See my email - Elaine

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FAX MEMORANDUM(12 pages)

TO: Daryl Petrarca/Kurt Groesch - AGRA

FROM: Matthew Dalton

DATE: November 3, 1994

SUBJECT: Bellefield Office Park
Bellevue, Washington

REF. NO: HEW-020 (sumltr.doc)

cc: Don Jefferson - Spieker Properties
Steve Mitchell - Great Western Bank

This memorandum presents our evaluation of the available data and recommendations to address environmental issues as part of the property transaction for the referenced site. The discussion in this memorandum is based on the sediment, water quality, and soil quality data received from North Creek Analytical who analyzed samples collected by AGRA.

This memorandum has been prepared using generally accepted practices for the nature of the work at the time and locality in which the work was completed. Our work relies on the data provided by AGRA and North Creek Analytical and assumes that this data is representative of the sampling and site conditions. This memorandum has been prepared for the exclusive use of Spieker Properties for specific application to the project site and purpose. No other warranty, expressed or implied, is made.

PROJECT BACKGROUND

The Bellefield Office Park was constructed over a filled in peat bog and is surrounded by the Mercer Slough (Figure 1). Structures constructed on the site are pile supported. The areas surrounding the buildings (e.g. parking lots, roadways etc.) were generally constructed over a "floating mat"of wood debris (hog fuel). Portions of the site, in the past, were used for landfilling of primarily residential demolition waste. Based on the sites use as a landfill, the subject property was reviewed by the Washington State Department

of Ecology and the Environmental Protection Agency. In the normal course of their review of the landfilling activities, the respective agencies determined that no additional actions were required.

During the due diligence phase of the referenced real estate transaction, an employee (Randy Bartl) of the property management company raised concerns about some of the previous filling operations (since 1978) with which he was familiar. Interviews with Mr. Bartl by Spieker Properties and AGRA indicated the possible presence of suspect subsurface materials on several portions of the site. The interviews with Mr. Bartl formed the basis for AGRA to develop a sampling and analysis program to assist in addressing these concerns. The agreed upon work program is outlined in AGRA's proposed letter dated September 26, 1994 as modified by recommendations in our memorandum dated October 12, 1994. The sampling program has been implemented and the results are discussed below.

DATA SUMMARY

Surface Water Sampling in Mercer Slough: Water samples were obtained from the locations shown on Figure 1. The samples were analyzed for a variety of constituents as listed below:

- pH
- Petroleum Hydrocarbons (WTPH-DX)
- Volatile Organic Compounds (8240)
- Semivolatile Organic Compounds (8270)
- Pesticides/PCBs (8081)
- Phenols (420.1)
- Metals (6010/7000)

The results are summarized on Table 1. As indicated, no constituents were detected above the laboratory reporting limits. The pH was measured at 7.2 in both the upstream and downstream samples.

Bottom Sediment Sampling in Mercer Slough: Three samples of sediments immediately beneath the surface water of the slough were obtained upstream and downstream of the site (Figure 1). The downgradient (south) sediment sample is described by AGRA as being composed of "silts, clays & organics". Two upgradient sediment samples were collected. One sample is described as a clean sand while the second sample is described as being similar to the downgradient sediment sample (composed of silts, clays & organics). The samples were analyzed for a similar range of constituents as were conducted for the slough water samples as summarized in Table 1.

- The pH of the downgradient sediment sample is reported to be 6.6. This pH is slightly acidic (a pH of 7 is neutral) which is consistent with the peaty environment in which the sample was obtained.

- No volatile organic compounds or phenols were detected in the downgradient sediment sample. We assume that the lack of volatile or phenol detections in this sample is the reason the upgradient sediment samples were not analyzed for these constituents.

- Several metals were detected in the downgradient sediment sample (chromium, copper, and zinc). The reported metal concentrations are relatively low and are well below MTCA - Method B cleanup levels for residential sites (Ecology 1994) as summarized below:

	Sediment Conc. (mg/kg)	Cleanup Level (mg/kg)
Chromium	38	400
Copper	16	2960
Zinc	37	2400

- Relatively high petroleum hydrocarbon concentrations (2,300 to 2,900 mg/kg) were detected in the upgradient and downgradient fine-grained (silt, clay & organic) sediment samples. This limited data suggests that the source of the hydrocarbons maybe "regional" in nature. A possible source of the hydrocarbons is runoff from area parking lots and roadways.

- Several semivolatile organic compounds were detected, mostly polycyclic aromatic hydrocarbons (PAHs), at concentrations less than 0.5 mg/kg. Lower concentrations of these constituents were detected in the downgradient sample as compared to the upgradient sample. The possible source of these compounds is area stormwater runoff from roadways and parking lots.

