Fairview Manor Site
Record of Decision (ROD)

Introduction

The Fairview Manor Apartments and Maintenance Shop site is located at 1260 Airport Way, the intersection of Airport Way and Cowles Street, in Fairbanks, Alaska. The legal description of the property is SW1/4 NW1/4 Section 10, T.1S., R.1W., F.M. The apartment complex (including a maintenance shop building) was constructed in the 1950s and continues to be used for residential purposes. The responsible party (RP) for this site is the Mortensen Trust.

Site investigations and groundwater monitoring have identified soil conditions at the Fairview Manor site. Two separate contaminated soil areas were identified at the Fairview Manor site. One area (at the maintenance shop building) was impacted by tetrachloroethylene (PCE) and the second area (the former site of a 10,000-gallon underground heating fuel storage tank (UST) near the northeast edge of the property) was impacted by diesel fuel. There are documented soil and groundwater impacts in both areas.

Site Information/Background

Maintenance Shop PCE Area

The Fairview Manor maintenance shop was used for a variety of purposes including storage and maintenance of building and grounds-keeping supplies. The soil conditions are sand with varying amounts of silt from the surface to 12 feet below ground surface (bgs) and sand with varying amounts of gravel to 60 feet bgs (the limit of soil borings). Groundwater was encountered approximately 11 feet bgs with flow in a north-northwest direction.

Soil

No specific spill events at the maintenance shop have been documented but the highest PCE levels (0.84 parts per million (ppm)) were identified in 1992 in surface (0 -2 feet bgs) soil (Table 1). There was no soil cleanup action conducted at this site and there has not been any additional sampling since 1992. The 18 AAC 75.341 Method Two PCE soil cleanup level for the migration to groundwater pathway at this site is 0.03 ppm or mg/kg.

Groundwater

Groundwater monitoring has been conducted at the Fairview Manor since 1992 when two wells were installed. Four additional wells were installed in 1993 to further assess the extent of the PCE groundwater plume. The PCE levels were highest at the maintenance shop building with evidence of decreasing concentrations away from that area. In 1993, groundwater samples detected PCE at 62 parts per billion (ppb) in MW-1 (located northwest of the shop building) whereas the March 2000 sample results from the same well identified PCE at 18.9 ppb (Table 2). In 1998, two temporary well points were installed downgradient of the maintenance shop at the

property boundary and they detected PCE at 5.69 ppb. The 18 AAC 75.345, Table C groundwater cleanup level for PCE is 5 ppb or ug/L.

A water well search did not identify any drinking water wells within a quarter mile of the site. There also was a groundwater investigation (using temporary well points) conducted off site in 1999 That detected PCE at 2.79 ppb and trichloroethylene (TCE) at 19.5 ppb . In March 2000, there was further assessment of the groundwater conducted to determine the potential for an offsite contaminant source; characterize the vertical and horizontal extent of contamination; and evaluate the potential for natural attenuation conditions that would allow the PCE to form TCE.

NOTE: The data implies there may be other PCE and TCE sources (besides the Fairview Manor site) in the area. However, other potential source area(s) will not be addressed under this decision document. This issue may be addressed under a separate investigation of other possible source areas in the future.

UST Heating Oil Area

The former 10,000-gallon underground storage tank (UST) used for heating fuel near the northeast edge of the property was removed in June 1993. It was reportedly in good condition and not leaking. The suspected sources of petroleum contamination at this site were leaking pipes and probable spills and releases.

Soil

Contaminated soil was excavated from the tank area based on field screening measurements. The soil was excavated down to the water table approximately 5 feet beyond the UST on the south, east and west sides. The excavation extended further on the northwest side where it was necessary to remove a monitoring well (MW-2) that had been installed in 1992. The only contaminant of concern identified was DRO. There was no evidence of BTEX detected in the soil. The samples from the excavation side walls did not identify contamination above the DRO cleanup level but the concentrations at the soil - groundwater interface ranged from 11,000 to 20,000 ppm at the north and west limits of the excavation.

