SUBSURFACE INVESTIGATION

SEEKINS FORD-LINCOLN-MERCURY
FAIRBANKS, ALASKA

Submitted To:

Seekins Ford-Lincoln-Mercury
1625 Old Steese Highway
Fairbanks, Alaska 99712

Submitted By:

AGRA Earth & Environmental, Inc.
3504 Industrial Avenue, Suite 5
Fairbanks, Alaska 99701

James A. Spontak
Staff Geologist

Laurence A. Peterson
Fairbanks Office Manager

DECEMBER 1995

32-01173-00

AGRA
Earth & Environmental

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

PAGE

LIST OF FIGURES

LIST OF TABLES

APPENDICES

1.0 INTRODUCTION

In July and August 1995, AGRA Earth & Environmental, Inc. (AEE) performed a subsurface investigation at Seekins Ford-Lincoln-Mercury, located at 1625 Old Steese Highway in Fairbanks. The property is legally described as Tract C, Maija Subdivision, Fairbanks, Alaska. AEE had previously conducted underground storage tank (UST) and injection well closure activities at the Seekins property in 1994. Detailed summaries of the work performed during the removal of the tanks and the injection well system are included in the final reports issued to M&M Constructors, Inc. and Seekins in January 1995. The primary objective of this project was to evaluate the extent and nature of potential groundwater contamination resulting from the former USTs and injection well. These possible contaminant sources were located in three areas on site. Two of these areas contained USTs which stored used oil and refined fuel products. The third source area contained the injection well system composed of an in-line septic tank and two tandem wooden septic cribs. The secondary objective was to evaluate the potential for contaminant migration at the Seekins property. Figure 1 shows the project vicinity in relation to neighboring properties. Figure 2 provides a generalized site layout and identifies the locations considered during this project.

The agreement between Seekins and the Alaska Department of Environmental Conservation (ADEC) contains four tasks. The individual tasks are described as follows:

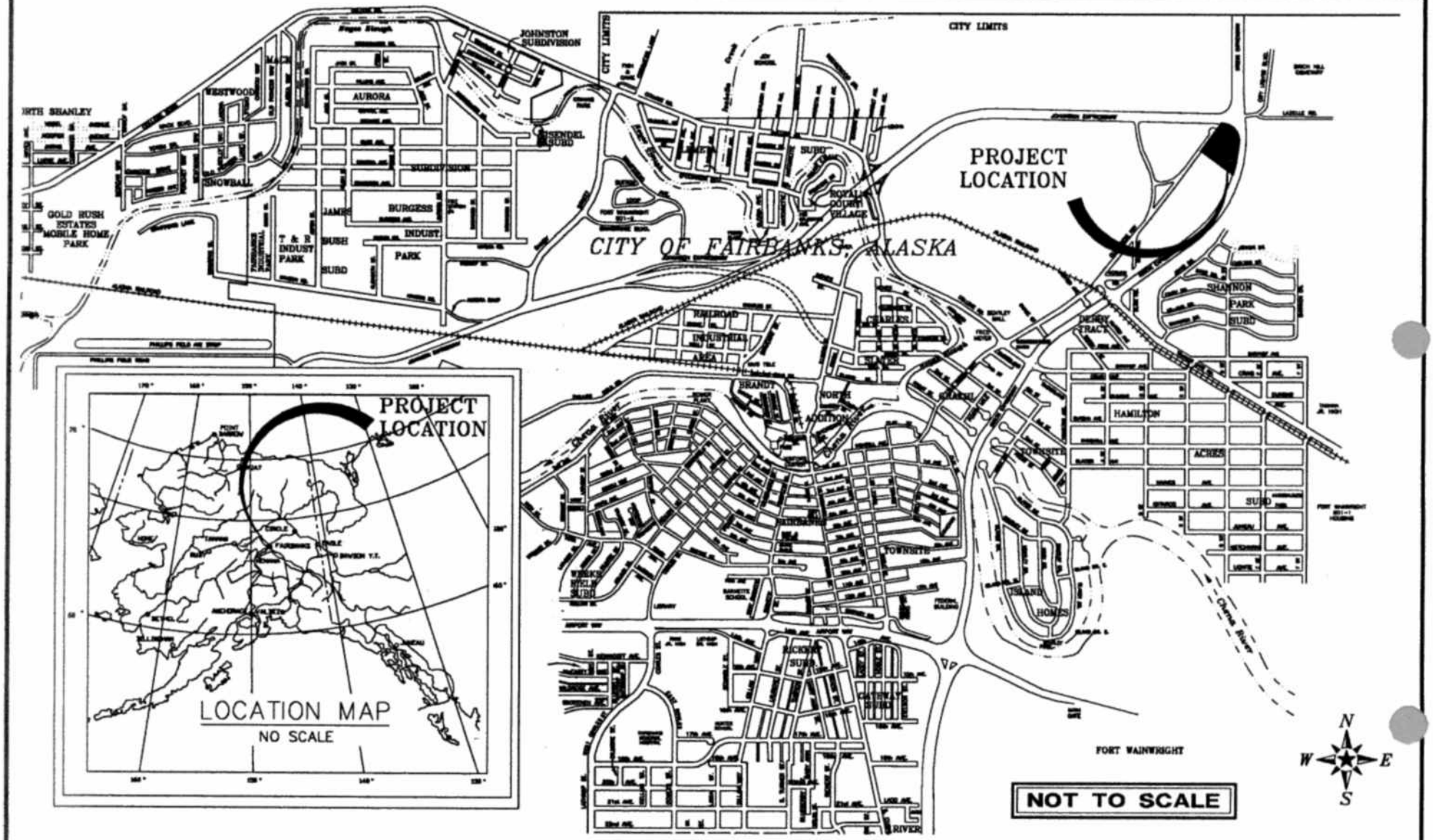
Task I — Obtain copies of the contaminated material acceptance receipts associated with the soils excavated and treated during the removal of the former USTs. The soils were treated at the OIT, Inc. Moose Creek Facility.

Task II — Perform a soil and groundwater testing program and submit a report summarizing the work conducted and the results of laboratory testing of soil and groundwater samples.

Task III — Conduct a quarter-mile well search of the Seekins property to identify potential receptors on neighboring properties.

Task IV — Develop a corrective action plan (CAP) for the areas potentially affected by the USTs or the former injection well system at the site.

This report completes the requirements of Tasks I and II of the project activities. Field work for this investigation, including monitoring well and temporary well installation and soil/water sample collection, was conducted between July 17 and August 1, 1995. Drilling and well construction services were provided by Airborne Exploration, Inc. of Fairbanks. All other phases of work were performed by AEE personnel.