- No PCBs were detected in the sediment samples. However, low concentration detections of dieldrin, heptachlor, and chlordane were reported. Chlordane was detected in the upgradient sediment sample while dieldrin and heptachlor were detected in the downgradient sediment samples. The reported pesticide concentrations are relatively low and are well below MTCA - Method B cleanup levels for residential sites (Ecology 1994) as summarized below:

	Sediment Conc. (mg/kg)	Cleanup Level (mg/kg)
Dieldrin	0.0037	0.063
Heptachlor	0.0062	0.222

Chlordane	0.0046	0.769

Site Ground-Water Sampling: To assist in addressing the issues raised by Randy Bartl, a series of well points were installed by AGRA at the locations shown on Figure 1. A description of the proposed locations of the well points based on our understanding of conversations that Spieker Properties had with Mr. Bartl are contained in the memorandum by Dalton, Olmsted & Fuglevand, Inc. dated October 12. We understand that AGRA visited the site with Mr. Bartl to assure that well points were installed at the locations shown on the two photographs which indicate the possible presence of oily material. It is our understanding that Mr. Bartl was able to locate the areas shown on the photographs and that well points were installed within 10 to 15 feet of the subject locations, based on a conversation with Daryl Petrarca of AGRA.

The well points were installed and sampled by AGRA. The samples were submitted to North Creek Analytical (Bothell, WA) for analysis for the following constituents:

- Petroleum Hydrocarbons (WTPH-DX)
- Volatile Organic Compounds (8021)
- Pesticides/PCBs (8081)
- Polycyclic Aromatic Hydrocarbons (8310 with selected GC/MS confirmation)

The results of the analyses are summarized in Tables 2 and 3.

- Petroleum hydrocarbons were reportedly detected in all the ground water samples. Diesel range hydrocarbons were detected in all the well points while heavier oil hydrocarbons were detected in nine of the sixteen well points. The MTCA Method A ground water cleanup level for petroleum hydrocarbons is 1 mg/l. This concentration was exceeded in wells MW-2, MW-3, MW-6, MW-7, MW-10, and MW-14.

  Interpretation of the data summarized in Table 2 is complicated by petroleum hydrocarbons being detected in a rinsate blank of a portion the 2-inch steel riser pipe used for the wells. The laboratory reported a diesel range hydrocarbon concentration of 4.1 mg/l and a heavy oil concentration of 8.8 mg/l in one of two rinsate blanks. The laboratory also reported that a "bead" of oil was observed to be present in the rinsate sample bottle. No hydrocarbons were detected in a rinsate blank of a portion of the 1.5-inch pipe used for the well points. However, the reported detection limits (diesel - 2.5 mg/l; heavy oil - 7.5 mg/l) are high because a sufficient volume of sample was not submitted to the laboratory for analysis. The results of the rinsate blank testing raise the possibility that some of the hydrocarbons detected in the well points could have been added by oil on the pipe.

- Volatile Organic Compounds were generally not detected in the water samples. However, naphthalene was detected in six of the well points at concentrations ranging between 1.4 ug/l and 16 ug/l. Naphthalene is a typical component of diesel and some other fuels and oils. The detected concentrations are below the MTCA - Method B ground-water cleanup level of 32 ug/l and the Cleanwater Act fresh-water chronic criteria of 620 ug/l.

- Polycyclic Aromatic Hydrocarbons (PAHs), not including naphthalene which is discussed above, were detected in samples from wells MW-2 and MW-3 (see Tables 2 and 3). The detected PAHs include acenaphthene, benzo(ghi)perylene, benzo(k)fluoranthene, fluoranthene, phenanthrene, and pyrene. With the exception of benzo(k) fluoranthene, the PAH concentrations meet available MTCA cleanup criteria and the available freshwater quality criteria.

- Pesticides and PCBs were detected in two of the sixteen wells; MW-2 and MW-6. The pesticides 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT, and the PCBs 1242, 1254, and 1260 were detected in well MW-2 while 4,4'-DDD and PCB-1254 were detected in well MW-6. As summarized in Table 2, 4,4'-DDD and 4,4'-DDE, meet the available MTCA cleanup and freshwater quality criteria. However, the freshwater quality criteria for 4,4'-DDT and the MTCA ground-water cleanup criteria are exceeded in wells MW-2 and MW-6.

Site Soil Sampling: AGRA collected nine soil samples from five well point locations and from four hand auger locations. The samples were analyzed for petroleum hydrocarbons using method WTPH-DX. The results are summarized on the North Creek Analytical Data sheet attached as Table 4. The highest concentrations were detected in well point WP-15 and SS-7.

