Scale in Feet

LEGEND

— Approximate Parcel Boundary

NOTE

Aerial imagery provided by Google Earth Pro, reproduced by permission granted by Google Earth™ Mapping Service.

Hilton Seattle Hotel
Seattle, Washington

VICINITY MAP

August 2014

21-1-12341-004

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 1

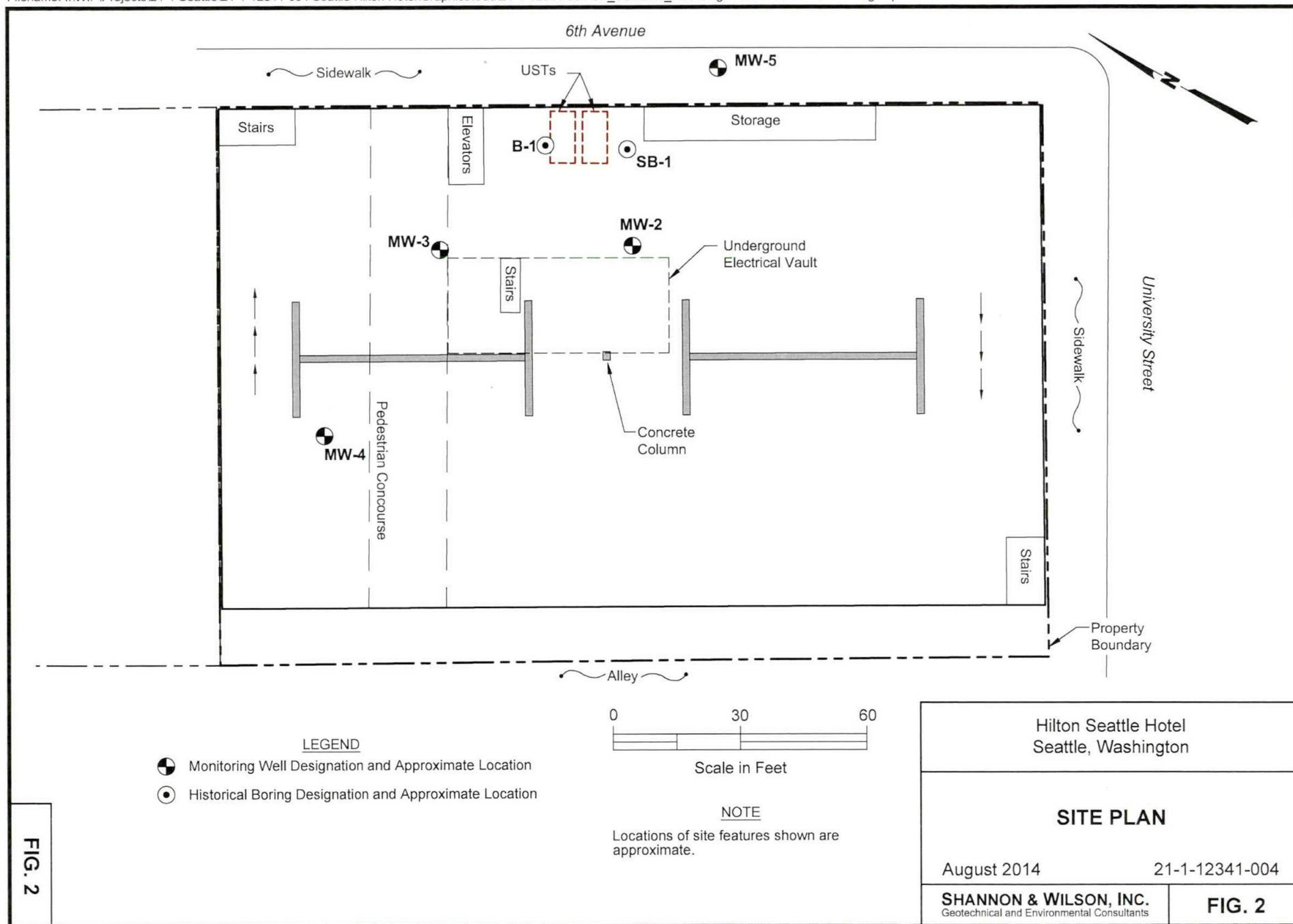
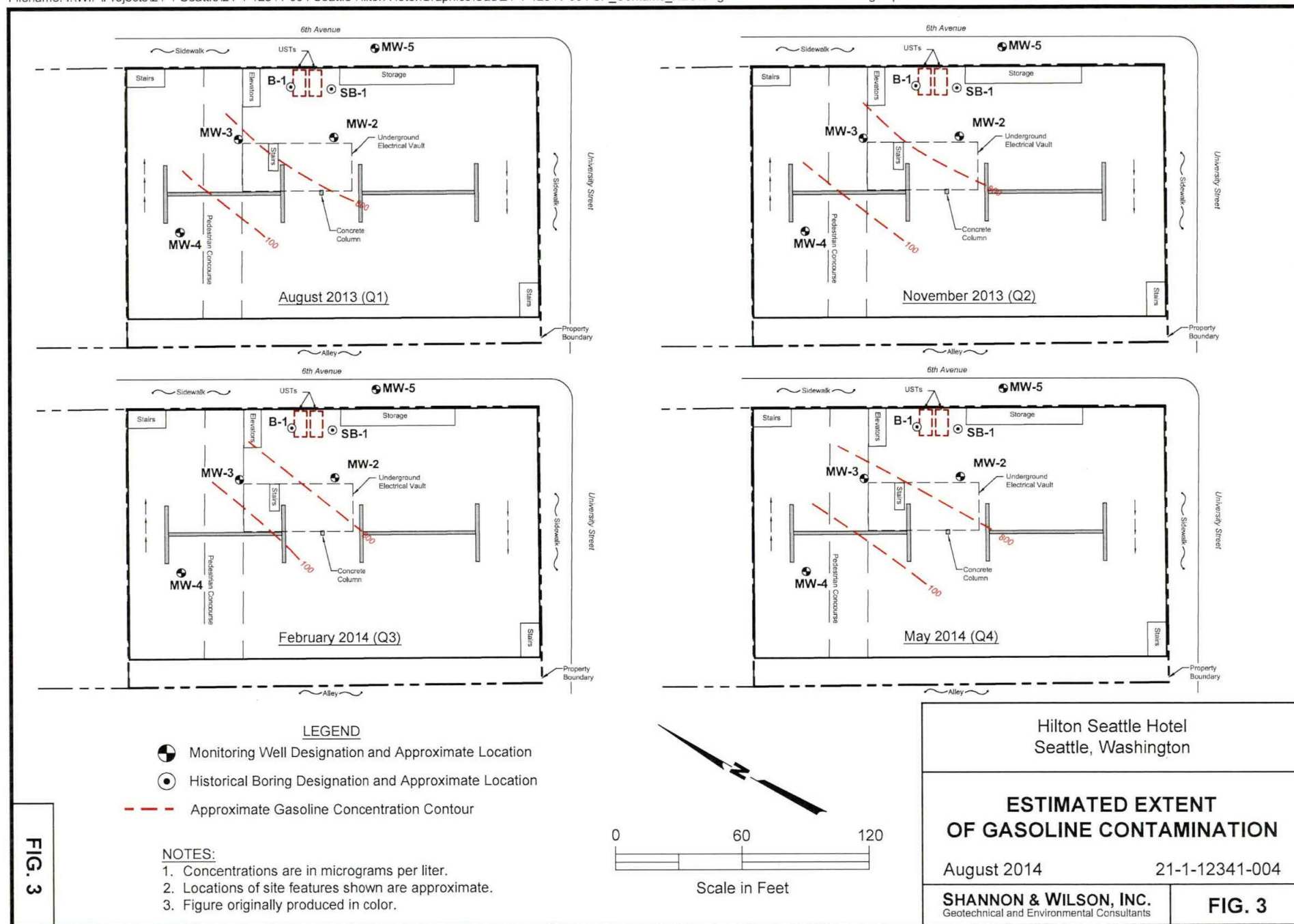
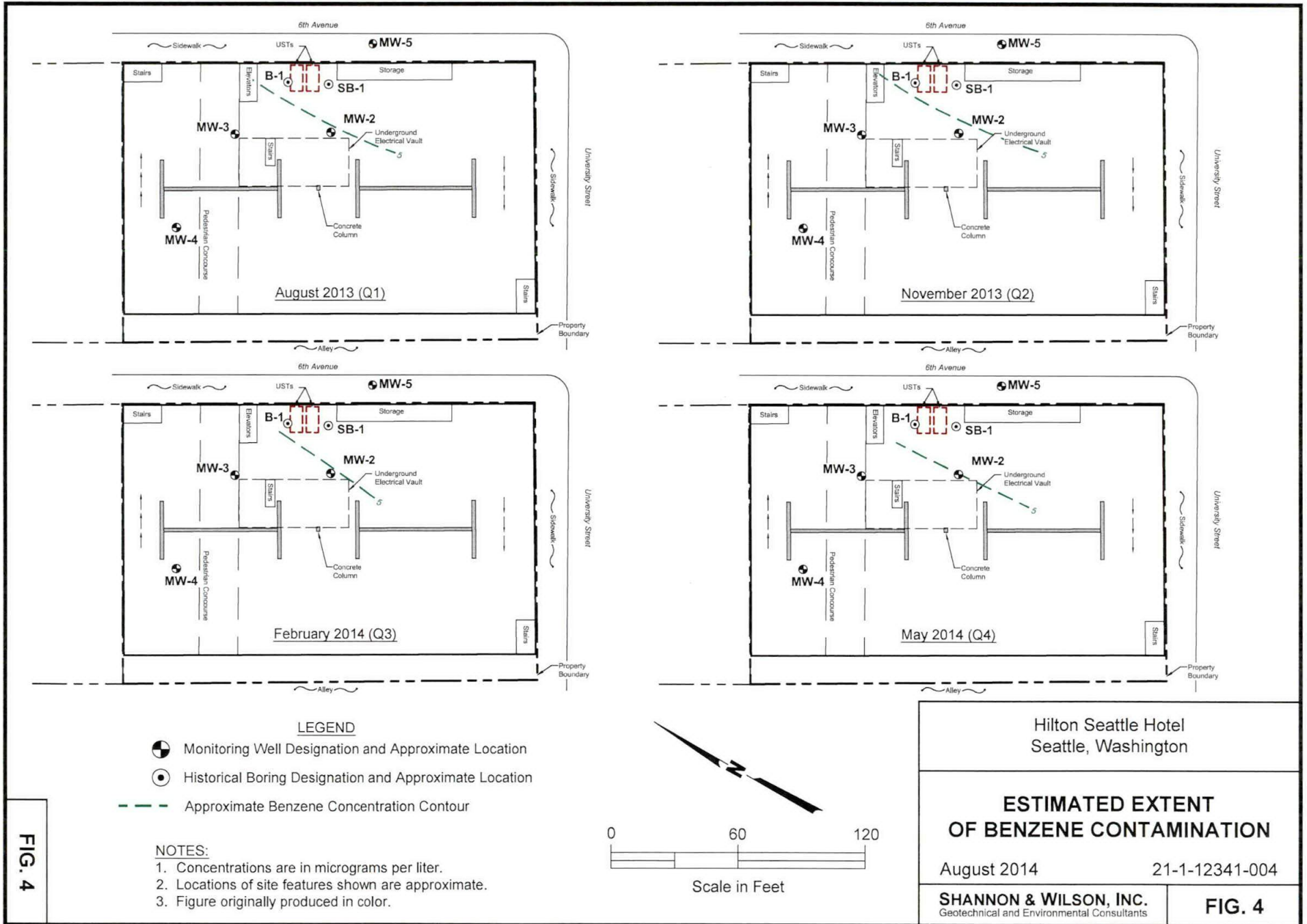
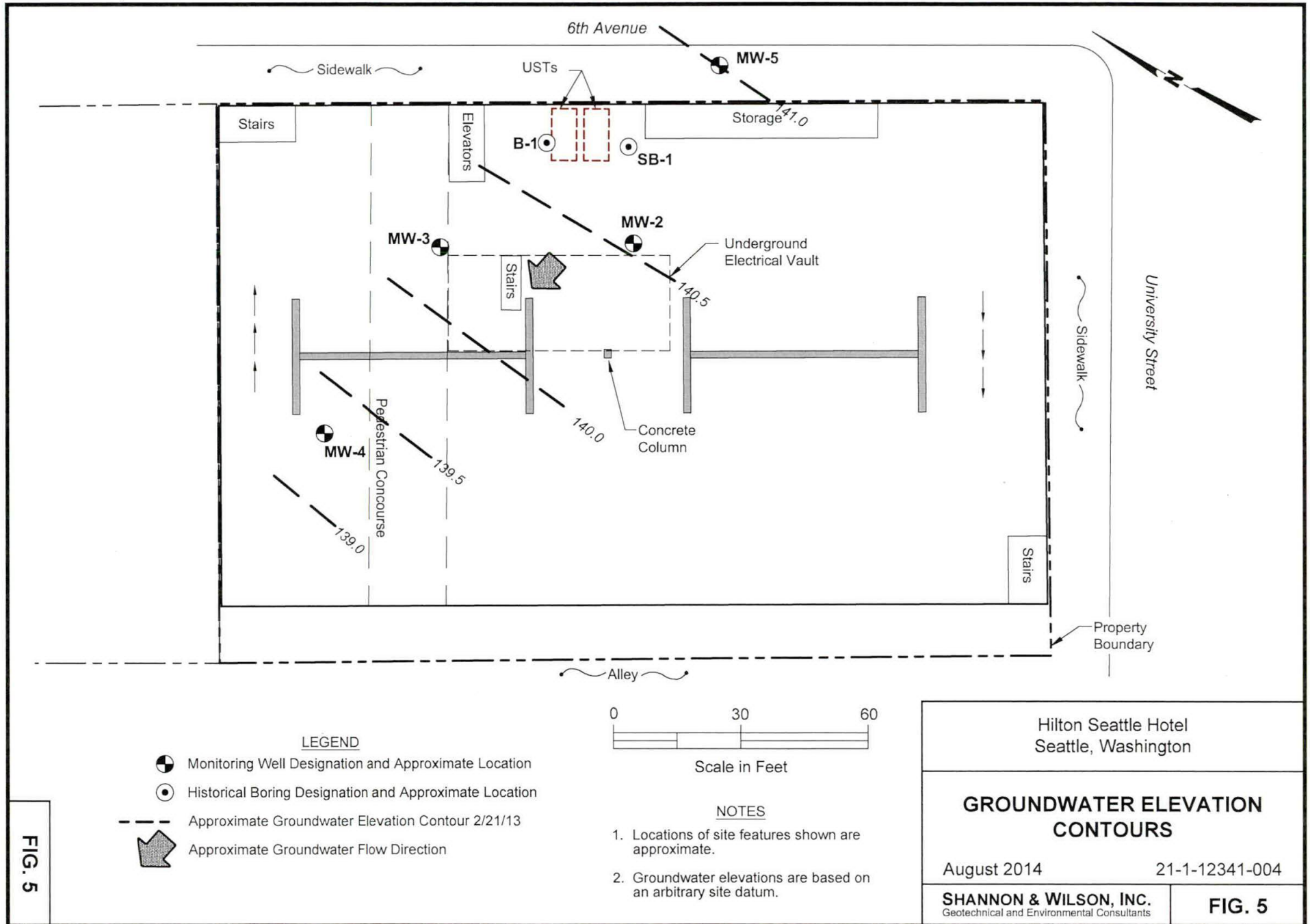


FIG. 2







SHANNON & WILSON, INC.

APPENDIX A
ANALYTICAL LABORATORY REPORT

21-1-12341-004



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

Shannon & Wilson
Michael Reynolds
400 N. 34th Street, Suite 100
Seattle, WA 98103

RE: Seattle Hilton
Lab ID: 1405287

June 06, 2014

Attention Michael Reynolds:

Fremont Analytical, Inc. received 4 sample(s) on 5/30/2014 for the analyses presented in the following report.

Ferrous Iron by SM3500-Fe B
Gasoline by NWTPH-Gx
Ion Chromatography by EPA Method 300.0
Total Metals by EPA Method 200.8
Volatile Organic Compounds by EPA Method 8260

This report consists of the following:

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

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

Thank you for using Fremont Analytical.

Sincerely,

A handwritten signature in black ink, appearing to read "M Dee".

Michael Dee
Sr. Chemist / Principal

CC:
Ed Ptak



Date: 06/06/2014

CLIENT: Shannon & Wilson
Project: Seattle Hilton
Lab Order: 1405287

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1405287-001	MW-4	05/30/2014 11:10 AM	05/30/2014 2:10 PM
1405287-002	MW-3	05/30/2014 11:45 AM	05/30/2014 2:10 PM
1405287-003	MW-2	05/30/2014 12:20 PM	05/30/2014 2:10 PM
1405287-004	MW-5	05/30/2014 1:30 PM	05/30/2014 2:10 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned



Case Narrative

WO#: 1405287

Date: 6/6/2014

CLIENT: Shannon & Wilson

Project: Seattle Hilton

I. SAMPLE RECEIPT:

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

II. GENERAL REPORTING COMMENTS:

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

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

III. ANALYSES AND EXCEPTIONS:

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



Analytical Report

WO#: 1405287

Date Reported: 6/6/2014

Client: Shannon & Wilson

Collection Date: 5/30/2014 11:10:00 AM

Project: Seattle Hilton

Lab ID: 1405287-001

Matrix: Water

Client Sample ID: MW-4

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
----------	--------	----	------	-------	----	---------------

Gasoline by NWTPH-Gx

Batch ID: R14634 Analyst: GH

Gasoline	ND	50.0		µg/L	1	5/30/2014 7:03:00 PM
Surr: 4-Bromofluorobenzene	102	65-135		%REC	1	5/30/2014 7:03:00 PM
Surr: Toluene-d8	104	65-135		%REC	1	5/30/2014 7:03:00 PM

Volatile Organic Compounds by EPA Method 8260

Batch ID: R14623 Analyst: EM

Benzene	ND	1.00		µg/L	1	5/30/2014 7:03:00 PM
Toluene	ND	1.00		µg/L	1	5/30/2014 7:03:00 PM
Ethylbenzene	ND	1.00		µg/L	1	5/30/2014 7:03:00 PM
m,p-Xylene	ND	1.00		µg/L	1	5/30/2014 7:03:00 PM
o-Xylene	ND	1.00		µg/L	1	5/30/2014 7:03:00 PM
Surr: Dibromofluoromethane	105	61.7-130		%REC	1	5/30/2014 7:03:00 PM
Surr: Toluene-d8	95.5	62.1-129		%REC	1	5/30/2014 7:03:00 PM
Surr: 1-Bromo-4-fluorobenzene	94.3	66.8-124		%REC	1	5/30/2014 7:03:00 PM

Ion Chromatography by EPA Method 300.0

Batch ID: R14638 Analyst: KT

Nitrate	ND	0.100		mg/L	1	5/30/2014 7:15:00 PM
Sulfate	31.5	1.50	D	mg/L	5	6/2/2014 3:06:00 PM

Total Metals by EPA Method 200.8

Batch ID: 7691 Analyst: TN

Lead	11.1	1.00		µg/L	1	6/2/2014 4:15:25 PM
------	------	------	--	------	---	---------------------

Ferrous Iron by SM3500-Fe B

Batch ID: R14649 Analyst: KT

Ferrous Iron	2.38	0.0300		mg/L	1	5/30/2014 5:46:00 PM
--------------	------	--------	--	------	---	----------------------

NOTES:

Turbidity and settleable sediments present possibly introducing a higher reading on instrument. Visual inspection of sample indicates that ferrous iron is present, but turbidity may have increased the reported value.

Qualifiers: B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
RL Reporting Limit

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



Analytical Report

WO#: 1405287

Date Reported: 6/6/2014

Client: Shannon & Wilson

Collection Date: 5/30/2014 11:45:00 AM

Project: Seattle Hilton

Lab ID: 1405287-002

Matrix: Water

Client Sample ID: MW-3

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
----------	--------	----	------	-------	----	---------------

Gasoline by NWTPH-Gx

Batch ID: R14634 Analyst: GH

Gasoline	187	50.0		µg/L	1	5/30/2014 8:02:00 PM
Surr: 4-Bromofluorobenzene	108	65-135		%REC	1	5/30/2014 8:02:00 PM
Surr: Toluene-d8	104	65-135		%REC	1	5/30/2014 8:02:00 PM

Volatile Organic Compounds by EPA Method 8260

Batch ID: R14623 Analyst: EM

Benzene	ND	1.00		µg/L	1	5/30/2014 8:02:00 PM
Toluene	ND	1.00		µg/L	1	5/30/2014 8:02:00 PM
Ethylbenzene	ND	1.00		µg/L	1	5/30/2014 8:02:00 PM
m,p-Xylene	2.22	1.00		µg/L	1	5/30/2014 8:02:00 PM
o-Xylene	1.37	1.00		µg/L	1	5/30/2014 8:02:00 PM
Surr: Dibromofluoromethane	103	61.7-130		%REC	1	5/30/2014 8:02:00 PM
Surr: Toluene-d8	101	62.1-129		%REC	1	5/30/2014 8:02:00 PM
Surr: 1-Bromo-4-fluorobenzene	100	66.8-124		%REC	1	5/30/2014 8:02:00 PM

Ion Chromatography by EPA Method 300.0

Batch ID: R14638 Analyst: KT

Nitrate	ND	0.100		mg/L	1	5/30/2014 8:26:00 PM
Sulfate	ND	0.300		mg/L	1	5/30/2014 8:26:00 PM

Total Metals by EPA Method 200.8

Batch ID: 7691 Analyst: TN

Lead	3.42	1.00		µg/L	1	6/2/2014 4:18:33 PM
------	------	------	--	------	---	---------------------

Ferrous Iron by SM3500-Fe B

Batch ID: R14649 Analyst: KT

Ferrous Iron	0.600	0.300	D	mg/L	10	5/30/2014 5:50:00 PM
--------------	-------	-------	---	------	----	----------------------

NOTES:

Sample diluted due to high levels of turbidity and sediment, making colorimetric analysis impossible with an undiluted aliquot.

Qualifiers: B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
RL Reporting Limit

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



Client: Shannon & Wilson

Collection Date: 5/30/2014 12:20:00 PM

Project: Seattle Hilton

Lab ID: 1405287-003

Matrix: Water

Client Sample ID: MW-2

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
----------	--------	----	------	-------	----	---------------

Gasoline by NWTPH-Gx

Batch ID: R14634 Analyst: GH

Gasoline	2,070	50.0		µg/L	1	5/30/2014 8:31:00 PM
Surr: 4-Bromofluorobenzene	111	65-135		%REC	1	5/30/2014 8:31:00 PM
Surr: Toluene-d8	99.0	65-135		%REC	1	5/30/2014 8:31:00 PM

Volatile Organic Compounds by EPA Method 8260

Batch ID: R14623 Analyst: EM

Benzene	1.82	1.00		µg/L	1	5/30/2014 8:31:00 PM
Toluene	2.00	1.00		µg/L	1	5/30/2014 8:31:00 PM
Ethylbenzene	36.5	1.00		µg/L	1	5/30/2014 8:31:00 PM
m,p-Xylene	5.65	1.00		µg/L	1	5/30/2014 8:31:00 PM
o-Xylene	2.82	1.00		µg/L	1	5/30/2014 8:31:00 PM
Surr: Dibromofluoromethane	104	61.7-130		%REC	1	5/30/2014 8:31:00 PM
Surr: Toluene-d8	102	62.1-129		%REC	1	5/30/2014 8:31:00 PM
Surr: 1-Bromo-4-fluorobenzene	103	66.8-124		%REC	1	5/30/2014 8:31:00 PM

Ion Chromatography by EPA Method 300.0

Batch ID: R14638 Analyst: KT

Nitrate	ND	0.100		mg/L	1	5/30/2014 8:44:00 PM
Sulfate	0.304	0.300		mg/L	1	5/30/2014 8:44:00 PM

Total Metals by EPA Method 200.8

Batch ID: 7691 Analyst: TN

Lead	2.71	1.00		µg/L	1	6/2/2014 4:21:40 PM
------	------	------	--	------	---	---------------------

Ferrous Iron by SM3500-Fe B

Batch ID: R14649 Analyst: KT

Ferrous Iron	1.15	0.0300		mg/L	1	5/30/2014 5:47:00 PM
--------------	------	--------	--	------	---	----------------------

Qualifiers: B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
RL Reporting Limit

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



Analytical Report

WO#: 1405287

Date Reported: 6/6/2014

Client: Shannon & Wilson

Collection Date: 5/30/2014 1:30:00 PM

Project: Seattle Hilton

Lab ID: 1405287-004

Matrix: Water

Client Sample ID: MW-5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
----------	--------	----	------	-------	----	---------------

Gasoline by NWTPH-Gx

Batch ID: R14634

Analyst: GH

Gasoline	51,400	2,500	D	µg/L	50	6/2/2014 1:14:00 PM
Surr: 4-Bromofluorobenzene	114	65-135		%REC	1	5/30/2014 9:01:00 PM
Surr: Toluene-d8	101	65-135		%REC	1	5/30/2014 9:01:00 PM

Volatile Organic Compounds by EPA Method 8260

Batch ID: R14623

Analyst: EM

Benzene	927	50.0	D	µg/L	50	6/2/2014 1:14:00 PM
Toluene	552	50.0	D	µg/L	50	6/2/2014 1:14:00 PM
Ethylbenzene	1,820	50.0	D	µg/L	50	6/2/2014 1:14:00 PM
m,p-Xylene	4,930	50.0	D	µg/L	50	6/2/2014 1:14:00 PM
o-Xylene	2,680	50.0	D	µg/L	50	6/2/2014 1:14:00 PM
Surr: Dibromofluoromethane	93.9	61.7-130		%REC	1	5/30/2014 9:01:00 PM
Surr: Toluene-d8	102	62.1-129		%REC	1	5/30/2014 9:01:00 PM
Surr: 1-Bromo-4-fluorobenzene	101	66.8-124		%REC	1	5/30/2014 9:01:00 PM

Ion Chromatography by EPA Method 300.0

Batch ID: R14638

Analyst: KT

Nitrate	ND	0.100		mg/L	1	5/30/2014 9:01:00 PM
Sulfate	2.36	0.300		mg/L	1	5/30/2014 9:01:00 PM

Total Metals by EPA Method 200.8

Batch ID: 7691

Analyst: TN

Lead	9.97	1.00		µg/L	1	6/2/2014 4:26:42 PM
------	------	------	--	------	---	---------------------

Ferrous Iron by SM3500-Fe B

Batch ID: R14649

Analyst: KT

Ferrous Iron	3.18	0.0300		mg/L	1	5/30/2014 5:48:00 PM
--------------	------	--------	--	------	---	----------------------

NOTES:

Turbidity and settleable sediments present possibly introducing a higher reading on instrument. Visual inspection of sample indicates that ferrous iron is present, but turbidity may have increased the reported value.

Qualifiers: B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
RL Reporting Limit

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



Date: 6/6/2014

Work Order: 1405287
CLIENT: Shannon & Wilson
Project: Seattle Hilton

QC SUMMARY REPORT
Ferrous Iron by SM3500-Fe B

Sample ID: MB-R14649	SampType: MBLK	Units: mg/L			Prep Date: 5/30/2014			RunNo: 14649			
Client ID: MBLKW	Batch ID: R14649				Analysis Date: 5/30/2014			SeqNo: 300797			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.0300									

Sample ID: 1405287-001CDUP	SampType: DUP	Units: mg/L			Prep Date: 5/30/2014				RunNo: 14649		
Client ID: MW-4	Batch ID: R14649				Analysis Date: 5/30/2014				SeqNo: 300801		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	1.83	0.0300						2.380	26.1	20	R

NOTES:

RPD out of limits due to sample turbidity and settleable sediments present.

Turbidity and settleable sediments present possibly introducing a higher reading on instrument. Visual inspection of sample indicates that ferrous iron is present, but turbidity may have increased the reported value.