In an effort to further reduce contaminant levels in the soil, a 10 foot section of slotted pipe with vertical risers was placed at the bottom of the excavation. This was intended to introduce oxygen and hopefully aid in bioremediation of the contaminated soil remaining in the ground. The soil excavated from the UST site was treated (land-farmed) on the property from 1993 through 1999. However, the sample results indicated the target cleanup level of 250 ppm was not achieved and the soil was then transported to a thermal treatment facility in September 1999.

Groundwater

MW-2 was installed in 1992 near the northwest corner of the heating oil tank. The groundwater was sampled for BTEX only (not DRO) and several compounds (benzene, ethylbenzene, and xylene) were detected but they were below ADEC cleanup levels. In May 2001, MW-10 and a temporary well (WP-2) were established down-gradient near the property boundary. The

groundwater samples identified 2.4 ppm DRO in MW-10 and were non detect for DRO and BTEX in WP-2. The Table C groundwater cleanup level for DRO is 1.5 ppm.

Contaminants of Concern

The contaminants of concern associated with this site include: PCE; TCE and DRO.

The possible pathway(s) of contaminant migration include: migration to groundwater through the soil and the ingestion and/or inhalation of contaminated groundwater. There is also the possible inhalation and ingestion of contaminated soil if it became accessible during excavation activities. The contaminants detected in the groundwater above the 18 AAC 75.345 Table C cleanup levels were PCE, TCE and DRO. However, there were no drinking water wells identified at the Fairview Manor site or within 0.25 miles and the risk posed by groundwater ingestion or inhalation is minimal or non existent.
The PCE detected in the soil is below the 18 AAC 75.341 Table B1 ingestion and inhalation levels and, therefore, poses no risk to residents or workers. However, there were DRO soil levels above the maximum allowable concentrations of ingestion and inhalation identified below the ground surface that may pose a risk if the soil was exposed and/or excavated.

There is no surface water near the site to be considered a pathway of concern.

Maintenance Shop PCE Area
Soil

PCE contamination was identified in July 1992 directly outside the maintenance shop. Soil samples were also collected during installation of MW-1 that is located approximately 75 feet from the northwest corner of the shop. In 1993, soil samples collected during the installation of three additional monitoring wells verified that the highest PCE soil concentration (0.840 ppm) was in the surface (0 -2 feet bgs) samples obtained from stained areas outside the shop building. The PCE soil levels from this area are presented in Table 1 below.

Table 1. Soil PCE concentrations in 1992-1993.

SITE	SAMPLE DEPTH (ft)	PCE CONCENTRATION (mg/kg)
SS1	Surface	0.070
SS2	Surface	0.200
SS3	Surface	0.840
MW1	2.5 – 4.0	0.060
MW1	10.0 – 11.5	0.040
MW1	15.0 – 16.5	0.023
MW3	3.0 – 5.0	0.004
MW3	15.0	0.010
MW4	2.5	< 0.002
MW4	5.0	0.003
MW6	2.5	<0.002
MW6	10.0	<0.002

Groundwater

The PCE level in MW-1, located northwest of the maintenance shop, was 62 ppb in 1993. The March 2000 level from that same well was 18.9 ppb. In 1998, two temporary well points were installed downgradient of the maintenance shop at the property boundary and the PCE concentration detected there was 5.69 ppb.

Table 2. Concentrations of PCE in groundwater collected between 7/23/92 and 3/30/00 from monitoring wells at Fairview Manor. Concentrations are reported in parts per billion (ug/L). The regulatory limit for PCE in groundwater is 5 ppb.

Monitoring Well	Screen Depth (ft)	7/23/92	7/28/93	11/4/93	9/29/94	1/5/95	4/10/95	7/27/95	11/1/96	3/4/97	11/13/98	7/1/99	3/30/00
1	10-20	16	54	62	30	10	13	21	21	15	22	25	18.9
3	40-50		4	---	3	3	2	ND	1.9	1.7	---	ND	ND
4	40-50		4	---	2	2	3	2	1.5	1.3	---	ND	---
5	10-20		11	12	6	3	<5	3	5.6	3.8	6	3.0	---
6	10-20		ND	---	ND	---	ND	ND	ND	ND	---	---	---
7	55-60												1.2
8-20	10-20												3.7
8-40	35-40												12.4

NOTE: There was additional groundwater monitoring conducted off site and downgradient from the Fairview Manor property in 1999. The contaminants identified were PCE at 2.79 ppb and TCE at 19.5 ppb which indicates a more extensive contaminant problem in this area.