As indicated on the table, petroleum hydrocarbons were detected in all the samples. The diesel range hydrocarbon concentrations ranged between 40 and 730 mg/kg while the heavier oil concentrations ranged between 240 and 920 mg/kg. Conversations with the laboratory indicate the possibility that at least some of the reported detections may be caused by interferences by "naturally occurring oils". The reported concentrations are above the typical total petroleum hydrocarbon cleanup level of 200 mg/kg.

OVERALL FINDINGS

- The sediment and surface water data indicate that activities on the Bellefield Office Park have not significantly impacted surface water and sediment in the Mercer Slough. No contaminants were detected in the slough water samples and the sediment quality of the upgradient and downgradient appears similar.

- The highest TPH concentrations (greater than 1 mg/l) were detected within the southern portion of the office park in wells MW-2, MW-3, MW-6, MW-7, MW-10, and MW-14. Some of the detected TPH concentrations may be related to oil present in the pipe used for the well points.

- The ground-water quality data indicates a source of pesticide and PCB contamination exists in the vicinity of MW-2 and MW-3. This contamination does not appear to have adversely impacted sediment and water quality in the Mercer Slough based on the limited sediment and surface water sampling (e.g. PCBs were not detected in the surface water or sediment samples). However, additional data is required to assess the extent of the PCBs and pesticides.

- Petroleum hydrocarbons were detected in all the collected soil samples. Some of the apparent detections may be associated with analytical method interferences of naturally occurring organic material.

RECOMMENDATIONS FOR ADDITIONAL WORK

In our opinion, additional work is required as a result of the issues raised by the initial work completed by AGRA. Following are our recommendations to further address the environmental issues that have been identified for the site.

- Wells MW-2, MW-3, MW-6, MW-7, MW-8 , MW-10, MW-11 and MW-14 should be reinstalled with clean oil-free pipe to reliability assess the presence of petroleum hydrocarbons in ground water. The wells should be resampled and analyzed for petroleum hydrocarbons using WTPH-DX. Appropriate pipe rinsate blanks should be collected. A sufficient volume of each sample should be collected to allow the laboratory to achieve their standard reporting limits.

- Five new well points should be installed at the locations shown on Figure 1 to assess the extent of TPHs and pesticides/PCBs in ground water. These well points should be installed using clean oil-free pipe and should be sampled for TPHs and pesticides/PCBs.

- Three auger borings to collect soil samples should be completed at the locations shown on Figure 1 to assess the material types and quality in the vicinity of MW-2. The boring should be drilled to a depth of approximately 20 feet. Soil samples should be collected with a 3-inch diameter split spoon sampler on 2.5 foot intervals. The samples should be described in detail, with an emphasis on detecting the presence of contaminated material (e.g. are the samples oily? etc.). All samples should be placed in appropriate containers for possible laboratory analysis. At least three samples from each boring should be analyzed for TPHs and pesticide/PCBs.

- Laboratory testing to attempt to identify the impact of naturally occurring organic material on the TPH analyses in soil and water should be conducted. We understand that this work is underway and that North Creek Analytical has been directed to assess the impact of using silica gel to remove organic material from several soil and water extracts. This work may suggest changes to the analytical approach for TPHs.

Please call if you have any questions.

Dalton, Olmsted & Fuglevand, Inc.