Sample ID: LCS-R14649	SampType: LCS	Units: mg/L				Prep Date: 5/30/2014			RunNo: 14649		
Client ID: LCSW	Batch ID: R14649					Analysis Date: 5/30/2014			SeqNo: 303335		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.950	0.0300	1.000	0	95.0	90	110				

Qualifiers:

B	Analyte detected in the associated Method Blank	D	Dilution was required	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits	ND	Not detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit	S	Spike recovery outside accepted recovery limits



Date: 6/6/2014

Work Order: 1405287
CLIENT: Shannon & Wilson
Project: Seattle Hilton

QC SUMMARY REPORT
Ion Chromatography by EPA Method 300.0

Sample ID: MB-R14638		SampType: MBLK		Units: mg/L		Prep Date: 5/30/2014			RunNo: 14638		
Client ID: MBLKW		Batch ID: R14638					Analysis Date: 5/30/2014			SeqNo: 300653	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Nitrate	ND	0.100									
Sulfate	ND	0.300									

Sample ID: LCS-R14638		SampType: LCS			Units: mg/L		Prep Date: 5/30/2014			RunNo: 14638		
Client ID: LCSW		Batch ID: R14638			Analysis Date: 5/30/2014			SeqNo: 300654				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Nitrate	2.70	0.100	3.000	0	90.1	90	110				
Sulfate	15.3	0.300	15.00	0	102	90	110				

Sample ID: 1405287-001CDUP	SampType: DUP				Units: mg/L		Prep Date: 5/30/2014			RunNo: 14638		
Client ID: MW-4	Batch ID: R14638				Analysis Date: 5/30/2014				SeqNo: 300656			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Nitrate	ND	0.100						0		20	
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Sample ID: 1405287-001CMS	SampType: MS	Units: mg/L			Prep Date: 5/30/2014				RunNo: 14638		
Client ID: MW-4	Batch ID: R14638	Analysis Date: 5/30/2014							SeqNo: 300657		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Nitrate	2.86	0.100	3.000	0	95.5	80	120				
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Sample ID: 1405287-001CMSD		SampType: MSD		Units: mg/L		Prep Date: 5/30/2014			RunNo: 14638			
Client ID: MW-4		Batch ID: R14638					Analysis Date: 5/30/2014			SeqNo: 300658		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Nitrate	2.84	0.100	3.000	0	94.6	80	120	2.864	0.952	20	
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Qualifiers:

B	Analyte detected in the associated Method Blank	D	Dilution was required	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits	ND	Not detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit	S	Spike recovery outside accepted recovery limits



Date: 6/6/2014

Work Order: 1405287
 CLIENT: Shannon & Wilson
 Project: Seattle Hilton

QC SUMMARY REPORT

Ion Chromatography by EPA Method 300.0

Sample ID: 1405287-001CMSD	SampType: MSD	Units: mg/L				Prep Date: 5/30/2014			RunNo: 14638		
Client ID: MW-4	Batch ID: R14638					Analysis Date: 5/30/2014			SeqNo: 300658		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sample ID: 1405287-001CDUP	SampType: DUP	Units: mg/L				Prep Date: 6/2/2014			RunNo: 14638		
Client ID: MW-4	Batch ID: R14638	Analysis Date: 6/2/2014						SeqNo: 300817			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	30.9	1.50						31.47	1.72	20	D

Sample ID: 1405287-001CMS	SampType: MS	Units: mg/L				Prep Date: 6/2/2014			RunNo: 14638		
Client ID: MW-4	Batch ID: R14638	Analysis Date: 6/2/2014							SeqNo: 300818		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	111	1.50	75.00	31.47	106	80	120				D

Sample ID: 1405287-001CMSD	SampType: MSD	Units: mg/L			Prep Date: 6/2/2014			RunNo: 14638			
Client ID: MW-4	Batch ID: R14638	Analysis Date: 6/2/2014						SeqNo: 300819			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	111	1.50	75.00	31.47	106	80	120	110.7	0.149	20	D

Qualifiers:

B	Analyte detected in the associated Method Blank	D	Dilution was required	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits	ND	Not detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit	S	Spike recovery outside accepted recovery limits



Date: 6/6/2014

Work Order: 1405287
CLIENT: Shannon & Wilson
Project: Seattle Hilton

QC SUMMARY REPORT
Total Metals by EPA Method 200.8

Sample ID: MB-7691		SampType: MBLK		Units: µg/L		Prep Date: 6/2/2014			RunNo: 14642		
Client ID: MBLKW		Batch ID: 7691					Analysis Date: 6/2/2014			SeqNo: 300725	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Lead	ND	1.00									
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Sample ID: LCS-7691	SampType: LCS	Units: µg/L				Prep Date: 6/2/2014				RunNo: 14642		
Client ID: LCSW	Batch ID: 7691					Analysis Date: 6/2/2014				SeqNo: 300728		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Lead	53.0	1.00	50.00	0	106	85	115				
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Sample ID: 1405276-003EDUP	SampType: DUP	Units: µg/L				Prep Date: 6/2/2014				RunNo: 14642		
Client ID: BATCH	Batch ID: 7691					Analysis Date: 6/2/2014				SeqNo: 300730		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Lead	2.01	1.00						1.907	5.21	30	
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Sample ID: 1405276-003EMS	SampType: MS	Units: µg/L			Prep Date: 6/2/2014			RunNo: 14642			
Client ID: BATCH	Batch ID: 7691				Analysis Date: 6/2/2014			SeqNo: 300731			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Lead	254	1.00	250.0	1.907	101	70	130				
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Sample ID: 1405276-003EMSD	SampType: MSD	Units: µg/L				Prep Date: 6/2/2014				RunNo: 14642	
Client ID: BATCH	Batch ID: 7691					Analysis Date: 6/2/2014				SeqNo: 300732	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Lead	250	1.00	250.0	1.907	99.4	70	130	254.3	1.52	30	
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Qualifiers:	B	Analyte detected in the associated Method Blank	D	Dilution was required	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits	ND	Not detected at the Reporting Limit
	R	RPD outside accepted recovery limits	RL	Reporting Limit	S	Spike recovery outside accepted recovery limits



Date: 6/6/2014

Work Order: 1405287
CLIENT: Shannon & Wilson
Project: Seattle Hilton

QC SUMMARY REPORT
Gasoline by NWTPH-Gx

Sample ID: 1405287-001ADUP	SampType: DUP	Units: µg/L				Prep Date: 5/30/2014			RunNo: 14634		
Client ID: MW-4	Batch ID: R14634					Analysis Date: 5/30/2014			SeqNo: 300588		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	ND	50.0						0		30	
Surr: Toluene-d8	52.0		50.00		104	65	135		0	0	
Surr: 4-Bromofluorobenzene	50.1		50.00		100	65	135		0	0	

Sample ID: LCS-R14634	SampType: LCS	Units: µg/L				Prep Date: 5/30/2014			RunNo: 14634		
Client ID: LCSW	Batch ID: R14634					Analysis Date: 5/30/2014			SeqNo: 300594		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	434	50.0	500.0	0	86.9	65	135				
Surr: Toluene-d8	50.9		50.00		102	65	135				
Surr: 4-Bromofluorobenzene	53.7		50.00		107	65	135				

Sample ID: MB-R14634	SampType: MBLK	Units: µg/L				Prep Date: 5/30/2014			RunNo: 14634		
Client ID: MBLKW	Batch ID: R14634					Analysis Date: 5/30/2014			SeqNo: 300595		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	ND	50.0									
Surr: Toluene-d8	51.6		50.00		103	65	135				
Surr: 4-Bromofluorobenzene	50.7		50.00		101	65	135				

Qualifiers: B Analyte detected in the associated Method Blank D Dilution was required E Value above quantitation range
H Holding times for preparation or analysis exceeded J Analyte detected below quantitation limits ND Not detected at the Reporting Limit
R RPD outside accepted recovery limits RL Reporting Limit S Spike recovery outside accepted recovery limits



Date: 6/6/2014

Work Order: 1405287
CLIENT: Shannon & Wilson
Project: Seattle Hilton

QC SUMMARY REPORT
Volatile Organic Compounds by EPA Method 8260

Sample ID: 1405273-008AMS	SampType: MS	Units: µg/L			Prep Date: 5/30/2014			RunNo: 14623			
Client ID: BATCH	Batch ID: R14623	Analysis Date: 5/30/2014						SeqNo: 300413			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	19.7	1.00	20.00	0	98.4	65.4	138				
Toluene	20.9	1.00	20.00	0	105	64	139				
Ethylbenzene	19.8	1.00	20.00	0	98.8	64.5	136				
m,p-Xylene	40.5	1.00	40.00	0	101	63.3	135				
o-Xylene	19.6	1.00	20.00	0	97.8	65.4	134				
Surr: Dibromofluoromethane	52.3		50.00		105	61.7	130				
Surr: Toluene-d8	51.7		50.00		103	62.1	129				
Surr: 1-Bromo-4-fluorobenzene	53.0		50.00		106	66.8	124				

Sample ID: LCS-R14623	SampType: LCS	Units: µg/L				Prep Date: 5/30/2014			RunNo: 14623		
Client ID: LCSW	Batch ID: R14623	Analysis Date: 5/30/2014							SeqNo: 300416		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	22.7	1.00	20.00	0	113	76	123				
Toluene	23.2	1.00	20.00	0	116	71.5	130				
Ethylbenzene	22.9	1.00	20.00	0	114	72	130				
m,p-Xylene	46.4	1.00	40.00	0	116	73	131				
o-Xylene	22.7	1.00	20.00	0	114	72.1	131				
Surr: Dibromofluoromethane	52.0		50.00		104	61.7	130				
Surr: Toluene-d8	50.8		50.00		102	62.1	129				
Surr: 1-Bromo-4-fluorobenzene	52.8		50.00		106	66.8	124				

Sample ID: MB-R14623	SampType: MBLK	Units: µg/L	Prep Date: 5/30/2014	RunNo: 14623							
Client ID: MBLKW	Batch ID: R14623		Analysis Date: 5/30/2014	SeqNo: 300417							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ND	1.00									
Toluene	ND	1.00									

Qualifiers:

B	Analyte detected in the associated Method Blank	D	Dilution was required	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits	ND	Not detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit	S	Spike recovery outside accepted recovery limits



Date: 6/6/2014

Work Order: 1405287
CLIENT: Shannon & Wilson
Project: Seattle Hilton

QC SUMMARY REPORT
Volatile Organic Compounds by EPA Method 8260

Sample ID: MB-R14623	SampType: MBLK	Units: µg/L			Prep Date: 5/30/2014			RunNo: 14623			
Client ID: MBLKW	Batch ID: R14623				Analysis Date: 5/30/2014			SeqNo: 300417			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Ethylbenzene	ND	1.00									
m,p-Xylene	ND	1.00									
o-Xylene	ND	1.00									

Surr: Dibromofluoromethane	51.1		50.00		102	61.7	130				
Surr: Toluene-d8	47.6		50.00		95.2	62.1	129				
Surr: 1-Bromo-4-fluorobenzene	47.0		50.00		94.0	66.8	124				

Sample ID: 1405287-001ADUP		SampType: DUP		Units: µg/L		Prep Date: 5/30/2014			RunNo: 14623			
Client ID: MW-4		Batch ID: R14623					Analysis Date: 5/30/2014			SeqNo: 300578		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Benzene	ND	1.00						0		30	
Toluene	ND	1.00						0		30	
Ethylbenzene	ND	1.00						0		30	
m,p-Xylene	ND	1.00						0		30	
o-Xylene	ND	1.00						0		30	

Surr: Dibromofluoromethane	53.0		50.00		106	61.7	130		0		
Surr: Toluene-d8	47.1		50.00		94.1	62.1	129		0		
Surr: 1-Bromo-4-fluorobenzene	46.4		50.00		92.9	66.8	124		0		

Qualifiers:

B	Analyte detected in the associated Method Blank	D	Dilution was required	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits	ND	Not detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit	S	Spike recovery outside accepted recovery limits



Sample Log-In Check List

Client Name: SW	Work Order Number: 1405287
Logged by: Chelsea Ward	Date Received: 5/30/2014 2:10:00 PM

Chain of Custody

1. Is Chain of Custody complete? Yes ☒ No ☐ Not Present ☐
2. How was the sample delivered? Client

Log In

3. Coolers are present? Yes ☒ No ☐ NA ☐
4. Shipping container/cooler in good condition? Yes ☒ No ☐
5. Custody seals intact on shipping container/cooler? Yes ☐ No ☐ Not Required ☒
6. Was an attempt made to cool the samples? Yes ☒ No ☐ NA ☐
7. Were all coolers received at a temperature of $>0^{\circ}\text{C}$ to 10.0°C ? Yes ☒ No ☐ NA ☐
8. Sample(s) in proper container(s)? Yes ☒ No ☐
9. Sufficient sample volume for indicated test(s)? Yes ☒ No ☐
10. Are samples properly preserved? Yes ☒ No ☐
11. Was preservative added to bottles? Yes ☐ No ☒ NA ☐
12. Is the headspace in the VOA vials? Yes ☐ No ☒ NA ☐
13. Did all samples containers arrive in good condition(unbroken)? Yes ☒ No ☐
14. Does paperwork match bottle labels? Yes ☒ No ☐
15. Are matrices correctly identified on Chain of Custody? Yes ☒ No ☐
16. Is it clear what analyses were requested? Yes ☒ No ☐
17. Were all holding times able to be met? Yes ☒ No ☐

Special Handling (if applicable)

18. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☒

Person Notified:		Date:	
By Whom:		Via:	☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:			
Client Instructions:			

19. Additional remarks:

Item Information

Item #	Temp °C	Condition
Cooler	8.2	Good
Sample	7.8	Good



Fremont

Analytical

3600 Fremont Ave N.
Seattle, WA 98103

Tel: 206-352-3790
Fax: 206-352-7178

Date: 5/30/14

Laboratory Project No (internal): 1405287

Page: 1 of: 1

Client: Shanna & Wilson
Address: 400 N 34th St. Suite 100
City, State, Zip: Seattle, WA 98103 Tel: 206-632-5000
Reports To (PM): msr@shannwil.com Fax:

Project Name: Seattle Hilton
Location: 6th Ave.
Collected by: EVP
Email: evp@shannwil.com Project No: 21-1-12341-004

*Matrix Codes: A = Air, AQ = Aqueous, B = Bulk, D = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, WW = Waste Water

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOC (EPA 8160)	GX/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (HXR)	SEM VOL (EPA 8170)	PAH (EPA 8270 - 5M)	PCBs (EPA 8082)	Metals** (6020 / 200.8)	Total (T) / Dissolved (D)	Anions (IC)***	EDB (8011)	Ferrus Iron	Comments/Depth
1 MW-4	5/30/14	1110	GW	X									X	T	X	X		
2 MW-3	1	1145	1	X									X	T	X	X		
3 MW-2	1	1220	1	X									X	T	X	X		
4 MW-5	1	1330	1	X									X	T	X	X		hold GX/BTEX
5																		
6																		
7																		
8																		
9																		
10																		

**Metals Analysis (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL Individual: Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl U V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

Sample Disposal: ☐ Return to Client ☒ Disposal by Lab (A fee may be assessed if samples are retained after 30 days.)

Relinquished	Date/Time	Received	Date/Time
x <u>[Signature]</u>	5/30/14 1410	x <u>[Signature]</u>	5/30/14 1410
Relinquished	Date/Time	Received	Date/Time
x		x	

Special Remarks:
Please hold Gx/BTEX analysis on MW-5

TAT -> SameDay^ NextDay^ 2 Day 3 Day STD

*Please coordinate with the lab in advance



Fremont

3600 Fremont Ave N.
Seattle, WA 98103

Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record

Date: 5/30/14

Laboratory Project No (internal): 1405287
Page: 1 of 1

Client: Shawna & Wilson
Address: 400 N 34th St. Suite 100
City, State, Zip: Seattle, WA 98103 Tel: 206-632-8200
Reports To (PM): MSF@shawwil.com Fax:

Project Name: Seattle Hilton
Location: 6th Ave.
Collected by: EVP
Email: mpe@shawwil.com Project No: 01-1-12341-004

*Matrix Codes: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, WW = Waste Water

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOC (EPA 8160)	SVOC (EPA 8160)	BTEX	Gasoline Range Organics (GRO)	Hydrocarbon Identification (HID)	Distillation Range Organics (DRO)	SMAI TOC (EPA 8210)	PAH (EPA 8210)	PCB (EPA 8081)	Metal** (ICP)	Total (T) (ICP)	Anions (ICP)	EDB (EPA 8210)	Ferron Iron	Comments/Depth
1 MW-4	5/30/14	110	GW	X								X	T	X				
2 MW-3		1145	I	X								X	T	X				
3 MW-2		1220	I	X								X	T	X				
4 MW-5		1330	I	X								X	T	X				hold Gx/BTEX OFF-HOLD 6/4 cgy rer Ed Ptak
5																		
6																		
7																		
8																		
9																		
10																		

**Metals Analysis (Circle): MTCA-5 RORA-8 Priority Pollutants: TAT Individual: Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Si Sn Ti Tl U V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

Sample Disposition: ☐ Return to Client ☒ Disposal by Lab (A fee may be assessed if samples are retained after 30 days)

Relinquished: [Signature] Date/Time: 5/30/14 1410

Received: [Signature] Date/Time: 5/30/14 1410

Relinquished: Date/Time:

Received: Date/Time:

Special Remarks:
Please hold Gx/BTEX analysis on MW-5

TAT -> SameDay^ NextDay^ 2 Day 3 Day ☒ SFL

*Please coordinate with the lab in advance

Appendix B

APPENDIX B
NATURAL ATTENUATION ANALYSIS OUTPUT

Module1: Mann-Kendall Trend Test for Plume Stability (Non-parametric Statistical Test)Site Name: Hilton Seattle HotelSite Address: Seattle, WAAdditional Description: NA Evaluation

Well (Sampling) Location?

MW-2

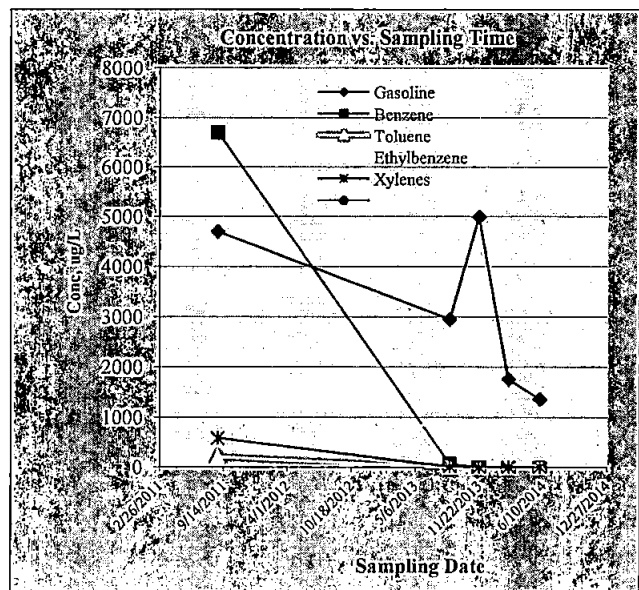
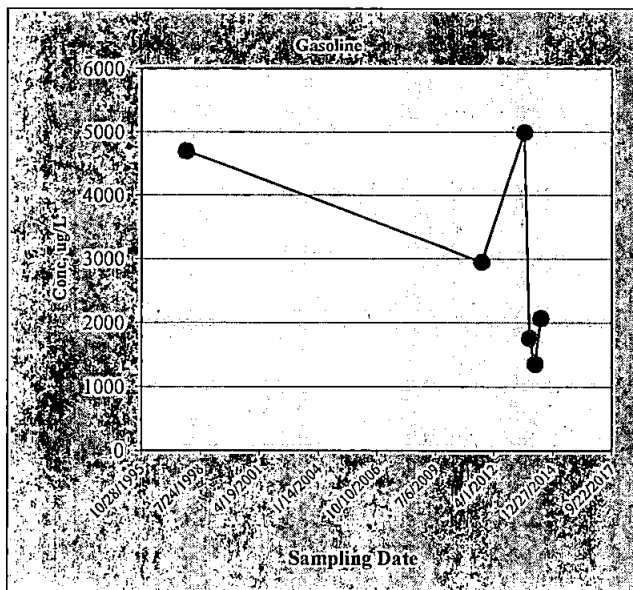
Level of Confidence (Decision Criteria)?

85%**1. Monitoring Well Information: Contaminant Concentration at a well: Quarterly sampling recommended.**

Sampling Event	Date Sampled	Hazardous Substances (unit is ug/L)				
		Gasoline	Benzene	Toluene	Ethylbenzene	Xylenes
#1	11/14/1997	4700	6700	210	670	590
#2	8/26/2011	2950	76.1	2.19	863	22
#3	8/22/2013	5000	3.07	2.01	408	10.8
#4	11/21/2013	1760	1.4	1.57	83.3	6.89
#5	2/21/2014	1360	2.9	1.62	20.8	7.44
#6	5/30/2014	2070	1.82	2	36.5	8.47
#7						
#8						
#9						
#10						
#11						
#12						
#13						
#14						
#15						
#16						

2. Mann-Kendall Non-parametric Statistical Test Results

Hazardous Substance?	Gasoline	Benzene	Toluene	Ethylbenzene	Xylenes	
Confidence Level Calculated?	86.40%	97.20%	93.20%	97.20%	93.20%	NA
Plume Stability?	Shrinking	Shrinking	Shrinking	Shrinking	Shrinking	NA
Coefficient of Variation?						n<4
Mann-Kendall Statistic "S" value?	-7	-11	-9	-11	-9	0
Number of Sampling Rounds?	6	6	6	6	6	0
Average Concentration?	2973.33	1130.88	36.57	346.93	107.60	NA
Standard Deviation?	1547.92	2728.46	84.97	359.63	236.39	NA
Coefficient of Variation?	0.52	2.41	2.32	1.04	2.20	NA
Blank if No Errors found						n<4

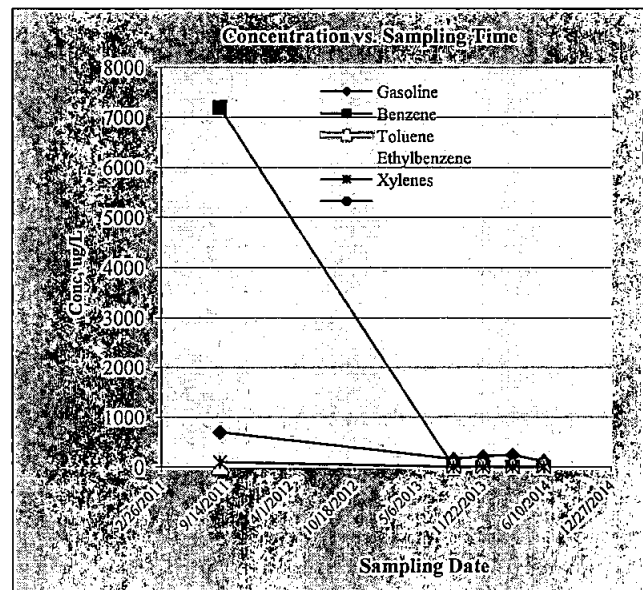
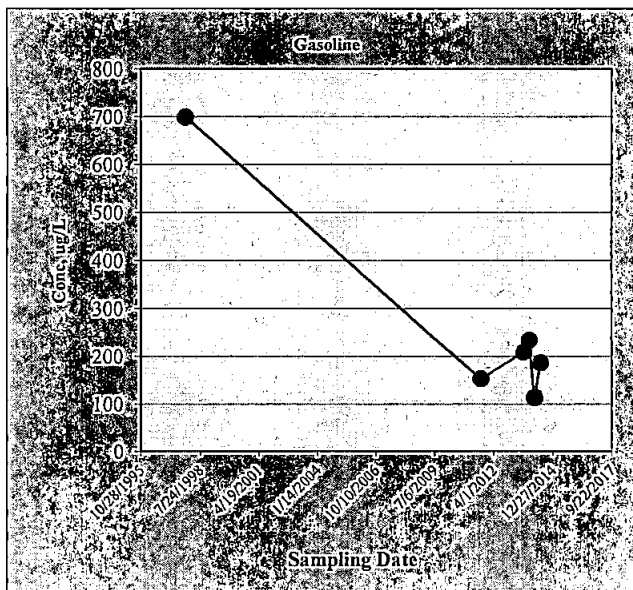
3. Temporal Trend: Plot of Concentration vs. Sampling TimeHazardous substance? GasolinePlume Stability? Shrinking

Module1: Mann-Kendall Trend Test for Plume Stability (Non-parametric Statistical Test)Site Name: Hilton Seattle HotelSite Address: Seattle, WAAdditional Description: NA EvaluationWell (Sampling) Location? MW-3Level of Confidence (Decision Criteria)? 85%**1. Monitoring Well Information: Contaminant Concentration at a well: Quarterly sampling recommended.**

Sampling Event	Date Sampled	Hazardous Substances (unit is ug/L)					
		Gasoline	Benzene	Toluene	Ethylbenzene	Xylenes	
#1	11/14/1997	700	7200	10	74	97	
#2	8/26/2011	153	0.5	0.5	0.5	1.35	
#3	8/22/2013	209	0.5	0.5	0.5	1	
#4	11/21/2013	235	0.5	0.5	0.5	1	
#5	2/21/2014	114	0.5	0.5	0.5	1	
#6	5/30/2014	187	0.5	0.5	0.5	3.59	
#7							
#8							
#9							
#10							
#11							
#12							
#13							
#14							
#15							
#16							

2. Mann-Kendall Non-parametric Statistical Test Results

Hazardous Substance?	Gasoline	Benzene	Toluene	Ethylbenzene	Xylenes	
Confidence Level Calculated?	76.50%	76.50%	76.50%	76.50%	64.00%	NA
Plume Stability?	Stable	Undetermined	Undetermined	Undetermined	Undetermined	NA
Coefficient of Variation?	CV <= 1	CV > 1	CV > 1	CV > 1	CV > 1	n<4
Mann-Kendall Statistic "S" value?	-5	-5	-5	-5	-4	0
Number of Sampling Rounds?	6	6	6	6	6	0
Average Concentration?	266.33	1200.42	2.08	12.75	17.49	NA
Standard Deviation?	216.65	2939.18	3.88	30.01	38.96	NA
Coefficient of Variation?	0.81	2.45	1.86	2.35	2.23	NA
Blank if No Errors found						n<4

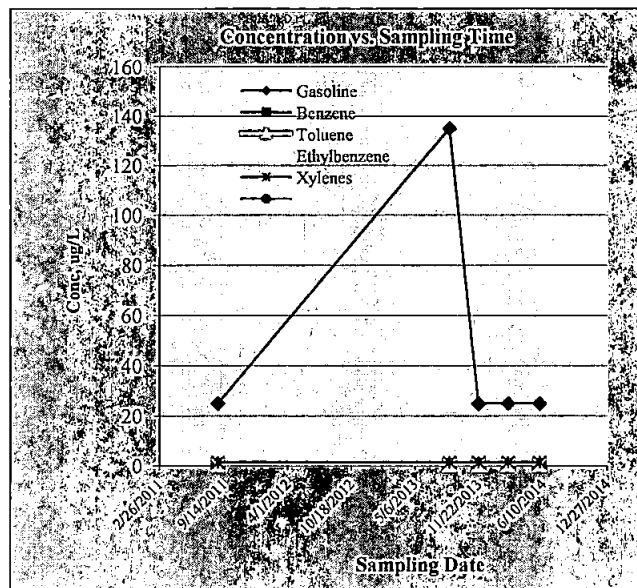
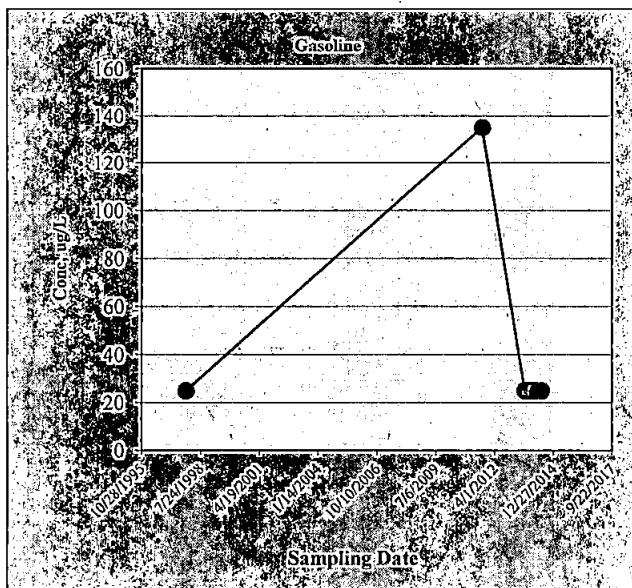
3. Temporal Trend: Plot of Concentration vs. Sampling TimeHazardous substance? GasolinePlume Stability? Stable

Module1: Mann-Kendall Trend Test for Plume Stability (Non-parametric Statistical Test)Site Name: Hilton Seattle HotelSite Address: Seattle, WAAdditional Description: NA EvaluationWell (Sampling) Location? MW-4Level of Confidence (Decision Criteria)? 85%**1. Monitoring Well Information: Contaminant Concentration at a well: Quarterly sampling recommended.**

Sampling Event	Date Sampled	Hazardous Substances (unit is ug/L)				
		Gasoline	Benzene	Toluene	Ethylbenzene	Xylenes
#1	11/14/1997	25	0.5	0.5	0.5	1.5
#2	8/26/2011	135	0.5	0.5	0.5	1.5
#3	8/22/2013	25	0.5	0.5	0.5	1.5
#4	11/21/2013	25	0.5	0.5	0.5	1.5
#5	2/21/2014	25	0.5	0.5	0.5	1.5
#6	5/30/2014	25	0.5	0.5	0.5	1.5
#7						
#8						
#9						
#10						
#11						
#12						
#13						
#14						
#15						
#16						