FROM CITY OF FAIRBANKS
VICINITY MAP

AGRA
Earth & Environmental
3504 Industrial Ave. Suite 5
Fairbanks, Alaska 99701

W.O.	32-01173-00
DESIGN	JAS
DRAWN	EBP/F1173V12
DATE	12/07/95
SCALE	AS SHOWN

SEEKINS FORD-LINCOLN-MERCURY
1625 OLD STEESE HWY
FAIRBANKS, ALASKA

LOCATION/VICINITY MAP
FIGURE 1

2.0 SITE DESCRIPTION

The Seekins property is located near the intersection of the Johansen Expressway and the Steese Highway, approximately one-quarter mile southwest of the Birch Hill Cemetery in Fairbanks. The site is generally flat with asphalt pavement extending from the lot entrance to the customer service and showroom areas. The remainder of the lot is covered by compacted, sandy-gravel fill. The property slopes gently to the east and runoff from the site is channeled into a drainage ditch that parallels the west side of the Steese Highway. The soils overlying the former tank areas appeared to be a loose to medium dense fine sand with some silt. The apparent water table beneath the site was encountered during excavation activities at approximately 17 feet below the ground surface.

The Seekins facility consists of a large building that supports maintenance shops, administrative offices and a sales showroom. The entire property is enclosed by a security fence with the main entrance to the site on the northwest central portion of the lot. A second security fence separates the storage yard from the administrative offices and showroom as shown in Figure 2. The northern portion of the property is used for saleable vehicle parking.

The gasoline and diesel tanks referenced above were located near the administrative offices and showroom. The two used oil tanks and the former injection well were situated within the secondary fenced area east of the facility. Table 1 summarizes the former tank system components.

TABLE 1
Summary of Tank Types and Sizes

Tank ID	Tank Size (gal)	Tank Description	Product Type
UST No. 1	500	Steel with steel piping	Used Oil
UST No. 2	500	Steel with steel piping	Used Oil
UST No. 3	2,000	Steel with steel piping	Diesel
UST No. 4	5,000	Steel with steel piping	Gasoline

3.0 BACKGROUND

During the 1994 field season, M&M removed the four former USTs and the in-line injection well. AEE personnel completed closure site assessments for each of the referenced systems. Final reports for both the UST and former injection well areas were submitted in January 1995 to M&M, Seekins, and the ADEC for review. Assessment work included subsurface soil sampling within the shaded areas shown on Figure 2. The following sections summarize the observations and analytical data compiled during the previous site work.

3.1 FORMER UST AREAS

The used oil tank system was decommissioned on August 31, 1994. Soil samples collected near the groundwater interface from this area were reported to have a maximum diesel range concentration of 290 mg/kg. Laboratory analysis of samples of the excavated soils indicated that the predominant contaminants were heavy hydrocarbons. Diesel range concentrations from the excavated materials removed during site work were reported to have a maximum concentration of 13,000 mg/kg.

Additional analyses were completed for halogenated volatile organics (HVOs) and total metals. Only two HVO compounds were detected in the used oil area samples. Tetrachloroethene was detected at concentrations between 0.25 mg/kg and 11 mg/kg, while 1,1,1-trichloroethane was detected at concentrations between 0.46 mg/kg and 14 mg/kg. Samples collected from the pit base reported low-level metals concentrations.

Hydrocarbon impacts in the gasoline/diesel tank area suggest that the primary contaminants are gasoline range compounds. This is supported by the presence of elevated benzene and total BTEX concentrations near the apparent soil/groundwater interface. A petroleum-type sheen was observed on the groundwater encountered at the pit base. The greatest impacts were noted at the northeastern corner of the tank area. Inspection of the analytical data showed dissipating levels at the southeastern corner.

Final documentary soil samples collected from the bottom of the gasoline/diesel tank excavation contained minor hydrocarbon concentrations on the diesel tank side of the pit and more significant hydrocarbon concentrations moving toward the gasoline tank location. Soil samples collected from the excavation sidewalls contained only minor hydrocarbon levels.

Approximately 115 cubic yards (yd^3) of impacted soil from the used oil tank area and 1,000 yd^3 of soil from the gasoline/diesel tank area were transported to the OIT Moose Creek facility for thermal treatment. Based on the observations noted during the tank removal process at both locations and the results of analytical testing, AEE recommended that additional subsurface investigation be completed in these areas to assess groundwater quality and determine the approximate groundwater flow direction beneath the Seekins property.

3.2 INJECTION WELL EXCAVATION

The injection well system formerly connected to the Seekins building was removed in accordance with the ADEC *Guidance Manual for Non-UST Soil Cleanup Levels*. The system was comprised of a 2,000-gallon septic tank and associated piping extending from the floor drain inside the Seekins garage facility. The floor drain piping was re-routed to the city sewer in August 1994. The portion of unused septic drain pipe remaining in the ground after the re-routing in 1994, was

excavated during removal of the well. The septic tank was situated with the long axis oriented roughly northwest and was buried approximately 7 feet below ground surface. The two 3-feet by 3-feet tandem open-bottom wooden septic cribs were oriented along the same direction as the septic tank and were located approximately 18 feet southeast of the tank. The tops of the cribs were located at roughly 9 to 10 feet below grade with the cribbing extending to approximately 13 feet below grade.

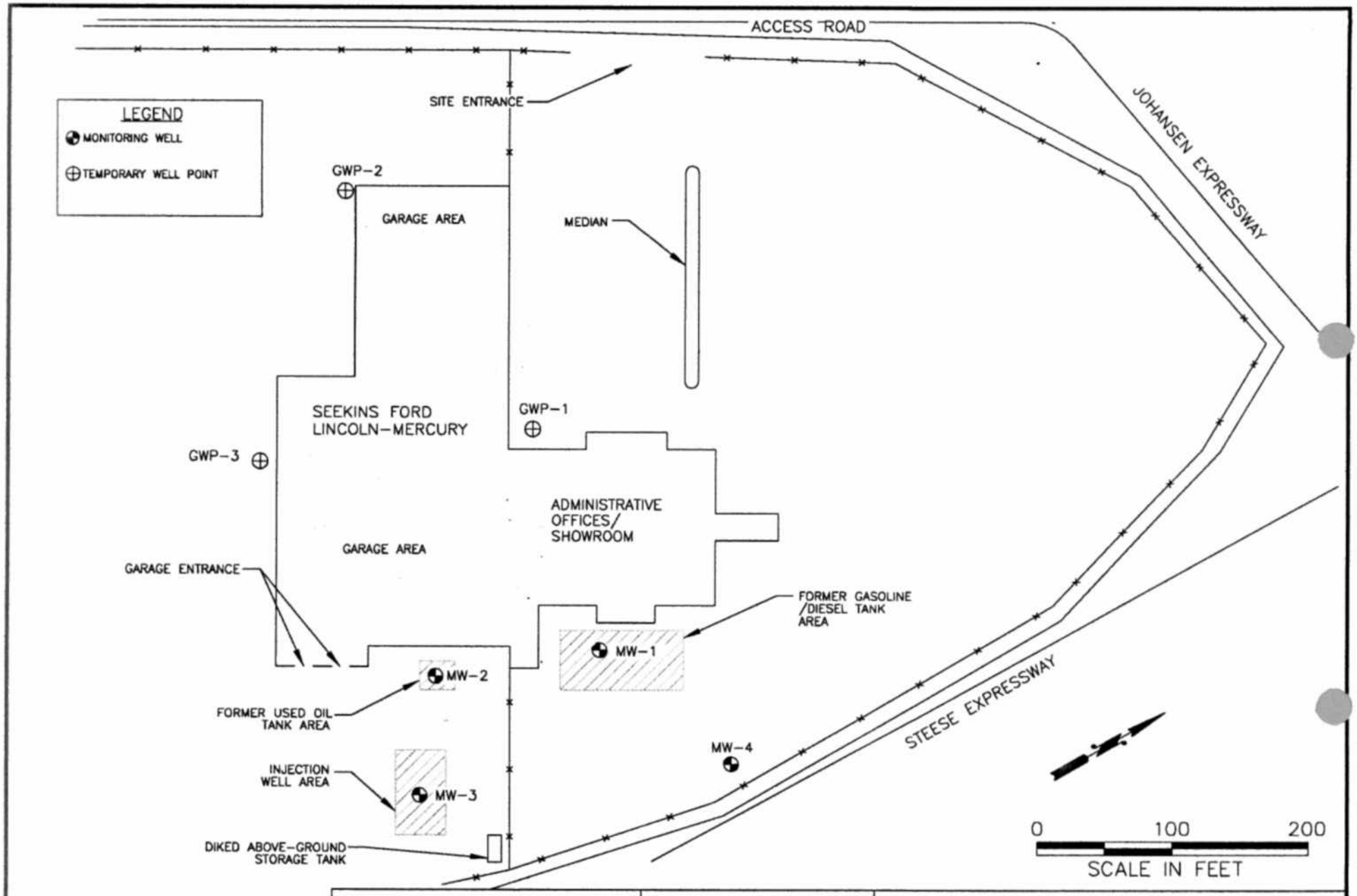
Analytical results for soil samples collected from the bottom of the excavation and the excavation sidewalls contained a maximum diesel range concentration of 19 mg/kg and non-detectable concentrations of benzene. Only one HVO compound was detected in these soil samples with a concentration of 1,2-dichlorobenzene at 0.044 mg/kg.

Approximately 925 yd^3 of impacted soil were removed from the former well area for thermal treatment at OIT. The reported hydrocarbon concentrations in the soils temporarily stockpiled on site during the well removal activities included maximum total BTEX, gasoline range, and diesel range values of 0.31 mg/kg, 79 mg/kg, and 1,600 mg/kg, respectively. Two HVO compounds were detected in the stockpiled soil samples. These samples exhibited maximum concentrations of 1,2-dichlorobenzene and tetrachloroethene at 0.65 mg/kg and 0.58 mg/kg.

Review of the analytical results indicated hydrocarbon concentrations that were below ADEC Level A cleanup standards. Additionally, the data obtained for the excavation sidewalls showed dissipating contaminant levels well below ADEC criteria. Impacts to the excavated soils, as measured in the temporary soil stockpile samples, indicated that no benzene was present and that the primary contaminants were heavy hydrocarbons. Because the injection well and associated piping had been removed, it was concluded that the potential for degradation of the drinking water aquifer or other connected aquifers had been minimized.

4.0 SCOPE OF WORK

In July 1995, AEE was contracted by Seekins to complete a limited subsurface investigation at the site. The scope of work for this investigation was described in AEE's *Proposal for Additional Subsurface Investigation, Seekins Ford-Lincoln-Mercury, Fairbanks, Alaska*, dated June 1995. This document was approved by the ADEC and reviewed by EPA prior to the start of work. The proposed plan was approved by Seekins in late June 1995. The objective of the investigation was to evaluate the extent and nature of potential hydrocarbon impacts to the groundwater beneath the property. As described in our proposal, three activities were planned to accomplish this objective. These activities included:



AGRA
Earth & Environmental
3504 Industrial Ave. Suite 5
Fairbanks, Alaska 99701

W.O.	32-01173-00
DESIGN	JAS
DRAWN	EBP/F1173SIT
DATE	12/15/95
SCALE	1"=100'

SEEKINS FORD-LINCOLN-MERCURY
1625 OLD STEESE HWY
FAIRBANKS, ALASKA

SITE PLAN
FIGURE 2

- Laboratory analysis of soil samples collected from seven soil borings in the vicinity of the former USTs, the former injection well system, and the property boundaries to assess the presence of subsurface soil contamination;

- Laboratory analysis of water samples collected from four permanent groundwater monitoring wells and three temporary well points installed across the site; and

- Evaluation of the general groundwater flow direction at the property.

5.0 TASK I - CONFIRMATION OF SOIL DISPOSAL

During the 1994 UST and injection well removal activities, AEE personnel collected characterization samples from the impacted soils in each source location. The excavated soils were then loaded directly into trucks for transportation to OIT for thermal treatment. This effort was based on OVM screening measurements at each location and the results of initial sampling of the temporarily stockpiled soils. In total, approximately 115 yd^3 of impacted soil derived from the used oil tank area, 1,000 yd^3 of soil removed from the gasoline/diesel tank area, and 925 yd^3 of soil excavated from the injection well area were transported for treatment.

AEE obtained copies of the contaminated material acceptance receipts on file with OIT. The receipts were issued to M&M Constructors personnel when they transferred the excavated soils to OIT for thermal treatment and subsequent disposal. In total, approximately 2,040 yd^3 of soil were accepted by the OIT facility. Copies of the acceptance receipts are included in Appendix A of this report.

6.0 TASK II - GROUNDWATER QUALITY EVALUATION

AEE completed this investigation to check for the presence of contaminated soils and groundwater beneath the Seekins property. All field work was conducted in accordance with the approved proposal detailing the scope of work for this project. Sample collection and handling were performed in accordance with the AEE Quality Assurance Program Plan (QAPP). The QAPP has been approved by ADEC and is on file in the ADEC Fairbanks office. The field portion of this investigation included drilling soil borings, installing monitoring wells and temporary groundwater well points, collecting representative soil and groundwater samples for laboratory analysis of select compounds, and conducting a well level survey. The methods used for each of these items are described in the following sections.

6.1 WELL INSTALLATION AND SOIL SAMPLING

Three temporary well points and four monitoring wells were installed across the property. The well points were numbered sequentially as GWP-1 through GWP-3, and the monitoring wells were numbered MW-1 through MW-4. The well point and monitoring well locations are indicated in Figure 2.

6.1.1 Well Point and Monitoring Well Construction

The drilling and well installation portion of this investigation was conducted on July 17 and 18, 1995. Two well types were installed as part of this project. Monitoring wells were placed to allow continued groundwater quality measurements, and well points were installed for temporary use in site characterization. All drilling was accomplished using a truck-mounted Mobile B-47HD drilling rig equipped with either six-inch or eight-inch outside diameter (OD) hollow-stem augers.

Upon reaching final depth, each boring was converted to either a monitoring well or a temporary well point. The monitoring wells were emplaced to a depth of approximately 25 feet. The well point borings were drilled to a depth of 18 feet below ground surface. An AEE geologist was on site to collect the samples, log the subsurface geology in each boring and the well point construction details. A geologic log for each of the seven borings is provided in Appendix B.

All wells were constructed using 2-inch ID Schedule 40 PVC well casing. The monitoring well casings were set at a depth of 25 feet with the lower 15-feet of casing constructed of 0.010-inch slotted PVC piping. The annulus was backfilled with select 10-20 grade silica sand to two feet above the well screen, or approximately eight feet below grade. A 2-feet-thick bentonite chip seal was placed above the sand pack. Clean native soils generated during the drilling process completed the well to grade. Each monitoring well was finished with a flush-mounted protective steel monument.

The temporary well points were set at approximately 18 feet below grade, with five feet of slotted casing at the bottom to straddle the apparent groundwater table. After each well point was emplaced in the borehole, the drilling auger was removed to allow the native soil to collapse on the well point. Additional backfill needed to complete each well point was derived from clean native soil removed during drilling. A bentonite chip seal was placed in the well point annulus extending from a depth of approximately 9 to 10 feet. Pea gravel was placed around the uppermost one foot of well casing to provide a wearing surface for vehicle traffic over the well location.

During the drilling process, potentially impacted drill cuttings were temporarily stored adjacent to each boring on the ground surface. Upon completion of well construction, the drill cuttings were shoveled into 55-gallon open-top steel drums for temporary storage on site. The drums were labeled with AEE's company name, phone number, the date of collection, and the nature of the contents.

6.1.2 Sample Collection and Equipment Decontamination

Sampling protocol included collecting field screening samples at approximate 5-foot intervals and an analytical sample at the apparent groundwater interface in each boring, beginning at a depth of approximately five feet below grade. A 3-inch outer diameter (OD) split-spoon sampler was driven in advance of the auger using a 340-pound pin hammer on a 30-inch drop. Upon removal from the boring, the sampler was opened, and the appropriate samples were collected. The field screening samples were collected immediately after obtaining the analytical sample. During the sample collection process, the soil in the sampler was characterized and examined for obvious indications of the presence of petroleum hydrocarbons. The soil characteristics and sample information were then recorded on the geologic log.

For each sample retrieved, AEE personnel collected the samples by hand, using a new pair of nitrile sampling gloves to transfer the soil to the appropriate sample containers. Collection of the field screening samples consisted of filling a clean, resealable plastic bag approximately one-half full of soil. The screening samples were labeled using the same number as the analytical sample, and the sample number was written directly on the bag using an indelible marker. Sample screening consisted of analyzing the headspace gas inside the bag for volatile organic compounds using an Environmental Instruments Model 580D Organic Vapor Meter (OVM). Prior to screening, each sample was warmed for 20 minutes inside the field vehicle. The samples were screened by inserting the probe of the OVM into a small opening at the top of the sample bag and allowing the headspace gas inside the bag to be pumped through the instrument. The OVM provides a digital display, in parts per million (ppm), of the concentration of volatile organic compounds in the headspace gas. For each sample, the maximum reading observed on the display was recorded as the headspace gas concentration for that sample. Although there is often no direct correlation between headspace gas readings and subsequent analytical results, headspace gas screening provides a semi-quantitative assessment of the presence of hydrocarbons in the sampled soil.

The analytical samples were collected by filling the laboratory-prepared sample jars to capacity to minimize headspace and then capping the jars with a Teflon-lined lid. Each jar was labeled with the sample number, the date and time of collection, and the analytical method requested. While on site, the jars were stored in a chilled cooler. The samples were then transferred to a refrigerator for storage until submitted to the laboratory.

Following sample collection, any residual soil in the sampler was discarded to the pile of soil cuttings adjacent to the boring. The split-spoon sampler was then decontaminated. The decontamination process included washing with a laboratory-grade soap solution, rinsing with potable water, and triple rinsing with distilled water. Decontaminated sampling equipment was stored on a clean surface until its next use.

6.2 GROUNDWATER EVALUATION

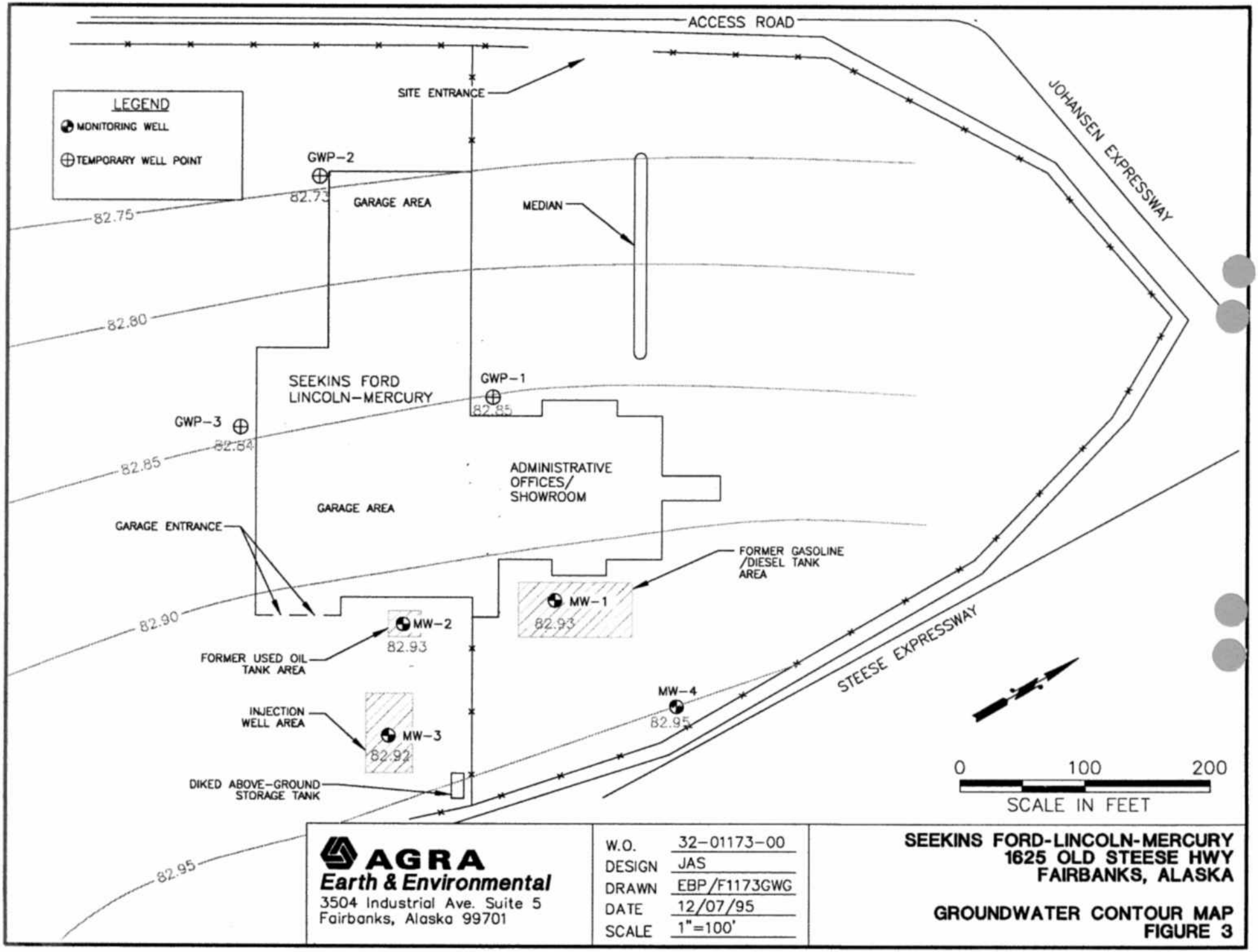
The groundwater quality evaluation included well development, collection of analytical water samples from the wells and well points, and completion of a well level survey of all well locations to provide a consistent reference datum for the elevational data obtained during this project. These activities are described in more detail in the following sections.

6.2.1 Monitoring Well Survey

To allow calculation of water table elevation, gradient, and groundwater flow direction, AEE personnel performed a well level survey and measured the depth to water at each well location on July 20 and 21, 1995. The level survey was conducted to determine the relative elevation of the top of each well casing with an accuracy of ±0.01 feet. A temporary benchmark (TBM) was established at the site and assigned an arbitrary elevation of 100 feet. Each of the on-site well points and monitoring wells was marked on the casing, and the elevation of that mark was surveyed relative to the TBM to establish reference elevations from which to measure the depth to water. This measuring point was used to calculate relative water table elevations. The survey data and calculated groundwater elevations are summarized in Table 2. Figure 3 is a graphic representation of the site-specific groundwater flow direction as inferred from the elevational data collected on July 21, 1995.

TABLE 2
Groundwater Elevational Data - July 21, 1995

Well Number	Top of Casing Elevation (ft)	Depth to Water (ft)	Water Table Elevation (ft)
MW-1	97.13	14.20	82.93
MW-2	97.57	14.64	82.93
MW-3	96.62	13.70	82.92
MW-4	95.88	12.93	82.95
GWP-1	97.47	14.62	82.85
GWP-2	97.75	15.02	82.73
GWP-3	97.02	14.18	82.84



AGRA
Earth & Environmental
3504 Industrial Ave. Suite 5
Fairbanks, Alaska 99701

W.O.	32-01173-00
DESIGN	JAS
DRAWN	EBP/F1173GWG
DATE	12/07/95
SCALE	1"=100'

SEEKINS FORD-LINCOLN-MERCURY
1625 OLD STEESE HWY
FAIRBANKS, ALASKA

GROUNDWATER CONTOUR MAP
FIGURE 3

6.2.2 Monitoring Well Development

The monitoring wells and temporary well points installed during this portion of the project were developed in accordance with ADEC guidelines on July 19, 1995. The water level in the wells was allowed to equilibrate for a minimum of 24 hours prior to development. The wells were then developed by alternately surging and purging the well using a disposable polyethylene bailer. The water removed from the well during the development process was visually examined for the existence of free-phase hydrocarbons or any noticeable signs of contamination. No visual evidence of hydrocarbon-type impacts was noted during development of the wells.

The water removed from the wells was moderately silty and showed little decrease in silt content throughout the development process. During well purging, AEE personnel removed a minimum of five casing volumes of water from the wells. The development water was deposited into open-top 55-gallon drums for temporary storage. Before leaving the site, AEE personnel replaced and secured the drum covers and positioned the drums adjacent to the Seekins garage building.

6.2.3 Groundwater Sample Collection

AEE personnel collected water samples from the installed well points and groundwater monitoring wells on July 21, 1995. Prior to collecting water samples at each well location, a disposable polyethylene bailer was lowered into the well to obtain a sample of the upper one to two feet of water in the well casing. This sample was visually examined for the presence of free-phase product or visible sheen.

The sample collection process included measurement of the depth to water and total depth in each well, calculation of the volume of water in each well, and purging of at least three well volumes of water using a disposable bailer. Following the purging of each well, a sample of the groundwater in the well was transferred to laboratory-prepared sample containers using the bailer. The samples were labeled with the well number, the date and time of collection, and the requested analytical methods. The particular analytical test methods selected for each of the samples were defined in our proposal for this project and approved by the ADEC. Table 3 summarizes these methods according to each well location. The samples were stored in a chilled cooler while on site and then transferred to a refrigerator for storage until submitted to the laboratory.

All purged water was placed into a 55-gallon open-top steel drum stored on site. The drum was labeled with AEE's company name and phone number, the date of collection, and the nature of the contents. Before leaving the site, AEE personnel replaced and secured the drum cover.

TABLE 3
Analytical Test Methods

Well ID	Location	Method
MW-1	Former Gasoline/Diesel UST Area	BTEX by EPA Method 8020 GRPH by EPA Method 8015 modified DRPH by EPA Method 8100 modified
MW-2	Former Used Oil Tank Area	BTEX by EPA Method 8020 GRPH by EPA Method 8015 modified DRPH by EPA Method 8100 modified TPH by Alaska Test Method AK 103 HVOs by EPA Method 8010 Total As, Cd, Cr, Pb by EPA Series 6000/ 7000 TCLP Tetrachloroethylene (Soil sample only)
MW-3	Former Injection Well Area	TCLP Benzene by EPA Method 1311/8020 GRPH by EPA Method 8015 modified DRPH by EPA Method 8100 modified TPH by Alaska Test Method AK 103 HVOs by EPA Method 8010 TCLP As, Cd, Cr, Pb by EPA Series 6000/ 7000
MW-4	Southeast Property Boundary	BTEX by EPA Method 8020 GRPH by EPA Method 8015 modified DRPH by EPA Method 8100 modified Volatile Organics by EPA Method 624 (water)
GWP-1	North Side of Administrative Building	BTEX by EPA Method 8020 GRPH by EPA Method 8015 modified DRPH by EPA Method 8100 modified
GWP-2		
GWP-3	North Side of Garage Building	TCLP Benzene by EPA Method 1311/8020 GRPH by EPA Method 8015 modified DRPH by EPA Method 8100 modified TPH by Alaska Test Method AK 103 HVOs by EPA Method 8010 TCLP As, Cd, Cr, Pb by EPA Series 6000/ 7000

7.0 FIELD OBSERVATIONS

The observations and measurements made while conducting the activities described in Section 6.0 allow a description of some of the predominant physical characteristics of the subsurface environment beneath the Seekins property. This characterization includes the general subsurface lithology and the groundwater within those sediments.

In general, the subsurface environment beneath the property includes approximately 5 to 7 feet of sandy silt with intermittent gravel lenses in the undisturbed locations on site. The zone of soil extending from 7 feet to approximately 15 feet below ground surface consisted of medium to fine sand with trace silt. Miscellaneous organic debris, including roots and branches, was observed to be interbedded within this layer. The soil beneath the apparent water table was visually classified as a coarse sandy alluvial gravel. This coarse gravel contact with the overlying sands was observed in borings MW-4, GWP-1, GWP-2, and GWP-3. At the time of drilling, the water table roughly corresponded with the upper surface of the gravel.

The former UST and injection well areas were observed to have been backfilled with gravelly sandy fill and compacted to a medium density. The presence of a shallow gravel layer extending from the ground surface to approximately the 2-foot depth was observed during the drilling of boring MW-3 in the former injection well area. The apparent groundwater interface in the tank areas was observed at 15 feet below surface at the time of drilling.

As each boring was advanced, AEE personnel selected a portion of each soil sample for field screening with an OVM. The results of screening indicated headspace soil vapor concentrations of 3 ppm in samples collected at the apparent groundwater interface in borings MW-4 and GWP-2. The samples obtained from 15 to 16.5 feet in depth in borings MW-2 and GWP-1 both produced OVM readings of 13 ppm, whereas the soil sample collected at the same depth in boring GWP-3 recorded an OVM screening concentration of 4 ppm. Screening of the soils sampled from boring MW-1 produced levels of 286 ppm at a depth of 15 feet and 1,107 ppm for the 20 feet to 21.5 feet depth interval. A moderate hydrocarbon-type sheen was observed on the soils at the bottom end of sample MW-1/S-3. Strong hydrocarbon-type odors were noted to emanate from the soils derived from this boring location. The soil samples collected from boring MW-3, placed within the former injection well area, produced only background headspace vapor concentrations in the shallow surface soils and at the groundwater interface. However, sample MW-3/S-4, collected from the 20 feet to 21.5 feet depth interval, produced a headspace concentration of 37.8 ppm.

In general, the water removed from each temporary well was silty and showed no decrease in silt content after purging approximately three well volumes from the well prior to sampling the groundwater. Septic-type odors were noted during sampling at well MW-3. Hydrocarbon-type odors were also detected during well purging efforts conducted at monitoring well MW-1.

8.0 ANALYTICAL RESULTS

The soil and groundwater samples selected for laboratory analysis were submitted to Superior Precision Analytical, Inc. of Martinez, California. The samples were submitted under AEE chain-of-custody procedures. Analytical results for the soil samples collected during the drilling process are summarized in Tables 4 through 6. Copies of the analytical reports are provided in Appendix C.

TABLE 4
Hydrocarbon Compounds in Soil
July 17 and 18, 1995

Well Number	TCLP Benzene (µg/L)	Benzene (mg/kg)	Total BTEX (mg/kg)	GRPH (mg/kg)	DRPH (mg/kg)	TPH (mg/kg)
MW-1/S-3	NT	0.026	0.89	5	90	NT
MW-2/S-3	NT	ND(0.005)	ND	ND(1)	ND(4)	ND(100)
MW-3/S-3	ND(5)	NT	NT	ND(1)	10	ND(100)
MW-4/S-3	NT	ND(0.006)	ND	ND(1)	ND(5)	NT
GWP-1/S-3	NT	ND(0.006)	ND	ND(1)	ND(5)	NT
GWP-2/S-3	NT	ND(0.006)	ND	ND(1)	ND(5)	NT
GWP-3/S-3	ND(5)	NT	NT	ND(1)	ND(5)	ND(100)

--- Indicates regulatory limit not established.
ND(x.x) Indicates analyte not detected above method detection limit. Detection limit shown in parentheses.
NT Indicates that the sample was not tested for the given parameter.

TABLE 5
Volatiles and Metals in Soil
July 17 and 18, 1995

Sample ID	HVOs* (µg/kg)		Total Metals (mg/kg)			
	1,4-Dichloro benzene	1,1,1-Trichloro ethane	As	Cd	Cr	Pb
MW-2/S-3	ND(5.4)	ND(5.4)	ND(2.7)	0.5	12	ND(2)
MW-3/S-3	18	ND(5.5)	NT	NT	NT	NT
GWP-3/S-3	ND(6.3)	11	NT	NT	NT	NT

ND - indicates the analyte was not detected above the method detection limit shown.
NT - indicates that the sample was not tested for the given parameter.
* All other HVO compounds were reported to be below the detection limit.

TABLE 6
TCLP Tetrachloroethene and TCLP Metals in Soil
July 17 and 18, 1995

Sample ID	TCLP Tetrachloroethene (µg/L)	TCLP Metals (mg/L)			
		As	Cd	Cr	Pb
MW-2/S-3	ND(0.5)	NT	NT	NT	NT
MW-3/S-3	NT	ND(0.6)	ND(0.1)	ND(0.6)	ND(0.6)
GWP-3/S-3	NT	ND(0.6)	ND(0.1)	ND(0.6)	ND(0.6)

ND Indicates the analyte was not detected above the method detection limit shown.
NT Indicates that the sample was not tested for the given parameter.

The results obtained for groundwater samples collected from the installed monitoring wells and temporary well points are summarized in Tables 7 through 9. From these results, it is significant to note that, despite the soil sample results, the water sample collected from monitoring well MW-1 contains detectable concentrations of all tested analytes. This sample exhibited concentrations of DRPH at 5,400 µg/L, GRPH at 180,000 µg/L, and benzene at 12,000 µg/L. Tables 8 and 9 also include data generated during laboratory testing for volatile compounds by two different analytical methods. Therefore, the results listed may appear to produce differing results for the same analyte. This is most probably caused by the difference in the testing protocols for each of the test methods.

TABLE 7
Hydrocarbon Compounds in Water
July 21, 1995

Well Number	TCLP Benzene (µg/L)	Benzene (µg/L)	Total BTEX (µg/L)	GRPH (µg/L)	DRPH (µg/L)	TPH (mg/L)
MW-1	NT	12,000	71,300	180,000	5,400	NT
MW-2	NT	ND(0.5)	6.8	150	350	ND(1)
MW-3	8	NT	NT	2,800	13,000	10
MW-4	NT	ND(0.5)	0.5	ND(50)	380	NT
GWP-1	NT	1,500	1,722	4,000	190	NT
GWP-2	NT	ND(0.5)	ND	ND(50)	ND(100)	NT
GWP-3	ND(0.5)	NT	NT	ND(50)	ND(100)	ND(1)

--- Indicates regulatory limit not established.
ND(x.x) Indicates analyte not detected above method detection limit. Detection limit shown in parentheses.
NT Indicates that the sample was not tested for the given parameter.

TABLE 8
Halogenated Volatiles and Metals in Water
July 21, 1995

Sample ID	HVOs* (µg/L)				Total Metals (mg/kg)			
	Trichloro fluoromethane	Chloroform	1,1,1-Trichloro ethane	Tetra chloro ethene	As	Cd	Cr	Pb
MW-2	NT	NT	NT	NT	ND(0.25)	ND(0.025)	ND(0.05)	ND(0.25)
MW-3	NT	NT	NT	NT	ND(0.25)	ND(0.025)	ND(0.05)	ND(0.25)
GWP-3	4	4.3	2.4	17	ND(0.25)	ND(0.025)	ND(0.05)	ND(0.25)

ND - indicates the analyte was not detected above the method detection limit shown.
NT - indicates that the sample was not tested for the given parameter.
* All other HVO compounds were reported to be below the detection limit.

TABLE 9
Volatile Organics in Water
July 21, 1995

Well Number	Dichloro methane (µg/L)	Trichlorofluoro methane (µg/L)	1,1-Dichloro ethane (µg/L)	Chloroform (µg/L)	1,1,1-Trichloro ethane (µg/L)	Carbon Tetrachloride (µg/L)
MW-2	ND(10)	6.3	ND(3)	ND(3)	57	8.2
MW-3	240	6.8	6.5	ND(3)	ND(3)	ND(3)
MW-4	ND(10)	ND(3)	ND(3)	5.5	ND(3)	ND(3)

Well Number	Trichloro ethene (µg/L)	Benzene (µg/L)	Tetrachloro ethene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	1,2-Dichloro benzene (µg/L)
MW-2	ND(3)	ND(1)	20	ND(3)	ND(3)	ND(3)	ND(3)
MW-3	12	3.7	29	49	11	81	90
MW-4	ND(3)	ND(1)	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)

--- Indicates regulatory limit not established.
ND(x.x) Indicates analyte not detected above method detection limit. Detection limit shown in parentheses.
* All other volatile organic compounds were reported to be below the detection limit.

AEE personnel obtained two duplicate samples (DUP-1 and DUP-2) in conjunction with the collection of water samples MW-1 and MW-2. These samples were submitted as quality control indicators. The two sample sets contained relative concentrations for all tested compounds within the allowable limit of ± 30 percent relative percent difference. Additionally, AEE field personnel submitted a trip blank sample, which accompanied the samples during collection, storage, and shipment to the laboratory. This sample exhibited non-detectable concentrations of all BTEX compounds, except toluene. Toluene was detected in the trip blank sample at a concentration of 0.6 µg/L, just above the method detection limit of 0.5 µg/L for this analyte. Copies of the laboratory analytical reports for these samples appear in Appendix C.

9.0 CONCLUSIONS

The primary objective of this field program was to evaluate the groundwater quality in the former source areas on site. To that end, a total of seven soil borings were advanced on the property, of which four were converted to long-term monitoring wells and three were converted to temporary groundwater well points. Soil and groundwater samples from these borings and/or wells were submitted for laboratory analysis as detailed in Section 6.2.3. On the basis of the observations made during the field investigation and the analytical results, the following conclusions are offered:

1) The majority of the hydrocarbon-impacted soil has been removed from the three former source areas. Soil samples collected from the materials above the apparent groundwater interface within the vicinity of the former source areas produced relatively low or non-detectable OVM vapor concentrations in all drilled borings. Analytical samples obtained near the groundwater interface in each boring showed largely non-detectable concentrations for all tested hydrocarbon compounds. The interface samples collected from borings MW-1 and MW-3 contained the only detectable hydrocarbon results with 0.026 mg/kg benzene, 0.89 mg/kg total BTEX, 5 mg/kg GRPH, and 90 mg/kg DRPH in sample MW-1/S-3. Sample MW-3/S-3 exhibited a DRPH concentration of 10 mg/kg. These values are below the most stringent ADEC Level A cleanup criteria. However, OVM field screening of the soils sampled below the apparent water table indicated that hydrocarbon impacts may be present in some of the soil boring locations. A marked increase in vapor concentrations was observed for the soils from the 20 feet to 21.5 feet depth interval in boring MW-1 (1,107 ppm), relative to the screening concentrations noted for the soil just above the groundwater interface (286 ppm). Vapor levels decreased to approximately 22 ppm at a depth of 25 feet in this boring. Therefore, it is noted that the vertical extent of detected hydrocarbon impacts in the former gasoline/diesel tank area appears to be roughly 5 feet to 7 feet below the apparent groundwater table elevation as observed during the well installation. The vertical distribution of impacts to the soils in the former used oil tank and

injection well areas was observed to follow a trend similar to that noted in boring MW-1. Based solely on the soil vapor headspace measurements recorded for each sample, these observations suggest a relatively consistent thickness of the zone of influence in the three source areas.

2) Maximum contaminant levels (MCLs) for HVO compounds in soil can be found in the federal RCRA regulations. Although the stated MCLs refer to the land disposal of waste, they provide a guideline for assessing the significance of the concentrations in soil samples from this project. Only two HVO compounds were detected in the soil samples tested for HVOs. The results reported for these samples were below the RCRA criteria. The MCLs for these compounds are listed in Table 10.

TABLE 10
MCLs for HVO Compounds in Soil

CONTAMINANT	MAXIMUM CONTAMINANT LEVEL (mg/kg)	OBSERVED HIGHEST CONCENTRATION (mg/kg)	
1,1,1-Trichloroethane	5.6	0.011	GWP-3/S-3
1,4-Dichlorobenzene	6.2	0.018	MW-3/S-3

The analytical results obtained for the total metals analyses indicate that the concentrations of total metals in the soils were almost all below the allowable levels using TCLP standards. Additionally, analysis for tetrachloroethene and metals using the TCLP extraction method reported non-detectable concentrations for all tested compounds. On this basis, the tested metals are not expected to be contaminants of concern at this site. These results also show that tetrachloroethene is not present at detectable levels in leachate from the soils in the former used oil tank area.

3) Hydrocarbon impacts to the groundwater beneath the site were detected in five of the seven well locations. The groundwater in wells GWP-2 and GWP-3 reported non-detectable concentrations for all tested hydrocarbon compounds. Monitoring well MW-4 showed only trace concentrations of toluene and DRPH. The results of testing for benzene indicated significant concentrations in wells MW-1 installed in the former gasoline/diesel tank area and GWP-1 located on the north side of the Seekins building. Benzene concentrations were reported to be 12,000 µg/L and 1,500 µg/L in these two locations. These levels exceed the ADEC MCL of 5 µg/L for benzene. The heavier GRPH and DRPH hydrocarbon compounds showed similar reductions in concentration from well MW-1 to well GWP-1. These facts indicate that a dissolved-phase hydrocarbon plume may extend from the former gasoline/diesel tank area to beyond GWP-1. Monitoring well MW-2 located within the former used oil tank excavation area produced relatively minor hydrocarbon

impacts, indicating only trace concentrations of toluene, ethylbenzene, xylenes, GRPH, and DRPH compounds. However, monitoring well MW-3 produced a concentration of TCLP benzene of 8 µg/L, which exceeds the ADEC cleanup criteria of 0.5 µg/L. Additionally, GRPH, DRPH, and TPH compounds were noted to be present in this well at detectable concentrations. The analytical results suggest that the hydrocarbon impacts in this location are primarily heavy-end compounds. Although wells GWP-1 and GWP-3 appear to be positioned near the boundaries of a dissolved-phase hydrocarbon plume, the data collected at this time are insufficient to fully characterize the nature and extent of this plume.

4) The MCLs for both HVO and volatile organic compounds in water can be found in the ADEC *Drinking Water Regulations* (18 AAC 80), which designates the allowable limits of specific contaminants in the groundwater. The MCLs for these compounds are listed in Table 11. As indicated below, no regulatory limit currently exists for 1,1-dichloroethane or trichlorofluoromethane.

TABLE 11
MCLs for HVO and Volatile Organic Compounds in Water

CONTAMINANT	MAXIMUM CONTAMINANT LEVEL (µg/L)	OBSERVED HIGHEST CONCENTRATION (µg/L)	
Dichloromethane	5	240	MW-3
Trichlorofluoromethane	---	6.8	MW-3
1,1-Dichloroethane	---	6.5	MW-3
Chloroform	100	5.5	MW-4
1,1,1-Trichloroethane	200	57	MW-2
Carbon Tetrachloride	5	8.2	MW-2
Trichloroethene	5	12	MW-3
Tetrachloroethene	5	29	MW-3
1,2-Dichlorobenzene	600	90	MW-3

The analytical results obtained for the HVO and volatile organic analyses indicate that the MCLs have been exceeded for four of the compounds. The groundwater sample collected from monitoring well MW-3 produced concentrations of dichloromethane, trichloroethene, and tetrachloroethene above the allowable limits as listed in the drinking water regulations.

Additionally, the samples obtained from wells MW-2 and GWP-3 also contained concentrations of tetrachloroethene above the allowable limit. Monitoring well MW-2 produced the only detectable concentration of carbon tetrachloride at 8.2 µg/L, which exceeds the MCL for this compound. The observed concentrations in these wells appear to corroborate the presence of a dissolved-phase plume extending westward from the source areas, though it is difficult to determine whether the source of the chlorinated compounds is the former used oil tanks or the injection well system.

5) Groundwater elevation measurements collected in July from the seven installed wells indicate a northwesterly flow direction for groundwater beneath the site. Based on physical characteristics, the permeability and hydraulic conductivity of the gravelly sand aquifer material are assumed to be moderate to high. These physical properties would tend to allow a rather large areal extent to be affected by the more volatile components observed in the groundwater. AEE suggests that at least two dissolved-phase plumes may be present beneath the site: one whose source is the former gasoline and diesel tanks and one with a combined source area comprised of the former used oil tanks and the former injection well system.

10.0 RECOMMENDATIONS

Based on the observations recorded during this portion of the project and the analytical results obtained for submitted soil and water samples, AEE recommends the following:

1) The temporary wells emplaced during the assessment field work should remain in place to allow for continued groundwater monitoring and sampling in accordance with the requirements to be set by the ADEC;

2) Further assessment of the northern portion of the property is necessary to better define the extent of dissolved hydrocarbons in the groundwater beneath the site. Additional work should include the delineation of the lateral extent of impacts to the groundwater downgradient of each potential source location. This objective can be accomplished using the temporary well point method employed as part of this investigative effort;

3) In accordance with ADEC requirements, AEE recommends completing a well search for the area within a quarter mile of the Seekins property. The purpose of the well search is to identify potential receptors downgradient of the former UST source areas. The results of the search can be used by the ADEC to obtain a qualitative understanding of the level of any risk to the identified potential receptors;

4) Based on the results of our field program outlined above, AEE recommends that a corrective action plan (CAP) be prepared for the Seekins property. The CAP will offer a strategy to remediate and/or monitor impacted soils and groundwater at the site. AEE recommends that the CAP be written after conducting the necessary field work outlined above in this section. This work will help to define both the vertical and horizontal extent of the contaminant plumes beneath the property. Seekins will then be in a position to make an informed decision regarding future corrective actions at the site.

   The CAP should include the following information:

   A) A summary of the investigative work performed at the site to date;

   B) A discussion of the applicable constraints imposed by the site conditions as divulged during the prior studies and a statement of any additional assumptions utilized during the formulation of the site-specific CAP; and

   C) An analysis comparing the most applicable methods of remediation for both soil and/or groundwater contamination in relation to the site conditions.

5) The soil cuttings and purge water derived during Task II activities are currently stored in 55-gallon drums at the site. AEE suggests that these items remain on site until the completion of any future site work which may produce additional materials. The stored materials should then be transported for appropriate treatment and subsequent disposal.

11.0 LIMITATIONS

This report has been prepared for the sole use of Seekins Ford-Lincoln-Mercury and their designated agents or representatives. The contents of this report should not be used by any other party without the express written consent of Seekins. The findings are relevant for the dates on which the work was conducted and should not be relied upon to represent conditions at later dates.

The observations and findings presented in this report are professional opinions based on the information gained from a small number of soil and water samples collected from a limited number of locations on the site. The measured concentrations of the tested analytes may not be representative of concentrations in unsampled portions of the property. The analytical methods used were selected based on the known past usage of the former tanks on the property. Additional analytes not tested for during this investigation may or may not be present. No warranty or guarantee is expressed or implied.