

UST Release Investigation Report



**ML&P Operations and Dispatch Center
1201 East First Avenue
Anchorage, Alaska**

November 2009



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LIST OF ACRONYMS

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
amsl	above mean sea level
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and total xylenes
COCs	contaminants of concern
DRO	diesel range organics
EPA	U.S. Environmental Protection Agency
GRO	gasoline range organics
HCG	Hoefler Consulting Group
mg/Kg	milligrams per Kilogram
mg/L	milligrams per Liter
MDL	method detection limit
ML&P	Municipal Light and Power
MOA	Municipality of Anchorage
NA	not analyzed/not applicable
ND	not detected at or above the method reporting limit
OBS	Oil Burning Specifications
PAH	polynuclear aromatic hydrocarbons
PCB	polychlorinated biphenyls
PCE	tetrachloroethene
PID	photoionization detector
ppm	parts per million
PQL	practical quantitation limit
RCRA	Resource Conservation and Recovery Act
RRO	residual range organics
TCE	trichloroethene
TRPH	total recoverable petroleum hydrocarbons
TSCA	Toxic Substances Control Act
TSDF	Treatment, Storage, and Disposal Facility
USCS	United Soil Classification System
UST	underground storage tank
VOC	volatile organic compound

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1 INTRODUCTION

This report describes the results of a limited release investigation and corrective actions performed during the removal of an inactive underground storage tank (UST) located next to the Anchorage Municipal Light and Power (ML&P) Operations and Dispatch Center Building (Operations Building). The Operations Building is located at 1201 E. 1st Avenue, Anchorage, Alaska (Figure 1-1, Vicinity Map). The UST removal and reporting was performed in September 2009, in accordance with Alaska Department of Environmental Conservation's (ADEC) UST regulations (18 Alaska Administrative Code [AAC] 78), and applicable sections of the UST Procedures Manual (ADEC 2002).

1.1 Site Background

The UST site is located on a parcel of land owned by the Municipality of Anchorage and operated by ML&P. The legal description of the property is Lot 5a, Block 39D, East Addition Anchorage Townsite. It encompasses the street addresses of 1201 and 1121 E. 1st Avenue, and is 238,274 square feet (ft²) in size. A small parcel of land adjacent to the north side of the property is leased by ML&P from the Alaska Railroad. The location of the UST, along with the approximate property fence line boundaries are shown on Figure 1-2, Site Plan.

The site is located in an industrial area between 1st Avenue and Ship Creek. The property was developed in the 1960s and has been used by ML&P for storage and support facilities. In addition to the Operations Building, the parcel includes the Vehicle Maintenance Building (garage), built around 1984. The site also contains a warehouse annex north of the Operations Building. The parcel formerly contained a Municipality of Anchorage (MOA) Paint and Sign Shop, which was demolished in 1997. The concrete slab and foundation of this building remain. Historical aerial photographs of the site, dating from 1964 until 2002, are shown in Figures 1-3a and 1-3b.

The UST north of the Operations Building was inactive in 2009 and there is limited information regarding its history. The buried tank apparently supplied fuel to a boiler previously located in the northwest corner of the Operations Building. The UST is shown on a facility drawing from 1953, included in Appendix A (M.L. Taylor and P.W. Kilpatrick, Architects 1953). Documentation regarding when the tank was taken out of active service has not been located. In 2009, the area above the UST was a parking lot, and was paved over with asphalt. No piping or access points were visible.

A concrete pad believed to have been the base of an electrical transformer is located next to the Operations Building, adjacent to the former UST (see Appendix B, Photograph Log). The original dates of service for the transformer in this location are not known. However, there are maintenance records from 1974 indicating that a transformer was replaced at this location (Matthews 2009, pers. com.). The transformer installed in 1974 did not contain oil with polychlorinated biphenyls (PCBs), and was removed in the mid 1980s.

On August 31, 2009, during a construction project to install water lines for a fire suppression system, a dark oil-like fluid began flowing into the project excavation next to the Operations

Building. Upon review of old facility drawings, the inactive UST was identified as the most likely source of the product. The investigations and removal actions described in this report followed soon thereafter.

1.2 Previous Spills and Investigations

There have been no previous investigations directly related to the UST or the immediate area prior to 2009. There have been, however, environmental investigations and cleanup of other portions of the land parcel, primarily focused on UST releases. In addition to the inactive UST next to the Operations Building, there were formerly three other USTs located on the property (see Figure 1-2 for locations). These include the following:

- One 4,000-gallon gasoline and one 4,000-gallon diesel UST located beneath a dispensing island on the southeast corner of the Vehicle Maintenance Building (1121 E. 1st Ave); and
- One 500-gallon used oil UST located on the east side of the Vehicle Maintenance Building approximately 100 feet to the north.

1.2.1 Gasoline UST Release

On March 29, 1989, a leak was discovered in the 4,000 gallon unleaded gasoline UST. The UST and adjacent diesel UST were subsequently removed. During the UST removals, approximately 400 yd³ of impacted soil were removed from the excavation. In addition, approximately 167,790 gallons of oily water and 850 gallons of fuel were recovered during and after the initial excavation (Shannon & Wilson 2003). In the fall of 1989, nine groundwater monitoring wells, one product recovery well, a groundwater air stripper, and a soil vapor extraction system were installed. The treatment system operated until February 1996. Groundwater monitoring was continued until 2002, when ADEC granted the site No Further Action status based on decreasing groundwater hydrocarbon concentrations. The groundwater well network was left in place at ADEC's request for future confirmation and closure sampling.

1.2.2 Used Oil UST Release

On October 26, 1990, a used oil UST was removed from the east side of the garage. Soil samples collected during the UST removal indicated significantly elevated petroleum hydrocarbons (5,700 milligrams per Kilogram [mg/Kg] total recoverable petroleum hydrocarbons [TRPH]) and low levels of trichloroethene (TCE) and tetrachloroethene (PCE) at the excavation limits. In 1992, additional sampling showed similar soil contamination and chlorinated solvents in the groundwater at concentrations ranging from 4.7 µg/L to 9.0 µg/L for PCE and 27 µg/L to 48 µg/L for TCE (Shannon & Wilson 2003).

In October 1993, three additional monitoring wells (B-1, B-2, and B-3) were installed at locations surrounding the former UST to further define the extent of PCE and TCE in the groundwater (Shannon & Wilson 1993). The highest concentrations were detected in well B-2, located nearest the former UST, with PCE concentrations of 0.025 milligrams per Liter (mg/L) and TCE at 0.043 mg/L. These concentrations exceeded ADEC groundwater cleanup levels. Quarterly sampling and analysis of well B-2 for TCE and PCE was initiated in 2002. Both compounds have continued to exceed the ADEC groundwater cleanup levels (18 AAC 75.345, Table C). There is no clear indication that concentrations are significantly decreasing and

approaching cleanup levels. In July 2009 (the most recently reported sampling event), the groundwater sample from well B-3 contained 0.0159 mg/L TCE and 0.0356 mg/L of PCE. The ADEC groundwater cleanup level for these two compounds is 0.005 mg/L. Cis-1,2-dichloroethene (cis-1,2-DCE) was also detected in July 2009, but below the associated cleanup level. Cis-1,2-DCE is a daughter product of the reductive dechlorination of TCE and PCE (Hoeftler Consulting Group [HCG] 2009a).

In a separate investigation, an Environmental Protection Agency (EPA) contractor installed well points west of the former waste oil tank to evaluate the former tanks contribution to vinyl chloride contamination detected downgradient (west) of the UST site. The results of the investigation indicated the solvent contamination from the waste oil tank degrades rather quickly and the contaminant plume is generally attenuated a short distance from the source area and is not responsible for the chlorinated solvent plume (CH2M HILL 2008). This site is still an active site in the ADEC contaminated sites database (Hazard ID 23606).

1.3 Current Regulatory Status

The Operations Building UST site was recently added (9/16/09) as an active site in the ADEC contaminated sites database. The Hazard ID is 25453.

1.4 Site Description and Regional Setting

The site lies adjacent to Ship Creek, approximately one mile upstream from its outlet into the Knik Arm of Cook Inlet. The site is relatively flat with an elevation of approximately 35 feet above mean sea level (amsl). Surface drainage at the site is generally to the northwest toward Ship Creek. However, direct runoff to the creek is impeded by an earthen embankment along the north edge of the property (see Figure 1-2, "Pole Yard" area). At its nearest point, Ship Creek is located approximately 300 feet from the northern edge of the UST excavation site; the creek elevation is approximately 10 feet below the average surface elevation of the site. No other surface water bodies are present in the vicinity of the site.

1.4.1 Geology

The facility is underlain stratigraphically by glacial, glaciofluvial, and glacial lacustrine sediments. Nearest the ground surface, varying thicknesses of fill associated with plant construction are present. Based on the regional geology, underlying the fill is approximately 15 feet of alluvial material deposited by Ship Creek (META 1994). The Bootlegger Cove Formation, made up of predominately silty clays and clayey silts, immediately underlies the alluvial sand and clay. This formation is estimated to be approximately 160 feet thick based on well logs. During excavations for this project, the soils in the immediate excavation areas were observed to be fairly uniform, consisting of well-graded gravels and sand mixtures with little fines. Occasional silt lenses were present. Semi-rounded coarse gravel and small cobbles were common, with a diameter up to 4 inches.