2. Mann-Kendall Non-parametric Statistical Test Results

Hazardous Substance?	Gasoline	Benzene	Toluene	Ethylbenzene	Xylenes	
Confidence Level Calculated?	64.00%	-500.00%	-500.00%	-500.00%	-500.00%	NA
Plume Stability?	Undetermined	Stable	Stable	Stable	Stable	NA
Coefficient of Variation?	CV > 1	CV <= 1	CV <= 1	CV <= 1	CV <= 1	n<4
Mann-Kendall Statistic "S" value?	-3	0	0	0	0	0
Number of Sampling Rounds?	6	6	6	6	6	0
Average Concentration?	43.33	0.50	0.50	0.50	1.50	NA
Standard Deviation?	44.91	0.00	0.00	0.00	0.00	NA
Coefficient of Variation?	1.04	0.00	0.00	0.00	0.00	NA
Blank if No Errors found						n<4

3. Temporal Trend: Plot of Concentration vs. Sampling TimeHazardous substance? GasolinePlume Stability? Undetermined

Note: relationship of " $y/x \leq 0.33$ " is preferred

Note: relationship of " $y/x \leq 0.33$ " is preferred

2. Groundwater Elevation:

[illegible]

Module 2: Graphical Presentation of Historical Ground Water Data: (Well to Well Analysis)

Site Name: Hilton Seattle Hotel

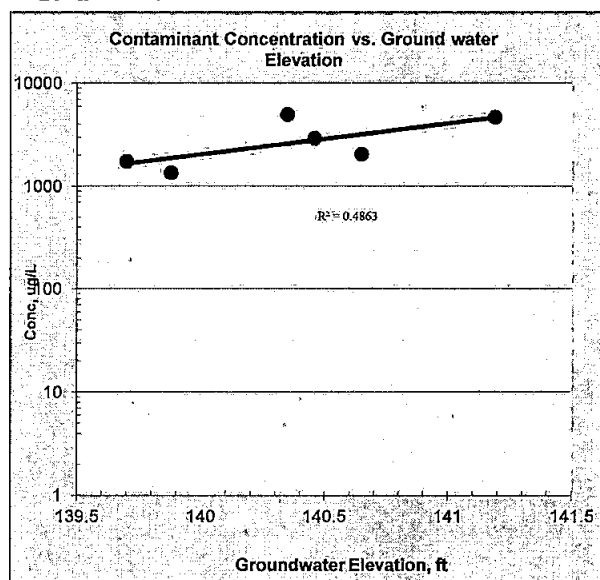
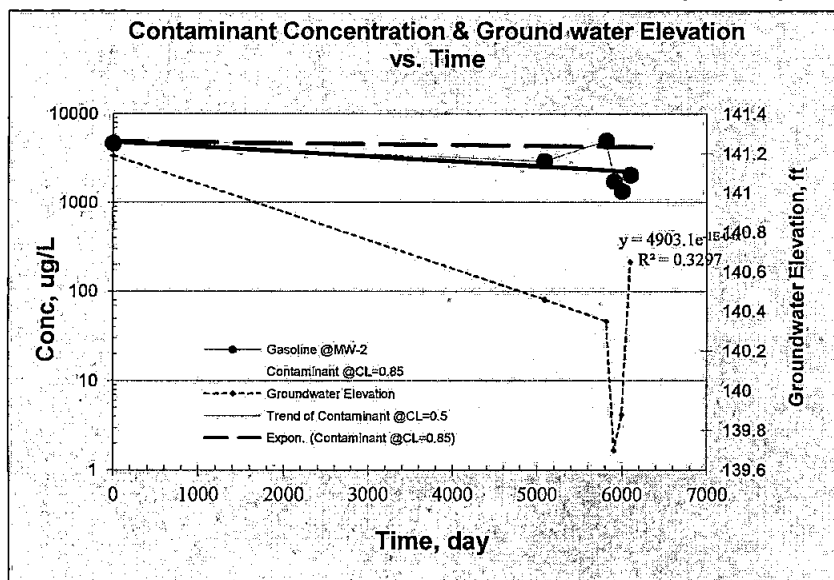
Site Address: Seattle, WA

Additional Description: NA Evaluation

Hazardous Substance Gasoline

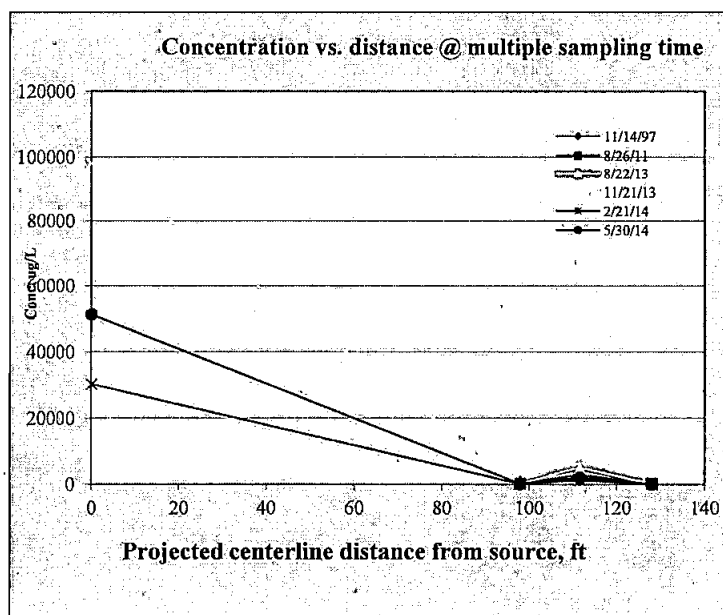
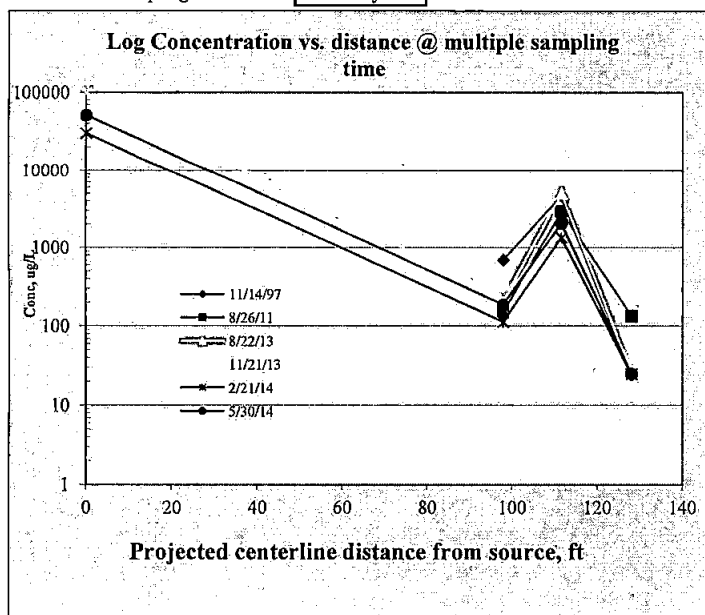
1. Temporal Trend at a Well (Concentration vs. Time & Groundwater Elevation : well-to-well analysis)

Name of Sampling Well?	MW-2	Confidence Level (Decision Criteria)?	85.0%
Confidence Level calculated with log-linear regression is?	76.660%		
Plume Stability?	Stable	; Decision Criteria is 85%.	
Slope: Point decay rate constant (k_{point}), yr^{-1}	0.047 @50% C.L.;	0.008 @85% C.L.	
Half Life for k_{point} , yr	14.821 @50% C.L.;	84.235 @85% C.L.	



2. Spatial and Temporal Trend along Overall Plume Length for Multiple Wells:

Plot #1: Sampling date #1	14-Nov-97
Plot #2: Sampling date #2	26-Aug-11
Plot #3: Sampling date #3	22-Aug-13
Plot #4: Sampling date #4	21-Nov-13
Plot #5: Sampling date #5	21-Feb-14
Plot #6: Sampling date #6	30-May-14



Module 2: Graphical Presentation of Historical Ground Water Data: (Well to Well Analysis)

Site Name: Hilton Seattle Hotel

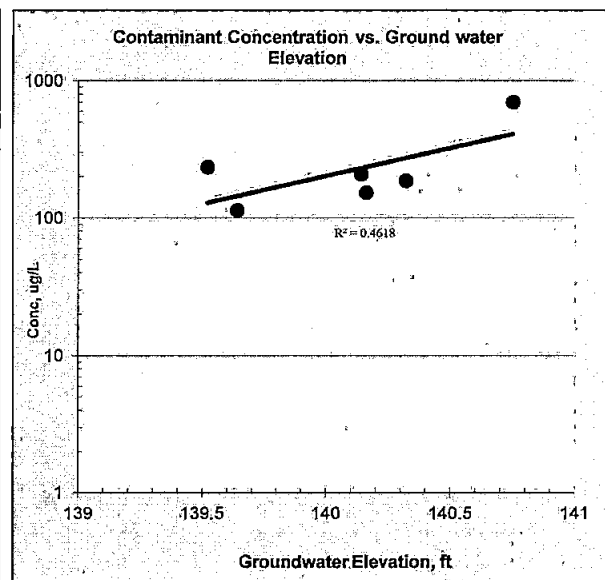
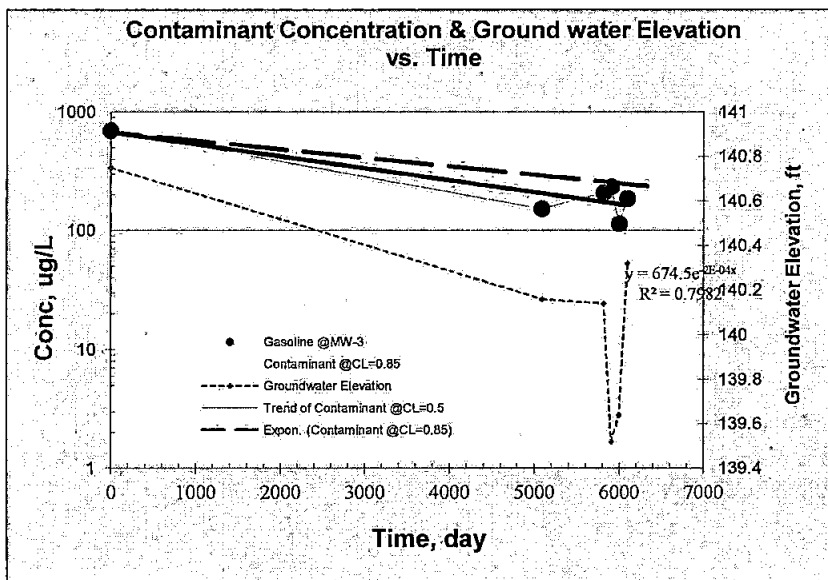
Site Address: Seattle, WA

Additional Description: NA Evaluation

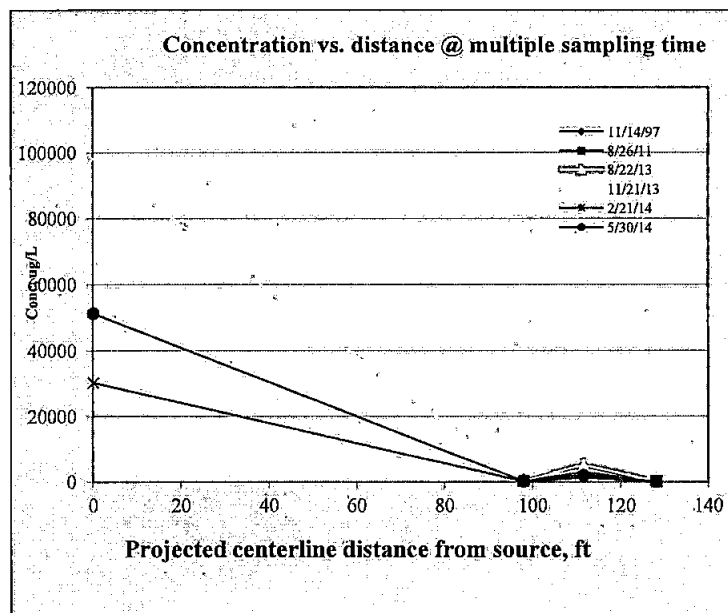
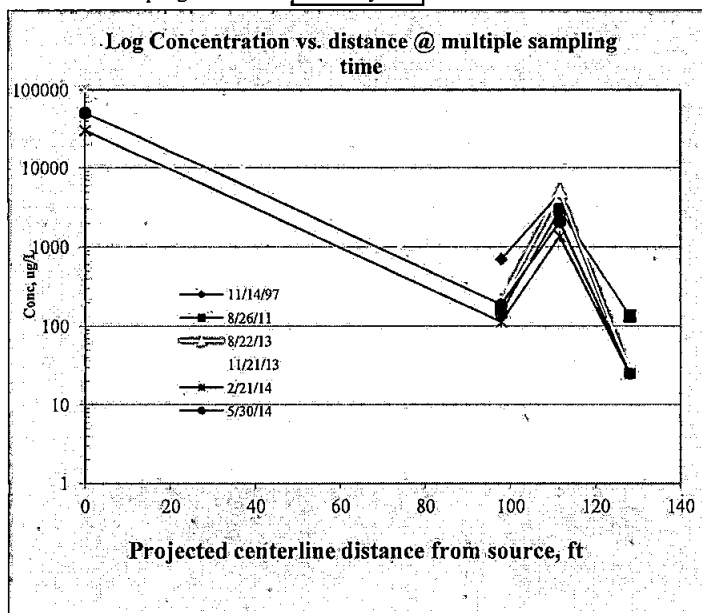
Hazardous Substance Gasoline

1. Temporal Trend at a Well (Concentration vs. Time & Groundwater Elevation : well-to-well analysis)

Name of Sampling Well?	MW-3	Confidence Level (Decision Criteria)?	85.0%
Confidence Level calculated with log-linear regression is?	98.356%		
Plume Stability?	Shrinking	; Decision Criteria is 85%.	
Slope: Point decay rate constant (k_{point}), yr^{-1}	0.085 @50% C.L.;	0.060 @85% C.L.	
Half Life for k_{point} , yr	8.145 @50% C.L.;	11.481 @85% C.L.	

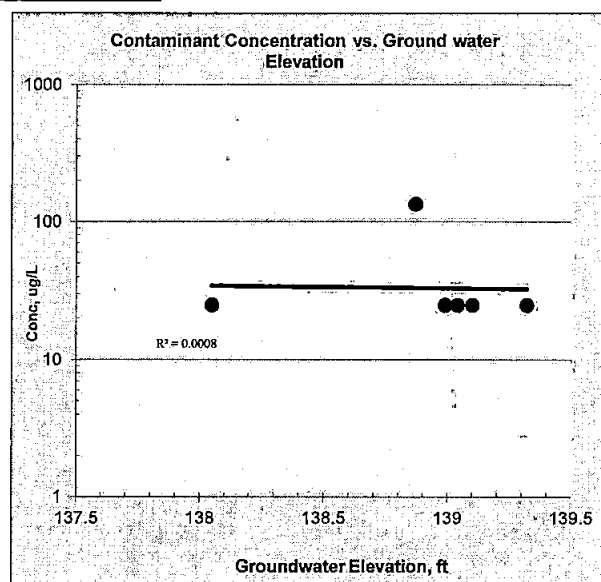
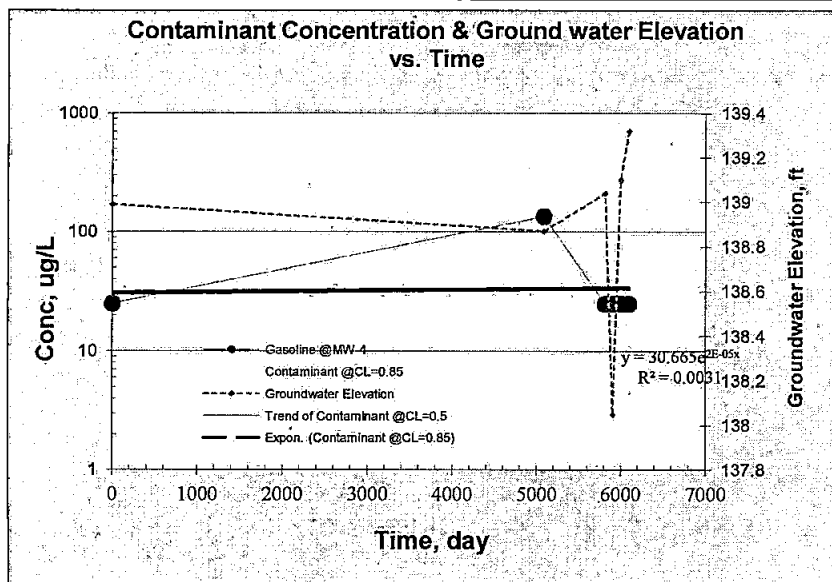
**2. Spatial and Temporal Trend along Overall Plume Length for Multiple Wells:**

Plot #1: Sampling date #1	14-Nov-97
Plot #2: Sampling date #2	26-Aug-11
Plot #3: Sampling date #3	22-Aug-13
Plot #4: Sampling date #4	21-Nov-13
Plot #5: Sampling date #5	21-Feb-14
Plot #6: Sampling date #6	30-May-14

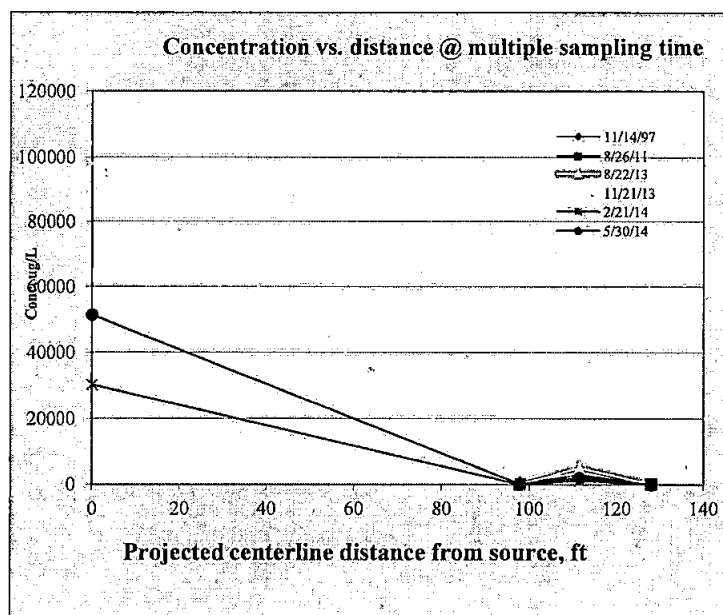
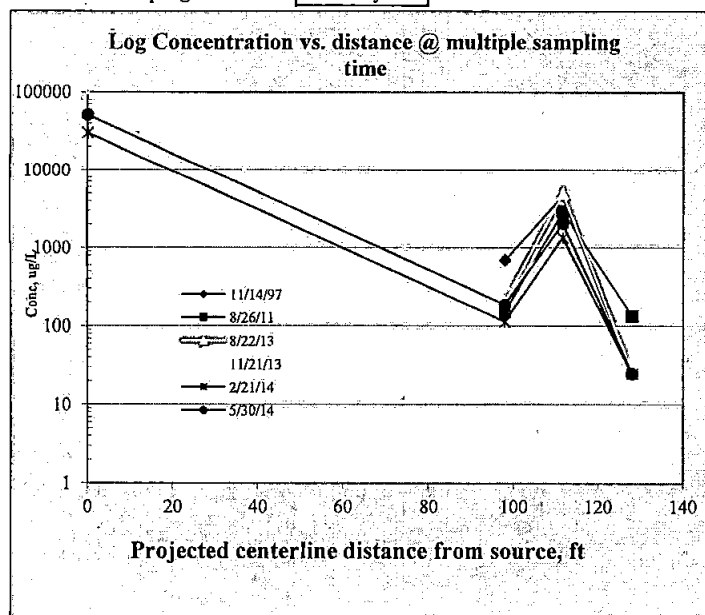


Module 2: Graphical Presentation of Historical Ground Water Data: (Well to Well Analysis)Site Name: *Hilton Seattle Hotel*Site Address: *Seattle, WA*Additional Description: *NA Evaluation*Hazardous Substance *Gasoline***1. Temporal Trend at a Well (Concentration vs. Time & Groundwater Elevation : well-to-well analysis)**

Name of Sampling Well?	MW-4	Confidence Level (Decision Criteria)?	85.0%
Confidence Level calculated with log-linear regression is?	8.285%		
Plume Stability?	UD	; Decision Criteria is 85%.	
Slope: Point decay rate constant (k_{point}), yr^{-1}	NA	@50% C.L.;	NA @85% C.L.
Half Life for k_{point} , yr	NA	@50% C.L.;	NA @85% C.L.

**2. Spatial and Temporal Trend along Overall Plume Length for Multiple Wells:**

Plot #1: Sampling date #1	14-Nov-97
Plot #2: Sampling date #2	26-Aug-11
Plot #3: Sampling date #3	22-Aug-13
Plot #4: Sampling date #4	21-Nov-13
Plot #5: Sampling date #5	21-Feb-14
Plot #6: Sampling date #6	30-May-14



Module 2: Temporal Analysis: Concentration of contaminant vs. time (Regression Analysis at each well)Site Name: *Hilton Seattle Hotel*Site Address: *Seattle, WA*Additional Description: *NA Evaluation*Hazardous Substance *Gasoline*

1. Level of Confidence (Decision Criteria)?		85%															
2. Prediction: Calculation of Restoration Time and Predicted Concentration at Wells																	
Well Location		MW-5	MW-2	MW-3	MW-4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
A. Cleanup Level (Criterion) to be achieved? ug/L		800	800	800	800												
A.1 Average (@50% CL ¹ best-fitting values)																	
Time to reach the criterion yr		NA	NA	-2.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Date when the Criterion to be achieved date		NA	NA	9/24/95	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
A.2 Boundary (@85% CL)																	
Time to reach the criterion ² yr		NA	NA	-2.83	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Date when the Criterion to be achieved date		NA	NA	11/28/94	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B Date of Prediction? date		9/1/14	9/1/14	9/1/14	9/1/14												
B.1 Average conc predicted (@50% CL) ug/L		NA	NA	159.47	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B.2 Boundary conc predicted (@85% CL) ug/L		NA	NA	242.48	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3. Log-Linear Regression Results																	
Coefficient of Determination r^2		0.285	0.330	0.798	0.003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Correlation Coefficient r		-0.534	-0.574	-0.893	0.055	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Number of data points n		3	6	6	6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4. Statistical Inference on the Slope of the Log-Linear Regression Line with t-statistics																	
One-tailed Confidence Level calculated, %		35.856%	76.660%	98.356%	8.285%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sufficient evidence to support that the slope of the regression line is significantly different from zero?		NO!	NO!	YES!	NO!	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Coefficient of Variation?		0.579	0.521	NA	1.036	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Plume Stability?		Stable	Stable	Shrinking	UD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5. Calculation of Point Decay Rate Constant (k_{point})																	
Slope: Point decay rate constant (k_{point})	@50% CL yr ⁻¹	1.207	0.047	0.085	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	@85% CL yr ⁻¹	NA	0.008	0.060	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Half Life for (k_{point})	@50% CL yr	0.574	14.821	8.145	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	@85% CL yr	NA	84.235	11.481	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: 1. CL : Confidence Level; UD= Undetermined

2. The length of time that will actually be required is estimated to be no more

Note: relationship of " $y/x \leq 0.33$ " is preferred

Note: relationship of " $y/x \leq 0.33$ " is preferred

2. Groundwater Elevation:

[illegible]

Module 2: Graphical Presentation of Historical Ground Water Data: (Well to Well Analysis)

Site Name: Hilton Seattle Hotel

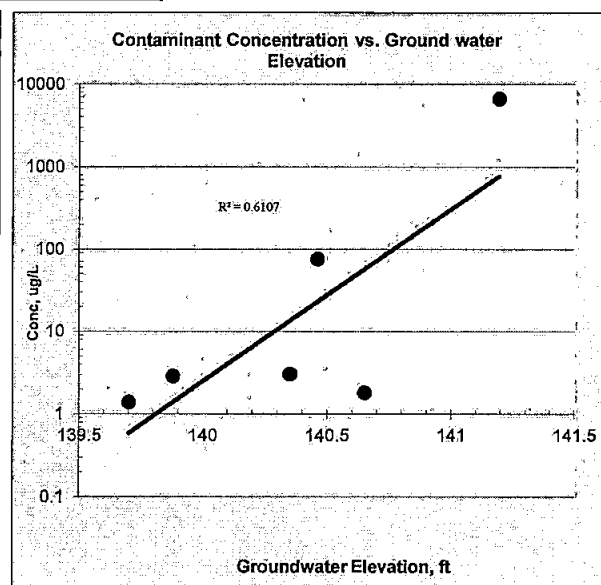
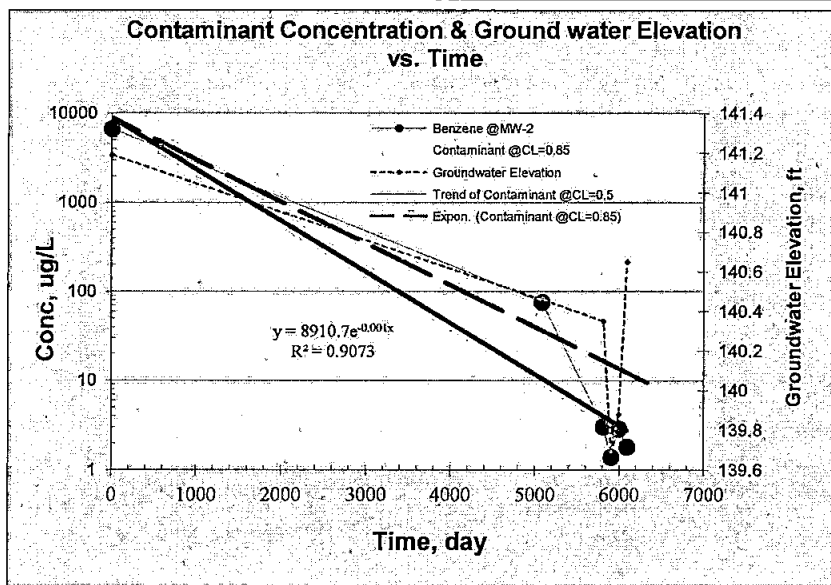
Site Address: Seattle, WA

Additional Description: NA Evaluation

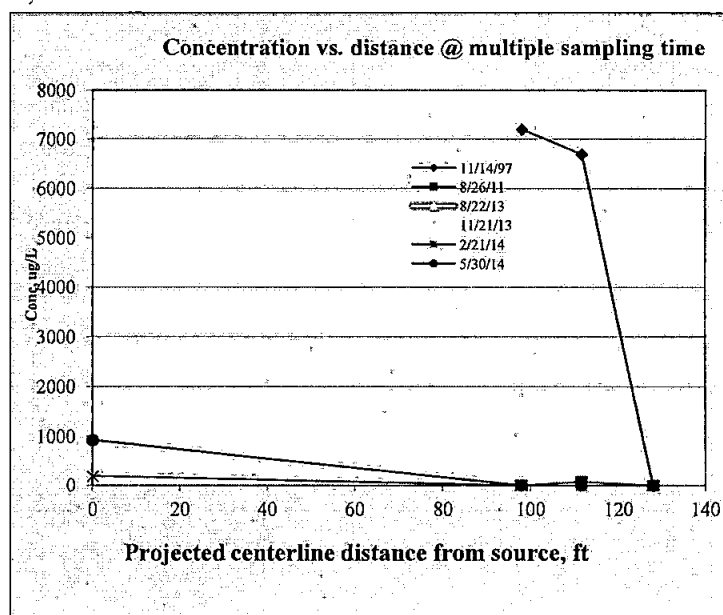
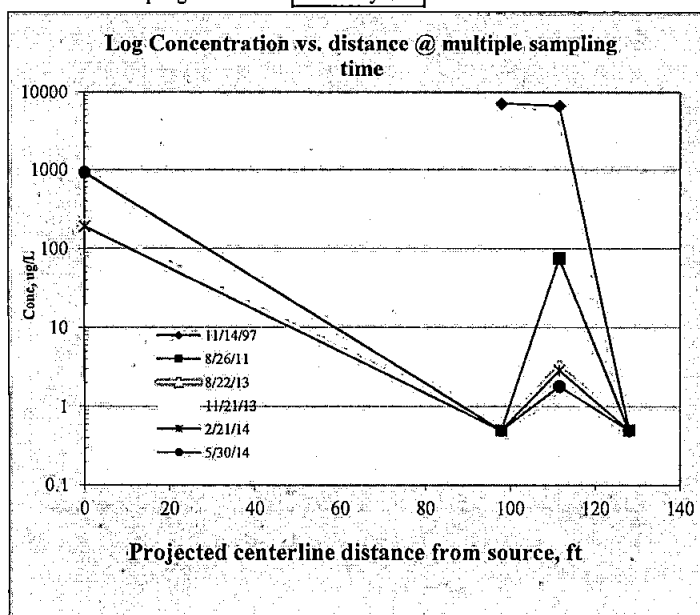
Hazardous Substance Benzene

1. Temporal Trend at a Well (Concentration vs. Time & Groundwater Elevation : well-to-well analysis)

Name of Sampling Well?	MW-2	Confidence Level (Decision Criteria)?	85.0%
Confidence Level calculated with log-linear regression is?	99.667%		
Plume Stability?	Shrinking ; Decision Criteria is 85%.		
Slope: Point decay rate constant (k_{point}), yr^{-1}	0.484 @50% C.L.;	0.395 @85% C.L.	
Half Life for k_{point} , yr	1.432 @50% C.L.;	1.756 @85% C.L.	