Table 3. Concentrations of TCE in groundwater collected between 7/23/92 and 3/30/00 from monitoring wells at Fairview Manor. Concentrations are reported in parts per billion (ug/L). The regulatory limit for TCE in groundwater is 5 ppb.

Monitoring Well	Screen Depth (ft)	7/23/92	7/28/93	11/4/93	9/29/94	1/5/95	4/10/95	7/27/95	11/1/96	3/4/97	11/13/98	7/1/99	3/30/0
1	10-20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3	40-50		2	---	1	ND	ND	ND	ND	ND	---	ND	ND
4	40-50		3	---	2	ND	ND	1	0.9	0.9	---	ND	---
5	10-20		ND	ND	1	ND	ND	ND	ND	ND	ND	ND	---
6	10-20		ND	---	ND	---	ND	ND	ND	ND	---	---	---
7	55-60												1.3
8-20	10-20												3.3
8-40	35-40												62.6

UST Heating Oil Spill

Soil

The soil samples collected in 1993 after excavation of the UST identified DRO at 11,000 to 20,000 ppm at the soil-groundwater interface. In May 2001, soil samples collected while installing MW-10 approximately 12 feet from the elevated DRO area did not detect any DRO or BTEX compounds.

Groundwater

In 1993, the groundwater samples from MW-2 detected benzene, ethylbenzene, and xylene but all were below Table C cleanup levels. However, it should be noted that groundwater samples were not analyzed for DRO in 1993 because State of Alaska regulatory limits for DRO in groundwater had not yet been established. In May 2001, samples from MW-10 (12 feet away from the former UST location) detected 2.4 ppm DRO in the groundwater but no BTEX.

Cleanup Levels

Maintenance Shop PCE Area

Soil

The PCE soil cleanup levels for this zone established in 18 AAC 75.341, Method Two, Table B1 are: 0.03 mg/kg (or ppm) for migration to groundwater; 80 ppm for inhalation; and 160 ppm for ingestion. However, in accordance with 18 AAC 75.340(e)(2), the responsible party (RP) may request alternative cleanup levels under Method Three based on site specific parameters. In this case, the RP requested a Method Three, migration to groundwater, soil cleanup level for PCE using the following Fairview Manor data:

Hydraulic Conductivity (K): The hydraulic conductivity is 44,000 meters/year.
Hydraulic Gradient (I): The hydraulic gradient is 0.00085 meters/year.
Infiltration (I): The infiltration rate is 0.06 meters/year.
Source Length (L): The source length is 30 meters.
Aquifer Thickness (d_a): The aquifer thickness is 200 meters.

Based on the site specific values referenced above and a proposed groundwater cleanup level of 10 times 18 AAC 75 Table C value for PCE, the alternative migration to groundwater soil cleanup level for PCE calculated for this site is 1.65 ppm.

Groundwater

Since the migration to groundwater pathway was identified as the pathway of concern for PCE at this site, the responsible party proposed an alternative groundwater cleanup level in accordance with 18 AAC 75.345(b)(2). This allows a cleanup level of ten times the Table C value if it is determined that the groundwater is not a drinking water source under 18 AAC 75.350.
The level of PCE detected in MW-1, closest well to the maintenance shop, was 18.9 ppb in 2000 whereas the PCE concentration in the same well in 1993 was 54 ppb.
The PCE concentrations identified in MW-4 and temporary well MW-7, located downgradient, at (or near) the Fairview Manor property line, were less than the 18 AAC 75.345, Table C cleanup level of 5 ppb in all monitoring events except a November 1998 sample that detected PCE at 5.7 ppb.