1.4.2 Hydrogeology

Groundwater at the site consists of a shallow water table aquifer and a deep confined aquifer. The aquifers are separated by the fine-grained Bootlegger Cove Formation which has a low permeability and acts as an aquitard, or confining unit. The shallow unconfined aquifer underlies the entire site and ranges from 4 to 20 feet below ground surface (bgs). The shallow aquifer is

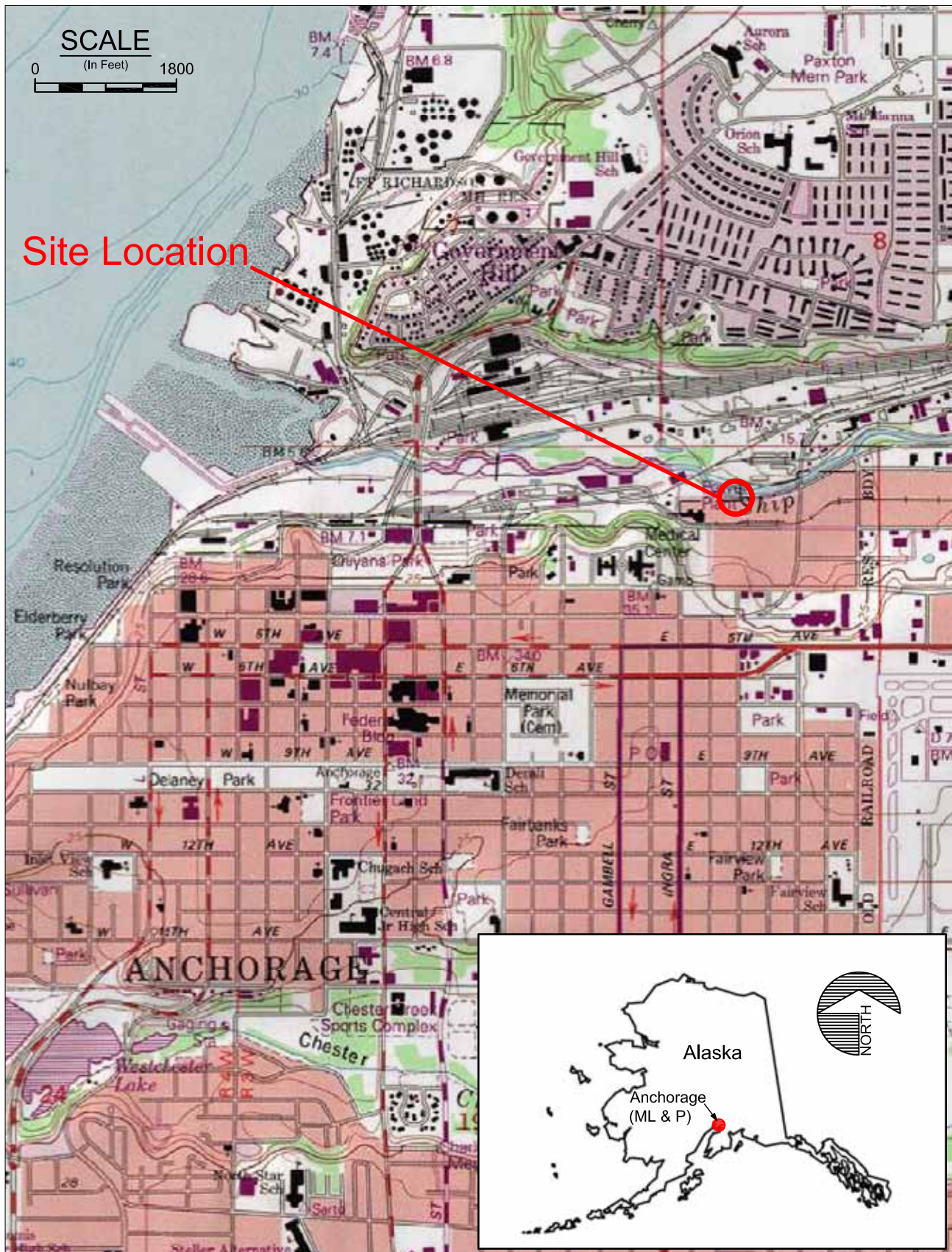
recharged primarily by precipitation and groundwater flow from areas upgradient from the site. Groundwater in this shallow aquifer discharges to Ship Creek and seeps, and also discharges by evapotranspiration. The general groundwater flow direction is west toward Cook Inlet (The RETEC Group 2008).

Shallow groundwater measurements from monitoring wells 2A1, B-1 and B-3 (Figure 1-2) by HCG on October 8, 2009 found the depth to groundwater ranged from 4.01 to 5.71 feet bgs (report pending). The groundwater elevation data from this monitoring event and others indicate the groundwater flow direction is to the west, parallel to Ship Creek (see Figure 1-2). The estimated hydraulic conductivity is anticipated to be in the range for coarse sand and gravel, 3.29×10^{-4} to 3.29×10^{-2} ft/s (Freeze and Cherry 1979). However, the numerous utilities and structures installed in the subsurface at the facility and the associated fill may have local effects on both groundwater flow direction and velocity.

A web search was conducted using the Alaska Department of Natural Resources Well Log Tracking System (WELTS) to determine water supply wells located within 0.75 miles of the site. Several deep water supply wells, installed by the MOA and located near Merrill Field, were identified. Merrill Field is approximately 0.75 miles southwest and hydraulically upgradient from the site. No shallow water supply wells were positively identified in the shallow aquifer within 0.75 miles of the site. Several wells on the north side of Ship Creek were identified; however, these wells are on the opposite side of a hydrologic boundary (Ship Creek) and are not hydrologically connected to the site.

1.4.3 Land Use

The area in the vicinity of the Operations Building and the lowland area along Ship Creek have historically been, and will likely continue to be used for commercial and industrial purposes. The area is zoned for heavy or light industry, and the area immediately adjacent to the UST site, and most of the surrounding area, is covered by buildings, concrete, asphalt, and gravel fill. The site is fully developed and there is little remaining natural habitat.

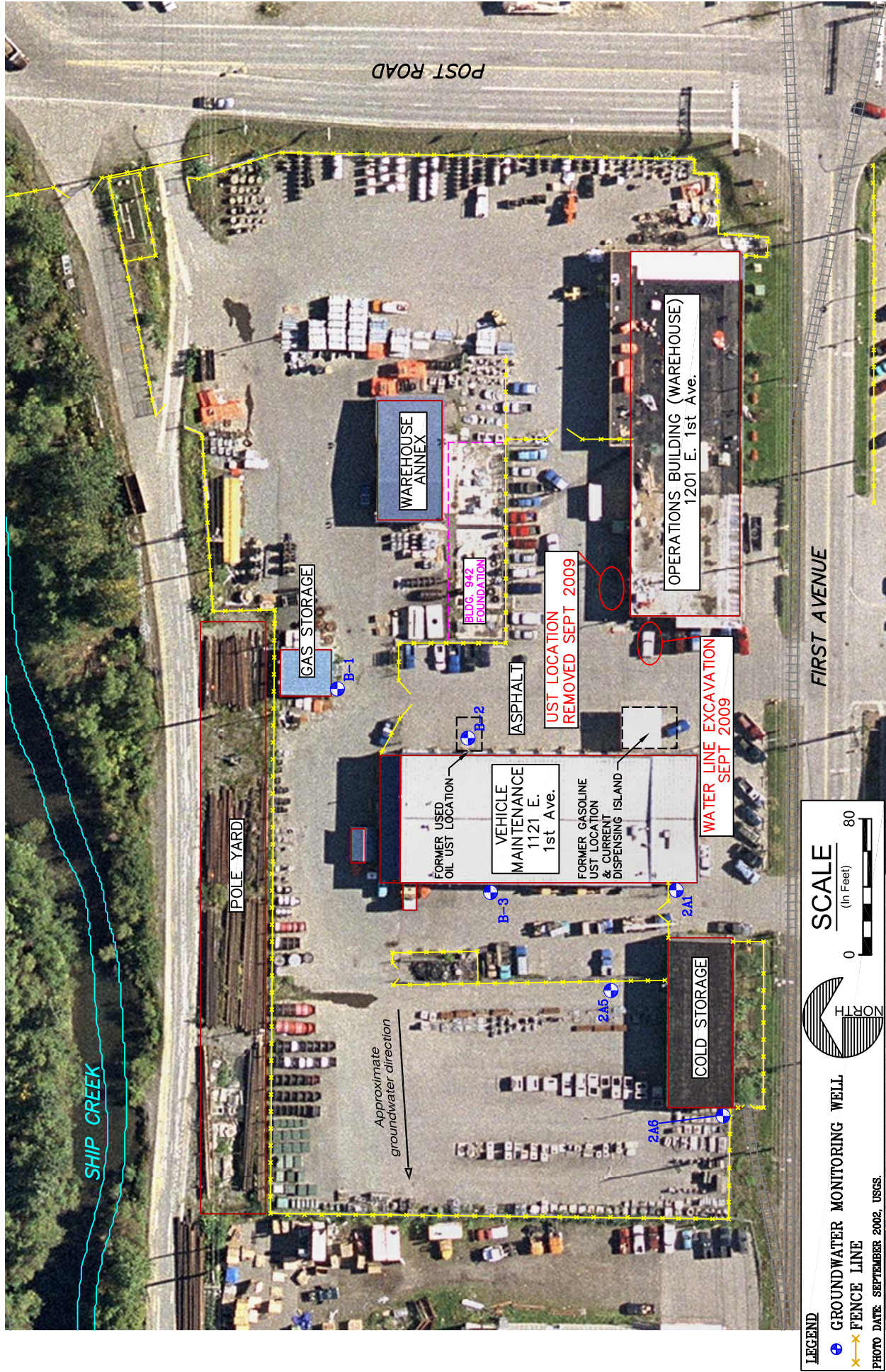


VICINITY MAP MUNICIPAL LIGHT & POWER 1121 E. 1st Avenue

ANCHORAGE, ALASKA

FIG.
1-1

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SITE PLAN

1201 E. 1st Avenue & 1121 E. 1st Avenue

MUNICIPAL LIGHT & POWER

FIG.