**2. Spatial and Temporal Trend along Overall Plume Length for Multiple Wells:**

Plot #1: Sampling date #1	14-Nov-97
Plot #2: Sampling date #2	26-Aug-11
Plot #3: Sampling date #3	22-Aug-13
Plot #4: Sampling date #4	21-Nov-13
Plot #5: Sampling date #5	21-Feb-14
Plot #6: Sampling date #6	30-May-14



Module 2: Graphical Presentation of Historical Ground Water Data: (Well to Well Analysis)

Site Name: Hilton Seattle Hotel

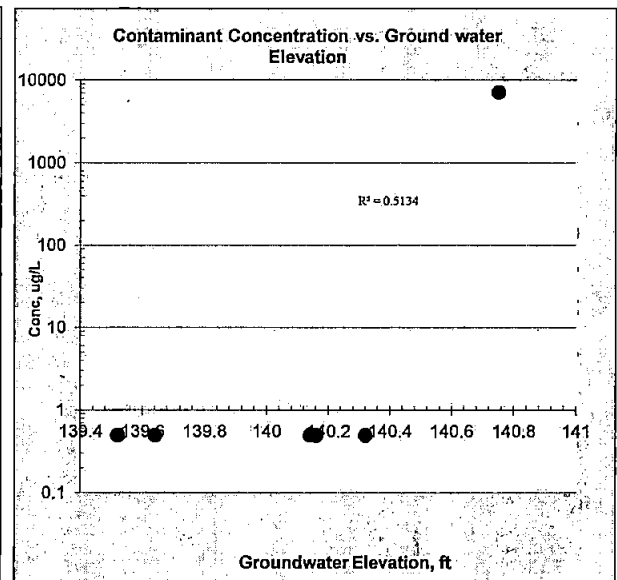
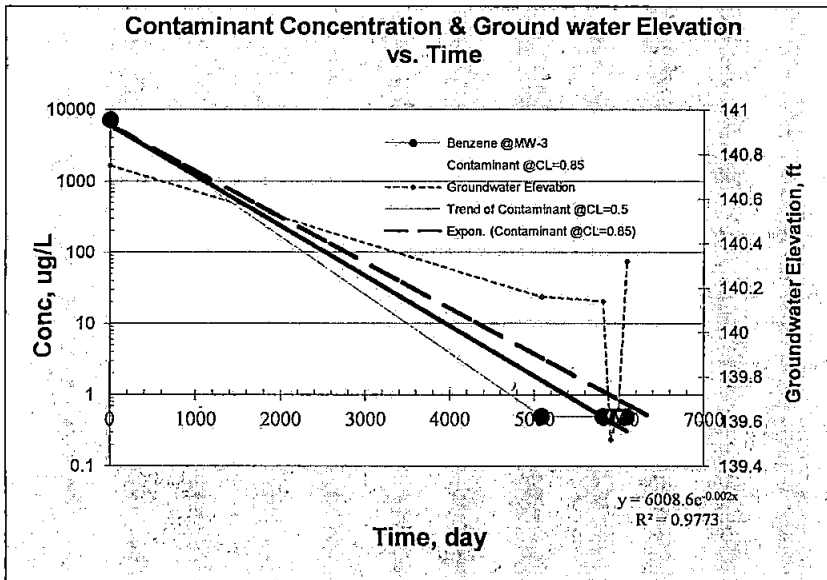
Site Address: Seattle, WA

Additional Description: NA Evaluation

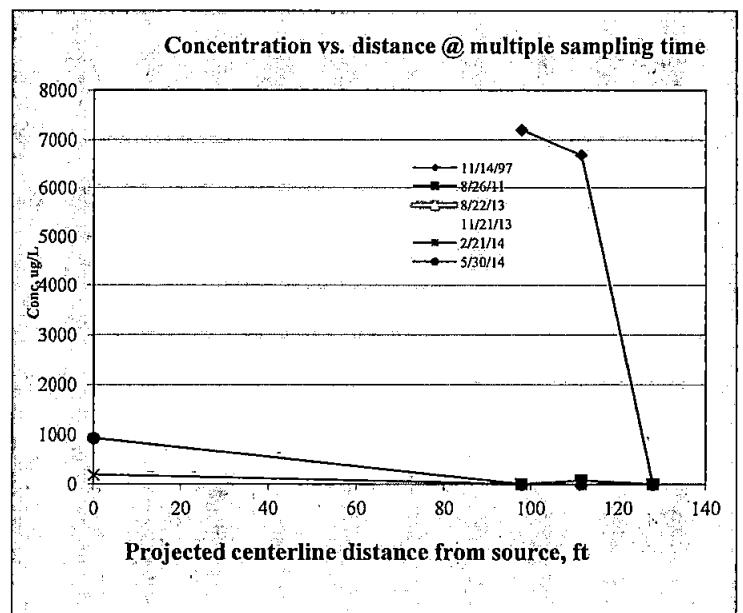
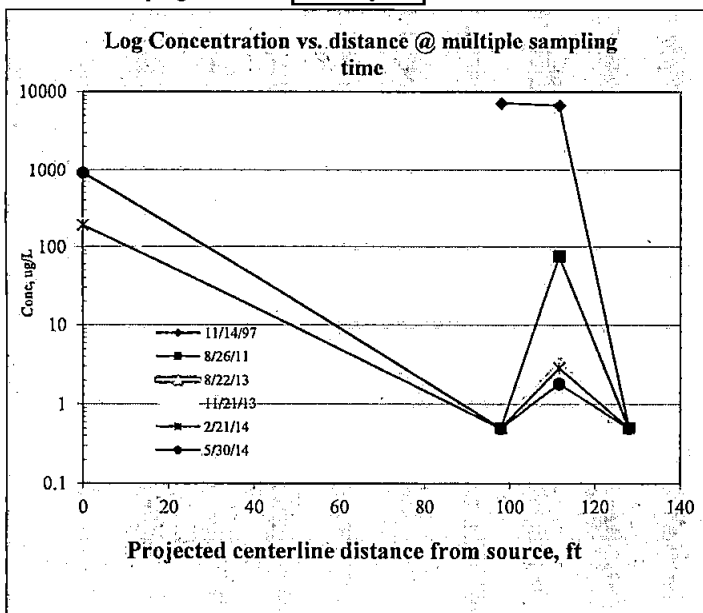
Hazardous Substance Benzene

1. Temporal Trend at a Well (Concentration vs. Time & Groundwater Elevation : well-to-well analysis)

Name of Sampling Well?	MW-3	Confidence Level (Decision Criteria)?	85.0%
Confidence Level calculated with log-linear regression is?	99.981%		
Plume Stability?	Shrinking ; Decision Criteria is 85%.		
Slope: Point decay rate constant (k_{point}), yr^{-1}	0.591 @50% C.L.;	0.539 @85% C.L.	
Half Life for k_{point} , yr	1.172 @50% C.L.;	1.285 @85% C.L.	

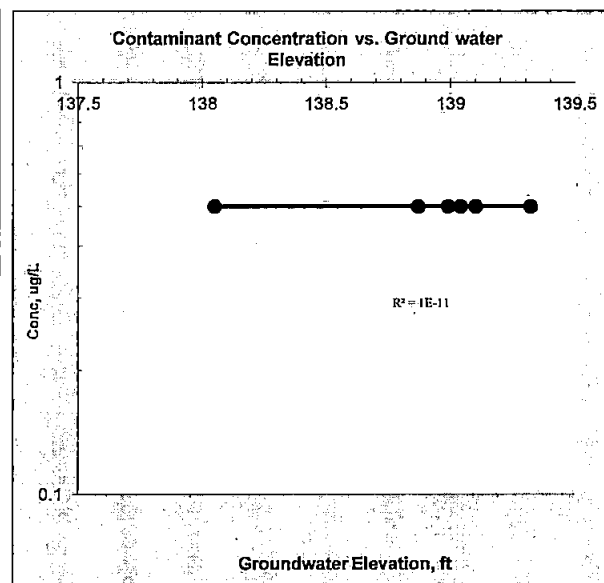
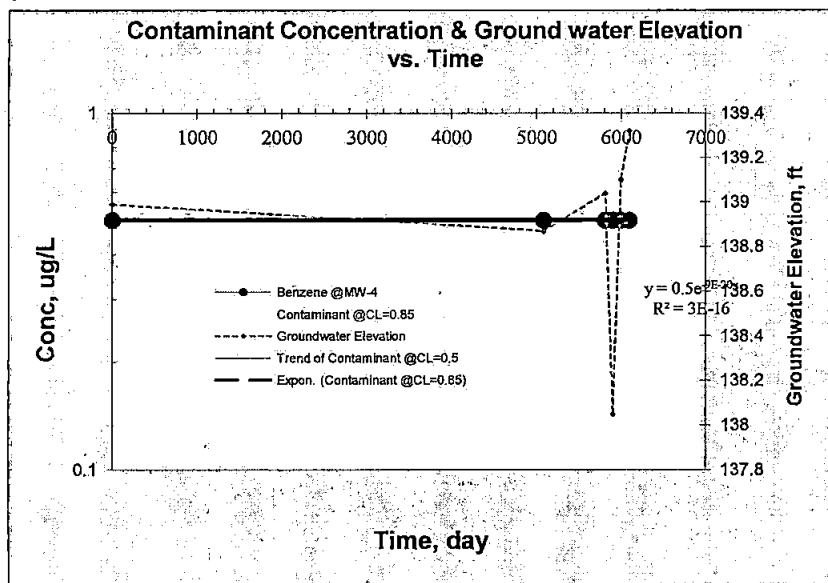
**2. Spatial and Temporal Trend along Overall Plume Length for Multiple Wells:**

Plot #1: Sampling date #1	14-Nov-97
Plot #2: Sampling date #2	26-Aug-11
Plot #3: Sampling date #3	22-Aug-13
Plot #4: Sampling date #4	21-Nov-13
Plot #5: Sampling date #5	21-Feb-14
Plot #6: Sampling date #6	30-May-14

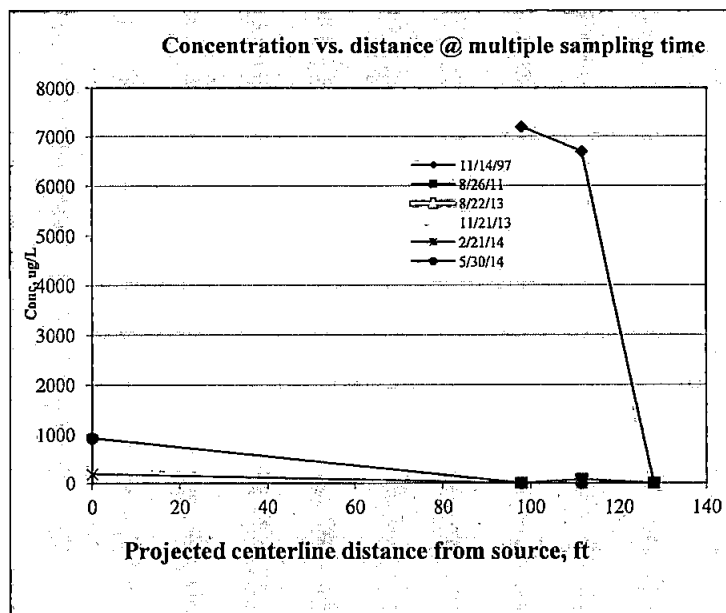
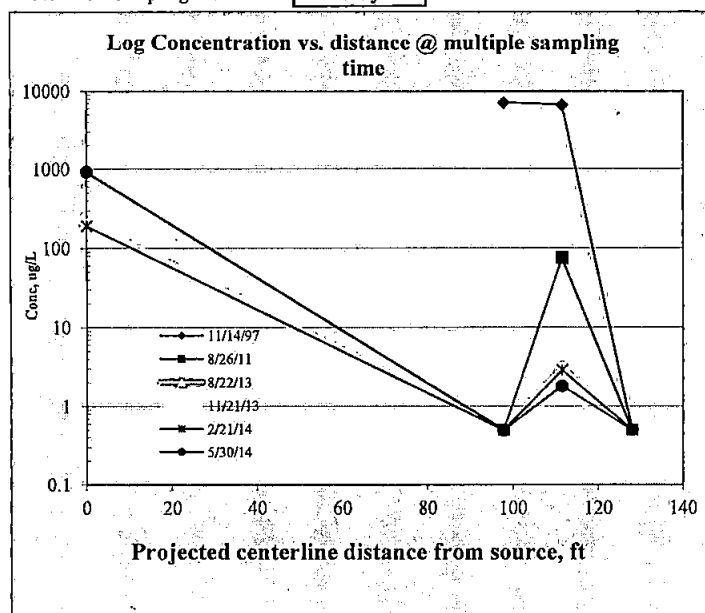


Module 2: Graphical Presentation of Historical Ground Water Data: (Well to Well Analysis)Site Name: *Hilton Seattle Hotel*Site Address: *Seattle, WA*Additional Description: *NA Evaluation*Hazardous Substance: *Benzene***1. Temporal Trend at a Well (Concentration vs. Time & Groundwater Elevation : well-to-well analysis)**

Name of Sampling Well?	MW-4	Confidence Level (Decision Criteria)?	85.0%
Confidence Level calculated with log-linear regression is?	NA		
Plume Stability?	NA	; Decision Criteria is 85%.	
Slope: Point decay rate constant (k_{point}), yr^{-1}	NA	@50% C.L.;	NA @85% C.L.
Half Life for k_{point} , yr	NA	@50% C.L.;	NA @85% C.L.

**2. Spatial and Temporal Trend along Overall Plume Length for Multiple Wells:**

Plot #1: Sampling date #1	14-Nov-97
Plot #2: Sampling date #2	26-Aug-11
Plot #3: Sampling date #3	22-Aug-13
Plot #4: Sampling date #4	21-Nov-13
Plot #5: Sampling date #5	21-Feb-14
Plot #6: Sampling date #6	30-May-14



Module 2: Temporal Analysis: Concentration of contaminant vs. time (Regression Analysis at each well)

Site Name: Hilton Seattle Hotel

Site Address: Seattle, WA

Additional Description: NA Evaluation

Hazardous Substance Benzene

1. Level of Confidence (Decision Criteria)?

85%

2. Prediction: Calculation of Restoration Time and Predicted Concentration at Wells

Well Location	MW-5	MW-2	MW-3	MW-4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
A. Cleanup Level (Criterion) to be achieved? ug/L	800	800	800	800												
A.1 Average (@50% CL ¹ best-fitting values)																
Time to reach the criterion yr	NA	4.98	3.41	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Date when the Criterion to be achieved date	NA	9/16/02	2/20/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
A.2 Boundary (@85% CL)																
Time to reach the criterion ² yr	NA	6.11	3.74	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Date when the Criterion to be achieved date	NA	11/1/03	6/20/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B Date of Prediction? date	9/1/14	9/1/14	9/1/14	9/1/14												
B.1 Average conc predicted (@50% CL) ug/L	NA	2.44	0.27	#DIV/0!	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B.2 Boundary conc predicted (@85% CL) ug/L	NA	11.09	0.64	#DIV/0!	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

3. Log-Linear Regression Results

Coefficient of Determination r^2	0.674	0.907	0.977	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Correlation Coefficient r	0.821	-0.953	-0.989	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Number of data points n	3	6	6	6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

4. Statistical Inference on the Slope of the Log-Linear Regression Line with t-statistics

One-tailed Confidence Level calculated, %	61.323%	99.667%	99.981%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sufficient evidence to support that the slope of the regression line is significantly different from zero?	NO!	YES!	YES!	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Coefficient of Variation?	0.919	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Plume Stability?	Stable	Shrinking	Shrinking	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

5. Calculation of Point Decay Rate Constant (k_{point})

Slope: Point decay rate constant (k_{point})	@50% CL yr ⁻¹	2.712	0.484	0.591	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	@85% CL yr ⁻¹	0.098	0.395	0.539	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Half Life for (k_{point})	@50% CL yr	0.256	1.432	1.172	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	@85% CL yr	7.053	1.756	1.285	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: 1. CL : Confidence Level; UD= Undetermined

2. The length of time that will actually be required is estimated to be no more

Note: relationship of " $y/x \leq 0.33$ " is preferred

Note: relationship of " $y/x \leq 0.33$ " is preferred

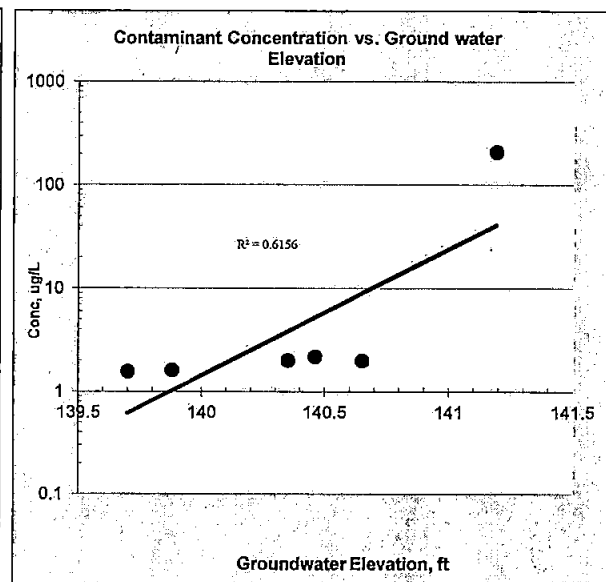
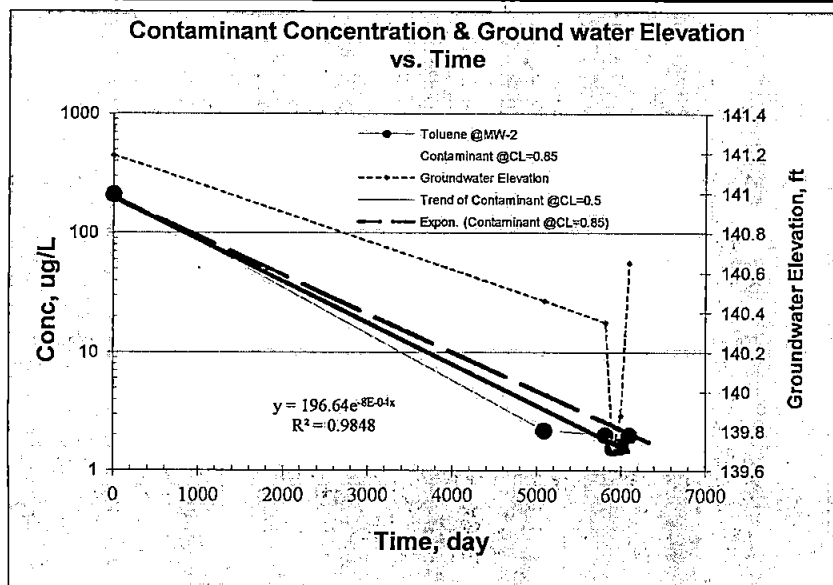
2. Groundwater Elevation:

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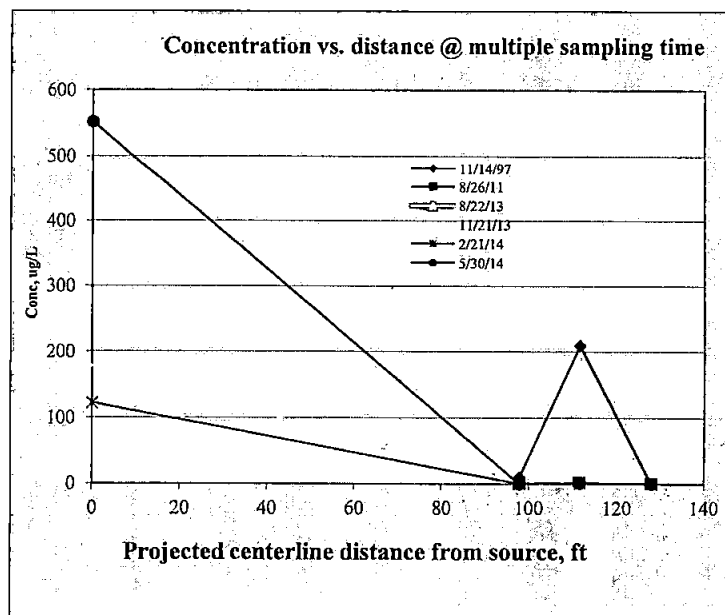
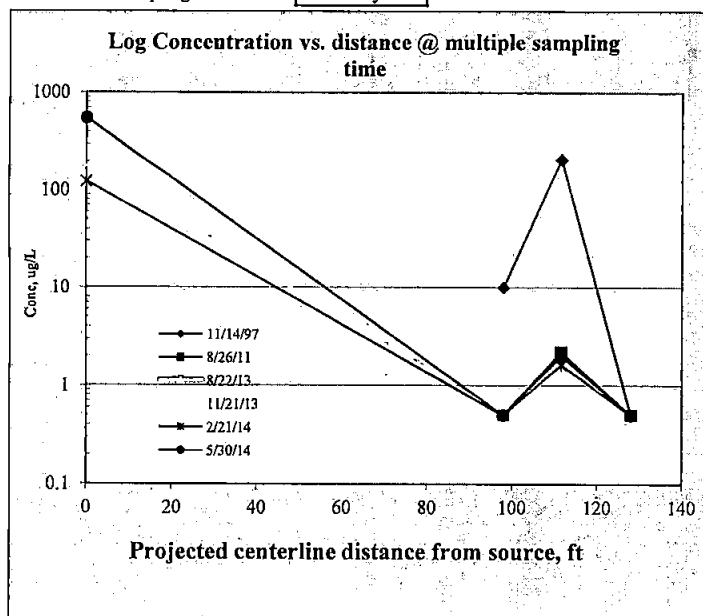
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Module 2: Graphical Presentation of Historical Ground Water Data: (Well to Well Analysis)Site Name: *Hilton Seattle Hotel*Site Address: *Seattle, WA*Additional Description: *NA Evaluation*Hazardous Substance *Toluene***1. Temporal Trend at a Well (Concentration vs. Time & Groundwater Elevation : well-to-well analysis)**

Name of Sampling Well?	MW-2	Confidence Level (Decision Criteria)?	85.0%
Confidence Level calculated with log-linear regression is?	99.991%		
Plume Stability?	Shrinking ; Decision Criteria is 85%.		
Slope: Point decay rate constant (k_{point}), yr^{-1}	0.294 @50% C.L.;	0.273 @85% C.L.	
Half Life for k_{point} , yr	2.360 @50% C.L.;	2.543 @85% C.L.	

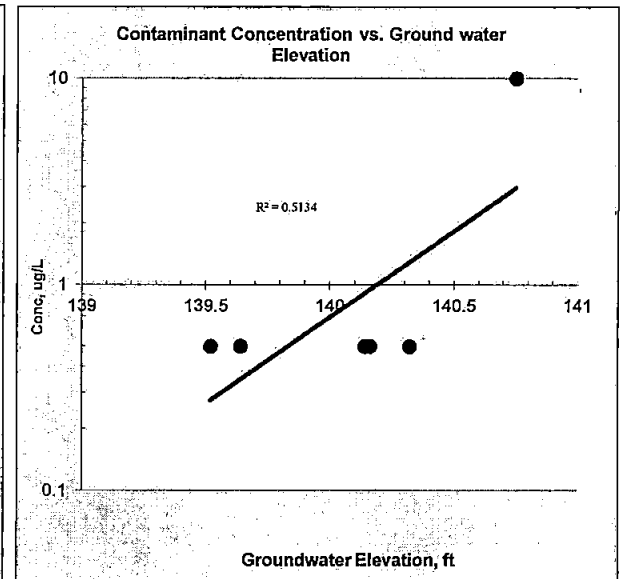
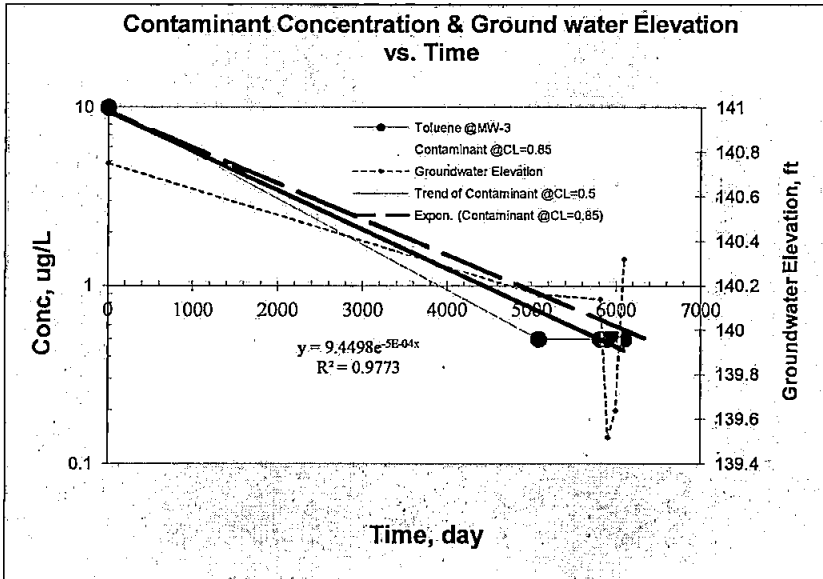
**2. Spatial and Temporal Trend along Overall Plume Length for Multiple Wells:**

Plot #1: Sampling date #1	14-Nov-97
Plot #2: Sampling date #2	26-Aug-11
Plot #3: Sampling date #3	22-Aug-13
Plot #4: Sampling date #4	21-Nov-13
Plot #5: Sampling date #5	21-Feb-14
Plot #6: Sampling date #6	30-May-14

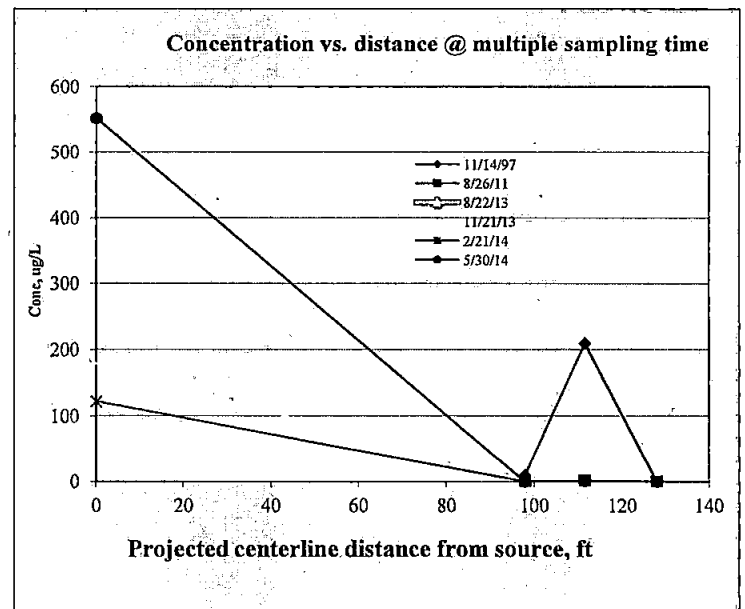
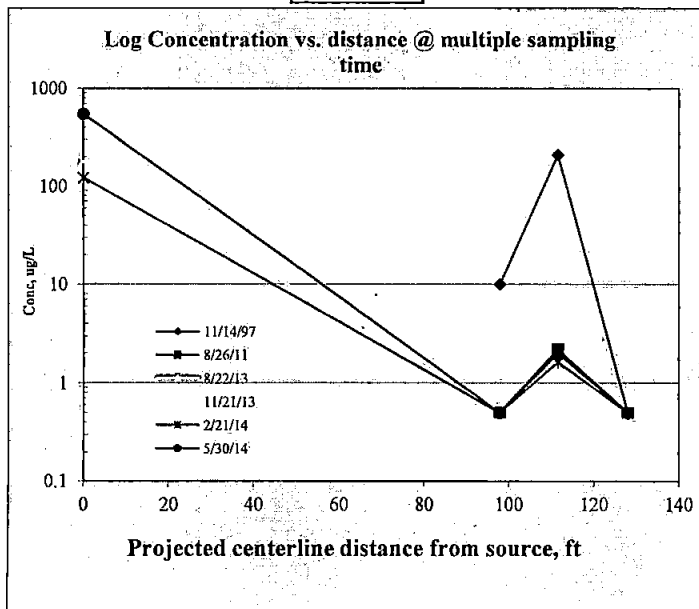


Module 2: Graphical Presentation of Historical Ground Water Data: (Well to Well Analysis)Site Name: *Hilton Seattle Hotel*Site Address: *Seattle, WA*Additional Description: *NA Evaluation*Hazardous Substance *Toluene***1. Temporal Trend at a Well (Concentration vs. Time & Groundwater Elevation : well-to-well analysis)**

Name of Sampling Well?	MW-3	Confidence Level (Decision Criteria)?	85.0%
Confidence Level calculated with log-linear regression is?	99.981%		
Plume Stability?	Shrinking	; Decision Criteria is 85%.	
Slope: Point decay rate constant (k_{point}), yr^{-1}	0.185 @50% C.L.;	0.169 @85% C.L.	
Half Life for k_{point} , yr	3.746 @50% C.L.;	4.108 @85% C.L.	