The alternative groundwater cleanup level in accordance with 18 AAC 75.345(b)(2) would allow ten times the Table C cleanup level of 5 ppb. This would allow the PCE cleanup level to be increased to 50 ppb based on a 18 AAC 75.350 determination that groundwater at the Fairview

Manor site is not a current (or future) drinking water source. In order to determine the status of the groundwater use at this site, the following information was considered:

1. There are no private or public drinking water wells onsite. In addition, a 1994 water well search did not identify any public or private drinking water wells within 0.25 mile of the site and it was determined that all properties within the area are connected to the public water system.
2. The wellhead protection area, the zone of contribution and recharge area for the Golden Heart Utility Wells, that serve the City of Fairbanks were calculated by ADEC and it was determined that the Fairview Manor site is outside these protection areas.
3. The groundwater in the City of Fairbanks is considered a "sole source aquifer" but the Fairview Manor site is located outside the wellhead protection area for the public drinking water wells that serve the City of Fairbanks.
4. The PCE levels in the groundwater at the property boundary are at, or below, the 5 ppb cleanup level in 18 AAC 75.345 Table C.

Based on the 18 AAC 75.350 information above, ADEC has determined that the groundwater at the Fairview Manor site is not a current (or future) drinking water source and a groundwater cleanup level of 10 times the 5 ppb 18 AAC 75 Table C level for PCE is appropriate. The 50 ppb level is considered protective of human health and the environment provided an institutional control is attached to the property that prohibits use of the groundwater as a drinking water source until such time that it meets the 18 AAC 75.345 Table C levels.

UST Heating Oil Area

Soil
The contaminants of concern found in the soil at the UST heating oil area are DRO and components of BTEX. The soil cleanup levels at this site are established in accordance with Method Two 18 AAC 75.341 Tables B1 and B2, Migration to Groundwater. The cleanup levels are: 250 ppm for DRO; 0.02 ppm for benzene; 5.5 ppm for ethylbenzene; 5.4 ppm for touluene; and 78 ppm for total xylenes.

Groundwater
The cleanup levels for groundwater established under 18 AAC 75.345, Table C are: 1.5 ppm for DRO; 0.005 ppm for benzene; 0.7 ppm for ethylbenzene; and 1.0 ppm for toluene.

Summary

Maintenance Shop PCE Area
Soil
There were several stained areas outside of the Fairview Manor Maintenance Shop where PCE contamination exceeded the 18 AAC 75.341, Method Two, migration to groundwater, soil cleanup level of 0.03 ppm. The highest PCE level of 0.84 ppm detected exceeds the migration to groundwater level but is below the Method Two inhalation and ingestion risk levels. The

responsible party requested a 18 AAC 75.340(e) Method Three alternative soil cleanup level of 1.65 ppm based on site specific parameters and an alternative groundwater cleanup level of 50 ppb. The 1.65 ppm PCE level is below the ingestion and inhalation levels for human health risk. Based on this information, the responsible party requests no further remedial action in regards to the PCE impacted soil at the site.

Groundwater
The groundwater monitoring program at this site indicates that PCE levels are declining (55 ppb to 18.9 ppb). Even though the PCE levels at the property boundary do not exceed the 18 AAC 75.345 Table C cleanup level of 5 ppb, they do exceed the Table C level at the maintenance shop area. Therefore, an alternative groundwater cleanup level of ten times the Table C level was requested in accordance with 18 AAC 75.345(b)(2).
The PCE level of 18.9 ppb in 2000 at the maintenance shop area is above the Table C cleanup level of 5 ppb. As a result, the RP evaluated the groundwater use at Fairview Manor site and determined that it is not a current (or future) drinking water source in accordance with 18 AAC 75.350. Therefore, an alternative cleanup level of ten times the Table C value of 50 ppb was requested.

UST Heating Oil Area
Soil
The DRO soil contamination was identified as high as 20,000 ppm at the soil-groundwater interface following the removal of the UST in 1993. The Method Two migration to groundwater cleanup level for this zone is 250 mg/kg. However, DRO levels above the 250 ppm level were not encountered in 2001 when MW-10 was installed 12 feet away from the former tank location which indicates the extent of contamination is limited.