1-2



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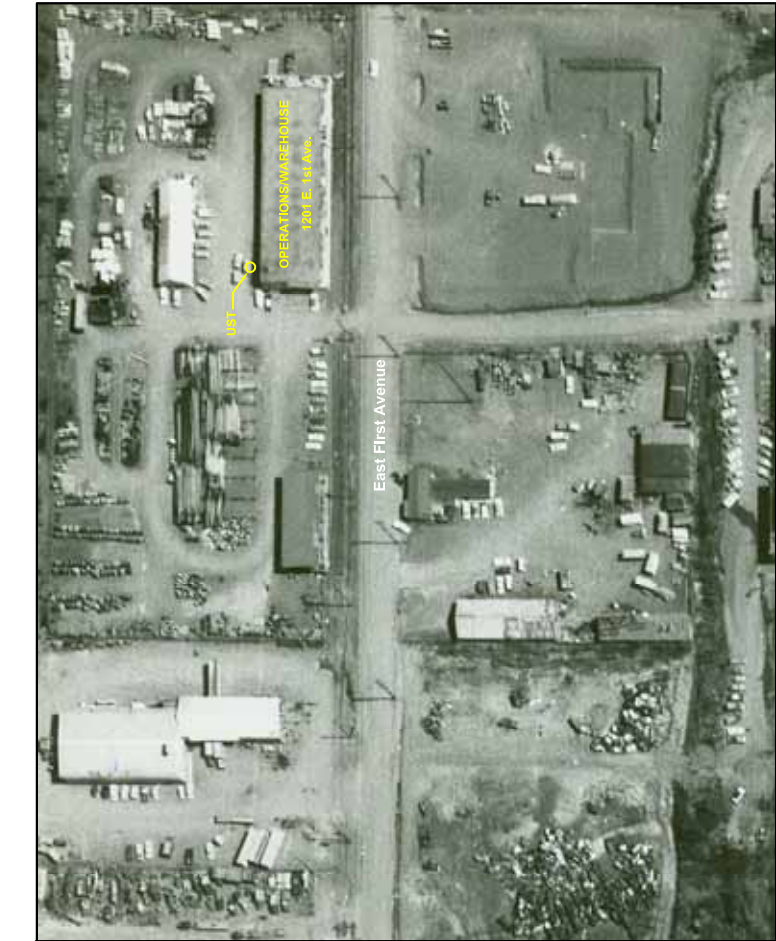


Photo Date: June 1, 1964

SCALE
0 180
(in Feet)

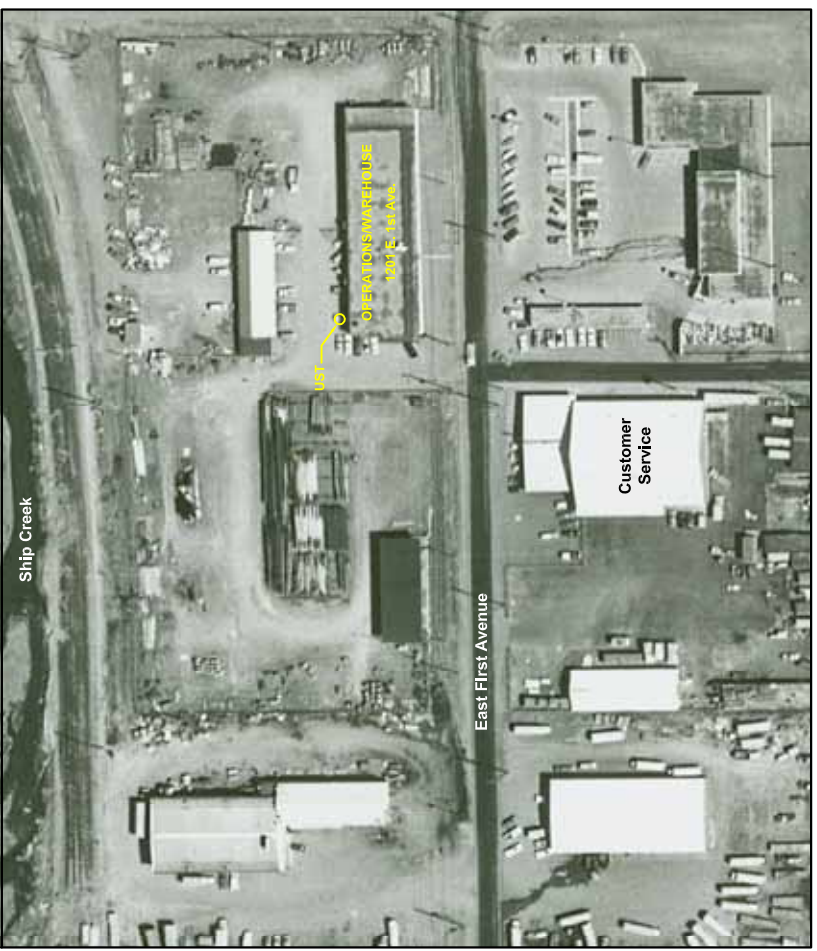


Photo Date: May 1968

SCALE
0 180
(in Feet)



HISTORICAL AERIAL PHOTOS OF OPERATIONS BUILDING
1201 E 1st Avenue
MUNICIPAL LIGHT & POWER

FIG.
1-3a

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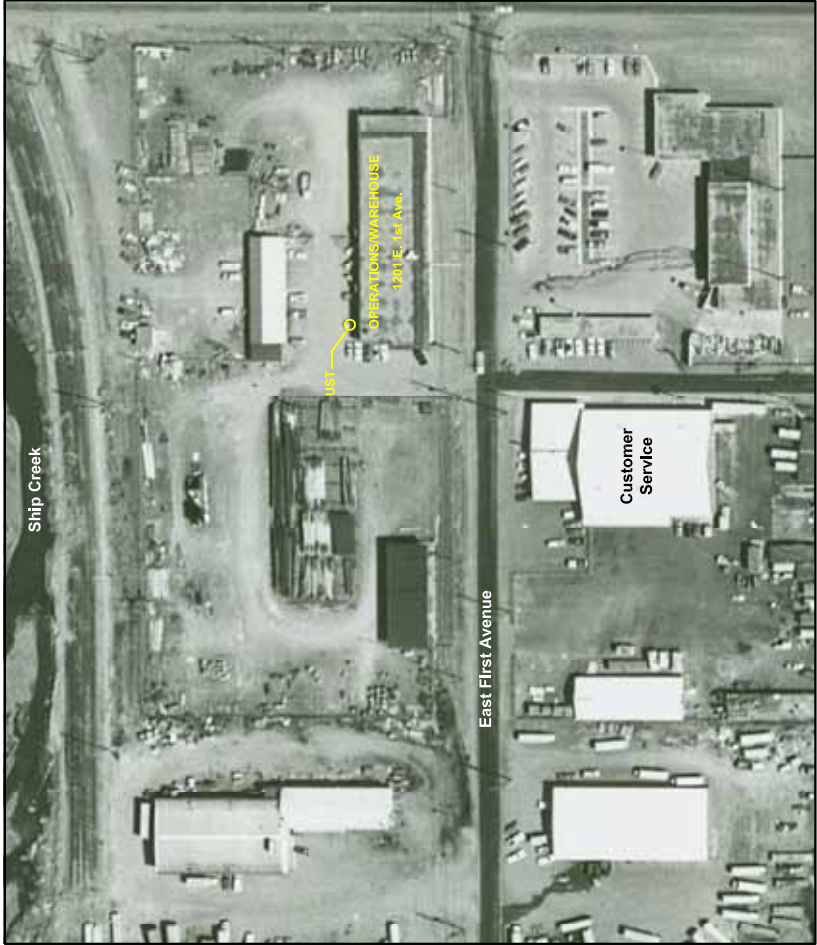


Photo Date: April 1970



Photo Date: September 2002



HISTORICAL AERIAL PHOTOS OF OPERATIONS BUILDING
1201 E. 1st Avenue
MUNICIPAL LIGHT & POWER

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2 UST RELEASE, REMOVAL AND CORRECTIVE ACTIONS

2.1 Initial Reported Release and Actions (Water Line Excavation)

As stated in Section 1.1, on August 31, 2009, a dark fuel oil-like fluid was observed flowing into an excavation on top of the water table next to the Operations Building during a construction project to install water lines. The area is referred to as the Water Line Excavation on Figure 2-1. Photos of the excavation are provided in Appendix A, Photograph Log. The excavation was approximately 6 to 7 feet deep and extended below the water table. The water table had been temporarily lowered by pumping to support the excavation activities, and the oil-like product was not observed until this dewatering occurred. A review of old facility drawings identified the inactive UST as the most likely source of the product.

Upon discovery of the suspected fuel release, oily water in the excavation was pumped into a vacuum truck for offsite disposal. Soil suspected of being contaminated was also removed from the lower portion of the excavation and placed on a lined containment. An oil-water separator system was installed to enable dewatering to continue and completion of the construction project. Dewatering was performed by installing a slotted culvert vertically as a sump next to the UST and pumping water to the surface for treatment and discharge. Water was run through an oil-water separator, and discharged to a secondary treatment tank where any remaining sheen was removed with sorbent pads. Treated water was discharged to the municipality's sewer system in accordance with ML&Ps discharge permit.

A Cleanup Plan was submitted by ML&P and approved by ADEC for site characterization and soil management during the remainder of the construction project (HCG 2009b). On September 4, the base of the excavation was expanded slightly to remove soil along the base of the excavation that may have become contaminated from contact with infiltrating product. The excavated soil was stockpiled on a liner. Three stockpiles of potentially contaminated soil were generated during the Water Line excavation, with a total volume of 11 yd³. Based on sample results, the stockpiled soil was either disposed offsite or determined to be suitable for onsite reuse (see Section 3.1.2).

After soil removal was complete, soil samples for laboratory analysis were collected along the excavation bottom and sidewalls to characterize the site conditions prior to backfilling. Sample results are discussed in Section 3. Following sampling, the water lines were installed, the excavation was backfilled, and the project was completed. Backfill material consisted of clean fill from offsite; sewer rock was used to backfill the excavation to approximately 4 feet bgs, and gravel was used above the sewer rock.

2.2 UST Removal

Following a review of old facility drawings, the likely source of the product was attributed to be the inactive UST. On September 1, 2009, the UST was emptied of approximately 425 gallons of fuel and 1,475 gallons of water. The fluids were sampled for the purpose of waste characterization and sent to an offsite Treatment, Storage and Disposal Facility (TSDF), Emerald Services in Anchorage, AK.