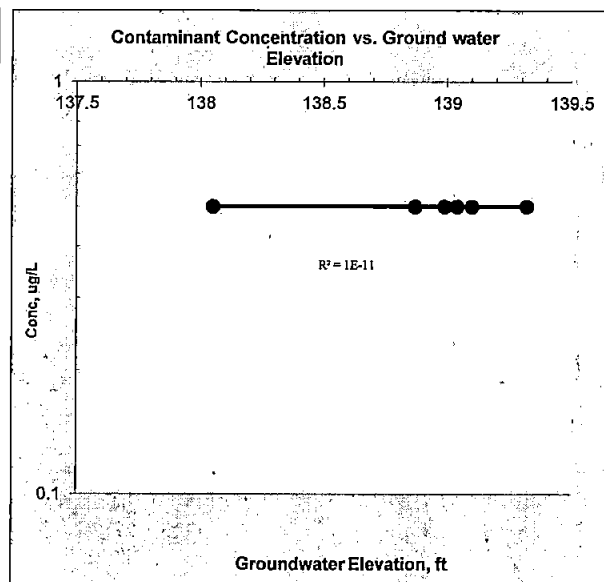
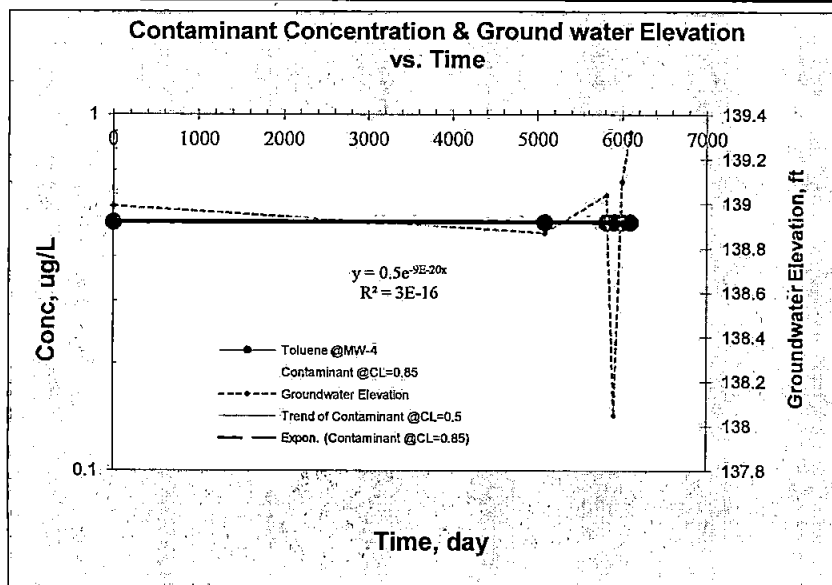
**2. Spatial and Temporal Trend along Overall Plume Length for Multiple Wells:**

Plot #1: Sampling date #1	14-Nov-97
Plot #2: Sampling date #2	26-Aug-11
Plot #3: Sampling date #3	22-Aug-13
Plot #4: Sampling date #4	21-Nov-13
Plot #5: Sampling date #5	21-Feb-14
Plot #6: Sampling date #6	30-May-14

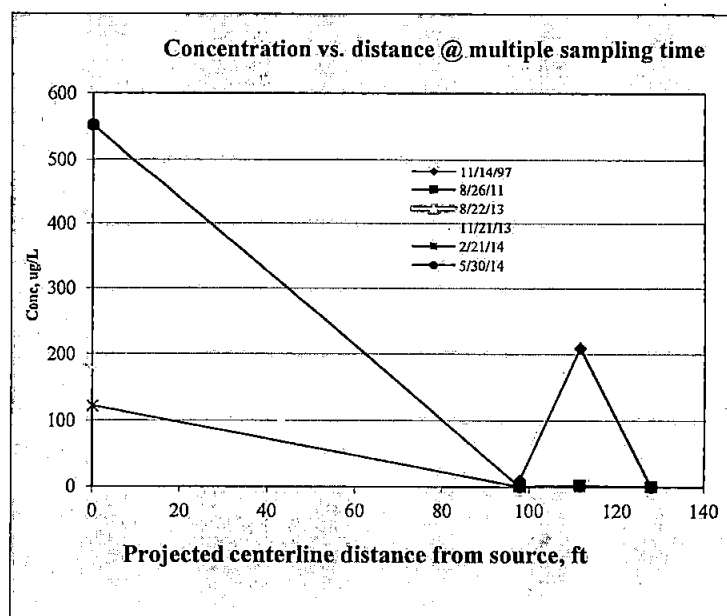
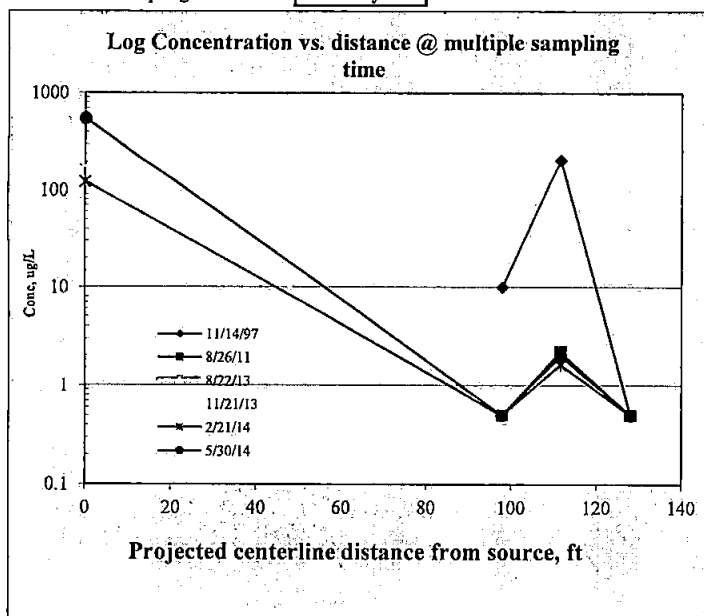


Module 2: Graphical Presentation of Historical Ground Water Data: (Well to Well Analysis)Site Name: *Hilton Seattle Hotel*Site Address: *Seattle, WA*Additional Description: *NA Evaluation*Hazardous Substance *Toluene***1. Temporal Trend at a Well (Concentration vs. Time & Groundwater Elevation : well-to-well analysis)**

Name of Sampling Well?	MW-4	Confidence Level (Decision Criteria)?	85.0%
Confidence Level calculated with log-linear regression is?	NA		
Plume Stability?	NA ; Decision Criteria is 85%.		
Slope: Point decay rate constant (k_{point}), yr^{-1}	NA @50% C.L.;	NA @85% C.L.	
Half Life for k_{point} , yr	NA @50% C.L.;	NA @85% C.L.	

**2. Spatial and Temporal Trend along Overall Plume Length for Multiple Wells:**

Plot #1: Sampling date #1	14-Nov-97
Plot #2: Sampling date #2	26-Aug-11
Plot #3: Sampling date #3	22-Aug-13
Plot #4: Sampling date #4	21-Nov-13
Plot #5: Sampling date #5	21-Feb-14
Plot #6: Sampling date #6	30-May-14



Module 2: Temporal Analysis: Concentration of contaminant vs. time (Regression Analysis at each well)Site Name: *Hilton Seattle Hotel*Site Address: *Seattle, WA*Additional Description: *NA Evaluation*Hazardous Substance *Toluene***1. Level of Confidence (Decision Criteria)?****85%****2. Prediction: Calculation of Restoration Time and Predicted Concentration at Wells**

Well Location	MW-5	MW-2	MW-3	MW-4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
A. Cleanup Level (Criterion) to be achieved? ug/L	800	800	800	800													
A.1 Average (@50% CL ¹ best-fitting values)																	
Time to reach the criterion yr	NA	-4.78	-23.99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Date when the Criterion to be achieved date	NA	12/15/92	10/5/73	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
A.2 Boundary (@85% CL)																	
Time to reach the criterion ² yr	NA	-5.15	-26.30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Date when the Criterion to be achieved date	NA	8/2/92	6/13/71	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B Date of Prediction? date	9/1/14	9/1/14	9/1/14	9/1/14													
B.1 Average conc predicted (@50% CL) ug/L	NA	1.36	0.41	#DIV/0!	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B.2 Boundary conc predicted (@85% CL) ug/L	NA	1.94	0.54	#DIV/0!	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

3. Log-Linear Regression Results

Coefficient of Determination r^2	0.533	0.985	0.977	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Correlation Coefficient r	0.730	-0.992	-0.989	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Number of data points n	3	6	6	6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

4. Statistical Inference on the Slope of the Log-Linear Regression Line with t-statistics

One-tailed Confidence Level calculated, %	52.116%	99.991%	99.981%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sufficient evidence to support that the slope of the regression line is significantly different from zero?	NO!	YES!	YES!	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Coefficient of Variation?	0.821	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Plume Stability?	Stable	Shrinking	Shrinking	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

5. Calculation of Point Decay Rate Constant (k_{point})

Slope: Point decay rate constant (k_{point})	@50% CL yr ⁻¹	2.201	0.294	0.185	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	@85% CL yr ⁻¹	NA	0.273	0.169	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Half Life for (k_{point})	@50% CL yr	0.315	2.360	3.746	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	@85% CL yr	NA	2.543	4.108	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: 1. CL : Confidence Level; UD= Undetermined

2. The length of time that will actually be required is estimated to be no more

Note: relationship of " $y/x \leq 0.33$ " is preferred

Note: relationship of " $y/x \leq 0.33$ " is preferred

2. Groundwater Elevation:

[illegible]

Module 2: Graphical Presentation of Historical Ground Water Data: (Well to Well Analysis)

Site Name: Hilton Seattle Hotel

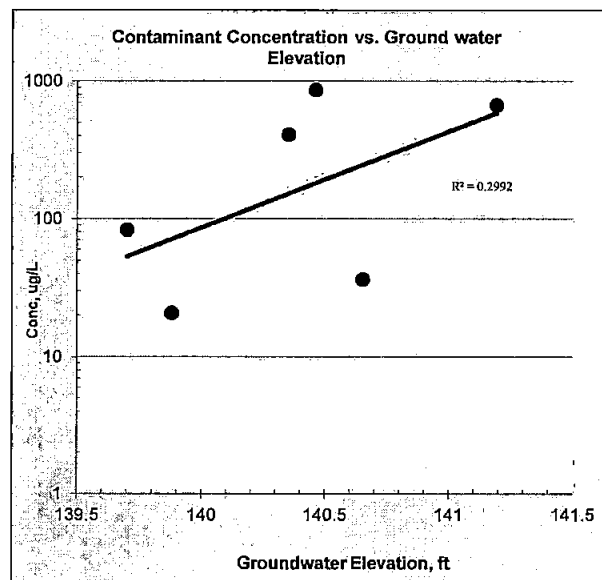
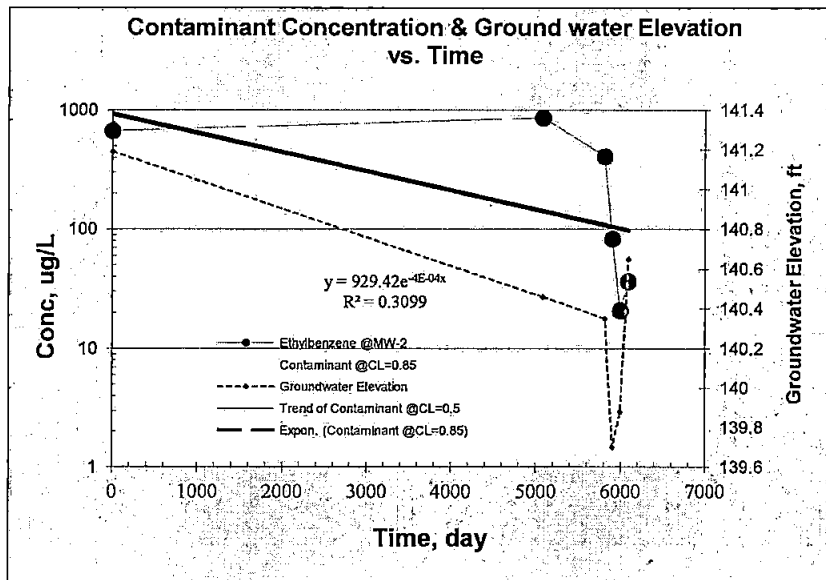
Site Address: Seattle, WA

Additional Description: NA Evaluation

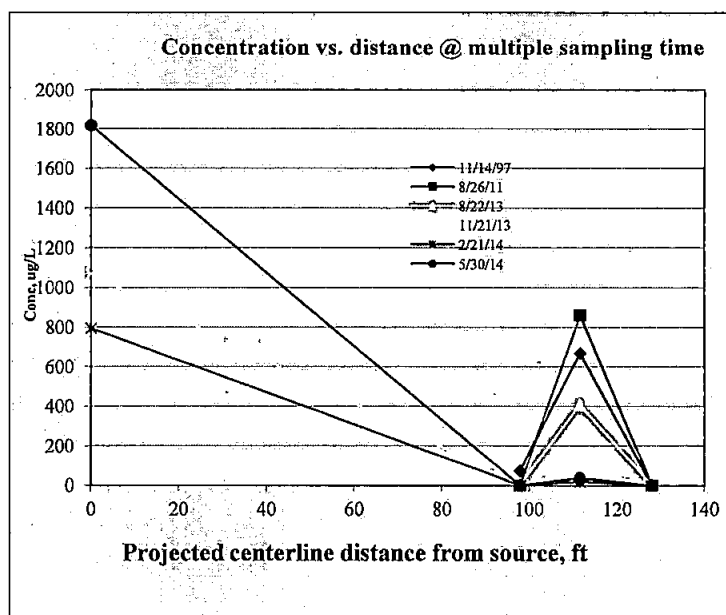
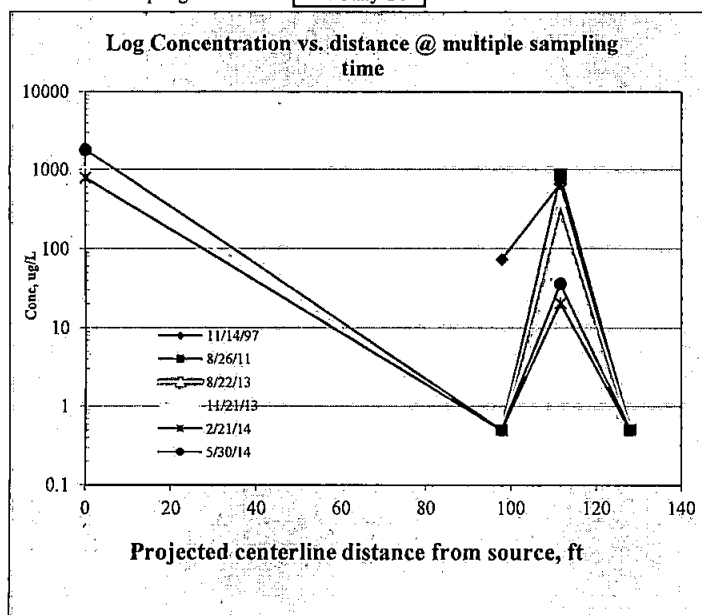
Hazardous Substance Ethylbenzene

1. Temporal Trend at a Well (Concentration vs. Time & Groundwater Elevation : well-to-well analysis)

Name of Sampling Well?	MW-2	Confidence Level (Decision Criteria)?	85.0%
Confidence Level calculated with log-linear regression is?	74.879%		
Plume Stability?	UD	; Decision Criteria is 85%.	
Slope: Point decay rate constant (k_{point}), yr ⁻¹	NA @50% C.L.;	NA @85% C.L.	
Half Life for k_{point} , yr	NA @50% C.L.;	NA @85% C.L.	

**2. Spatial and Temporal Trend along Overall Plume Length for Multiple Wells:**

Plot #1: Sampling date #1	14-Nov-97
Plot #2: Sampling date #2	26-Aug-11
Plot #3: Sampling date #3	22-Aug-13
Plot #4: Sampling date #4	21-Nov-13
Plot #5: Sampling date #5	21-Feb-14
Plot #6: Sampling date #6	30-May-14



Module 2: Graphical Presentation of Historical Ground Water Data: (Well to Well Analysis)

Site Name: Hilton Seattle Hotel

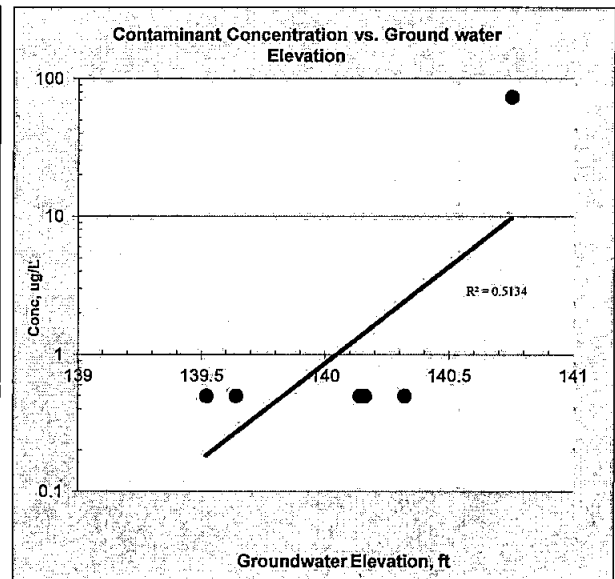
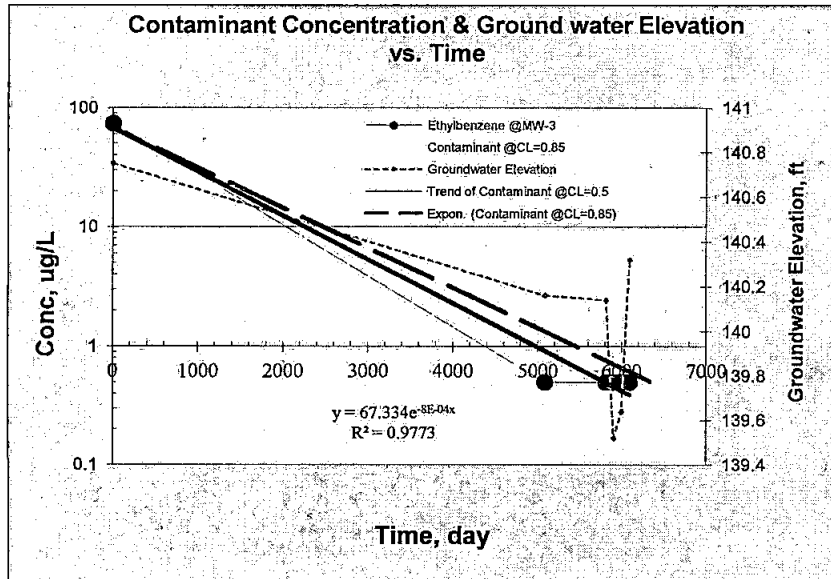
Site Address: Seattle, WA

Additional Description: NA Evaluation

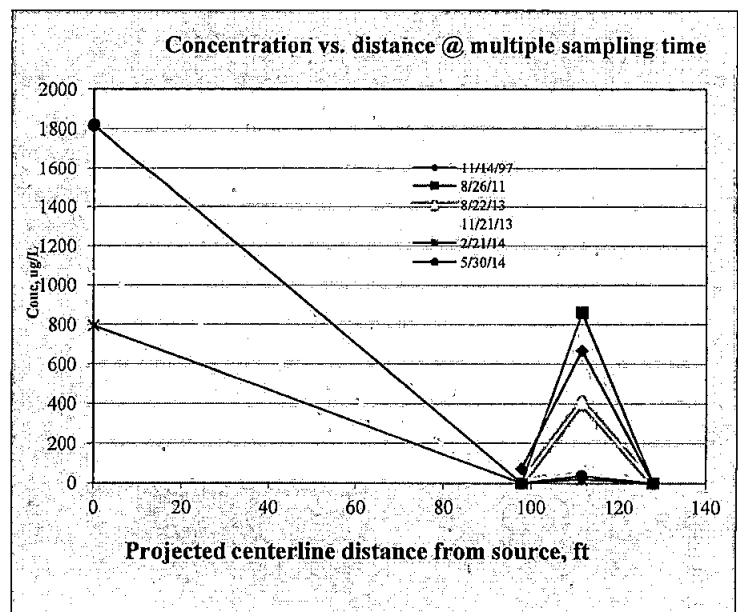
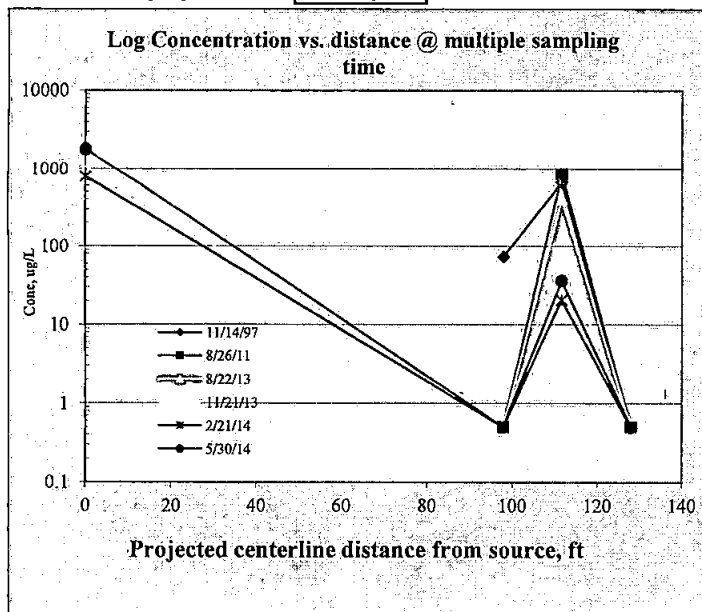
Hazardous Substance Ethylbenzene

1. Temporal Trend at a Well (Concentration vs. Time & Groundwater Elevation : well-to-well analysis)

Name of Sampling Well?	MW-3	Confidence Level (Decision Criteria)?	85.0%
Confidence Level calculated with log-linear regression is?	99.981%		
Plume Stability?	Shrinking ; Decision Criteria is 85%.		
Slope: Point decay rate constant (k_{point}), yr^{-1}	0.309 @50% C.L.;	0.281 @85% C.L.	
Half Life for k_{point} , yr	2.246 @50% C.L.;	2.462 @85% C.L.	

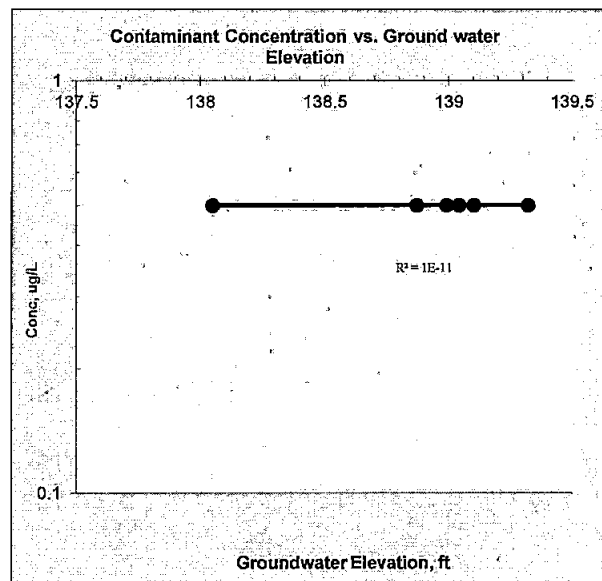
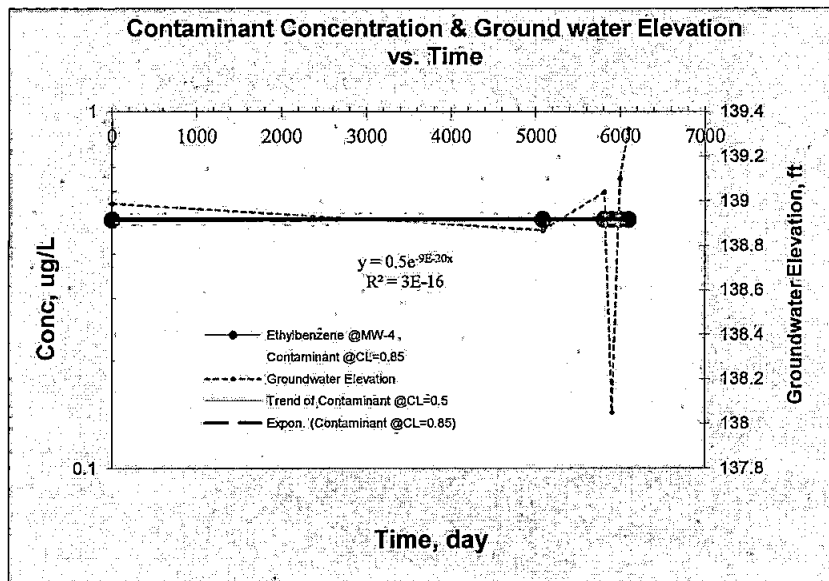
**2. Spatial and Temporal Trend along Overall Plume Length for Multiple Wells:**

Plot #1: Sampling date #1	14-Nov-97
Plot #2: Sampling date #2	26-Aug-11
Plot #3: Sampling date #3	22-Aug-13
Plot #4: Sampling date #4	21-Nov-13
Plot #5: Sampling date #5	21-Feb-14
Plot #6: Sampling date #6	30-May-14

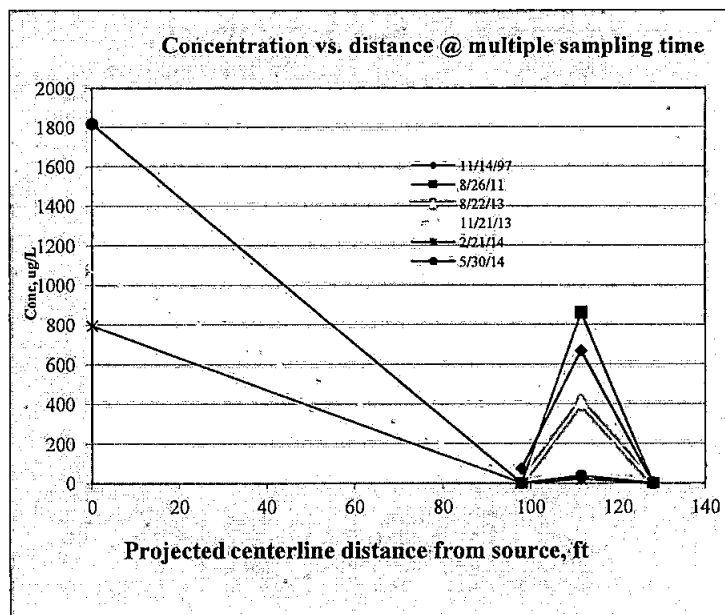
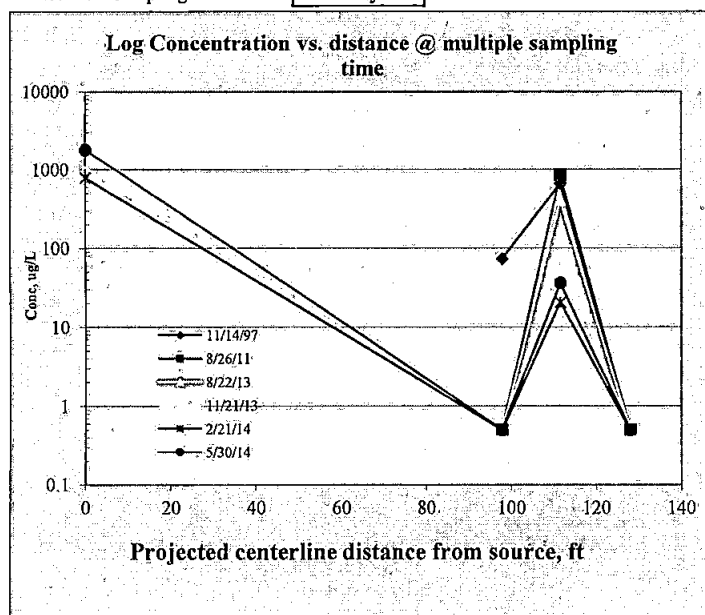


Module 2: Graphical Presentation of Historical Ground Water Data: (Well to Well Analysis)Site Name: *Hilton Seattle Hotel*Site Address: *Seattle, WA*Additional Description: *NA Evaluation*Hazardous Substance *Ethylbenzene***1. Temporal Trend at a Well (Concentration vs. Time & Groundwater Elevation : well-to-well analysis)**

Name of Sampling Well?	MW-4	Confidence Level (Decision Criteria)?	85.0%
Confidence Level calculated with log-linear regression is?	NA		
Plume Stability?	NA	; Decision Criteria is 85%.	
Slope: Point decay rate constant (k_{point}), yr^{-1}	NA	@50% C.L.;	NA @85% C.L.
Half Life for k_{point} , yr	NA	@50% C.L.;	NA @85% C.L.