Groundwater
DRO contamination of 2.4 ppm was detected at MW-10 in 2001 above the 18 AAC 75.345 Table C level of 1.5 ppm. However, since the majority of the soil contamination was removed in 1993, the low levels of DRO in the groundwater may represent a stable or declining trend in contaminant levels. In order to establish a trend in contaminant levels, the groundwater monitoring should continue annually until the Table C cleanup level of 1.5 ppm DRO is achieved. The Table C cleanup level must be achieved for a minimum of two years in order to establish a stable or decreasing trend.

ADEC Decision

Maintenance Shop PCE Area

Soil
Based on the information provided in this decision document, ADEC approves of an alternative PCE soil cleanup level of 1.65 mg/kg. Since there was no soil contamination identified above this level on site, no further action is required in regards to soil at the Fairview Manor Maintenance Shop area. The determination is subject to the following conditions:

(a) If any soil is removed from this site in the future, it shall be managed in accordance with ADEC regulations in effect at the time of removal. This includes 18 AAC 75.325(i) requirements for ADEC approval prior to off site transport of soil or groundwater.
(b) If PCE contamination is identified in the future at levels that may pose a risk to human health or the environment, additional investigative and/or corrective action may be required.
(c) ADEC shall continue to evaluate the groundwater monitoring results required below and make a determination at the time regarding any need to address soil contamination.
(d) An institutional control shall be attached to the property that identifies the nature and extent of the PCE impacted soil and any conditions that may apply to its transport and/or disposal from the site.

Groundwater
Based on an 18 AAC 75.350 determination, ADEC does not consider the groundwater at the Fairview Manor property a current (or future) drinking water source. Therefore, an alternative groundwater cleanup level of 50 ppb for PCE is approved subject to the following conditions:

(a) The responsible party (or the owner or operator of the property) is required to conduct groundwater monitoring in accordance with an ADEC approved monitoring plan; and
(b) An institutional control shall be attached to the property that identifies the nature and extent of the groundwater contamination and any restrictions on the use; extraction; and/or discharge of impacted groundwater. The institutional control shall prohibit use of the groundwater at the Fairview Manor property as a drinking water source until such time that it meets the 18 AAC 75.345 Table C drinking water levels.

UST Heating Oil Area

Soil
ADEC has determined that the majority of soil impacted by the former UST has been removed. There may be soil that exceeds 18 AAC 75.341 Tables B1 and B2 soil cleanup levels for DRO and BTEX components but it is of limited extent based on information from the installation of MW-10. Therefore, no further remedial action is required for the DRO impacted soil remaining at the UST area subject to the following conditions:

(a) If any soil is removed from this property in the future, it shall be managed in accordance with ADEC regulations in effect at the time of removal. This includes 18 AAC 75.325(i) requirements for ADEC approval prior to off site transport of soil or groundwater.
(b) If DRO contaminated soil is identified in the future at levels that may pose a risk to human health or the environment, additional investigative and/or corrective action may be required; and
(c) ADEC shall evaluate the groundwater monitoring results required below and make a determination regarding future remedial and/or monitoring actions.

Groundwater
The 2001 groundwater sampling event identified DRO at 2.4 ppm which is above the 18 AAC 75.345 Table C cleanup level of 1.5 ppm. ADEC recognizes that the majority of the impacted soil was removed from the UST area and some residual contamination may remain. Based on

the fact that the groundwater is impacted by DRO above the established cleanup level, annual groundwater monitoring at MW-10 will be required until the established DRO cleanup level of 1.5 ppm is achieved for two consecutive years. The sampling event should be conducted in accordance with an ADEC approved monitoring plan.

Approval:

The record of decision presented above is approved.

Jeff Conn, Project Manager
ADEC Contaminated Sites Remediation Program

12/5/01
Date

Jim Frechione, Section Manager
ADEC Contaminated Sites Remediation Program

11/16/01
Date

Figure 1. Location of Maintenance Shop, Old UST, and location of monitoring wells.