The UST was subsequently removed on September 14, 2009. A release investigation was conducted concurrently with the removal action, as a release was suspected. The removal action and release investigation were conducted in accordance with a project Work Plan (HCG 2009c) approved by ADEC. Photos of the UST removal and excavation are provided in Appendix A, Photograph Log. For reference, Appendix C includes the ADEC Site Assessment and Release Investigation Summary Form and ADEC UST Post Closure Notice, summarizing information included in this report.

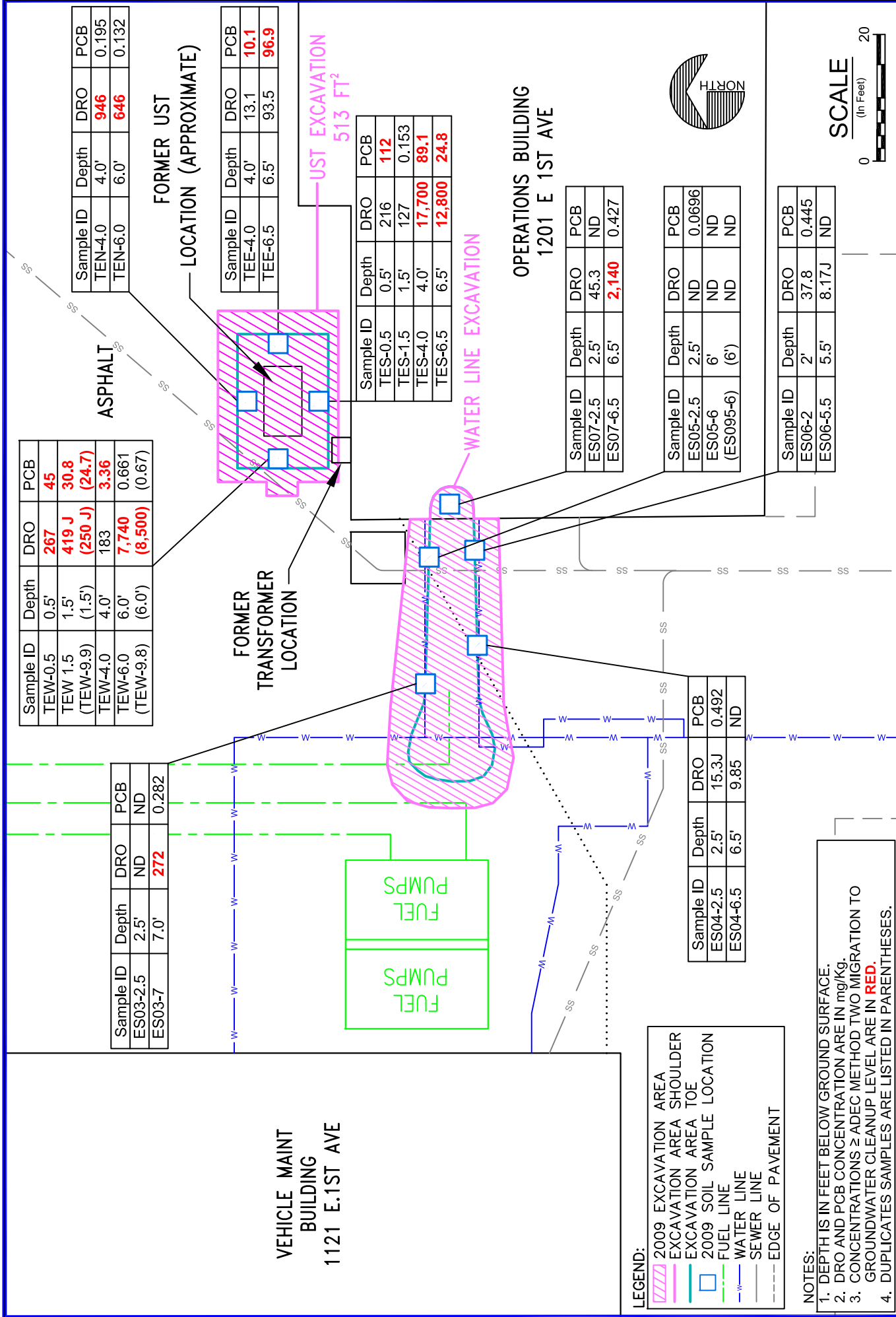
During the removal action, ground water dewatering continued because the UST removal required excavation below the water table. Initially, the upper 3 feet of soil, stockpile SP04, was removed from around the UST and placed on the adjacent asphalt (see Table 3-2). A concrete vault and cover, located directly on top of the UST, was removed. Dark staining was evident on the top surface of the concrete, especially in the vault area. The concrete was placed on a liner for eventual cleaning and testing.

After the concrete cover was removed, soil around the sides of the UST was excavated. Soil excavated below 3 feet bgs (stockpile SP05) was placed on a liner pending the results of sampling and analysis. An excavation depth of approximately 6 feet bgs was required to remove the UST. The steel tank was approximately 11 feet long and 6 feet 2 inches in diameter with an estimated capacity of approximately 2,500 gallons. There were numerous (40-60) holes up to one inch in diameter along the lower half of the tank, estimated to be at the approximate water table level prior to dewatering.

Fluids, primarily water with a small quantity of fuel, were still present in the UST on the date of its removal, and were pumped from the tank prior to the final excavation. Water in the tank was likely ground water that had infiltrated the tank through the numerous holes since the previous pumping on September 1. The oily water (508 gallons total) was sent to an offsite TSDF for disposal (Emerald Services, Anchorage, AK).

After the UST was removed, visible product and sheening was present on groundwater at the bottom of the excavation. Product was removed with sorbent boom and pads. The most visibly-contaminated soils around the base and edges of the excavation were removed and combined with SP05 stockpiled soil. Following excavation, soil sampling was conducted along the perimeter of the excavation on all four sidewalls at multiple depth intervals to characterize the site conditions. The sample results are presented in Section 3.

The excavation was backfilled after the completion of soil sampling. Backfill material consisted of three types: (1) From the bottom of the excavation to the estimated water table depth (4 feet bgs), backfill material consisted of approximately 40 yd³ of clean sewer rock (coarse gravel with no sand or fines); (2) Stockpile SP04 soil was placed over the sewer rock to a depth of 0.5 to 1 foot bgs. The SP004 soil (approximately 60 yd³) was originally removed from the upper 3 feet of soil within the excavation; (3) Approximately 12 yd³ of surface soil (0-3 bgs) from the Water Line excavation area was used to fill the remainder of the UST excavation. The area was paved approximately one week later. A cross section of the backfilled excavation is shown on Figure 2-2.



1121 E. 1st Avenue
MUNICIPAL LIGHT & POWER

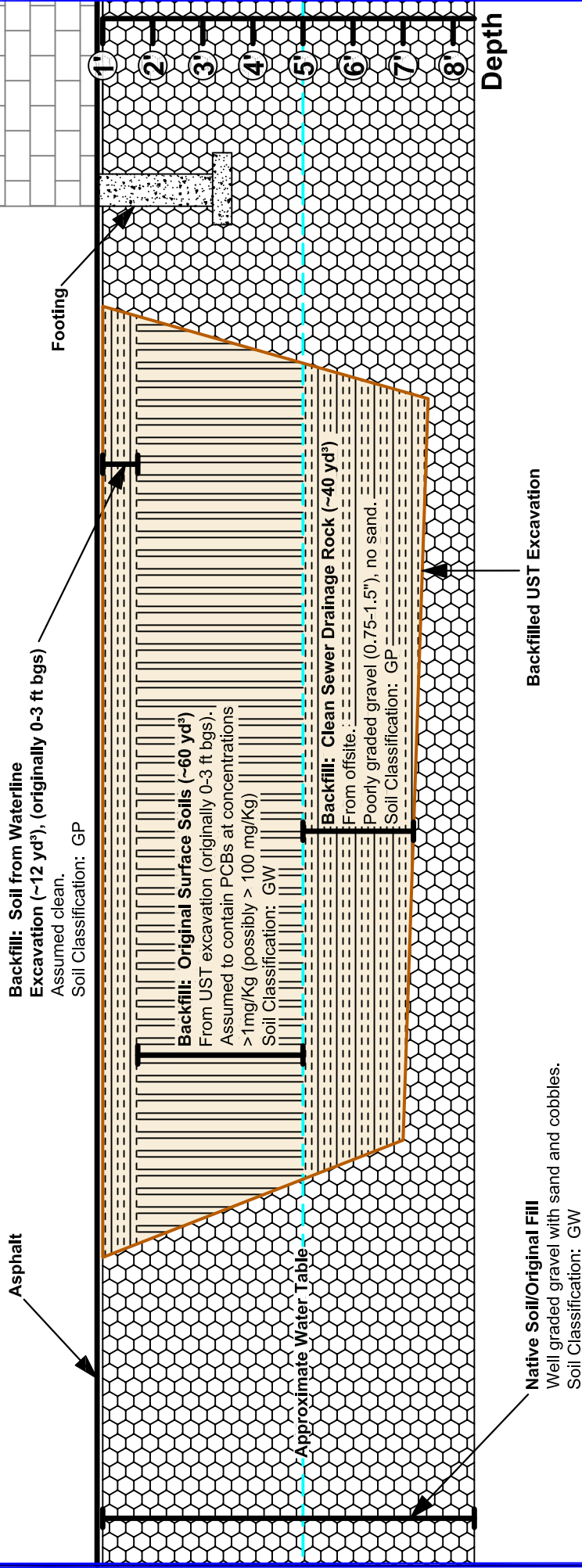
Detailed Site Map with Sample Results - Water Line and UST Excavation, Sept. 2009

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North

South

OPERATIONS BUILDING
1201 E 1ST AVE



SCALE
0 3
(In Feet)



CROSS SECTION OF UST EXCAVATION AFTER BACKFILLING SEPTEMBER 2009
OPERATIONS BUILDING
MUNICIPAL LIGHT & POWER 1121 E. 1st Avenue
ANCHORAGE, ALASKA

FIG.
2-2

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The UST was cleaned to remove any residual product and sent to Alaska Metal Recycling for disposal. The cleaning generated two 55-gallon drums of oily sludge. Nineteen drums of oily sorbent pads and boom were generated during cleanup activities at the Water Line and UST excavation. The drums, including the oily sludge, were sent to an offsite TSDF for disposal (Emerald Services, Anchorage, AK) with ultimate disposal in the lower 48 States. These wastes were characterized based on the product sample recovered from the UST (see Section 3.1).

Groundwater pumping and treatment, as described in Section 2.1.1, was continued until September 21 to remove as much residual product as possible from soil and groundwater at the site. At the conclusion of groundwater treatment, no sheening was observed and no product was recovered in the oil-water separator over a 3-day period (Matthews 2009, pers. com.).

2.3 Sampling and Analysis

Samples of soil, water and fuel product were collected for the purposes of site and waste characterization throughout the project using standardized methods according to the project Work Plans (HCG 2009b and 2009c) and ADEC guidance documents (ADEC 2002). Sampling was performed by HCG environmental scientists (Brent Veltkamp and Bret Berglund). All site characterization and most waste characterization samples were analyzed by SGS Environmental Services, Inc. in Anchorage, Alaska. Several waste characterization samples were analyzed by Columbia Analytical Services (CAS) in Kelso, Washington. Specific analyses for each sample type are detailed on tables 3-1 through 3-4 in Section 3.

Site characterization samples were soil grab samples collected from discrete depth intervals in excavations and from soil stockpiles. Soil samples were collected by hand using clean disposable stainless steel sampling spoons, while wearing disposable nitrile sampling gloves. Soil collected for field duplicates for semi-volatiles analysis was homogenized in a decontaminated stainless steel bowl prior to filling sample jars.

To aid in sample location selection, soil stockpiles were screened for volatiles using the headspace method as described in the ADEC UST Procedures Manual, Section 4.4.2 (ADEC 2002). Using this procedure, a photoionization detector (PID) headspace sample was collected and screened at a rate of at least one sample per 10 yd³. Samples were randomly distributed throughout the stockpile and collected at a depth of at least 18 inches below the surface. The screening locations and results were recorded in a field log book, and on stockpile screening logs. For soils contaminated or potentially contaminated, analytical samples were collected from the locations with the highest PID reading at a rate of at least two samples for the first 50 yd³ and 1 per every additional 50 yd³ (or portion thereof). The analyses were focused on the contaminants of concern based on the site history and results of the product sample from the UST (see Table 3-1), and included petroleum hydrocarbons (diesel range organics/residual range organics [DRO/RRO] and gasoline range organics/benzene, toluene, ethylbenzene, and total xylenes [GRO/BTEX]) and PCBs. Petroleum hydrocarbons were not analyzed if it was decided beforehand that stockpiled soil would be sent offsite for disposal based on PID-screening and visual observations. In stockpile SP04, consisting of cover soil from the UST excavation, PID readings were all less than 25 parts per million (ppm) and the soil was classified as clean and reused as excavation backfill without laboratory analysis.

Soil descriptions, field observations, PID results, and sample information was documented in the field logbook. Soil sample locations were documented by swing tying measurements from fixed reference points (buildings). Soils were classified using the Unified Soil Classification System (USCS) and recording observations of color, odor, and staining. Observations, descriptions, and other pertinent sample information were recorded in the field notebook.

2.4 Data Reporting

Analytical data was provided in Level II hardcopy and electronic format. Lab reports are included on CD in Appendix D, along with a Data Quality Assessment and ADEC Laboratory Data Review Checklists.

A Data Quality Assessment was performed in accordance with ADEC quality assurance procedures for laboratory data (ADEC 2009) to ensure that the data set met project data quality objectives. An ADEC Laboratory Data Review Checklist was completed for each laboratory work order. The data assessment did not include samples collected for waste characterization. The data review included an evaluation of the following and did not indicate any concerns limiting the usefulness of the data:

- chain-of-custody forms (CoCs), custody seals on coolers, and internal cooler arrival temperatures to ensure that the samples were securely transported and properly preserved;
- hold times (not applicable to PCBs);
- trip blanks;
- continuous calibration verifications;
- instrument and method/extraction and blanks;
- surrogate recoveries;
- laboratory control sample and laboratory control sample duplicate recovery (as percent recovery) and precision (as relative percent difference);
- matrix spike and matrix spike duplicate recovery (as percent recovery) and precision (as relative percent difference); and
- laboratory detection and reporting limits.

The data review indicated the reported laboratory data was of good quality. The following tabulated data qualifiers were added to the laboratory-provided data where applicable based on the evaluation.

Qualifier	Description
F	The analyte was positively identified but the associated concentration was estimated above the method detection limit (MDL) and below the practical quantitation limit (PQL).
J	The analyte was positively identified, the quantitation was an estimate. Where applicable a "+" or "-" was appended to indicate positive or negative bias, respectively.
ND	The analyte was analyzed for, but not detected. The associated numerical value was at or below the MDL.
M	A matrix effect was present. Where applicable a "+" or "-" was appended to indicate positive or negative bias, respectively.
B	The compound was positively identified in the method blank and/or trip blank. The reported concentration was less than 5X that of the blank, or less than 10X for common laboratory contaminants, methylene chloride and acetone.

The rationale for applying qualifiers to specific data sets is described in the Data Quality Assessment. There were several volatile analytes identified where the MDL were higher than migration to groundwater cleanup levels. The MDLs reported with the data are typical for the methodology applied. For those analytes, it is not possible to state with certainty that the affected analytes are not present in the samples above migration to groundwater cleanup levels. The data set was 100% complete with no omissions or rejections with respect to analysis.

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3 SAMPLE RESULTS

3.1 Waste Characterization Results

The types and results of waste characterization samples are listed in Table 3-1, with the exception of soil stockpile sample results, listed on Table 3-2. Sample result tables are included at the end of this section. In addition to sample results, the tables also summarize the disposition of the various wastes. A description of the most relevant results is presented below. Analytical data reports are included in Appendix D (on CD).

3.1.1 Product and Water Samples

A sample of the product removed from the UST was collected for laboratory analysis of oil burn specifications (total halogens, PCBs, Resource Conservation and Recovery Act [RCRA] metals, and flash point) and volatile organic compounds (VOCs). In addition, a product sample was collected from the Water Line Excavation in the sump area within building. The product results met the RCRA oil burn specification, except for PCBs (Table 3-1). PCBs were detected at 3.4 mg/Kg in the sample from the UST (PS03) and 17 mg/Kg in the product sample from the Water Line excavation (PS02). Based on the oil burn specifications results and visual observations, the product had the characteristics of a light fuel oil or diesel fuel. Chlorinated solvents were not present based on total halogen and VOC analysis.

CAS also performed testing on product sample PS03 from the UST in order to provide additional information regarding the nature of the fuel. The testing included a hydrocarbon identification screen, specific gravity (0.85), and viscosity (2.90 centipoise [cP] @ 24.8 °C). Based on the results, the laboratory concluded that the sample was composed primarily of an unknown slightly weathered diesel, potentially with some lighter fuels (Appendix D, CAS K0909082).

A sample of the water recovered from the excavation was also analyzed for VOCs. (Table 3-1, Sample Water 1). No chlorinated solvents were detected, although some fuel components were present in low concentrations (less than 18 AAC 75.345, Table C, Groundwater Cleanup Levels).

3.1.2 Soil Stockpile Results

Water Line Excavation

The soil stockpiles from the Water Line Excavation (SP01, SP02 and SP03) all contained detectable PCBs (Table 3-2). However, no samples exceeded the ADEC Method Two cleanup level of 1 mg/Kg. Based on the petroleum levels, the soil was either classified for onsite reuse or sent offsite for disposal as a non-hazardous waste.

The stockpile results were consistent with results for sample ES02, a sample collected from the bottom of the excavation prior to conducting the final soil removal. This composite sample was collected for planning purposes, with the intention of characterizing the contaminated soil prior to its removal. The sample was analyzed for PCBs and VOCs. Chlorinated solvents were not detected in the soil; however, PCBs were detected at 0.165 mg/Kg (Table 3-1).

UST Excavation

Two stockpiles were generated during the UST removal. The first stockpile, designated SP04, consisted of sandy gravel soil from approximately 0-3 feet bgs, above the top level of the UST. The stockpile was approximately 60 yd³, and was not visibly contaminated. Six PID headspace screening samples were collected from the stockpile; the maximum reading was 7.8 ppm. No analytical samples were collected. The stockpile was designated suitable for reuse based on PID readings and visual observations, and was ultimately used as backfill in the excavation (at the time, PCB contamination was not suspected).

Soil removed from the deeper portion of the excavation, designated stockpile SP05, was visibly contaminated with petroleum hydrocarbons. Four PID headspace screening samples were collected, all had elevated readings over the range of the instrument (>15,000). Laboratory analysis detected PCBs up to 114 mg/kg and DRO to 2,550 mg/Kg. The PCB concentration in the stockpile exceeded the Toxic Substances Control Act (TSCA) regulatory level of 50 mg/Kg. This required the soil to be disposed offsite as a TSCA regulated waste in a RCRA hazardous waste landfill.

3.2 Site Characterization Results

3.2.1 Water Line Excavation Area

The soil sample results from the completed Water Line Excavation are presented on Table 3-3 and Figure 2-1. Analytical data reports are included in Appendix D (on CD). Samples were collected prior to installation of the water line and backfill of the excavation. Ten samples and one replicate were collected in locations distributed along the bottom of the excavation and sidewalls. The samples were analyzed for GRO/BTEX, DRO/ RRO, and PCBs; two samples from the most likely areas of contamination were analyzed for VOCs.

No sample concentrations exceeded the ADEC Method Two cleanup level for the under 40-inch zone. However, DRO and two chlorinated solvents (tetrachloroethene and trichloroethene) exceeded the most stringent ADEC Method Two cleanup level (Migration to Groundwater). DRO exceeded this cleanup level in two locations along the floor of the excavation. The highest concentration (2,140 mg/Kg) was detected within a small excavation within the building (Sample ES07-6.5). This is the same location where the two chlorinated solvents exceeded the Migration to Groundwater cleanup level. PCBs were detected in 5 of 10 samples but no sample concentrations exceeded the ADEC Method Two cleanup level of 1 mg/Kg. Aroclor 1260 was the only PCB detected.

3.2.2 UST Excavation Area

After the UST and soil removal was complete, soil samples were collected from the excavation to characterize the remaining soils. Samples were collected from twelve locations on the perimeter sidewalls of the excavation; at the bottom (6.0-6.5 feet bgs) and 4 feet bgs along all four sidewalls, and at 0.5 and 1.5 feet bgs on the southern and western sidewalls (Figure 2-1). Soil samples could not be collected directly below the former tank due to the presence of groundwater in the excavation. The soil samples were analyzed primarily for GRO/BTEX, DRO/RRO and PCBs, with some additional selective analyses for polynuclear aromatic hydrocarbons (PAHs).

Soil sample results are presented in Table 3-4 and summarized on Figure 2-1. Analytical data reports are included in Appendix D (on CD). DRO and PCBs exceeded the ADEC Method Two cleanup level for the under 40-inch zone (direct contact or ingestion). DRO exceeded the cleanup standard in two locations with a maximum concentration of 17,700 mg/kg. The more stringent Migration to Groundwater Cleanup standard was exceeded in 6 of 12 locations. PCBs were detected in all 12 sample locations, and exceeded 1 mg/Kg in 8 of 12 locations. The maximum PCB concentration was 112 mg/Kg. Three of the 12 samples were above 50 mg/Kg. Aroclor 1260 was the only PCB detected. Several PAH compounds (1-Methylnaphthalene and 2-methylnaphthalene) slightly exceeded the ADEC Method Two Migration to Groundwater cleanup standard.

Petroleum contamination was generally highest at the deepest sample point on a given sidewall. Near surface samples (0.5 and 1.5 feet bgs) contained relatively low levels of petroleum contamination. This suggests there may have been minor spills at the surface (perhaps during tank filling), but the primary point of release was in the subsurface near the water table. The highest concentrations of DRO tended to be on the south and west portions of the excavation. This southwest corner is the down gradient edge of the excavation based on the general groundwater flow in the area (Figure 2-1). In addition, alteration of the normal groundwater flow direction during dewatering of the Water Line Excavation may have inadvertently contributed to contaminant migration in this area.

With respect to PCBs, the sampling indicated that contamination was generally highest in the surface soil next to the Operations Building. However, there were also some fairly elevated PCB concentrations in the subsurface at 4 to 6 feet bgs. The detected concentrations tended to decrease to the north.

It is assumed PCBs are also present in the soil in the 1 to 4 feet bgs depth range within the backfilled excavation. PCBs were detected in all four sidewall samples from 0.5 and 1.5 feet bgs. Therefore, it is probable that the surface soil between these points contained PCBs. This surface soil was originally removed, and then placed back in the UST excavation at a depth of 1 to 4 feet bgs. Clean backfill was used below and above this material to fill the remainder of the excavation (see Section 2.2, and Figure 2-2).

3.3 Results Discussion

A review of the data and site history suggests that there were probably two separate sources for the contaminants detected at the site.

- Spills/Leaks of diesel fuel from the UST, and
- Spills/leaks of dielectric fluids with PCBs from the adjacent transformer.

The petroleum contamination at the site is attributed to leaks from the UST. The tank had numerous corrosion holes in its lower half indicating that leaks may have been occurring for some time. However, the current information indicates the release was relatively limited with respect to volume and area of impact. If there had been a long-term release consisting of multiple tank volumes, soils in the nearby Water Line excavation would likely have exhibited more extensive and higher concentrations of petroleum in the subsurface. In addition, it is likely the presence of a large, historical release would have been suspected or confirmed in the

groundwater sampling conducted as part of the Gasoline and Used Oil UST investigations in the 1990s (see Section 1.2). These sites and associated monitoring wells are located cross- or downgradient of the Operations Building UST. These circumstances suggest the leaks may have developed after the tank became inactive which limited the release to less than one tank volume. Assuming this is the case, the maximum volume of the release would be 1,975 gallons (original tank volume [2,500 gallons], minus recovered product [425 gallons], minus tank sludge [100 gallons]). In addition, there does not appear to have been significant migration in the direction of the Water Line Excavation until the groundwater in the area was artificially lowered by pumping in 2009.

The most likely explanation for the presence of PCBs in the soil is a historical release or spill of dielectric fluids containing PCBs from the transformer originally located on the adjacent concrete pad. This release(s) likely occurred prior to 1974, when the transformer was replaced with a non-PCB containing transformer (see Section 1.1). The PCBs were most likely released at the ground surface and initially moved no farther than the immediate dielectric fluid spill area. PCBs have low water solubility, generally bind to fine grained soils, and do not migrate unless the soils are moved through human activity or natural processes (e.g., erosion).

The presence of fuel leaking from the UST has probably contributed to the subsequent migration of PCBs from their initial point of release. PCBs are soluble in petroleum products such as fuel and oil, and can therefore be mobilized if light non-aqueous phase liquid (LNAPL) is present and migrating. These conditions were present in the vicinity of the UST and could account for the PCBs being detected in the subsurface at depths of 6 feet bgs. It could also account for the PCBs being detected at low concentrations (3.4 mg/Kg) in the fuel contained in the tank and in the product sampled from the Water Line Excavation. This appears to be more probable than the alternate explanation that fluids containing PCBs were disposed intentionally into the UST.

The extent of PCB and petroleum hydrocarbon contamination in the soil or groundwater cannot be quantified with the available data set. However, as discussed above, the limited information available suggests impacts are relatively localized. Furthermore, the extent of PCB contamination should be limited to the extent of migration of the LNAPL phase (fuel or dielectric fluid), unless the PCBs were originally dispersed prior to the area being covered by asphalt. It is likely that petroleum and PCB-contaminated soil extends below the foundation of the Operations Building.

On October 10, 2009, three monitoring wells downgradient of the UST excavation were sampled for DRO/RRO and PCBs (Figure 1-2, Wells 2A1, B-1 and B-2). When available, this data set will help define the extent of contaminant migration from the site, particularly dissolved components. A preliminary review of the data set indicates contaminants associated with the UST site have not caused elevated concentrations of contaminants at these locations (HCG 2009d).

**Table 3-1 Summary of Waste Characterization Samples
MLP Operations and Dispatch Center**

Sample ID	Sample Date	Sample Type	Location/Description	Analysis	Summary of Analytical Results								Comments and Disposition of Applicable Waste	
					Oil Burn Specifications (OBS)					Other Analyses				
					Flash Point (°C)	Total Halogens (mg/L)	Metals (mg/Kg)			PCBs (mg/Kg) ¹	Chlorinated Solvents ² (mg/L)			
				Limits:	37.8 °C	4,000	Arsenic	Cadmium	Chromium	Lead				
PS02	9/1/2009	Liquid	Product collected from water line excavation, sump area inside building.	OBS, VOCs	93	246	ND (0.4)	ND (0.03)	0.2 F	ND (0.4)	17	ND (7.0)	Recovered product sent offsite to TSDF (Emerald Services)	
PS03	9/1/2009	Liquid	Product sample from UST prior to removal.	OBS, VOCs	61	ND (100)	ND (0.4)	0.03 F	0.2 F	1.1	3.4	ND (14)	Recovered product sent offsite to TSDF (Emerald Services)	
Water1	9/1/2009	Liquid	Oil water collected from vacuum truck following removal from Water Line Excavation.	VOCs	NA	NA	NA	NA	NA	NA	NA	ND (0.0062) ³	Some fuel compounds were detected below 18 AAC 75 Table C criteria. Sample was run at a 20 fold dilution, some MDLs are elevated.	
Con01	9/17/2009	Solid (concrete chips)	Sample of concrete cover on the top of UST. Sample collected using hammer drill from area of dark staining on concrete inside surface of piping vault after tank concrete was cleaned.	PCBs	NA	NA	NA	NA	NA	NA	0.725	NA	Oil water sent offsite to TSDF (Emerald Services)	
													Sample depth 0-1.0 inches. Concrete was dark-stained at the surface, and light grey underneath surface (unstained). Concrete sent offsite for disposal (Anchorage Regional Landfill). Stained wood around the vault was disposed with soil in SP05 (see Table 3-2)	
ES02	9/2/2009	Solid (soil)	Soil from water line excavation. Representative composite sample of soil that was to be excavated (collected from the contaminated zone). Purpose was to expedite waste characterization of the soil for disposal.	PCBs, VOCs	NA	NA	NA	NA	NA	NA	0.165	ND (0.0728) ³	No chlorinated solvents detected; some fuel components below Method 2 Migration to Groundwater.	
													Soil excavated on 9/4/2009. See stockpile SP03, Table 3-2, Soil Stockpile Log and Sample Results	

Notes:

- 1 - PCB-1260 was the congener detected in all samples.
- 2 - Samples were analyzed for Chloroethane, Vinyl Chloride, 1,1-Dichloroethene, trans-1,2-Dichloroethene, cis-1,2-Dichloroethene, 1,2-Dichloroethane, Trichloroethene, 1,1,2-Trichloroethane, Tetrachloroethene, 1,1,2,2-Tetrachloroethane. For nondetects ("ND"), the highest method detection limit is shown in parentheses.
- 3 - These samples were analyzed for full list volatile organic compounds. No chlorinated solvents were detected. Screening Criteria are 18 AAC 75 Table C for waters and Tables B1 and B2 for soils.
- 4- The product samples (PS02 and PS03) were also used to characterize the 2 drums of oil sludge, and 19 drums of oiled sorbent pads, boom, and PPE generated during the cleanup. Therefore, these wastes were assumed to have PCBs < 50 mg/Kg.

Data Flags

F reported value was between the laboratory MDL and PQL
ND nondetect, method detection limit is presented in brackets to the left

Abbreviations

AAC	Alaska Administrative Code	PCB	Polychlorinated Biphenyl
MDL	Method Detection Limit	PQL	Practical Quantitation Limit
mg/kg	milligrams per kilogram	TSDF	Treatment, Storage, and Disposal Facility
NA	Not Analyzed	VOC	Volatile Organic Compound
OBS	Oil Burning Specification		

Bold and Shaded = Sample results exceed the screening criteria.

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**Table 3-2. Soil Stockpile Log and Sample Results
MLP Operations and Dispatch Center**

Stockpile Number	Origin of Soil	Approximate Size of Stockpile in Cubic Yards	Excavation Date	Sample Date	PID Reading (ppm)	Lab Sample Number	Analytical Results (mg/Kg)					Disposition of Soil
							PCBs	DRO	RRO	GRO	BTEX	
SP01	Water Line Excavation: First soil from potentially-contaminated soil removed with vacuum truck	3	9/1/2009	9/4/2009	95 in-situ	SP01	0.0696	87.8	36.5	4.04	ND[0.0141]	No contaminants detected above regulatory cleanup levels (ADEC or TSCA). Soil is stored onsite in the Pole Yard on the ground surface. In 2010, soil will be used for re-grading northwest of the Vehicle Maintenance Building and paved with asphalt. ADEC notified of plan and concurred in Sept. 2009.
SP02	Water Line Excavation: Second batch of soil removed from main excavation with vacuum truck	5	9/1/2009	9/4/2009	15000+ in-situ	SP02A	0.223	NA	NA	NA	NA	Sent offsite for disposal at TSDF ²
					15000+ in-situ	SP02B	0.380	NA	NA	NA	NA	
SP03	Water Line Excavation: Removed with vacuum truck during final excavation cleanup	3	9/4/2009	9/4/2009	191 in-situ	SP03A	0.121	NA	NA	NA	NA	Sent offsite for disposal at TSDF ²
					337 in-situ	SP03B	0.0619	NA	NA	NA	NA	
SP04	UST Excavation: surface soil 0-3' bgs	60	9/11/2009	9/14/2009	7.8 headspace	Screening Only	NA	NA	NA	NA	NA	Used to backfill UST excavation from approximately 4.0 to 0.7 feet bgs.
SP05	UST Excavation: soils 3-6.5' bgs next to tank	12	9/14/2009	9/14/2009	15000+ headspace	SP05A	114	2550	351	NA	NA	Sent offsite for disposal at TSDF (TSCA regulated waste, PCBs>50 mg/Kg) ²
					15000+ headspace	SP05B	94.1	2420	350	NA	NA	

Notes:

- 1) Soil PID-screened from multiple locations; area of highest PID reading was sampled for laboratory analysis. PID readings were both in-situ, and bagged headspace readings as shown.
- 2) Soil from stockpiles SP02, SP03, and SP05 was sent offsite to Emerald Services (Anchorage AK) and then to the lower 48 States for disposal.
Soil with PCBs > 50 mg/Kg was disposed in a RCRA hazardous waste landfill (Subtitle C landfill). The other soils were disposed in a non-hazardous waste landfill (RCRA Subtitle D).
- 3) PCB-1260 was the congener identified.

Data Flags

ND nondetect, method detection limit is presented in brackets to the left

Abbreviations

AAC	Alaska Administrative Code	NA	not analyzed
ADEC	Alaska Department of Environmental Conservation	PCB	Polychlorinated Biphenyl
bgs	below ground surface	PID	photoionization detector
BTEX	benzene, toluene, ethylbenzene, and total xylenes	PQL	Practical Quantitation Limit
DRO	diesel range organics	RCRA	Resource Conservation and Recovery Act
GRO	gasoline range organics	RRO	residual range organics
MDL	method detection limit	TSCA	Toxic Substances Control Act
mg/Kg	milligrams per kilogram	TSDF	Treatment, Storage and Disposal Facility

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Table 3-3. Water Line Excavation Soil Sample Results, September 4, 2009 (Post Removal Action)
MLP Operations and Dispatch Center

Compound: milligrams per kilogram (mg/kg)	Method Two (under 40-inch zone) ¹	Method Two Migration to Groundwater ²	Sample Locations ³																Maximum Concentration ⁴		Frequency of Detection ⁵	Frequency Above Primary Screening Criteria ^{5,6}	Contaminant of Concern (COC) ⁷								
			ES03-7 04-Sep-09 1094698001		ES04-6.5 04-Sep-09 1094698002		Primary ES05-6 04-Sep-09 1094698003		Replicate ES095-6 04-Sep-09 1094698007		ES06-5.5 04-Sep-09 1094698006		ES07-6.5 04-Sep-09 1094698008		ES03-2.5 04-Sep-09 1094698009		ES04-2.5 04-Sep-09 1094698010							ES05-2.5 04-Sep-09 1094698011		ES06-2 04-Sep-09 1094698012		ES07-2.5 04-Sep-09 1094698013		Trip Blank 04-Sep-09 1094698019	
			Conc	Flag	Conc	Flag	Conc	Flag	Conc	Flag	Conc	Flag	Conc	Flag	Conc	Flag	Conc	Flag	Conc	Flag	Conc	Flag	Conc	Flag	Conc	Flag	Conc	Flag	Conc	Flag	
Sample Depth (feet bgs)		--	7		6.5		6		6		5.5		6.5		2.5		2.5		2.5		2		2.5		--		--	--			
Isopropylbenzene (Cumene)	62	51	--	--	--	--	--	--	--	--	[0.00647]	ND	0.0256	=	--	--	--	--	--	--	--	--	--	--	--	0.0256	=	1/2	0/2	No	
Methylene chloride	160	0.016	--	--	--	--	--	--	--	--	[0.0257]	ND	[0.0238]	ND	--	--	--	--	--	--	--	--	--	--	--	[0.0257]	ND	0/2	0/2	No	
Methyl-t-butyl ether	290	1.3	--	--	--	--	--	--	--	--	[0.00996]	ND	[0.00923]	ND	--	--	--	--	--	--	--	--	--	--	--	[0.00996]	ND	0/2	0/2	No	
Naphthalene	28	20	--	--	--	--	--	--	--	--	0.0209	J	3.9	=	--	--	--	--	--	--	--	--	--	--	--	3.9	=	2/2	0/2	No	
n-Butylbenzene	42	15	--	--	--	--	--	--	--	--	0.00726	J	0.178	=	--	--	--	--	--	--	--	--	--	--	--	0.178	=	2/2	0/2	No	
n-Propylbenzene	42	15	--	--	--	--	--	--	--	--	0.0104	J	0.0388	=	--	--	--	--	--	--	--	--	--	--	--	0.0388	=	2/2	0/2	No	
o-Xylene	--	--	--	--	--	--	--	--	--	--	[0.0124]	ND	0.124	=	--	--	--	--	--	--	--	--	--	--	--	0.124	=	1/2	0/2	No	
P & M-Xylene	--	--	--	--	--	--	--	--	--	--	[0.0124]	ND	0.222	=	--	--	--	--	--	--	--	--	--	--	--	0.222	=	1/2	0/2	No	
sec-Butylbenzene	41	12	--	--	--	--	--	--	--	--	[0.00647]	ND	0.0727	=	--	--	--	--	--	--	--	--	--	--	--	0.0727	=	1/2	0/2	No	
Styrene	200	0.96	--	--	--	--	--	--	--	--	[0.00647]	ND	[0.006]	ND	--	--	--	--	--	--	--	--	--	--	--	[0.00647]	ND	0/2	0/2	No	
tert-Butylbenzene	70	12	--	--	--	--	--	--	--	--	[0.00647]	ND	0.00673	J	--	--	--	--	--	--	--	--	--	--	--	0.00673	J	1/2	0/2	No	
Tetrachloroethene	10	0.024	--	--	--	--	--	--	--	--	[0.00647]	ND	0.0309	=	--	--	--	--	--	--	--	--	--	--	--	0.0309	=	1/2	0/2	No	
Toluene	220	6.5	--	--	--	--	--	--	--	--	[0.0124]	ND	[0.0115]	ND	--	--	--	--	--	--	--	--	--	--	--	[0.0124]	ND	0/2	0/2	No	
trans-1,2-Dichloroethene	160	0.37	--	--	--	--	--	--	--	--	[0.00647]	ND	[0.006]	ND	--	--	--	--	--	--	--	--	--	--	--	[0.00647]	ND	0/2	0/2	No	
trans-1,3-Dichloropropene	27	0.033	--	--	--	--	--	--	--	--	[0.00647]	ND	[0.006]	ND	--	--	--	--	--	--	--	--	--	--	--	[0.00647]	ND	0/2	0/2	No	
Trichloroethene	0.57	0.02	--	--	--	--	--	--	--	--	[0.00647]	ND	0.0738	=	--	--	--	--	--	--	--	--	--	--	--	0.0738	=	1/2	0/2	No	
Trichlorofluoromethane	990	86	--	--	--	--	--	--	--	--	[0.0124]	ND	[0.0115]	ND	--	--	--	--	--	--	--	--	--	--	--	[0.0124]	ND	0/2	0/2	No	
Vinyl chloride	4.3	0.0085	--	--	--	--	--	--	--	--	[0.00996]	ND	[0.00923]	ND	--	--	--	--	--	--	--	--	--	--	--	[0.00996]	ND	0/2	0/2	No	
Xylenes (total)	63	63	--	--	--	--	--	--	--	--	[0.0249]	ND	0.346	=	--	--	--	--	--	--	--	--	--	--	--	0.346	=	1/2	0/2	No	
Polychlorinated Biphenyls (SW8082)																															
Aroclor-1016	--	--	[0.0168]	ND	[0.0163]	ND	[0.0168]	ND	[0.0165]	ND	[0.0165]	ND	[0.016]	ND	[0.0163]	ND	[0.016]	ND	[0.0162]	ND	[0.016]	ND	[0.0153]	ND	--	[0.0168]	ND	0/10	0/10	No	
Aroclor-1221	--	--	[0.0168]	ND	[0.0163]	ND	[0.0168]	ND	[0.0165]	ND	[0.0165]	ND	[0.016]	ND	[0.0163]	ND	[0.016]	ND	[0.0162]	ND	[0.016]	ND	[0.0153]	ND	--	[0.0168]	ND	0/10	0/10	No	
Aroclor-1232	--	--	[0.0168]	ND	[0.0163]	ND	[0.0168]	ND	[0.0165]	ND	[0.0165]	ND	[0.016]	ND	[0.0163]	ND	[0.016]	ND	[0.0162]	ND	[0.016]	ND	[0.0153]	ND	--	[0.0168]	ND	0/10	0/10	No	
Aroclor-1242	--	--	[0.0168]	ND	[0.0163]	ND	[0.0168]	ND	[0.0165]	ND	[0.0165]	ND	[0.016]	ND	[0.0163]	ND	[0.016]	ND	[0.0162]	ND	[0.016]	ND	[0.0153]	ND	--	[0.0168]	ND	0/10	0/10	No	
Aroclor-1248	--	--	[0.0168]	ND	[0.0163]	ND	[0.0168]	ND	[0.0165]	ND	[0.0165]	ND	[0.016]	ND	[0.0163]	ND	[0.016]	ND	[0.0162]	ND	[0.016]	ND	[0.0153]	ND	--	[0.0168]	ND	0/10	0/10	No	
Aroclor-1254	--	--	[0.0168]	ND	[0.0163]	ND	[0.0168]	ND	[0.0165]	ND	[0.0165]	ND	[0.016]	ND	[0.0163]	ND	[0.016]	ND	[0.0162]	ND	[0.016]	ND	[0.0153]	ND	--	[0.0168]	ND	0/10	0/10	No	
Aroclor-1260	--	--	0.282	=	[0.0163]	ND	[0.0168]	ND	[0.0165]	ND	[0.0165]	ND	0.427	=	[0.0163]	ND	0.492	=	0.0696	=	0.445	=	[0.0153]	ND	--	0.492	=	5/10	0/10	No	
Total PCBs	1.0	1.0	0.282	=	[0.0163]	ND	[0.0168]	ND	[0.0165]	ND	[0.0165]	ND	0.427	=	[0.0163]	ND	0.492	=	0.0696	=	0.445	=	[0.0153]	ND	--	0.492	=	5/10	0/10	No	
Percent Solids (SM2540G)																															
Total Solids	--	--	89	=	90.1	=	88.9	=	90.4	=	90.9	=	92.6	=	90.7	=	93.2	=	91.9	=	92.2	=	96.8	=	--	--	--	--	--	--	--

Notes:

- 1 - Primary Screening Criteria: the cleanup level corresponds to the lowest value for direct contact or inhalation of soil as listed in 18 AAC 75.341, Tables B1 and B2, (Method Two cleanup levels) for the under 40 inch zone (October 9, 2008).
- 2 - Secondary Screening Criteria: the value corresponds to the value listed in 18 AAC 75.341, Tables B1 and B2, Migration to Groundwater (October 9, 2008).
- 3 - The field sample identification number, date collected and laboratory sample identification number are provided. The sample depth in feet is listed after the hyphen at the end of the sample identification number.
- 4 - The maximum concentration of a detected analyte is shown. If an analyte was not detected, then the highest MDL is shown. Trip blanks are not included.
- 5 - A parent and duplicate sample are counted as one sample. The higher of the two values are used for the purpose of counting detections and exceedances. Trip blanks are not included.
- 6 - Screening criteria values are from 18 AAC 75.341 Method Two Under 40-inch Zone. Total values are the summation of detected compounds only. If all values are nondetectable, the highest MDL is shown.
- 7 - A compound is considered a COC if it exceeds the primary screening criteria.
- 8 - Total values were the summation of detected compounds only. If compounds were not detected, then the highest MDL was listed.

Data Flags

ND nondetect, method detection limit is presented in brackets to the left
F reported value was between the laboratory MDL and PQL

Abbreviations

-- Not applicable or screening criteria does not exist for this compound
AAC Alaska Administrative Code
bgs below ground surface
COC Contaminant of Concern
MDL Method Detection Limit

bold and shaded - value exceeds primary screening criteria (Method Two Cleanup Levels)
shaded - value exceeds Method Two migration to groundwater cleanup levels.

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4 SUMMARY AND CONCLUSIONS

Visual observations and sampling and analysis have confirmed a release of diesel fuel occurred from an inactive UST next to the ML&P Operations Building (1121 E. 1st Ave, Anchorage, AK). The duration of the release(s) or the total quantity of fuel released is unknown. However, the site history and sample results (both current and past) suggest the release was less than 2,000 gallons and the impacts are localized. The UST was emptied of product and removed from the ground in September of 2009, stopping the potential for future releases.

Sampling indicated that there was also a PCB spill located in the same approximate location as the UST. The source of the PCBs is assumed to be spills or leaks of dielectric fluids from a transformer that was located a few feet from the UST prior to 1974. The fuel release appears to have enabled the PCBs to migrate within the fuel-saturated zone and in some areas the contaminants are commingled.

Limited soil removal was performed in combination with the UST removal and the associated water line installation project. After the removal action was complete, soil sampling and analysis detected contaminants above ADEC regulatory cleanup levels (18 AAC 75.341) along the edges of the excavation. Based on these results, the primary contaminants of concern (COCs) at the site are DRO and PCBs. PAHs are also potential COCs.

Along the edges of the UST excavation, DRO and PCBs exceeded the ADEC Method Two cleanup level for the under 40-inch zone (direct contact or ingestion). The maximum detected DRO concentration was 17,700 mg/Kg, and the maximum detected PCB concentration was 112 mg/Kg. Two PAH compounds (1-methylnaphthalene and 2-methylnaphthalene) slightly exceeded the Method Two Migration to Groundwater cleanup standard. It is also suspected that a portion of the soil used to backfill the excavation contained PCBs above 1 mg/Kg, and possibly above 50 mg/Kg, as soil from the excavation was used for backfill before it was known PCBs were present. The soil removed from the UST excavation for disposal (12 yd³) had a maximum detected PCB concentration of 114 mg/Kg and DRO of 2,550 mg/Kg.

At the nearby Water Line Excavation, no sample concentrations exceeded the ADEC Method Two cleanup level for the under 40-inch zone after the removal action was complete. However, DRO and two chlorinated solvents (tetrachloroethene and trichloroethene) exceeded the most stringent ADEC Method Two cleanup level (Migration to Groundwater). The highest DRO concentration detected was 2,140 mg/Kg. This sample was located at a depth of 6.5 feet bgs in the small excavation within the Operations Building. The two chlorinated solvents exceeded the Migration to Groundwater Cleanup Level at this location as well. PCBs were detected but no sample concentrations exceeded 1 mg/Kg.

The contaminated soil detected at the Water Line Excavation is attributed to migration from adjacent sources areas, the dominant source being the UST area. Product (fuel) was observed flowing into the excavation from the UST area in September 2009. It is also possible some of the detected petroleum hydrocarbons on the west side of the Water Line Excavation originated from the Gasoline UST site to the west. The low levels of chlorinated solvents detected in the soils

are likely the result of transport from offsite locations. There is documented contamination of chlorinated solvents in the ground water in the region (e.g., The RETEC Group 2008; BGES 2007; CH2MHill 2008).

Groundwater sampling was not performed as part of this investigation. However, based on visual observations and soil sampling results, impacts to ground water are likely, at least in the immediate area. Potentially, some free product is still present. However, given the dewatering and product recovery efforts conducted for several weeks during and after UST removal, it is likely most if not all residual product is relatively immobile and localized.

Current information, albeit limited, does not indicate there are current exposure pathways between the COCs and human or ecological receptors. Contamination appears to be localized and confined within the subsurface of the facility boundaries. The contaminated soil is covered by concrete or asphalt, preventing contact between potential receptors and the soil. Volatile components are low, indicating vapors are unlikely to pose a significant risk. There are no drinking water wells on the property or adjacent properties, and surface water bodies are not present. These circumstances suggest the site poses a low risk to human health or the environment given the current site conditions.

As a result of this release investigation, several recommendations are offered for consideration:

- Appropriate institutional controls should be put in place and maintained to prevent the exposure to contaminants at adverse concentrations.
- Additional site characterization should be performed to define the extent of contamination, evaluate the potential for offsite migration, and determine the appropriate management strategy for the site. At a minimum, groundwater monitoring of existing groundwater wells should be performed to confirm that contaminants are not migrating beyond the immediate area and potentially reaching downgradient receptors. This sampling was initiated in October 2009 and results are pending. Soil sampling for PCBs and DRO beyond the boundaries of the UST excavation is also advisable.
- PCB concentrations in excess of 50 mg/Kg were detected and remain in the soil at the site. Therefore, the cleanup and disposal of the PCB-contaminated soil must comply with applicable TSCA regulations (40 CFR 761.61) unless the EPA approves alternative requirements as part of a risk-based disposal under 40 CFR 761.61(c). Under 40 CFR 761.61(a), self-implementing onsite cleanup and disposal of PCB remediation waste, the EPA has established cleanup levels and associated institutional controls for PCB remediation waste (contaminated soil). Under these regulations, the PCB cleanup level for soil varies from 1 to 100 mg/Kg depending upon the site use (occupancy). The cleanup levels and institutional controls applicable to a “low occupancy area” are probably appropriate for the site and could be implemented fairly readily. Under these regulations, soil with PCBs greater than 100 mg/Kg must be removed unless risk-based disposal is approved in accordance with 40 CFR 761.61(c). The site management strategy should consider whether removal of the PCB-contaminated soil to some threshold level (e.g., 100, 50 or 25 mg/Kg) is preferred over the implementation of more restrictive institutional controls. Removal actions will be complicated by the existing infrastructure (utilities and buildings) and shallow water table. Therefore, the most

practical approach may be a combination of removal actions and institutional controls, contingent upon regulator approval.

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Appendix A

1953 Operations Building Schematic Drawing