**2. Spatial and Temporal Trend along Overall Plume Length for Multiple Wells:**

Plot #1: Sampling date #1	14-Nov-97
Plot #2: Sampling date #2	26-Aug-11
Plot #3: Sampling date #3	22-Aug-13
Plot #4: Sampling date #4	21-Nov-13
Plot #5: Sampling date #5	21-Feb-14
Plot #6: Sampling date #6	30-May-14



Module 2: Temporal Analysis: Concentration of contaminant vs. time (Regression Analysis at each well)Site Name: *Hilton Seattle Hotel*Site Address: *Seattle, WA*Additional Description: *NA Evaluation*Hazardous Substance *Ethylbenzene*

1. Level of Confidence (Decision Criteria)?		85%															
2. Prediction: Calculation of Restoration Time and Predicted Concentration at Wells																	
Well Location		MW-5	MW-2	MW-3	MW-4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
A. Cleanup Level (Criterion) to be achieved?	ug/L	800	800	800	800												
A.1 Average (@50% CL ¹ best-fitting values)																	
Time to reach the criterion	yr	NA	NA	-8.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Date when the Criterion to be achieved	date	NA	NA	9/20/89	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
A.2 Boundary (@85% CL)																	
Time to reach the criterion ²	yr	NA	NA	-8.79	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Date when the Criterion to be achieved	date	NA	NA	12/11/88	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B Date of Prediction?	date	9/1/14	9/1/14	9/1/14	9/1/14												
B.1 Average conc predicted (@50% CL)	ug/L	NA	NA	0.36	#DIV/0!	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B.2 Boundary conc predicted (@85% CL)	ug/L	NA	NA	0.57	#DIV/0!	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3. Log-Linear Regression Results																	
Coefficient of Determination	r ²	0.420	0.310	0.977	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Correlation Coefficient	r	0.648	-0.557	-0.989	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Number of data points	n	3	6	6	6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4. Statistical Inference on the Slope of the Log-Linear Regression Line with t-statistics																	
One-tailed Confidence Level calculated, %		44.862%	74.879%	99.981%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sufficient evidence to support that the slope of the regression line is significantly different from zero?		NO!	NO!	YES!	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Coefficient of Variation?		0.431	1.037	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Plume Stability?		Stable	UD	Shrinking	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5. Calculation of Point Decay Rate Constant (<i>k_{point}</i>)																	
Slope: Point decay rate constant (<i>k_{point}</i>)	@50% CL	yr ⁻¹	1.043	NA	0.309	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	@85% CL	yr ⁻¹	NA	NA	0.281	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Half Life for (<i>k_{point}</i>)	@50% CL	yr	0.665	NA	2.246	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	@85% CL	yr	NA	NA	2.462	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: 1. CL : Confidence Level; UD= Undetermined

2. The length of time that will actually be required is estimated to be no more

Note: relationship of " $y/x \leq 0,33$ " is preferred

Note: relationship of " $y/x \leq 0,33$ " is preferred

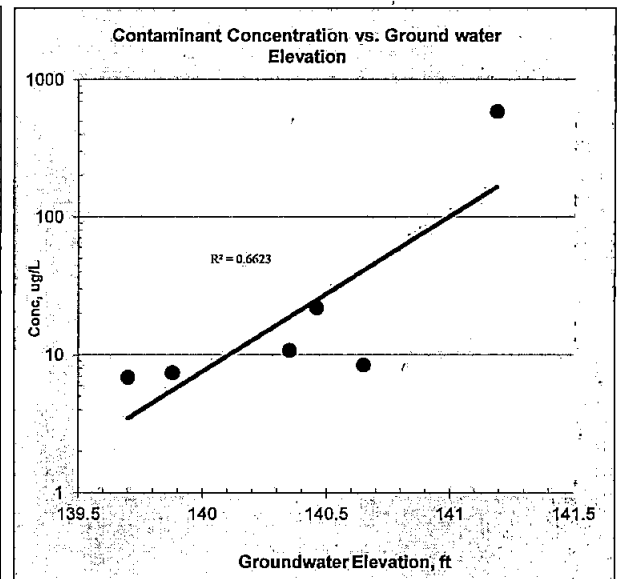
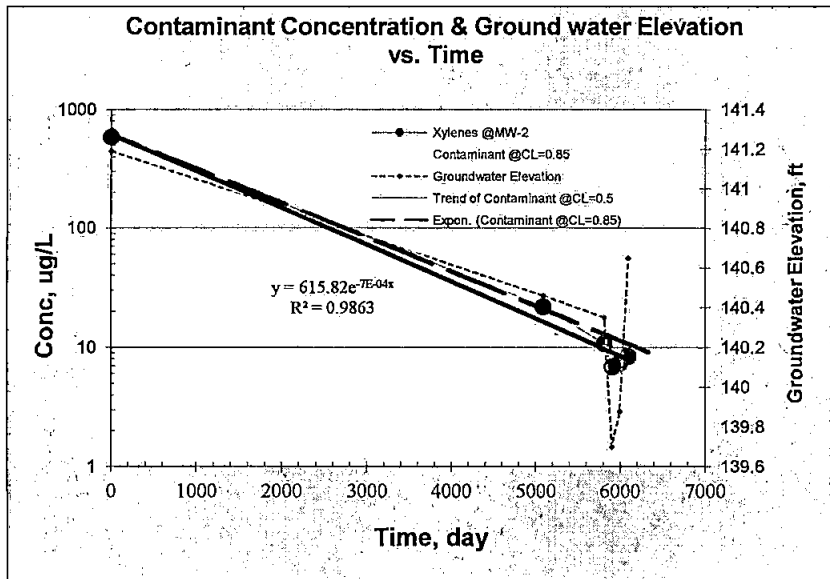
2. Groundwater Elevation:

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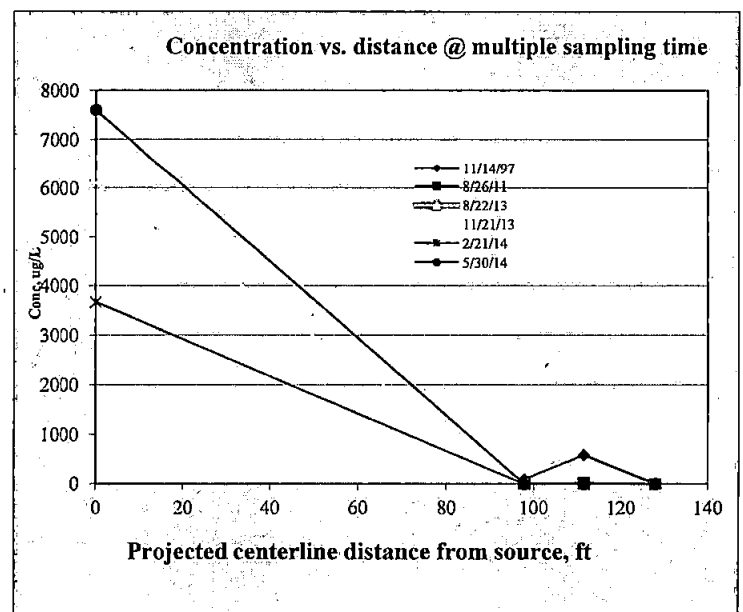
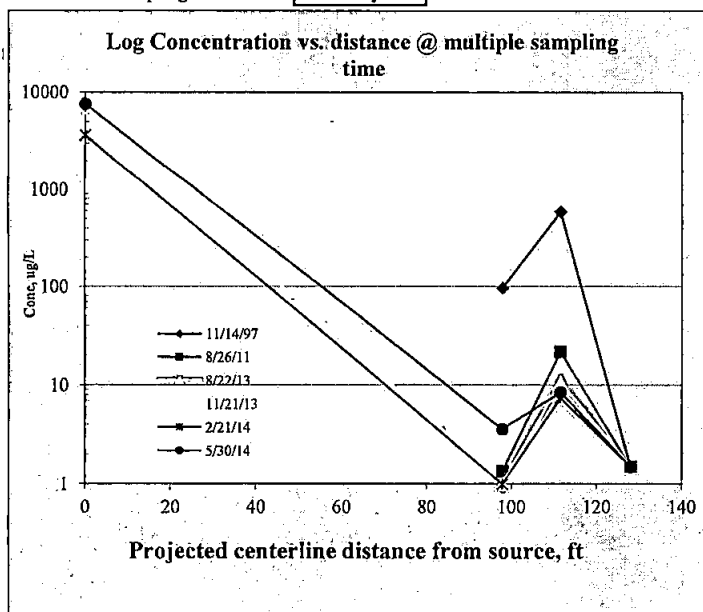
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Module 2: Graphical Presentation of Historical Ground Water Data: (Well to Well Analysis)Site Name: *Hilton Seattle Hotel*Site Address: *Seattle, WA*Additional Description: *NA Evaluation*Hazardous Substance *Xylenes***1. Temporal Trend at a Well (Concentration vs. Time & Groundwater Elevation : well-to-well analysis)**

Name of Sampling Well?	MW-2	Confidence Level (Decision Criteria)?	85.0%
Confidence Level calculated with log-linear regression is?	99.993%		
Plume Stability?	Shrinking ; Decision Criteria is 85%.		
Slope: Point decay rate constant (k_{point}), yr ⁻¹	0.261 @50% C.L.;	0.243 @85% C.L.	
Half Life for k_{point} , yr	2.660 @50% C.L.;	2.855 @85% C.L.	

**2. Spatial and Temporal Trend along Overall Plume Length for Multiple Wells:**

Plot #1: Sampling date #1	14-Nov-97
Plot #2: Sampling date #2	26-Aug-11
Plot #3: Sampling date #3	22-Aug-13
Plot #4: Sampling date #4	21-Nov-13
Plot #5: Sampling date #5	21-Feb-14
Plot #6: Sampling date #6	30-May-14



Module 2: Graphical Presentation of Historical Ground Water Data: (Well to Well Analysis)

Site Name: Hilton Seattle Hotel

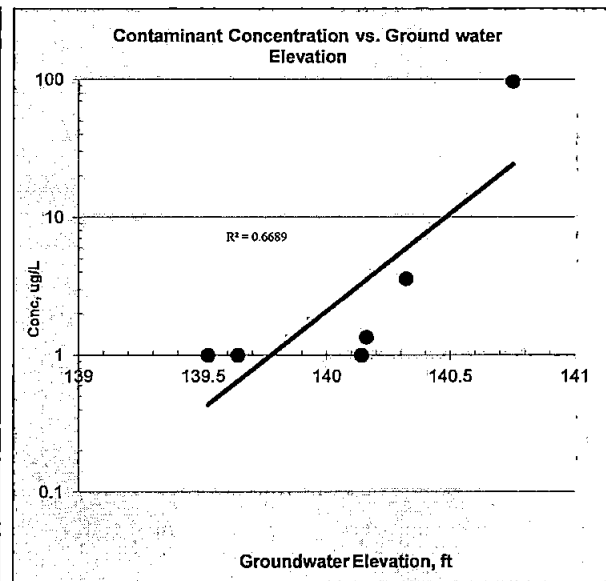
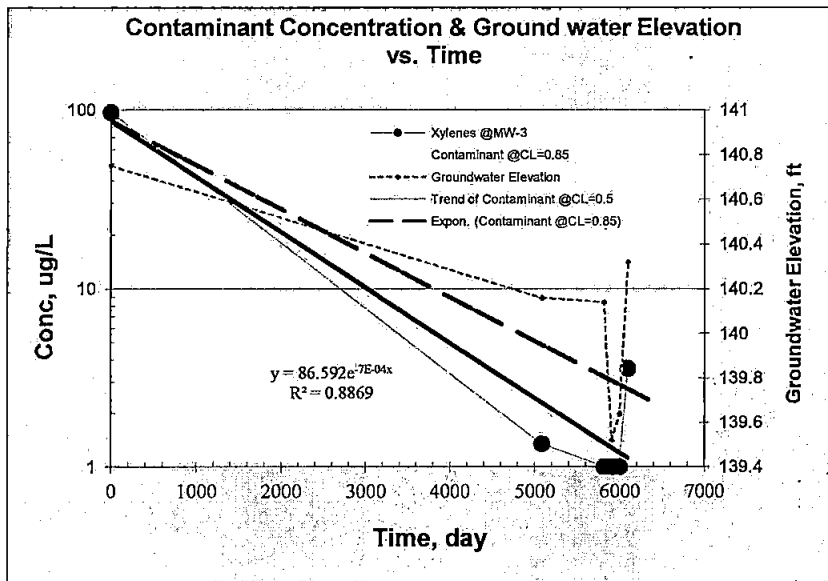
Site Address: Seattle, WA

Additional Description: NA Evaluation

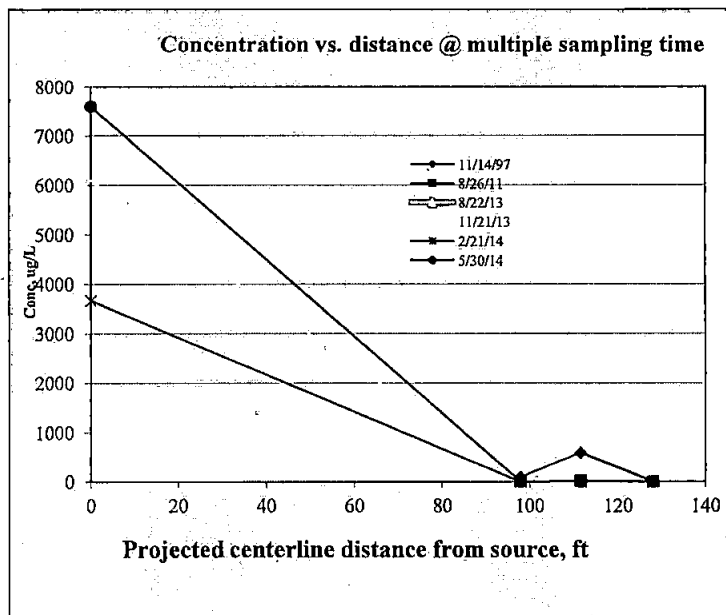
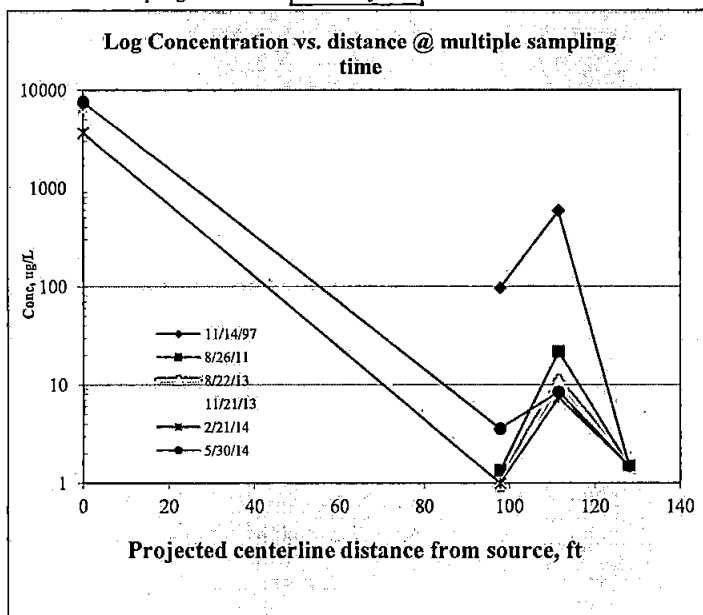
Hazardous Substance: Xylenes

1. Temporal Trend at a Well (Concentration vs. Time & Groundwater Elevation : well-to-well analysis)

Name of Sampling Well?	MW-3	Confidence Level (Decision Criteria)?	85.0%
Confidence Level calculated with log-linear regression is?	99.501%		
Plume Stability?	Shrinking	; Decision Criteria is 85%.	
Slope: Point decay rate constant (k_{point}), yr^{-1}	0.261 @50% C.L.;	0.207 @85% C.L.	
Half Life for k_{point} , yr	2.660 @50% C.L.;	3.352 @85% C.L.	

**2. Spatial and Temporal Trend along Overall Plume Length for Multiple Wells:**

Plot #1: Sampling date #1	14-Nov-97
Plot #2: Sampling date #2	26-Aug-11
Plot #3: Sampling date #3	22-Aug-13
Plot #4: Sampling date #4	21-Nov-13
Plot #5: Sampling date #5	21-Feb-14
Plot #6: Sampling date #6	30-May-14



Module 2: Graphical Presentation of Historical Ground Water Data: (Well to Well Analysis)

Site Name: Hilton Seattle Hotel

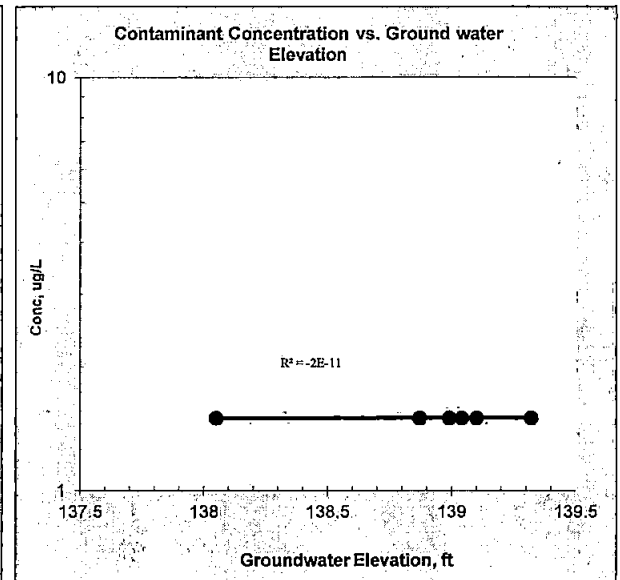
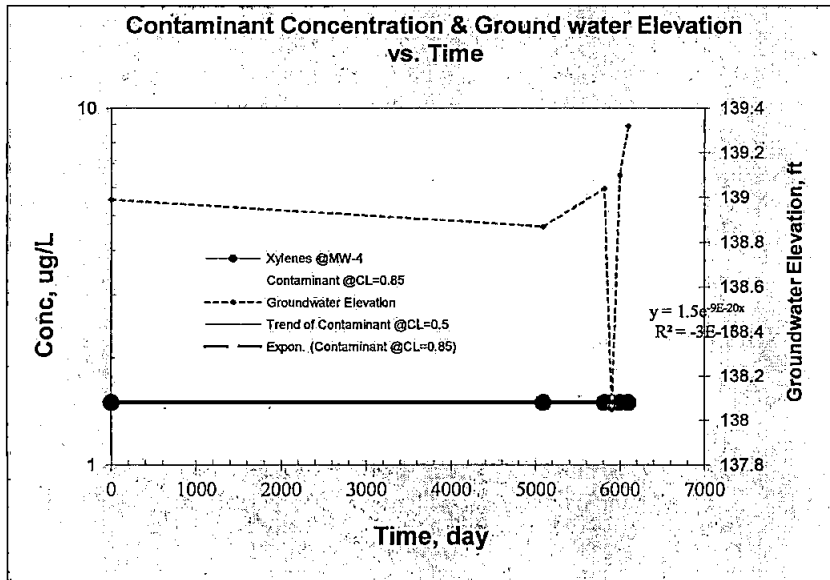
Site Address: Seattle, WA

Additional Description: NA Evaluation

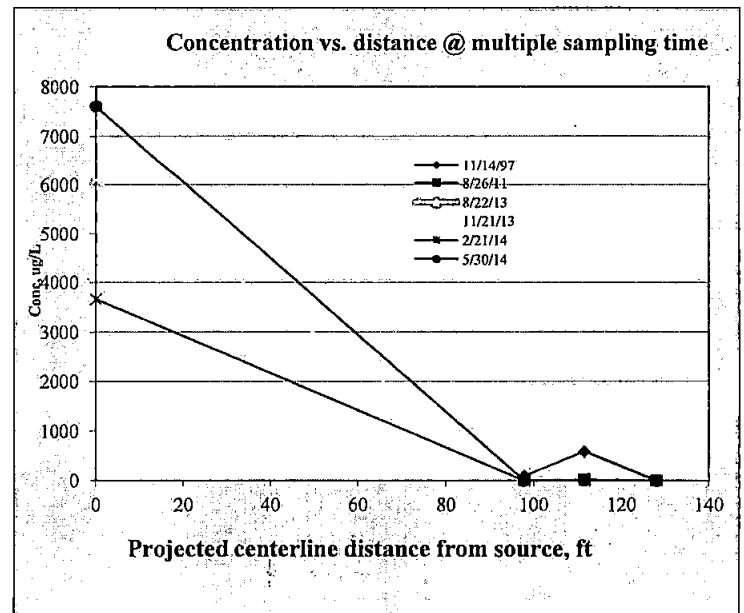
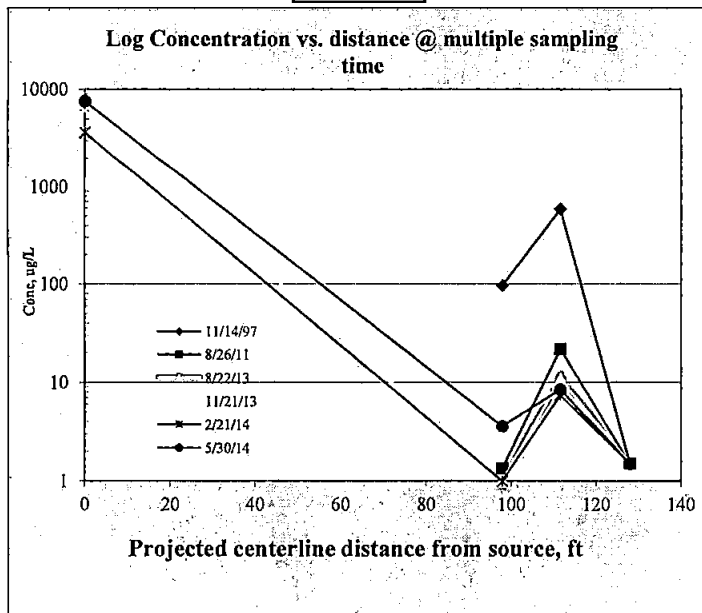
Hazardous Substance Xylenes

1. Temporal Trend at a Well (Concentration vs. Time & Groundwater Elevation : well-to-well analysis)

Name of Sampling Well?	MW-4	Confidence Level (Decision Criteria)?	85.0%
Confidence Level calculated with log-linear regression is?	0.000%		
Plume Stability?	Stable. ; Decision Criteria is 85%.		
Slope: Point decay rate constant (k_{point}), yr^{-1}	0.000 @50% C.L.;	NA @85% C.L.	
Half Life for k_{point} , yr	##### @50% C.L.;	NA @85% C.L.	

**2. Spatial and Temporal Trend along Overall Plume Length for Multiple Wells:**

Plot #1: Sampling date #1	14-Nov-97
Plot #2: Sampling date #2	26-Aug-11
Plot #3: Sampling date #3	22-Aug-13
Plot #4: Sampling date #4	21-Nov-13
Plot #5: Sampling date #5	21-Feb-14
Plot #6: Sampling date #6	30-May-14



Module 2: Temporal Analysis: Concentration of contaminant vs. time (Regression Analysis at each well)

Site Name: Hilton Seattle Hotel

Site Address: Seattle, WA

Additional Description: NA Evaluation

Hazardous Substance Xylenes

1. Level of Confidence (Decision Criteria)?		85%															
2. Prediction: Calculation of Restoration Time and Predicted Concentration at Wells																	
Well Location		MW-5	MW-2	MW-3	MW-4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
A. Cleanup Level (Criterion) to be achieved? ug/L		800	800	800	800												
A.1 Average (@50% CL ¹ best-fitting values)																	
Time to reach the criterion yr		NA	-1.00	-8.53	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Date when the Criterion to be achieved date		NA	9/23/96	3/16/89	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
A.2 Boundary (@85% CL)																	
Time to reach the criterion ² yr		NA	-1.08	-10.75	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Date when the Criterion to be achieved date		NA	8/27/96	12/27/86	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B Date of Prediction? date		9/1/14	9/1/14	9/1/14	9/1/14												
B.1 Average conc predicted (@50% CL) ug/L		NA	7.45	1.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B.2 Boundary conc predicted (@85% CL) ug/L		NA	10.06	2.60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3. Log-Linear Regression Results																	
Coefficient of Determination r^2		0.098	0.986	0.887	0.000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Correlation Coefficient r		0.313	-0.993	-0.942	0.000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Number of data points n		3	6	6	6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4. Statistical Inference on the Slope of the Log-Linear Regression Line with t-statistics																	
One-tailed Confidence Level calculated, %		20.274%	99.993%	99.501%	0.000%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sufficient evidence to support that the slope of the regression line is significantly different from zero?		NO!	YES!	YES!	NO!	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Coefficient of Variation?		0.343	NA	NA	0.000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Plume Stability?		Stable	Shrinking	Shrinking	Stable	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5. Calculation of Point Decay Rate Constant (k_{point})																	
Slope: Point decay rate constant (k_{point})	@50% CL yr ⁻¹	0.450	0.261	0.261	0.000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	@85% CL yr ⁻¹	NA	0.243	0.207	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Half Life for (k_{point})	@50% CL yr	1.541	2.660	2.660	#####	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	@85% CL yr	NA	2.855	3.352	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: 1. CL : Confidence Level; UD= Undetermined

2. The length of time that will actually be required is estimated to be no more

Module 3: Assimilative Capacity and Geochemical Indicator PlotSite Name: Hilton Seattle HotelSite Address: Seattle, WAAdditional Description: NA Evaluation**1. Monitoring Well information: Enter Average Contaminant Concentrations at the Monitoring Wells**

Sampling Location:	Unit				MW-5	MW-2	MW-3	MW-4						
Centerline Distance from source	ft				0	44	78	128						
Benzene	ug/L				927	1.82	187	0.5						
Toluene	ug/L				552	2	0.5	0.5						
Ethylbenzene	ug/L				1820	36.5	0.5	0.5						
Total Xylenes	ug/L				7610	8.47	1	1						
BTEX	ug/L													
User-specified chemical2	ug/L													
User-specified chemical3	ug/L													

2. Enter Average Geochemical Indicator's Concentrations (direct measurement) at the Monitoring Wells.

	Unit	Background	NA	NA	NA	MW-5	MW-2	MW-3	MW-4	NA	NA	NA	NA	NA
Dissolved Oxygen	mg/L						0.19	0.14	0.41					
Nitrate	mg/L	0.05				0.05	0.05	0.05	0.05					
Sulfate	mg/L	2.36				2.36	0.304	0.15	31.5					
Manganese	mg/L													
Ferrous Iron	mg/L	3.18				3.18	1.15	0.6	2.38					
Methane	mg/L													
Redox Potential, E_H	mV						-153.9	-149.2	-81.4					
Alkalinity	mg/L													
pH	unitless						6.89	7.15	7.77					

3. Expressed Assimilative Capacity Calculation: Utilization Factor (UF)

Contaminant for UF Selection

Benzene**Equivalent Contaminant Degradation**

	Unit	UF	NA	NA	NA	MW-5	MW-2	MW-3	MW-4	NA	NA	NA	NA	NA
Dissolved Oxygen utilized	mg/L	0.33	N/A	N/A	N/A	N/A	-0.1	0.0	-0.1	N/A	N/A	N/A	N/A	N/A
Nitrate utilized	mg/L	0.21	N/A	N/A	N/A	0.0	0.0	0.0	0.0	N/A	N/A	N/A	N/A	N/A
Sulfate utilized	mg/L	0.22	N/A	N/A	N/A	0.0	0.5	0.5	-6.4	N/A	N/A	N/A	N/A	N/A
Manganese produced	mg/L	0.09	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ferrous Iron produced	mg/L	0.047	N/A	N/A	N/A	0.0	-0.1	-0.1	0.0	N/A	N/A	N/A	N/A	N/A
Methane produced	mg/L	1.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	mg/L		N/A	N/A	N/A	N/A	0.3	0.3	-6.6	N/A	N/A	N/A	N/A	N/A

4. Geochemical Indicator Plot

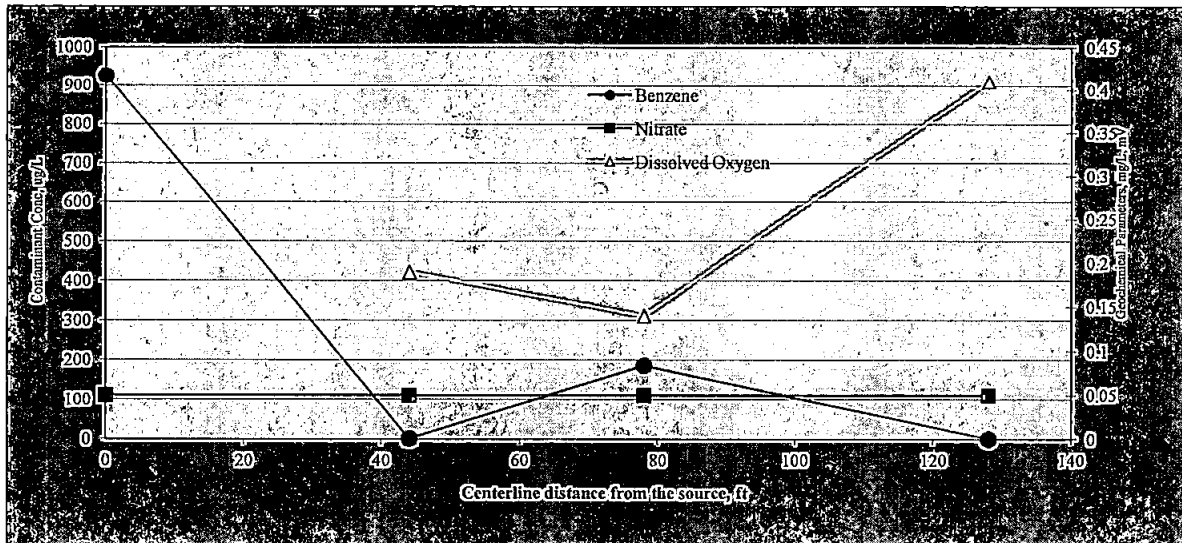
Hazardous Substance

Benzene

Geochemical Indicator?