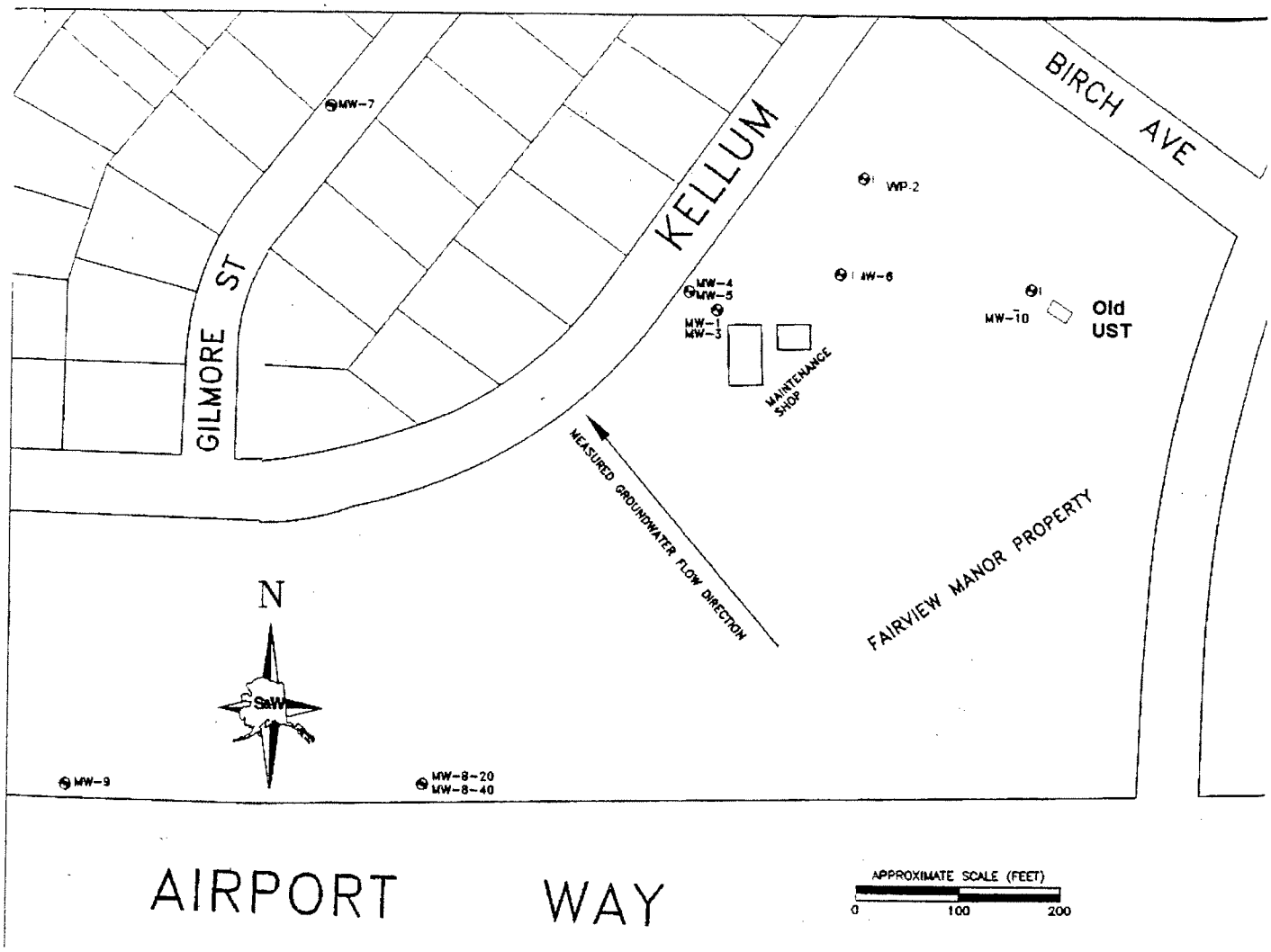

Figure 2. UST Excavation and Monitoring Well Locations.