Matthew G. Dalton

Matthew G. Dalton
Sr. Consulting Hydrogeologist

attachments

testing of the cuttings and
testing of the peat

continuous sampling of 3 borings?
or 2½ ft intervals

Select samples based on visual appearance
based on ~~TVA~~, OVM

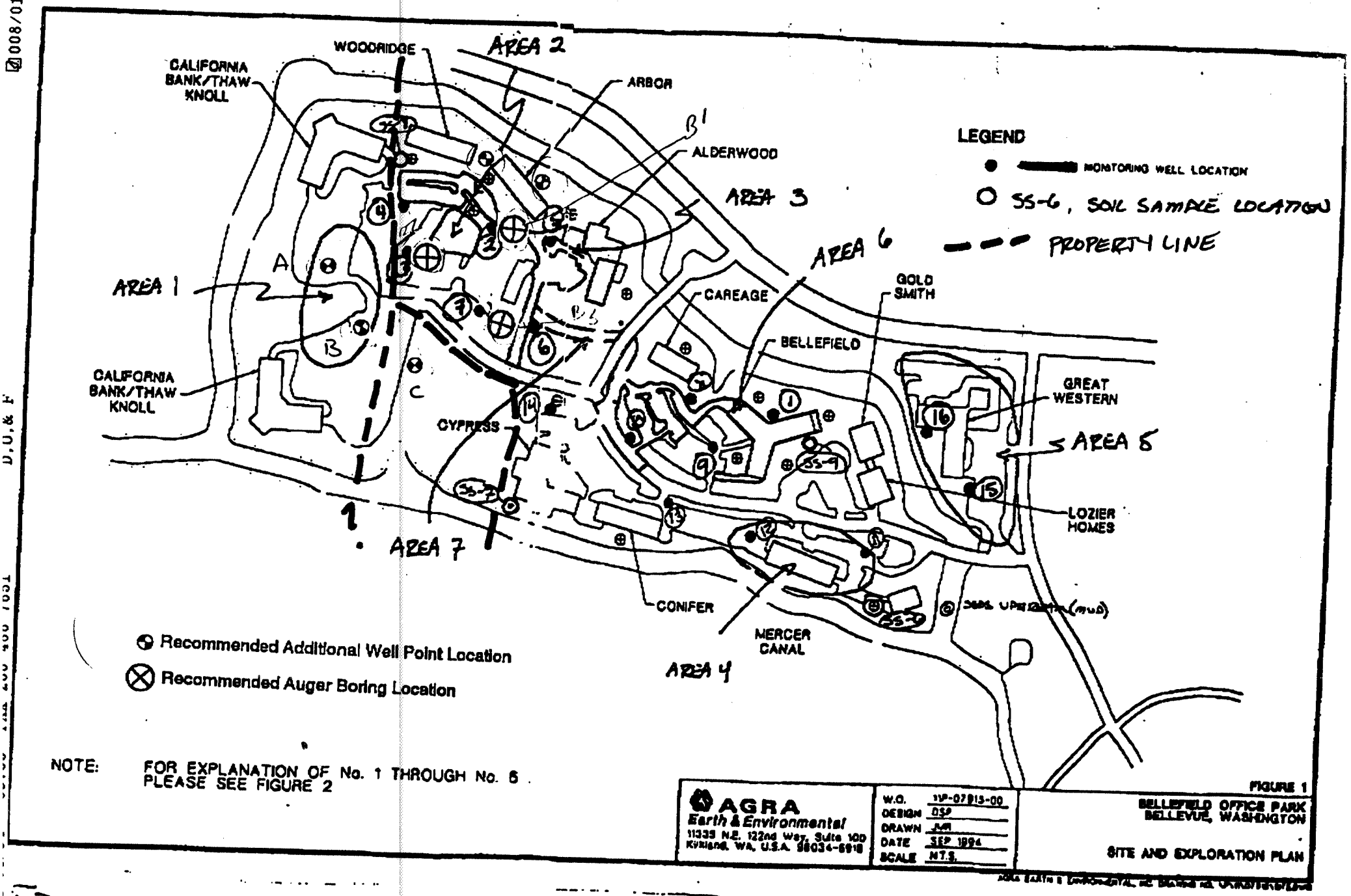

Figure 1

TABLE 1 - Results of Mercer Slough Bottom Sediment and Surface Water Analyses

Bellefield Office Park
Bellevue, Washington

	Sediment Samples (mg/kg)			Surface Water Samples (mg/l)	
	Upgradient(1)	Upgradient(2)	Downgradient(3)	West Water	East Water
Description	clean sand	silts, clays, organics		—	—
pH	—	—	6.6	7.2	7.2
WTPH-DX					
Diesel	18	480	2400	<0.25	<0.25
Heavy Oil	110	2900	2300	<0.75	<0.75
Volatiles (8240)	—	—	nd	nd	nd
Semivolatiles (8270)					
Benzoic Acid	<0.5	—	1.9	<0.01	<0.01
Benzo(a)anthracene	0.11	—	<0.1	<0.005	<0.005
Benzo(b)fluoranthene	0.21	—	<0.1	<0.005	<0.005
Benzo(ghi)perylene	0.1	—	<0.1	<0.005	<0.005
Benzo(a)pyrene	0.14	—	1.8	<0.005	<0.005
Chrysene	0.18	—	<0.1	<0.005	<0.005
Fluoranthene	0.29	—	<0.1	<0.005	<0.005
Phenanthrene	0.16	—	<0.1	<0.005	<0.005
Pyrene	0.29	—	<0.1	<0.005	<0.005
Others	nd	—	nd	nd	nd
Pesticides/PCBs (8081)					
Dieldrin	<0.002	—	0.0037	<0.00007	<0.00007
Heptachlor	<0.001	—	0.0062	<0.00004	<0.00004
Chlordane (technical)	0.0046	—	<0.001	<0.00015	<0.00015
Others	nd	—	nd	nd	nd
Phenols (420.1)	—	—	<0.5	<0.025	<0.025
Metals (6010/7000)					
Chromium	—	—	38	<0.01	<0.01
Copper	—	—	16	<0.02	<0.02
Zinc	—	—	37	<0.01	<0.01

Notes:

(1) - North H2O (soil) - on laboratory sheets

(2) - sed-upstream - on laboratory sheets

(3) - South Soil on laboratory sheets

TABLE 2 - SUMMARY OF GROUND-WATER QUALITY DATA

Bellefield Office Park
Bellevue, Washington

Well	WTPH-DX (mg/l)		Volatiles (8021) (ug/l)		Sum PAHs	PCBs/Pest.- 8081(ug/l)					
	Diesel	Heavy Oil	Naphthalene	Others	(ug/l)	4,4'-DDD	4,4'-DDE	4,4'-DDT	PCB-1242	PCB-1254	PCB-1260
MW-1	0.34	<0.75	<1	nd	na	<0.08	<0.06	<0.18	<1	<1	<1
MW-2	4	16	<1	nd	20.1(3)	0.34	0.043	0.12	1.6	1.7	0.42
MW-3	1.1	1.7	6.2	nd	3.6(3)	<0.04	<0.03	<0.09	<0.1	<0.1	<0.1
MW-4	0.37	<0.75	1.9	nd	nd	<0.04	<0.03	<0.09	<0.1	<0.1	<0.1
MW-5	0.27	<0.75	1.4	nd	nd	<0.04	<0.03	<0.09	<0.1	<0.1	<0.1
MW-6	2.1	4.8	2.4	nd	nd(1)	0.042	<0.03	<0.09	<0.1	0.16	<0.1
MW-7	1.7	4.2	16	nd	nd	<0.04	<0.03	<0.09	<0.1	<0.1	<0.1
MW-8	0.89	0.75	<1	nd	nd	<0.04	<0.03	<0.09	<0.1	<0.1	<0.1
MW-9	0.76	0.77	2.8	nd	nd	<0.04	<0.03	<0.09	<0.1	<0.1	<0.1
MW-10	2.3	5.9	<1	nd	nd	NA	NA	NA	NA	NA	NA
MW-11	0.63	0.96	<1	nd	nd	<0.04	<0.03	<0.09	<0.1	<0.1	<0.1
MW-12	0.53	<0.75	<1	nd	nd	<0.04	<0.03	<0.09	<0.1	<0.1	<0.1
MW-13	0.74	<0.75	<1	nd	nd	<0.04	<0.03	<0.09	<0.1	<0.1	<0.1
MW-14	0.94	1.3	<1	nd	nd	<0.04	<0.03	<0.09	<0.1	<0.1	<0.1
MW-15	0.61	<0.75	<1	nd	nd	<0.04	<0.03	<0.09	<0.1	<0.1	<0.1
MW-16	0.44	<0.75	<1	nd	nd	<0.04	<0.03	<0.09	<0.1	<0.1	<0.1
Cleanup Levels(2)											
MTCA Method A	1	1	na	—	(3)	na	na	0.1	0.1	0.1	0.1
MTCA Method B	na	na	32	—	(3)	0.37	0.26	0.26	0.01	0.01	0.01
Freshwater Criteria(4)	na	na	620	—	(3)	na	1050(5)	0.001	0.014(6)	0.014(6)	0.014(6)

Notes:

(1) - Matrix interference caused relatively high reporting limit

(2) - MTCA Levels based on drinking water exposure

(3) - see Table 3

(4) - Freshwater chronic criteria

(5) - Freshwater acute criteria

(6) - For PCB mixtures

na - not available

nd - not detected

TABLE 3 - Results of PAH Analyses in Ground-Water

	MW-2		MW-3		MTCA-Method B	Freshwater
	8310	8270	8310	8270	(ug/l)	Criteria (1)
Acenaphthene	<5	<5	<5	5.7	960	520
Benzo(ghi) perylene	2.1	<5	<0.1	<5	na	na
Benzo(k)fluoranthene	0.98	<5	<0.1	<5	0.1(4)	na
Fluoranthene	7.7	5.8	1.8	<5	640	3980(2)
Phenanthrene	<5	5.3	<5	<5	na	6.3(3)
Pyrene	9.3	10.2	1.8	<5	480	na

(1) - Freshwater Chronic Criteria

(2) - Freshwater Chronic Criteria not available. Indicated value is the freshwater acute criteria

(3) - Proposed Criterion

(4) - MTCA Method A Criteria