Dissolved Oxygen

Geochemical Indicator?

Nitrate

Module 3: Assimilative Capacity and Geochemical Indicator Plot

Site Name: Hilton Seattle Hotel

Site Address: Seattle, WA

Additional Description: NA Evaluation

1. Monitoring Well information: Enter Average Contaminant Concentrations at the Monitoring Wells

Sampling Location:	Unit				MW-5	MW-2	MW-3	MW-4						
Centerline Distance from source	ft				0	44	78	128						
Benzene	ug/L				927	1.82	187	0.5						
Toluene	ug/L				552	2	0.5	0.5						
Ethylbenzene	ug/L				1820	36.5	0.5	0.5						
Total Xylenes	ug/L				7610	8.47	1	1						
BTEX	ug/L													
User-specified chemical2	ug/L													
User-specified chemical3	ug/L													

2. Enter Average Geochemical Indicator's Concentrations (direct measurement) at the Monitoring Wells.

	Unit	Background	NA	NA	NA	MW-5	MW-2	MW-3	MW-4	NA	NA	NA	NA	NA
Dissolved Oxygen	mg/L						0.19	0.14	0.41					
Nitrate	mg/L	0.05				0.05	0.05	0.05	0.05					
Sulfate	mg/L	2.36				2.36	0.304	0.15	31.5					
Manganese	mg/L													
Ferrous Iron	mg/L	3.18				3.18	1.15	0.6	2.38					
Methane	mg/L													
Redox Potential, E_H	mV						-153.9	-149.2	-81.4					
Alkalinity	mg/L													
pH	unitless						6.89	7.15	7.77					

3. Expressed Assimilative Capacity Calculation: Utilization Factor (UF)

Contaminant for UF Selection

Benzene

Equivalent Contaminant Degradation

	Unit	UF	NA	NA	NA	MW-5	MW-2	MW-3	MW-4	NA	NA	NA	NA	NA
Dissolved Oxygen utilized	mg/L	0.33	N/A	N/A	N/A	N/A	-0.1	0.0	-0.1	N/A	N/A	N/A	N/A	N/A
Nitrate utilized	mg/L	0.21	N/A	N/A	N/A	0.0	0.0	0.0	0.0	N/A	N/A	N/A	N/A	N/A
Sulfate utilized	mg/L	0.22	N/A	N/A	N/A	0.0	0.5	0.5	-6.4	N/A	N/A	N/A	N/A	N/A
Manganese produced	mg/L	0.09	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ferrous Iron produced	mg/L	0.047	N/A	N/A	N/A	0.0	-0.1	-0.1	0.0	N/A	N/A	N/A	N/A	N/A
Methane produced	mg/L	1.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	mg/L		N/A	N/A	N/A	N/A	0.3	0.3	-6.6	N/A	N/A	N/A	N/A	N/A

4. Geochemical Indicator Plot

Hazardous Substance

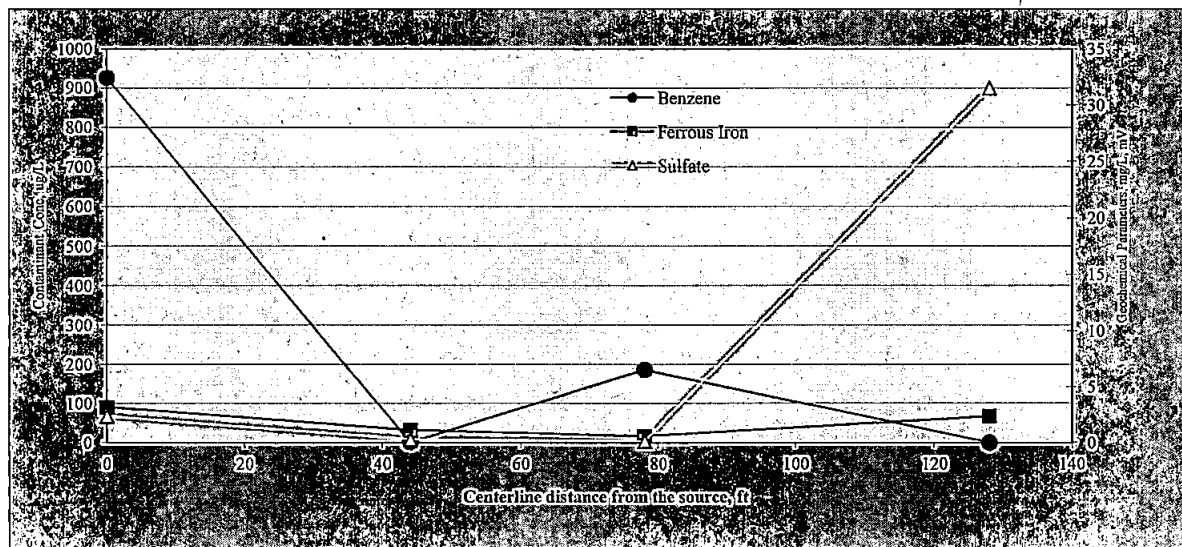
Benzene

Geochemical Indicator?

Sulfate

Geochemical Indicator?

Ferrous Iron



Module 3: Assimilative Capacity and Geochemical Indicator Plot

Site Name: Hilton Seattle Hotel

Site Address: Seattle, WA

Additional Description: NA Evaluation

1. Monitoring Well information: Enter Average Contaminant Concentrations at the Monitoring Wells

Sampling Location:	Unit				MW-5	MW-2	MW-3	MW-4						
Centerline Distance from source	ft				0	44	78	128						
Benzene	ug/L				927	1.82	187	0.5						
Toluene	ug/L				552	2	0.5	0.5						
Ethylbenzene	ug/L				1820	36.5	0.5	0.5						
Total Xylenes	ug/L				7610	8.47	1	1						
BTEX	ug/L													
User-specified chemical2	ug/L													
User-specified chemical3	ug/L													

2. Enter Average Geochemical Indicator's Concentrations (direct measurement) at the Monitoring Wells.

	Unit	Background	NA	NA	NA	MW-5	MW-2	MW-3	MW-4	NA	NA	NA	NA	NA
Dissolved Oxygen	mg/L						0.19	0.14	0.41					
Nitrate	mg/L	0.05				0.05	0.05	0.05	0.05					
Sulfate	mg/L	2.36				2.36	0.304	0.15	31.5					
Manganese	mg/L													
Ferrous Iron	mg/L	3.18				3.18	1.15	0.6	2.38					
Methane	mg/L													
Redox Potential, E_H	mV						-153.9	-149.2	-81.4					
Alkalinity	mg/L													
pH	unitless						6.89	7.15	7.77					

3. Expressed Assimilative Capacity Calculation: Utilization Factor (UF)

Contaminant for UF Selection: Benzene

Equivalent Contaminant Degradation

	Unit	UF	NA	NA	NA	MW-5	MW-2	MW-3	MW-4	NA	NA	NA	NA	NA
Dissolved Oxygen utilized	mg/L	0.33	N/A	N/A	N/A	N/A	-0.1	0.0	-0.1	N/A	N/A	N/A	N/A	N/A
Nitrate utilized	mg/L	0.21	N/A	N/A	N/A	0.0	0.0	0.0	0.0	N/A	N/A	N/A	N/A	N/A
Sulfate utilized	mg/L	0.22	N/A	N/A	N/A	0.0	0.5	0.5	-6.4	N/A	N/A	N/A	N/A	N/A
Manganese produced	mg/L	0.09	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ferrous Iron produced	mg/L	0.047	N/A	N/A	N/A	0.0	-0.1	-0.1	0.0	N/A	N/A	N/A	N/A	N/A
Methane produced	mg/L	1.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	mg/L		N/A	N/A	N/A	N/A	0.3	0.3	-6.6	N/A	N/A	N/A	N/A	N/A

4. Geochemical Indicator Plot

Hazardous Substance

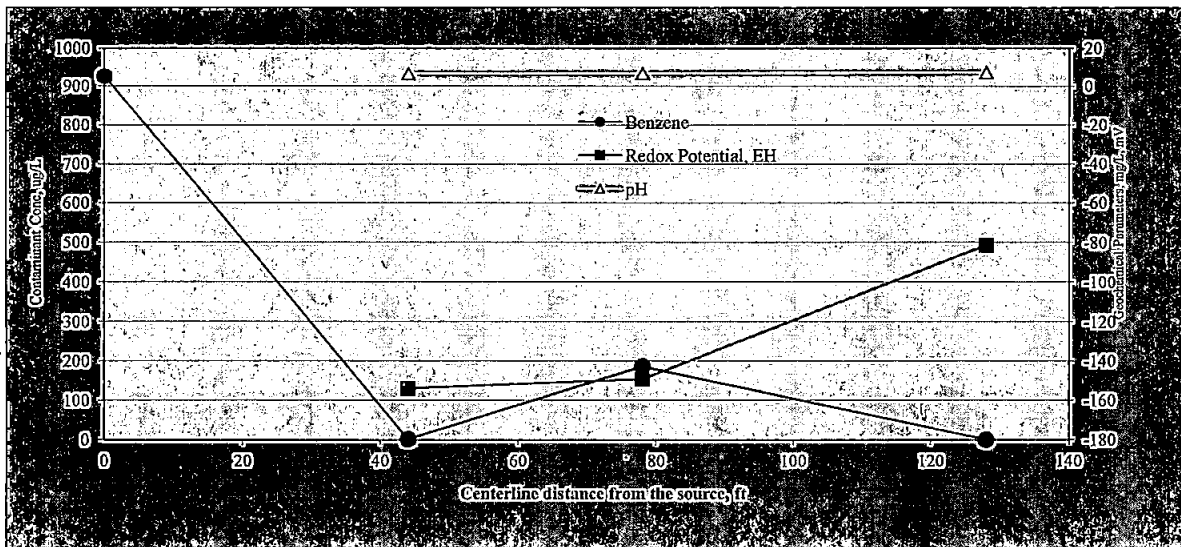
Benzene

Geochemical Indicator?

pH

Geochemical Indicator?

Redox Potential, EH



Module 3: Assimilative Capacity and Geochemical Indicator Plot

Site Name: *Hilton Seattle Hotel*

Site Address: *Seattle, WA*

Additional Description: *NA Evaluation*

1. Monitoring Well information: Enter Average Contaminant Concentrations at the Monitoring Wells

Sampling Location:	Unit				MW-5	MW-2	MW-3	MW-4						
Centerline Distance from source	ft				0	44	78	128						
Benzene	ug/L				927	1.82	187	0.5						
Toluene	ug/L				552	2	0.5	0.5						
Ethylbenzene	ug/L				1820	36.5	0.5	0.5						
Total Xylenes	ug/L				7610	8.47	1	1						
BTEX	ug/L													
User-specified chemical2	ug/L													
User-specified chemical3	ug/L													

2. Enter Average Geochemical Indicator's Concentrations (direct measurement) at the Monitoring Wells.

	Unit	Background	NA	NA	NA	MW-5	MW-2	MW-3	MW-4	NA	NA	NA	NA	NA
Dissolved Oxygen	mg/L						0.19	0.14	0.41					
Nitrate	mg/L	0.05				0.05	0.05	0.05	0.05					
Sulfate	mg/L	2.36				2.36	0.304	0.15	31.5					
Manganese	mg/L													
Ferrous Iron	mg/L	3.18				3.18	1.15	0.6	2.38					
Methane	mg/L													
Redox Potential, E_H	mV						-153.9	-149.2	-81.4					
Alkalinity	mg/L													
pH	unitless						6.89	7.15	7.77					

3. Expressed Assimilative Capacity Calculation: Utilization Factor (UF)

Contaminant for UF Selection

Toluene

Equivalent Contaminant Degradation

	Unit	UF	NA	NA	NA	MW-5	MW-2	MW-3	MW-4	NA	NA	NA	NA	NA
Dissolved Oxygen utilized	mg/L	0.32	N/A	N/A	N/A	N/A	-0.1	0.0	-0.1	N/A	N/A	N/A	N/A	N/A
Nitrate utilized	mg/L	0.21	N/A	N/A	N/A	0.0	0.0	0.0	0.0	N/A	N/A	N/A	N/A	N/A
Sulfate utilized	mg/L	0.21	N/A	N/A	N/A	0.0	0.4	0.5	-6.1	N/A	N/A	N/A	N/A	N/A
Manganese produced	mg/L	0.09	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ferrous Iron produced	mg/L	0.046	N/A	N/A	N/A	0.0	-0.1	-0.1	0.0	N/A	N/A	N/A	N/A	N/A
Methane produced	mg/L	1.28	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	mg/L		N/A	N/A	N/A	N/A	0.3	0.3	-6.3	N/A	N/A	N/A	N/A	N/A

4. Geochemical Indicator Plot

Hazardous Substance

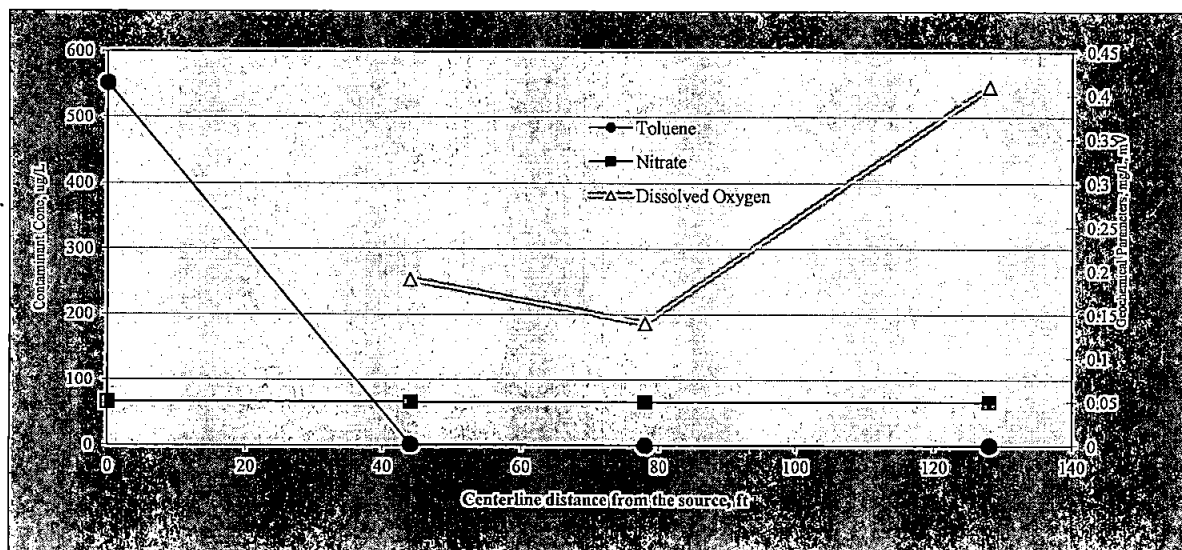
Toluene

Geochemical Indicator?

Dissolved Oxygen

Geochemical Indicator?

Nitrate



Module 3: Assimilative Capacity and Geochemical Indicator Plot

Site Name: Hilton Seattle HotelSite Address: Seattle, WAAdditional Description: NA Evaluation

1. Monitoring Well information: Enter Average Contaminant Concentrations at the Monitoring Wells

Sampling Location:	Unit				MW-5	MW-2	MW-3	MW-4						
Centerline Distance from source	ft				0	44	78	128						
Benzene	ug/L				927	1.82	187	0.5						
Toluene	ug/L				552	2	0.5	0.5						
Ethylbenzene	ug/L				1820	36.5	0.5	0.5						
Total Xylenes	ug/L				7610	8.47	1	1						
BTEX	ug/L													
User-specified chemical2	ug/L													
User-specified chemical3	ug/L													

2. Enter Average Geochemical Indicator's Concentrations (direct measurement) at the Monitoring Wells.

	Unit	Background	NA	NA	NA	MW-5	MW-2	MW-3	MW-4	NA	NA	NA	NA	NA
Dissolved Oxygen	mg/L						0.19	0.14	0.41					
Nitrate	mg/L	0.05				0.05	0.05	0.05	0.05					
Sulfate	mg/L	2.36				2.36	0.304	0.15	31.5					
Manganese	mg/L													
Ferrous Iron	mg/L	3.18				3.18	1.15	0.6	2.38					
Methane	mg/L													
Redox Potential, E_H	mV						-153.9	-149.2	-81.4					
Alkalinity	mg/L													
pH	unitless						6.89	7.15	7.77					

3. Expressed Assimilative Capacity Calculation: Utilization Factor (UF)

Contaminant for UF Selection

Toluene

Equivalent Contaminant Degradation

	Unit	UF	NA	NA	NA	MW-5	MW-2	MW-3	MW-4	NA	NA	NA	NA	NA
Dissolved Oxygen utilized	mg/L	0.32	N/A	N/A	N/A	N/A	-0.1	0.0	-0.1	N/A	N/A	N/A	N/A	N/A
Nitrate utilized	mg/L	0.21	N/A	N/A	N/A	0.0	0.0	0.0	0.0	N/A	N/A	N/A	N/A	N/A
Sulfate utilized	mg/L	0.21	N/A	N/A	N/A	0.0	0.4	0.5	-6.1	N/A	N/A	N/A	N/A	N/A
Manganese produced	mg/L	0.09	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ferrous Iron produced	mg/L	0.046	N/A	N/A	N/A	0.0	-0.1	-0.1	0.0	N/A	N/A	N/A	N/A	N/A
Methane produced	mg/L	1.28	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	mg/L		N/A	N/A	N/A	N/A	0.3	0.3	-6.3	N/A	N/A	N/A	N/A	N/A

4. Geochemical Indicator Plot

Hazardous Substance

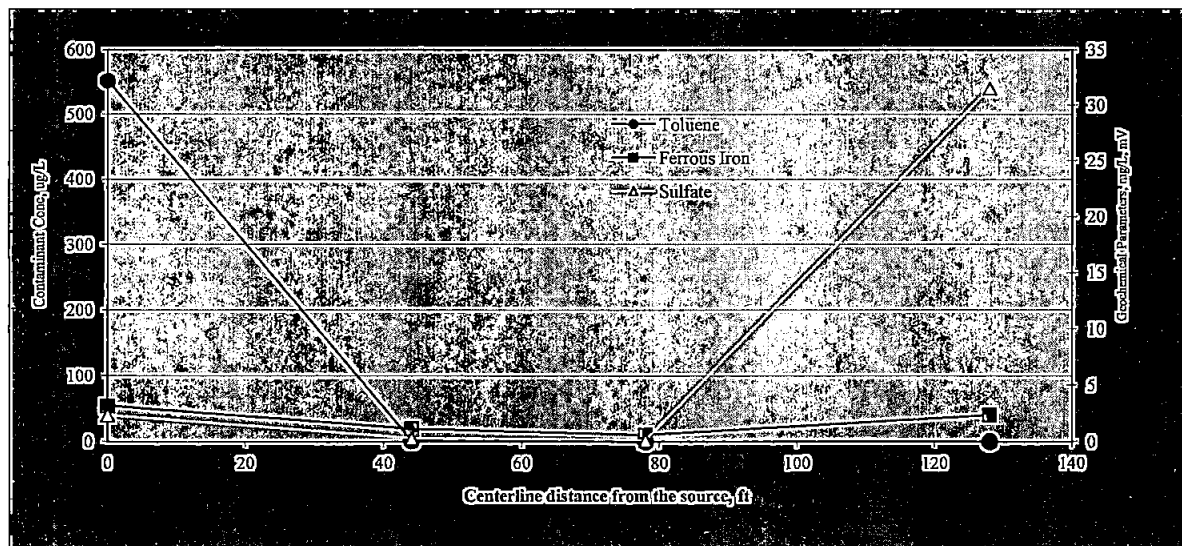
Toluene

Geochemical Indicator?

Sulfate

Geochemical Indicator?

Ferrous Iron



Module 3: Assimilative Capacity and Geochemical Indicator PlotSite Name: Hilton Seattle HotelSite Address: Seattle, WAAdditional Description: NA Evaluation**1. Monitoring Well information: Enter Average Contaminant Concentrations at the Monitoring Wells**

Sampling Location:	Unit				MW-5	MW-2	MW-3	MW-4						
Centerline Distance from source	ft				0	44	78	128						
Benzene	ug/L				927	1.82	187	0.5						
Toluene	ug/L				552	2	0.5	0.5						
Ethylbenzene	ug/L				1820	36.5	0.5	0.5						
Total Xylenes	ug/L				7610	8.47	1	1						
BTEX	ug/L													
User-specified chemical2	ug/L													
User-specified chemical3	ug/L													

2. Enter Average Geochemical Indicator's Concentrations (direct measurement) at the Monitoring Wells.

	Unit	Background	NA	NA	NA	MW-5	MW-2	MW-3	MW-4	NA	NA	NA	NA	NA
Dissolved Oxygen	mg/L						0.19	0.14	0.41					
Nitrate	mg/L	0.05				0.05	0.05	0.05	0.05					
Sulfate	mg/L	2.36				2.36	0.304	0.15	31.5					
Manganese	mg/L													
Ferrous Iron	mg/L	3.18				3.18	1.15	0.6	2.38					
Methane	mg/L													
Redox Potential, E_H	mV						-153.9	-149.2	-81.4					
Alkalinity	mg/L													
pH	unitless						6.89	7.15	7.77					

3. Expressed Assimilative Capacity Calculation: Utilization Factor (UF)

Contaminant for UF Selection

Toluene**Equivalent Contaminant Degradation**

	Unit	UF	NA	NA	NA	MW-5	MW-2	MW-3	MW-4	NA	NA	NA	NA	NA
Dissolved Oxygen utilized	mg/L	0.32	N/A	N/A	N/A	N/A	-0.1	0.0	-0.1	N/A	N/A	N/A	N/A	N/A
Nitrate utilized	mg/L	0.21	N/A	N/A	N/A	0.0	0.0	0.0	0.0	N/A	N/A	N/A	N/A	N/A
Sulfate utilized	mg/L	0.21	N/A	N/A	N/A	0.0	0.4	0.5	-6.1	N/A	N/A	N/A	N/A	N/A
Manganese produced	mg/L	0.09	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ferrous Iron produced	mg/L	0.046	N/A	N/A	N/A	0.0	-0.1	-0.1	0.0	N/A	N/A	N/A	N/A	N/A
Methane produced	mg/L	1.28	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	mg/L		N/A	N/A	N/A	N/A	0.3	0.3	-6.3	N/A	N/A	N/A	N/A	N/A

4. Geochemical Indicator Plot

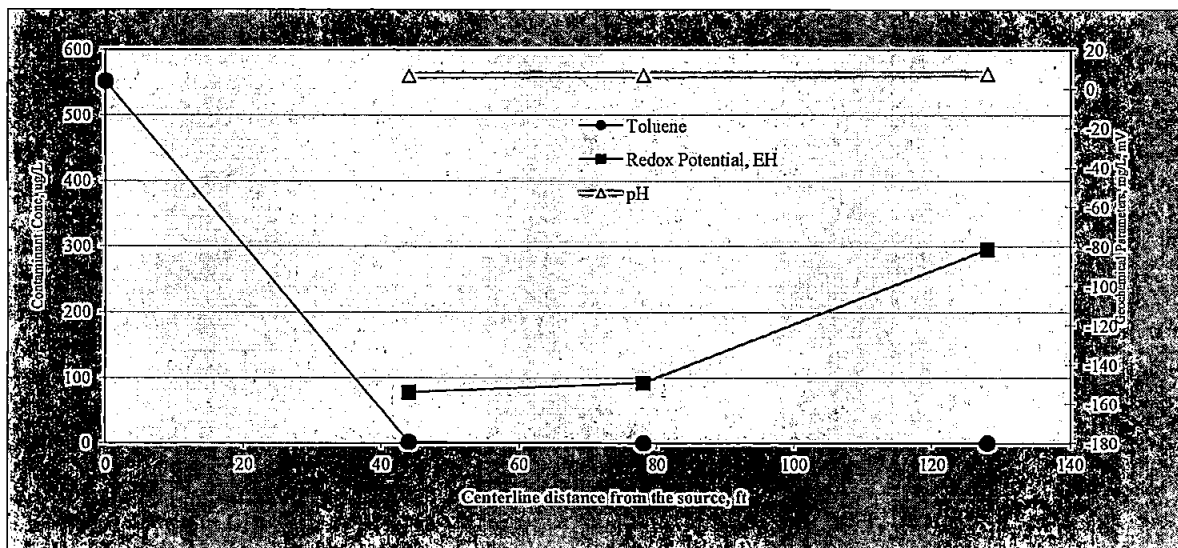
Hazardous Substance

Toluene

Geochemical Indicator?

pH

Geochemical Indicator?

