

November 15, 2005

Alaska Department of Environmental Conservation 610 University Avenue Fairbanks, Alaska 99709

Attn: Mr. Jim Frechione

RE: RESULTS OF 2005 GROUNDWATER MONITORING AT FAIRVIEW MANOR APARTMENTS, 1260 AIRPORT WAY, FAIRBANKS, ALASKA, ADEC NRO FILE NO. 120.38.040

We have completed the fourth round of annual groundwater monitoring at the Fairview Manor apartments following the granting of a No-Further-Remedial-Action-Planned (NFRAP) status for the site by the Alaska Department of Environmental Conservation (ADEC). This work was performed in partial fulfillment of the requirements stated in the ADEC December 5, 2001, Record of Decision (ROD) regarding groundwater quality at the site. This report describes the sampling activities, and presents the results of volatile organic compound (VOC) and diesel range organic (DRO) analyses performed on the groundwater samples.

BACKGROUND

The ADEC issued a NFRAP with respect to the tetrachloroethene (PCE) in the soil at the maintenance shop, and DRO in the soil at the former underground storage tank (UST), and stipulated in their ROD that a work plan addressing groundwater sampling and analysis be prepared. We subsequently prepared a work plan (*Environmental Services Agreement, Compliance Monitoring, Fairview Manor Apartments, Fairbanks, Alaska*, dated March 4, 2002) indicating groundwater samples would be collected from monitoring wells MW-1, MW-5, and MW-10 (Figure 1) on an annual basis. Samples from MW-10, near the UST, were to be analyzed for DRO and benzene, toluene, ethylbenzene, and xylenes (BTEX), and samples from wells downgradient from the maintenance shop (MW-1 and MW-5) were to be analyzed for VOCs.

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In addition, the ROD stated that the ADEC has determined the groundwater at the Fairview Manor site is not a current or future drinking-water source; therefore, the ROD included a waiver of adherence to the 18 AAC 75.345 Table C drinking water levels for PCE, allowing up to ten times the Table C value of 5 micrograms per liter (μ g/L) (i.e., concentrations of PCE in water up to 50 μ g/L are allowed). This waiver allowing a ten-fold increase in groundwater cleanup level only included PCE and did not extend to DRO or BTEX.

SAMPLING

On September 16, 2005, Andrea Carlson, an environmental scientist from our Fairbanks office, collected samples from monitoring wells MW-1, MW-5, and MW-10. The depth to the water table in each well was first measured with an electronic water sounder. Prior to sampling, each well was purged until groundwater temperature, conductivity, and pH stabilized over three consecutive readings and no further reduction in turbidity was apparent.

Purging and sampling were conducted at each well with a decontaminated, battery-powered, variable-speed, submersible pump equipped with new discharge tubing. Purge water was delivered to Emerald Services for treatment and disposal; a certificate of disposal/recycle is attached to this letter.

Following well purging, samples were collected into the appropriate laboratory-prepared sample containers. They were placed in a cooler and kept cold until they were delivered to SGS Environmental Services, Inc. (SGS) in Fairbanks. SGS submitted these samples to their Anchorage laboratory for analysis. Samples from MW-1 and MW-5 were analyzed for VOCs by EPA Method 8260, and the sample from MW-10 was analyzed for DRO by Alaska Method AK102, and BTEX by EPA Method 8021.

Quality assurance and quality control (QA/QC) measures for this sampling effort consisted of collecting and analyzing a field duplicate sample from MW-1 for VOCs, and carrying trip and temperature blanks in the field during sample acquisition. The trip and temperature blanks also accompanied the samples during storage and transfer to SGS; the trip blank was submitted for analysis of VOCs, and the temperature blank was used to check that the samples arrived at the

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analytical laboratory within the proper temperature range. In addition, the laboratory applied their in-house QC standards in accordance with their Quality Assurance Program Plan (QAPP).

RESULTS

Groundwater Elevation

Depths to groundwater measured at well MW-1, MW-5, and MW-10 indicate the groundwater elevation at those locations were between 11.5 and 12 feet below the ground surface.

Groundwater Analytical Results

The results of the 2005 water quality analyses conducted on samples from wells MW-1, MW-5, and MW-10 are presented in Table 1. For comparison purposes, a history of the concentrations of analytes detected in these three wells also has been tabulated (Table 2). The laboratory analytical report for the August 2005 samples is included as an attachment to this report.

PCE was detected in the duplicate samples from MW-1 (31.3 and 31.7 μ g/L) and in the sample from MW-5 (8.16 μ g/L). No other volatile analytes were detected at concentrations exceeding the Practical Quantitation Limits (PQLs).

DRO compounds were detected in the water sample from MW-10 at a concentration of 1.60 mg/L (the laboratory comments indicated the pattern is consistent with a weathered middle distillate); BTEX were not detected above their PQLs.

Quality Assurance/Quality Control

The duplicate samples were collected from MW-1 to assess error associated with sampling and laboratory variability. Where possible, the relative percent difference (RPD; the difference between analyte concentrations in each sample divided by the mean of the two) was calculated to evaluate the degree of this error; RPDs are calculable only if both duplicates contain an analyte at concentrations above its PQL. For this sample set, the RPD could only be calculated for PCE (1.3 percent), as no other analytes met this criterion. The calculated RPD was within Shannon & Wilson's acceptable range of ± 30 percent.

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Laboratory QA/QC efforts demonstrated that the quality of the analytical data was generally acceptable. The trip blank was found to be free of VOCs, indicating no cross-contamination of samples likely occurred during sampling or transport of samples to the laboratory.

Laboratory QC included the procedures outlined in the SGS, ADEC-approved, standard operating procedures documentation. As presented in the laboratory report's QC data package summary sheets, the majority of the laboratory QC parameters fell within SGS's acceptable limits, with the exception of the following:

Sample Number	QC DEVIATIONS
1055646004	DRO/RRO LCS/LCSD DRO spike recovery is biased low, and RRO spike recovery is biased high. Sample reextracted past hold time, results confirmed.

It is unlikely the data were compromised by QC deviations noted in the table above, and the data are acceptable for the purposes of this study.

DISCUSSION

The concentrations of PCE measured in the MW-1 and MW-5 samples were higher than those measured during the previous sampling event in August 2004 (Table 2). For both wells the PCE concentration was below the maximum concentration previously observed at each location, and the concentrations did not exceed the site-specific cleanup levels for these wells. The concentration of DRO in MW-10 remained above the maximum acceptable level of 1.50 mg/L.

CONCLUSIONS

This fourth round of annual groundwater monitoring at wells MW-1, MW-5, and MW-10 at the Fairview Manor site detected PCE and DRO. PCE did not exceed groundwater cleanup levels established for this site. DRO exceeded the cleanup level; the ADEC included a requirement in the ROD that groundwater quality at the heating-oil UST site be monitored annually until DRO concentrations do not exceed the cleanup level for two consecutive years. Based on the current results, at least two more annual groundwater-monitoring events will be required at the heating-oil UST (MW-10). We recommend continued monitoring of MW-1 and MW-5 until PCE

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concentrations in the groundwater at these locations are below 5 μ g/L for two consecutive sampling events.

LIMITATIONS

This report was prepared for the exclusive use of The Mortensen Trust and their representatives in the assessment of the groundwater quality at the Fairview Manor Apartments in Fairbanks, Alaska. The data we have presented are based on the scope of our services and the sampling and analysis that we performed. They should not be construed as definite conclusions about the groundwater quality at the site; changes due to natural forces or human activity can occur on the site. The data presented herein should be considered representative only of the time of our sampling and not as a definite statement regarding reported conditions.

If you have any questions regarding this report or conclusions based on the analytical results, please do not hesitate to call.

Sincerely,

SHANNON & WILSON, INC.

Reviewed by:

electronic copy____

Mark S. Lockwood, C.P.G. Principal Geologist David M. McDowell Vice President

Enclosures:	Table 1	September 2005 Analytical Results				
	Table 2	Historical Results from Wells MW-1, MW-5, and MW-10				
	Figure 1	Monitoring Well Locations				
	Emerald Alaska, Inc Certificate of Disposal/Recycle					
	SGS Analy	tical Laboratory Report				

cc: Thomas S. Hayward J.V. Brown

						Ethyl-	p- & m-		Tetrachloro-
		Sample	DRO	Benzene	Toluene	benzene	Xylenes	o-Xylene	ethene
Well	Sample Number	Date	(mg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
	Groundwater clea	1.5	5	1000	700	10,000 (To	tal xylenes)	50 ¹	
MW-1	1287-091605-001	9/16/2005	na	<0.400	<1.00	<1.00	<2.00	<1.00	31.3
MW-1	1287-091605-002 ³	9/16/2005	na	<0.400	<1.00	<1.00	<2.00	<1.00	31.7
MW-5	1287-091605-003	9/16/2005	na	<0.400	<1.00	<1.00	<2.00	<1.00	8.16
MW-10	1287-091605-004	9/16/2005	1.60	<0.500	<2.00	<2.00	<2.00	<2.00	na

TABLE 1. September 2005 Analytical Results

<u>Notes</u>

¹ Alternate cleanup level, based on ADEC ROD for this site, dated December 2001.

 2 na = analyte not determined in this sample

³ Field duplicate sample from MW-1

									Trichloro-	Dichloro-	Dibromo-
					Ethyl	p- & m-		Tetrachloro-	fluoro-	difluoro-	chloro-
	Sample	DRO	Benzene	Toluene	benzene	Xylenes	o-Xylene	ethene	methane	methane	methane
Well	Date	(mg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
Groundwater		1.5	5	1000	700	10,000 (Tetel video ce)		50 ¹	NCL ²	7,300	60
Clean							(Total xylenes)				
MVV-1	//23/1992	N/A °	<0.1	<0.1	<0.1	<0).2	16	<1	<1	<1
MW-1	7/28/1993	N/A °	<1	<1	<1	<	2	55/53	<1	<1	<1
MW-1	11/4/1993	N/A ³	N/A ³	62	<1	<1	<1				
MW-1	9/29/1994	N/A ³	<1	<1	<1	<	:2	30	<1	<1	<1
MW-1	1/5/1995	N/A ³	<1	<1	<1	<	:2	10	<1	<1	<1
MW-1	4/10/1995	N/A ³	<1	<1	<1	<	:2	13.0	<1	<1	<1
MW-1	7/21/1995	N/A ³	<1/<1	<1/<1	<1/<1	<2/<2		19/22	<1/<1	1/1	<1/<1
MW-1	11/1/1996	N/A ³	N/A ³	20.9/20.1	<1/<1	N/A ³	<1/<1				
MW-1	3/3/1997	N/A ³	N/A ³	14.7/15.6	<1/<1	N/A ³	1.63/<1				
MW-1	11/23/1998	N/A ³	<1	<1	<1	<2		22.2	<1	<1	<1
MW-1	6/30/1999	N/A ³	<1/<1	<1/<1	<1/<1	<2,	/<2	24.9/25.0	<1	<1	<1
MW-1	3/31/2000	N/A ³	<1	<1	<1	<	:2	18.9	<1	<1	<1
		_	<0.500/	<1.00/	<1.00/	<2.00/	<1.00/		<1.00/	<1.00/	<1.00/
MW-1	8/22/2002	N/A ³	<0.500	<1.00	<1.00	<2.00	<1.00	37.1/39.0	1.12	<1.00	<1.00
		0	<0.400/	<1.00/	<1.00/	<2.00/	<1.00/		<1.00/	<1.00/	<1.00/
MW-1	8/29/2003	N/A ³	<0.400	<1.00	<1.00	<2.00	<1.00	33.2/32.0	<1.00	<1.00	<1.00
		2	<0.400/	<1.00/	<1.00/	<2.00/	<1.00/		<1.00/	<1.00/	<1.00/
MW-1	8/20/2004	N/A ^s	<0.400	<1.00	<1.00	<2.00	<1.00	29.9/28.2	<1.00	<1.00	<1.00
	- / / /		<0.400/	<1.00/	<1.00/	<2.00/	<1.00/	o (o (o (=	<1.00/	<1.00/	<0.500/
MW-1	9/16/2005	N/A ³	<0.400	<1.00	<1.00	<2.00	<1.00	31.3/31.7	<1.00	<1.00	< 0.500
	0/40/0000	NI/A 3	<0.400/	<1.00/	<1.00/	<2.00/	<1.00/	20 7/20 5	4 00/4 44	<1.00/	<0.500/
MW-1	8/16/2006	N/A	<0.400	<1.00	<1.00	<2.00	<1.00	30.7/29.5	1.38/1.44	<1.00	<0.500

 TABLE 2. Historical Results from Wells MW-1, MW-5, and MW-10

									Trichloro-	Dichloro-	Dibromo-
					Ethyl	p- & m-		Tetrachloro-	fluoro-	difluoro-	chloro-
	Sample	DRO	Benzene	Toluene	benzene	Xylenes	o-Xylene	ethene	methane	methane	methane
Groundwater		1.5	5	1000	700	10,000 (Total vulance)		50 ¹	NCL ²	7,300	60
IVIVV-5	7/23/1992	No sample	No sample	No sample	No sample	No sample	No sample				
MW-5	7/28/1993	N/A °	<1	<1	<1	<	2	11	<1	<1	<1
MW-5	11/4/1993	N/A ³	N/A ^s	N/A ³	N/A ^s	N/A ^o	N/A ^s	12	<1	<1	<1
MW-5	9/29/1994	N/A ³	<1	<1	<1	<	2	6	<1	<1	<1
MW-5	1/5/1995	N/A ³	<1	<1	<1	<	2	3/3	<1/<1	1/1	<1/<1
MW-5	4/10/1995	N/A ³	<1	<1	<1	<	2	4	<1	1	<1
MW-5	7/21/1995	N/A ³	<1	<1	<1	<	2	3	<1	2	<1
MW-5	11/1/1996	N/A ³	N/A ³	5.58	<1	N/A ³	<1				
MW-5	3/3/1997	N/A ³	N/A ³	3.84	<1	N/A ³	<1				
MW-5	11/23/1998	N/A ³	<1	<1	<1	<2		5.97	<1	<1	<1
MW-5	6/30/1999	N/A ³	<1	<1	<1	<2		3.04	<1	<1	<1
MW-5	3/31/2000	No sample	No sample	No sample	No sample	No sample	No sample				
MW-5	8/22/2002	N/A ³	<0.500	<1.00	<1.00	<2.00	<1.00	3.93	<1.00	1.48	<1.00
MW-5	8/29/2003	N/A ³	<0.400	<1.00	<1.00	<2.00	<1.00	4.5	<1.00	<1.00	<1.00
MW-5	8/20/2004	N/A ³	<0.400	<1.00	<1.00	<2.00	<1.00	6.88	<1.00	<1.00	<1.00
MW-5	9/16/2005	N/A ³	<0.400	<1.00	<1.00	<2.00	<1.00	8.16	<1.00	<1.00	<1.00
MW-5	8/16/2006	N/A ³	<0.400	<1.00	<1.00	<2.00	<1.00	6.49	1.20	1.68	<0.500
		2.24/	<0.500/	<1.00/	<1.00/	<2.00/	<1.00/		_	_	
MW-10	5/31/2001	2.52	<0.500	<1.00	<1.00	<2.00	<1.00	N/A ³	N/A ³	N/A ³	N/A ³
MW-10	8/22/2002	2.11	<0.500	5.89	<2.00	<2.00	<2.00	N/A ³	N/A ³	N/A ³	N/A ³
MW-10	8/29/2003	1.50	<0.500	<2.00	<2.00	<2.00	<2.00	N/A ³	N/A ³	N/A ³	N/A ³
MW-10	8/20/2004	3.19	<0.500	<2.00	<2.00	2.40	<2.00	N/A ³	N/A ³	N/A ³	N/A ³
MW-10	9/16/2005	1.60	<0.500	<2.00	<2.00	<2.00	<2.00	N/A ³	N/A ³	N/A ³	N/A ³
MW-10	8/16/2006	2.030	<0.500	<2.00	<2.00	<2.00	<2.00	N/A ³	N/A ³	N/A ³	N/A ³

TABLE 2. Historical Results from Wells MW-1, MW-5, and MW-10

<u>Notes</u>

Bold indicates an exceedance of the 18 AAC 75.345 Table C cleanup level

¹ Alternate cleanup level, based on ADEC ROD for this site, dated December 2001.

 2 NCL = no cleanup level exists for this analyte

 3 N/A = analyte not determined in this sample