Redox Potential, EH

Module 3: Assimilative Capacity and Geochemical Indicator Plot

Site Name: Hilton Seattle HotelSite Address: Seattle, WAAdditional Description: NA Evaluation

1. Monitoring Well information: Enter Average Contaminant Concentrations at the Monitoring Wells

Sampling Location:	Unit				MW-5	MW-2	MW-3	MW-4					
Centerline Distance from source	ft				0	44	78	128					
Benzene	ug/L				927	1.82	187	0.5					
Toluene	ug/L				552	2	0.5	0.5					
Ethylbenzene	ug/L				1820	36.5	0.5	0.5					
Total Xylenes	ug/L				7610	8.47	1	1					
BTEX	ug/L												
User-specified chemical2	ug/L												
User-specified chemical3	ug/L												

2. Enter Average Geochemical Indicator's Concentrations (direct measurement) at the Monitoring Wells.

	Unit	Background	NA	NA	NA	MW-5	MW-2	MW-3	MW-4	NA	NA	NA	NA	NA
Dissolved Oxygen	mg/L						0.19	0.14	0.41					
Nitrate	mg/L	0.05				0.05	0.05	0.05	0.05					
Sulfate	mg/L	2.36				2.36	0.304	0.15	31.5					
Manganese	mg/L													
Ferrous Iron	mg/L	3.18				3.18	1.15	0.6	2.38					
Methane	mg/L													
Redox Potential, E_H	mV						-153.9	-149.2	-81.4					
Alkalinity	mg/L													
pH	unitless						6.89	7.15	7.77					

3. Expressed Assimilative Capacity Calculation: Utilization Factor (UF)

Contaminant for UF Selection

Ethylbenzene

Equivalent Contaminant Degradation

	Unit	UF	NA	NA	NA	MW-5	MW-2	MW-3	MW-4	NA	NA	NA	NA	NA
Dissolved Oxygen utilized	mg/L	0.32	N/A	N/A	N/A	N/A	-0.1	0.0	-0.1	N/A	N/A	N/A	N/A	N/A
Nitrate utilized	mg/L	0.2	N/A	N/A	N/A	0.0	0.0	0.0	0.0	N/A	N/A	N/A	N/A	N/A
Sulfate utilized	mg/L	0.21	N/A	N/A	N/A	0.0	0.4	0.5	-6.1	N/A	N/A	N/A	N/A	N/A
Manganese produced	mg/L	0.09	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ferrous Iron produced	mg/L	0.045	N/A	N/A	N/A	0.0	-0.1	-0.1	0.0	N/A	N/A	N/A	N/A	N/A
Methane produced	mg/L	1.27	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	mg/L		N/A	N/A	N/A	N/A	0.3	0.3	-6.3	N/A	N/A	N/A	N/A	N/A

4. Geochemical Indicator Plot

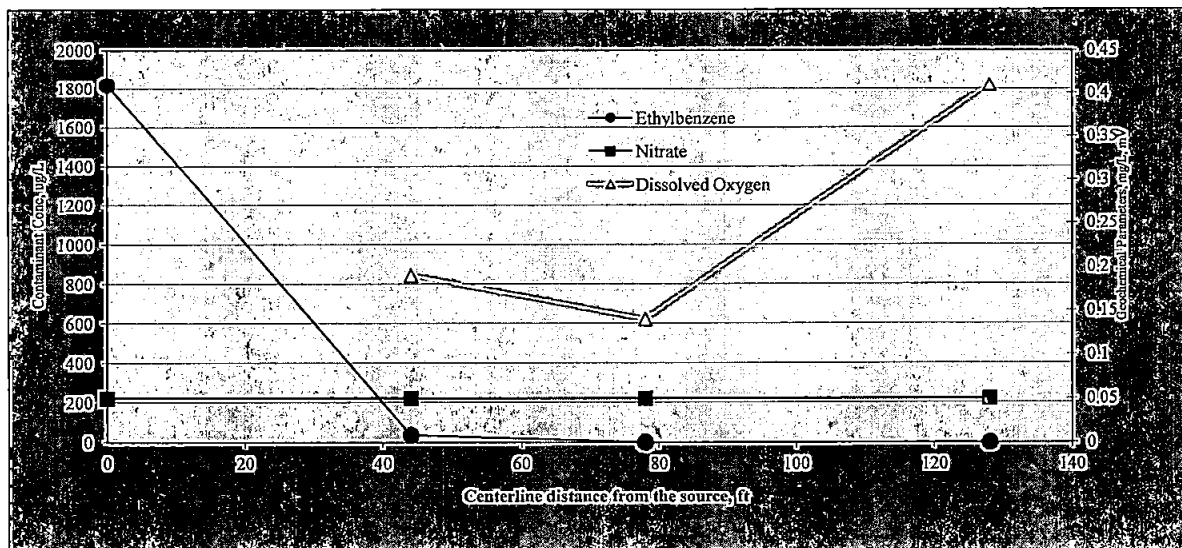
Hazardous Substance

Ethylbenzene

Geochemical Indicator?

Dissolved Oxygen

Geochemical Indicator?

Nitrate

Module 3: Assimilative Capacity and Geochemical Indicator Plot

Site Name: Hilton Seattle Hotel

Site Address: Seattle, WA

Additional Description: NA Evaluation

1. Monitoring Well information: Enter Average Contaminant Concentrations at the Monitoring Wells

Sampling Location:	Unit				MW-5	MW-2	MW-3	MW-4						
Centerline Distance from source	ft				0	44	78	128						
Benzene	ug/L				927	1.82	187	0.5						
Toluene	ug/L				552	2	0.5	0.5						
Ethylbenzene	ug/L				1820	36.5	0.5	0.5						
Total Xylenes	ug/L				7610	8.47	1	1						
BTEX	ug/L													
User-specified chemical2	ug/L													
User-specified chemical3	ug/L													

2. Enter Average Geochemical Indicator's Concentrations (direct measurement) at the Monitoring Wells.

	Unit	Background	NA	NA	NA	MW-5	MW-2	MW-3	MW-4	NA	NA	NA	NA	NA
Dissolved Oxygen	mg/L						0.19	0.14	0.41					
Nitrate	mg/L	0.05				0.05	0.05	0.05	0.05					
Sulfate	mg/L	2.36				2.36	0.304	0.15	31.5					
Manganese	mg/L													
Ferrous Iron	mg/L	3.18				3.18	1.15	0.6	2.38					
Methane	mg/L													
Redox Potential, E_H	mV						-153.9	-149.2	-81.4					
Alkalinity	mg/L													
pH	unitless						6.89	7.15	7.77					

3. Expressed Assimilative Capacity Calculation: Utilization Factor (UF)

Contaminant for UF Selection

Ethylbenzene

Equivalent Contaminant Degradation

	Unit	UF	NA	NA	NA	MW-5	MW-2	MW-3	MW-4	NA	NA	NA	NA	NA
Dissolved Oxygen utilized	mg/L	0.32	N/A	N/A	N/A	N/A	-0.1	0.0	-0.1	N/A	N/A	N/A	N/A	N/A
Nitrate utilized	mg/L	0.2	N/A	N/A	N/A	0.0	0.0	0.0	0.0	N/A	N/A	N/A	N/A	N/A
Sulfate utilized	mg/L	0.21	N/A	N/A	N/A	0.0	0.4	0.5	-6.1	N/A	N/A	N/A	N/A	N/A
Manganese produced	mg/L	0.09	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ferrous Iron produced	mg/L	0.045	N/A	N/A	N/A	0.0	-0.1	-0.1	0.0	N/A	N/A	N/A	N/A	N/A
Methane produced	mg/L	1.27	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	mg/L		N/A	N/A	N/A	N/A	0.3	0.3	-6.3	N/A	N/A	N/A	N/A	N/A

4. Geochemical Indicator Plot

Hazardous Substance

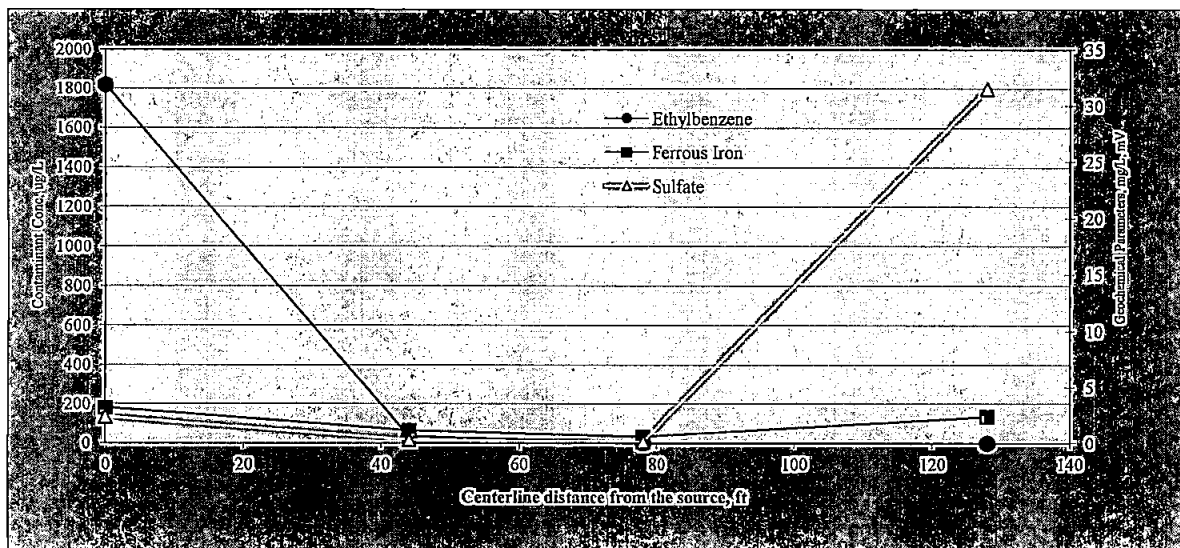
Ethylbenzene

Geochemical Indicator?

Sulfate

Geochemical Indicator?

Ferrous Iron



Module 3: Assimilative Capacity and Geochemical Indicator Plot

Site Name: Hilton Seattle Hotel

Site Address: Seattle, WA

Additional Description: NA Evaluation

1. Monitoring Well information: Enter Average Contaminant Concentrations at the Monitoring Wells

Sampling Location:	Unit				MW-5	MW-2	MW-3	MW-4						
Centerline Distance from source	ft				0	44	78	128						
Benzene	ug/L				927	1.82	187	0.5						
Toluene	ug/L				552	2	0.5	0.5						
Ethylbenzene	ug/L				1820	36.5	0.5	0.5						
Total Xylenes	ug/L				7610	8.47	1	1						
BTEX	ug/L													
User-specified chemical2	ug/L													
User-specified chemical3	ug/L													

2. Enter Average Geochemical Indicator's Concentrations (direct measurement) at the Monitoring Wells.

	Unit	Background	NA	NA	NA	MW-5	MW-2	MW-3	MW-4	NA	NA	NA	NA	NA
Dissolved Oxygen	mg/L						0.19	0.14	0.41					
Nitrate	mg/L	0.05				0.05	0.05	0.05	0.05					
Sulfate	mg/L	2.36				2.36	0.304	0.15	31.5					
Manganese	mg/L													
Ferrous Iron	mg/L	3.18				3.18	1.15	0.6	2.38					
Methane	mg/L													
Redox Potential, E_H	mV						-153.9	-149.2	-81.4					
Alkalinity	mg/L													
pH	unitless						6.89	7.15	7.77					

3. Expressed Assimilative Capacity Calculation: Utilization Factor (UF)

Contaminant for UF Selection

Ethylbenzene

Equivalent Contaminant Degradation

	Unit	UF	NA	NA	NA	MW-5	MW-2	MW-3	MW-4	NA	NA	NA	NA	NA
Dissolved Oxygen utilized	mg/L	0.32	N/A	N/A	N/A	N/A	-0.1	0.0	-0.1	N/A	N/A	N/A	N/A	N/A
Nitrate utilized	mg/L	0.2	N/A	N/A	N/A	0.0	0.0	0.0	0.0	N/A	N/A	N/A	N/A	N/A
Sulfate utilized	mg/L	0.21	N/A	N/A	N/A	0.0	0.4	0.5	-6.1	N/A	N/A	N/A	N/A	N/A
Manganese produced	mg/L	0.09	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ferrous Iron produced	mg/L	0.045	N/A	N/A	N/A	0.0	-0.1	-0.1	0.0	N/A	N/A	N/A	N/A	N/A
Methane produced	mg/L	1.27	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	mg/L		N/A	N/A	N/A	N/A	0.3	0.3	-6.3	N/A	N/A	N/A	N/A	N/A

4. Geochemical Indicator Plot

Hazardous Substance

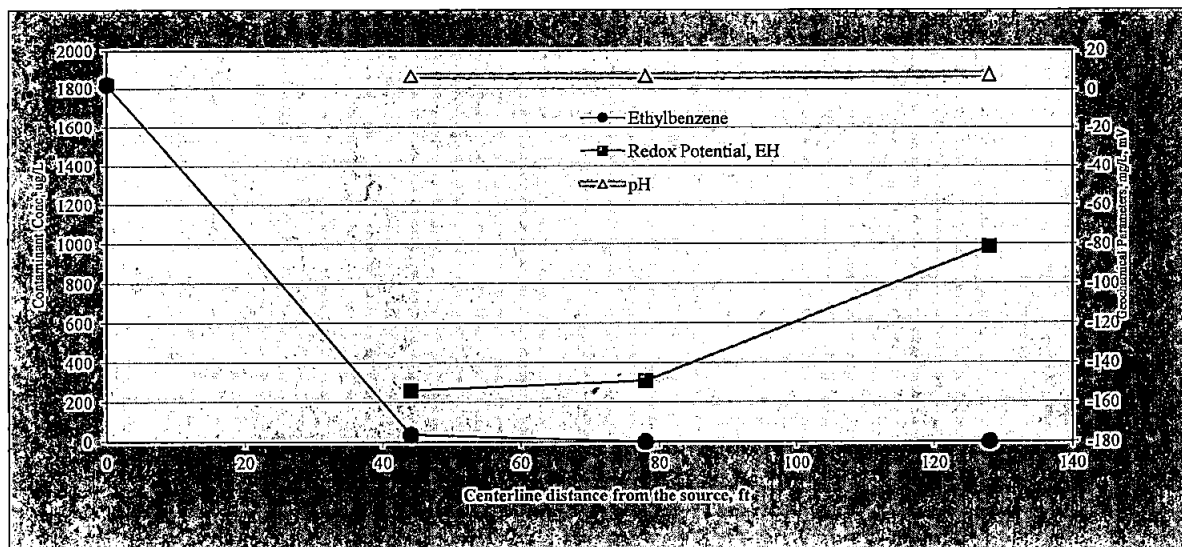
Ethylbenzene

Geochemical Indicator?

pH

Geochemical Indicator?

Redox Potential, EH



Module 3: Assimilative Capacity and Geochemical Indicator Plot

Site Name: Hilton Seattle Hotel

Site Address: Seattle, WA

Additional Description: NA Evaluation

1. Monitoring Well information: Enter Average Contaminant Concentrations at the Monitoring Wells

Sampling Location:	Unit				MW-5	MW-2	MW-3	MW-4						
Centerline Distance from source	ft				0	44	78	128						
Benzene	ug/L				927	1.82	187	0.5						
Toluene	ug/L				552	2	0.5	0.5						
Ethylbenzene	ug/L				1820	36.5	0.5	0.5						
Total Xylenes	ug/L				7610	8.47	1	1						
BTEX	ug/L													
User-specified chemical2	ug/L													
User-specified chemical3	ug/L													

2. Enter Average Geochemical Indicator's Concentrations (direct measurement) at the Monitoring Wells.

	Unit	Background	NA	NA	NA	MW-5	MW-2	MW-3	MW-4	NA	NA	NA	NA	NA
Dissolved Oxygen	mg/L						0.19	0.14	0.41					
Nitrate	mg/L	0.05				0.05	0.05	0.05	0.05					
Sulfate	mg/L	2.36				2.36	0.304	0.15	31.5					
Manganese	mg/L													
Ferrous Iron	mg/L	3.18				3.18	1.15	0.6	2.38					
Methane	mg/L													
Redox Potential, E_H	mV						-153.9	-149.2	-81.4					
Alkalinity	mg/L													
pH	unitless						6.89	7.15	7.77					

3. Expressed Assimilative Capacity Calculation: Utilization Factor (UF)

Contaminant for UF Selection

Total Xylenes

Equivalent Contaminant Degradation

	Unit	UF	NA	NA	NA	MW-5	MW-2	MW-3	MW-4	NA	NA	NA	NA	NA
Dissolved Oxygen utilized	mg/L	0.32	N/A	N/A	N/A	N/A	-0.1	0.0	-0.1	N/A	N/A	N/A	N/A	N/A
Nitrate utilized	mg/L	0.2	N/A	N/A	N/A	0.0	0.0	0.0	0.0	N/A	N/A	N/A	N/A	N/A
Sulfate utilized	mg/L	0.21	N/A	N/A	N/A	0.0	0.4	0.5	-6.1	N/A	N/A	N/A	N/A	N/A
Manganese produced	mg/L	0.09	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ferrous Iron produced	mg/L	0.045	N/A	N/A	N/A	0.0	-0.1	-0.1	0.0	N/A	N/A	N/A	N/A	N/A
Methane produced	mg/L	1.27	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	mg/L		N/A	N/A	N/A	N/A	0.3	0.3	-6.3	N/A	N/A	N/A	N/A	N/A

4. Geochemical Indicator Plot

Hazardous Substance

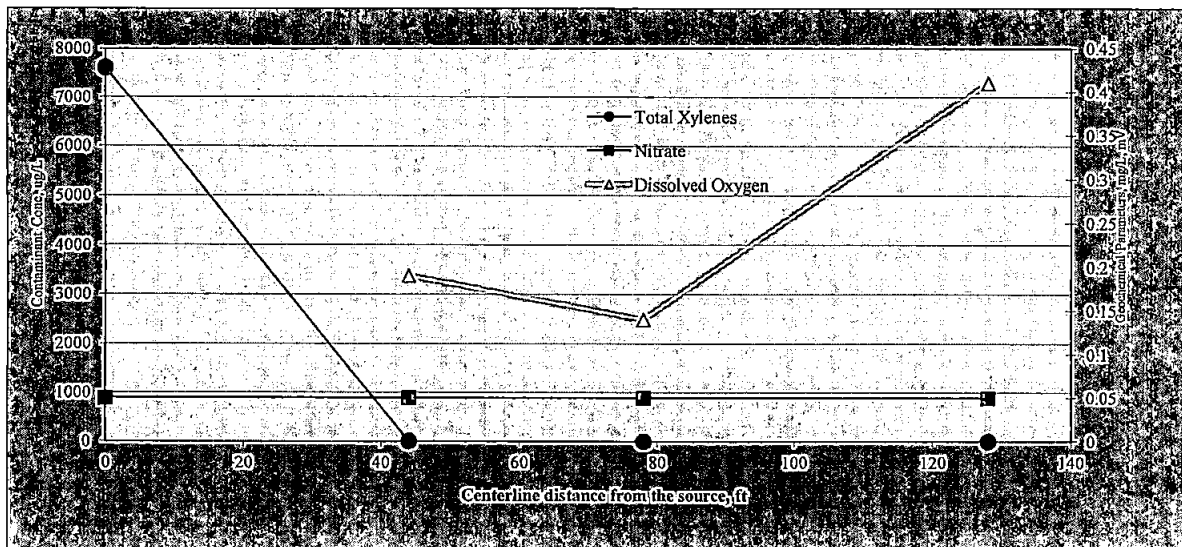
Total Xylenes

Geochemical Indicator?

Dissolved Oxygen

Geochemical Indicator?

Nitrate



Module 3: Assimilative Capacity and Geochemical Indicator PlotSite Name: Hilton Seattle HotelSite Address: Seattle, WAAdditional Description: NA Evaluation**1. Monitoring Well information: Enter Average Contaminant Concentrations at the Monitoring Wells**

Sampling Location:	Unit				MW-5	MW-2	MW-3	MW-4					
Centerline Distance from source	ft				0	44	78	128					
Benzene	ug/L				927	1.82	187	0.5					
Toluene	ug/L				552	2	0.5	0.5					
Ethylbenzene	ug/L				1820	36.5	0.5	0.5					
Total Xylenes	ug/L				7610	8.47	1	1					
BTEX	ug/L												
User-specified chemical2	ug/L												
User-specified chemical3	ug/L												

2. Enter Average Geochemical Indicator's Concentrations (direct measurement) at the Monitoring Wells.

	Unit	Background	NA	NA	NA	MW-5	MW-2	MW-3	MW-4	NA	NA	NA	NA	NA
Dissolved Oxygen	mg/L						0.19	0.14	0.41					
Nitrate	mg/L	0.05				0.05	0.05	0.05	0.05					
Sulfate	mg/L	2.36				2.36	0.304	0.15	31.5					
Manganese	mg/L													
Ferrous Iron	mg/L	3.18				3.18	1.15	0.6	2.38					
Methane	mg/L													
Redox Potential, E_H	mV						-153.9	-149.2	-81.4					
Alkalinity	mg/L													
pH	unitless						6.89	7.15	7.77					

3. Expressed Assimilative Capacity Calculation: Utilization Factor (UF)

Contaminant for UF Selection

Total Xylenes**Equivalent Contaminant Degradation**

	Unit	UF	NA	NA	NA	MW-5	MW-2	MW-3	MW-4	NA	NA	NA	NA	NA
Dissolved Oxygen utilized	mg/L	0.32	N/A	N/A	N/A	N/A	-0.1	0.0	-0.1	N/A	N/A	N/A	N/A	N/A
Nitrate utilized	mg/L	0.2	N/A	N/A	N/A	0.0	0.0	0.0	0.0	N/A	N/A	N/A	N/A	N/A
Sulfate utilized	mg/L	0.21	N/A	N/A	N/A	0.0	0.4	0.5	-6.1	N/A	N/A	N/A	N/A	N/A
Manganese produced	mg/L	0.09	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ferrous Iron produced	mg/L	0.045	N/A	N/A	N/A	0.0	-0.1	-0.1	0.0	N/A	N/A	N/A	N/A	N/A
Methane produced	mg/L	1.27	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	mg/L		N/A	N/A	N/A	N/A	0.3	0.3	-6.3	N/A	N/A	N/A	N/A	N/A

4. Geochemical Indicator Plot

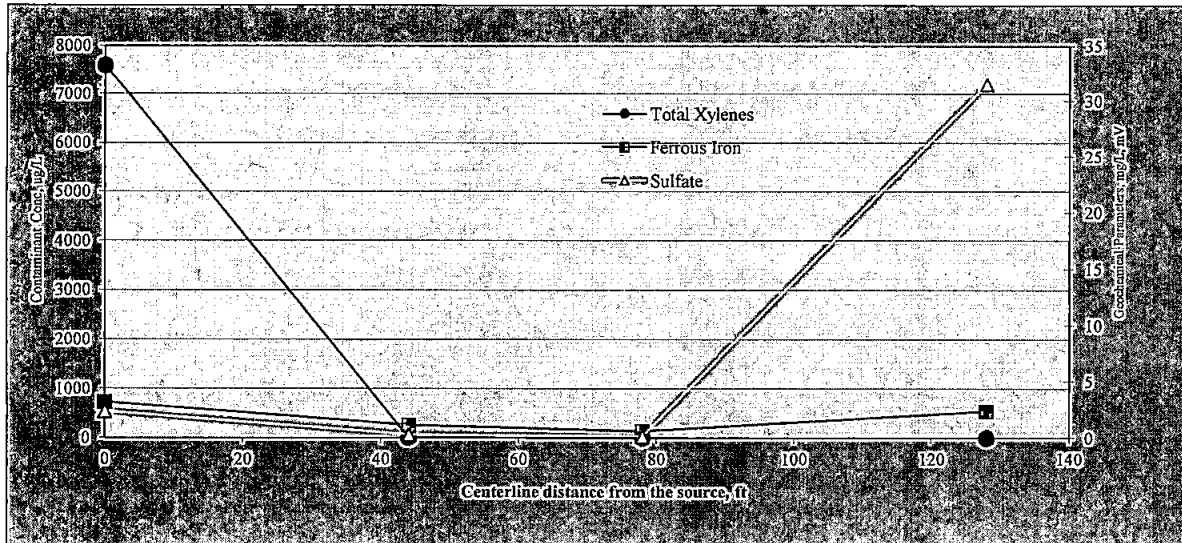
Hazardous Substance

Total Xylenes

Geochemical Indicator?

Sulfate

Geochemical Indicator?

Ferrous Iron

Module 3: Assimilative Capacity and Geochemical Indicator PlotSite Name: Hilton Seattle HotelSite Address: Seattle, WAAdditional Description: NA Evaluation**1. Monitoring Well information: Enter Average Contaminant Concentrations at the Monitoring Wells**

Sampling Location:	Unit				MW-5	MW-2	MW-3	MW-4						
Centerline Distance from source	ft				0	44	78	128						
Benzene	ug/L				927	1.82	187	0.5						
Toluene	ug/L				552	2	0.5	0.5						
Ethylbenzene	ug/L				1820	36.5	0.5	0.5						
Total Xylenes	ug/L				7610	8.47	1	1						
BTEX	ug/L													
User-specified chemical2	ug/L													
User-specified chemical3	ug/L													

2. Enter Average Geochemical Indicator's Concentrations (direct measurement) at the Monitoring Wells.

	Unit	Background	NA	NA	NA	MW-5	MW-2	MW-3	MW-4	NA	NA	NA	NA	NA
Dissolved Oxygen	mg/L						0.19	0.14	0.41					
Nitrate	mg/L	0.05				0.05	0.05	0.05	0.05					
Sulfate	mg/L	2.36				2.36	0.304	0.15	31.5					
Manganese	mg/L													
Ferrous Iron	mg/L	3.18				3.18	1.15	0.6	2.38					
Methane	mg/L													
Redox Potential, E_H	mV						-153.9	-149.2	-81.4					
Alkalinity	mg/L													
pH	unitless						6.89	7.15	7.77					

3. Expressed Assimilative Capacity Calculation: Utilization Factor (UF)

Contaminant for UF Selection

Total Xylenes**Equivalent Contaminant Degradation**

	Unit	UF	NA	NA	NA	MW-5	MW-2	MW-3	MW-4	NA	NA	NA	NA	NA
Dissolved Oxygen utilized	mg/L	0.32	N/A	N/A	N/A	N/A	-0.1	0.0	-0.1	N/A	N/A	N/A	N/A	N/A
Nitrate utilized	mg/L	0.2	N/A	N/A	N/A	0.0	0.0	0.0	0.0	N/A	N/A	N/A	N/A	N/A
Sulfate utilized	mg/L	0.21	N/A	N/A	N/A	0.0	0.4	0.5	-6.1	N/A	N/A	N/A	N/A	N/A
Manganese produced	mg/L	0.09	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ferrous Iron produced	mg/L	0.045	N/A	N/A	N/A	0.0	-0.1	-0.1	0.0	N/A	N/A	N/A	N/A	N/A
Methane produced	mg/L	1.27	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	mg/L		N/A	N/A	N/A	N/A	0.3	0.3	-6.3	N/A	N/A	N/A	N/A	N/A

4. Geochemical Indicator Plot

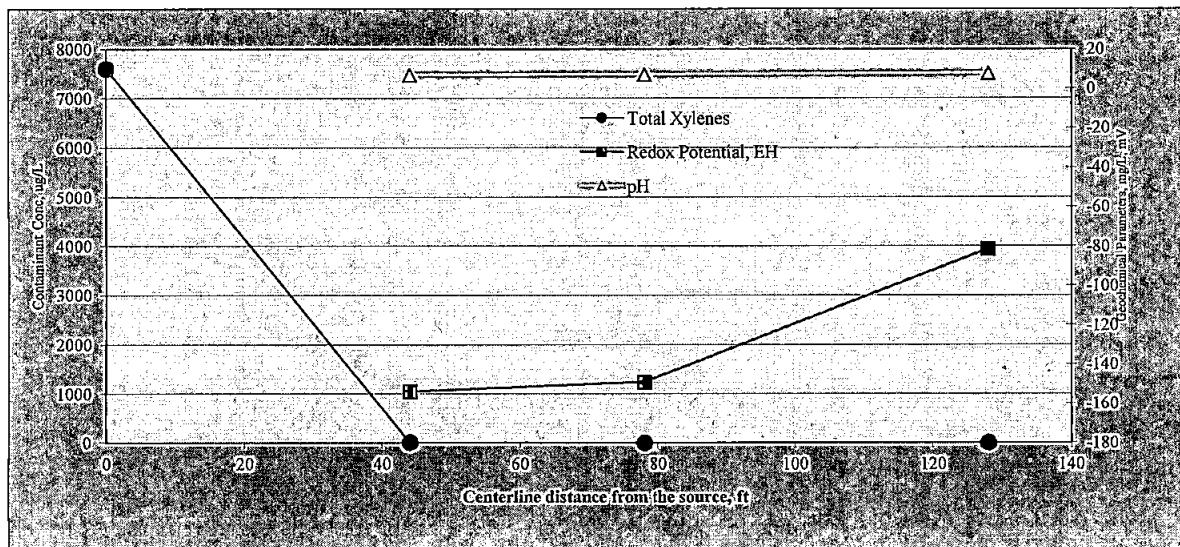
Hazardous Substance

Total Xylenes

Geochemical Indicator?

pH

Geochemical Indicator?

Redox Potential, EH

Appendix C

Continued

Appendix C

APPENDIX C

**IMPORTANT INFORMATION ABOUT YOUR
GEOTECHNICAL/ENVIRONMENTAL REPORT**



Date: August 2014
To: Mr. Zahoor Ahmed
R.C. Hedreen Company

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL/ENVIRONMENTAL REPORT

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include: the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used: (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors which were considered in the development of the report have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the
ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland