ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Mom and Pop's Grocery and Gas
Palmer, Alaska

2010 SITE CHARACTERIZATION REPORT

DRAFT

August 2010

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A WHOLLY OWNED SUBSIDARY OF
SLR INTERNATIONAL CORP.

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ABBREVIATIONS

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
ASR	Alaska Soil Recycling
bgs	below ground surface
BTEX	Benzene, Toluene, Ethylbenzene, and Xylene
CCV	Continuing Calibration Verification
CSM	Conceptual Site Model
DL	Detection Limit
DRO	Diesel Range Organics
EPA	United States Environmental Protection Agency
ft	feet
GAC	Granular Activated Carbon
GRO	Gasoline Range Organics
HCG	Hoefler Consulting Group, Inc.
ID	Identification
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOQ	Limit of Quantitation
MCL	Maximum Contaminant Level
MDL	Method Detection Limit
µg/L	micrograms per Liter
mg/Kg	milligrams per Kilogram
mL	milliliters
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ND	Non-Detect
PAH	Polycyclic Aromatic Hydrocarbon
PARCCS	Precision, Accuracy, Representativeness, Comparability, Completeness, and Sensitiviy
ppm	parts per million
PQL	Practical Quantitation Limit
PID	Photoioniziation Detector
RPD	Relative Percent Difference
RRO	Residual Range Organics
SGS	SGS-Environmental Services, Inc.
SIM	Selective Ion Monitoring
UST	Underground Storage Tank
VOC	Volatile Organic Compounds

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1 INTRODUCTION

This report describes the findings and recommendations of the site characterization conducted May 24 to 27, 2010 at the Mom and Pop's Grocery and Gas in Palmer, Alaska. This site is listed in the Alaska Department of Environmental Conservation (ADEC) Contaminated Sites Database with the hazard identification (ID) number 22919. This work was completed by Hoefler Consulting Group, Inc. (HCG) under ADEC Term Contract 18-4002-10.

1.1 Site Background

The former Mom and Pop's Grocery and Gas is located at mile 46.5 on the Old Glenn Highway in Palmer, Alaska (Figure 1-1). The site covers approximately 97,600 square feet (ft) and contains the old convenience store, pump islands, soil treatment cell, three monitoring wells, and one domestic supply well. The site is bound by residential property to the north, the Old Glenn Highway to the south, and mixed development (i.e., clearing, residential and business buildings) to the east and west (Figure 1-1). The Matanuska River is approximately 200 ft southwest of the site. The legal description is Foothills Estates subdivision, Lot 9, Block 3 (HCG 2010).

An underground storage tank (UST) system was used at the site and consisted of two 10,000 gallon gasoline tanks. Terrasat Consultants conducted a UST Site Assessment at the site in March 1993 following a failed tightness test. During the assessment, screening with a photoionization detector (PID) indicated the presence of volatile compounds. The assessment was conducted during a product line repair at the station. Based on the identified contamination, three monitoring wells were installed by hollow stem auger (HSA) drilling techniques. Soil samples were collected from the pit dug for well installation. Additionally, soil samples were collected from beneath the product lines. Samples were sent to a laboratory for analytical analysis. Concentrations of gasoline range organics (GRO) were 8,300 milligrams per kilogram (mg/Kg) and total benzene, toluene, ethylbenzene, and xylenes (BTEX) were 3,950 mg/Kg. These concentrations were greater than applicable ADEC Method Two Migration to Groundwater Cleanup levels. Free product was also observed in the downgradient monitoring well MW-2 and depth to groundwater was noted at 9 feet (ft) below ground surface (bgs) (Terrasat 1993).

In 1994, the two 10,000-gallon USTs were removed and approximately 300 cubic yards of petroleum-contaminated soil was excavated. The excavated soil was placed in an 80 x 40 foot long-term treatment cell for onsite remediation. The excavation was reportedly left open to help accelerate the degradation of gasoline type hydrocarbons. The excavation and associated soil stockpile remain onsite. No analytical samples were collected during tank closure activities due to standing water in the excavation and free product in a monitoring well (MW-2, see Figure 4-1). However, based on field observations, it was determined likely that hydrocarbon compounds were present in the soil and groundwater at concentrations exceeding ADEC Method Two soil and groundwater cleanup levels.

1.2 Objectives

The purpose of this investigation was to determine the nature and extent of contamination, to the extent possible given access limitation, at the former Mom and Pop's Grocery and Gas site and to develop a conceptual site model (CSM) in order to evaluate risk to human health and the environment. Results for surface water were evaluated relative to 18 Alaska Administrative Code (AAC) 70 Alaska Water Quality Standards (AWQS) as primary screening criteria and National Oceanic and Atmospheric Administration (NOAA) Screening Quick Reference Tables (SQuiRT) values for freshwater as secondary screening criteria. Results for the soil sampling were

evaluated relative to 18 AAC 75, Tables B1 and B2 (Method Two cleanup levels) for the under 40 inch zone. Results for groundwater sampling were evaluated relative to 18 AAC 75, Table C Groundwater Cleanup Levels. Drinking water samples from the domestic water survey were evaluated relative to 18 AAC 80.300 Maximum Contaminant Level (MCLs). The site-specific objectives were as follows:

- Drill up to seven soil borings and collect soil samples.
    - Collect two soil samples from up to 7 borings and submit to an ADEC-approved laboratory for analytical testing of diesel range organics (DRO)/residual range organics (RRO), GRO, and BTEX. Analyze two samples with the highest headspace results for polycyclic aromatic hydrocarbons (PAHs).

- Complete each boring as a monitoring well.
    - Test groundwater samples for DRO/RRO, GRO, and BTEX compounds. Analyze one well for PAHs.
    - Either remove wells or complete wells as flush mounts prior to leaving the site.

- Complete a well survey of nearby residences within a quarter mile of the site.
    - If domestic wells within a quarter mile of the site are identified and permission grated for sample collection, then collect water samples and analyze for volatile organic compounds (VOCs).

- Prepare traffic control plans that comply with Alaska Department of Transportation and Public Facilities (ADOT&PF) permitting requirements.
    - Since site access has not been granted, restrict work to the Old Glenn Highway right-of-way adjacent to the Mom and Pop property. Generate necessary traffic control plans.

- Develop a conceptual site model using ADEC guidance in order to evaluate risk to human health and the environment.

- Prepare a draft and final report that interprets analytical results and provides conclusions and recommendations for further assessment, monitoring, and/or corrective actions.

NORTH

SCALE
(In Feet)
0 100

Hoefler
CONSULTING GROUP

MOM AND POPS GROCERY AND GAS SITE AND PROPOSED SAMPLE LOCATION MAP

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO: 8901–018

DATE: 3–15–2010

FIGURE NO: 1 — 1

H:\8901 - ADEC\Spill Cleanup Contract\8901-018 Mom & Pops\Report\Figure 1-1.dwg, 7/27/2010 12:40:17 PM, Adobe PDF (temporary)\8881.pc3

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2 INVESTIGATION METHODS AND ACTIVITIES

Investigation methods and activities were completed in accordance with the *Work Plan for Site Characterization at Mom and Pop's Grocery and Gas, Hazard ID 22919, Palmer, Alaska* (HCG 2010), approved by the ADEC Project Manager. Variances to Work Plan procedures are noted and discussed in applicable sections of this report.

A field logbook (Appendix A) was maintained to document daily field activities. Information such as field team members' names, sample locations, field screening results, site observations, site conditions, and work directives were recorded. All notes were recorded in indelible ink on "Rite in the Rain" paper, bound, and sequentially numbered.

Upon arrival at the site, HCG personnel walked the Old Glenn Highway right-of-way adjacent to the property to determine safety risks prior to performing any work. Attention was given to traffic patterns, buried utilities, and general safety hazards. Prior to site arrival, Alaska Digline, Inc. was contracted to identify buried utilities onsite. They located an underground natural gas utility as well as a telephone/fiber optics line. Each of these utilities was labeled with marking paint in the vicinity of proposed borehole locations. The field team investigated other possible buried utilities by contacting the Division of Public Works for the City of Palmer, Alaska. A representative there was able to further confirm that there were no other buried utilities in the investigation area. On this initial site visit, the HCG field team also identified equipment staging and decontamination areas.

After completion of initial site reconnaissance and setup, field personnel performed surface water sampling, domestic well surveys and sampling from adjacent properties, soil sampling and monitoring well installation, and groundwater sampling from the installed wells. The HCG field crew consisted of two ADEC-qualified personnel with previous sampling experience. Two drillers from Discovery Drilling and the Project Managers from ADEC and HCG joined the field team on the day of drilling (May 25, 2010) to assist and oversee field activities.

2.1 Surface Water Sampling

A surface water body between MW-3 and MW-4 was identified and examined for signs of hydrocarbon impact. The surface water is in the form of a small slow moving stream running southeast under the Glenn Highway through a culvert (Figure 4-1). There were no signs of hydrocarbon impact, sheen or odor, in the stream or surrounding vegetation. Water quality parameters and a sample were collected from the stream and analyzed for DRO/RRO, GRO, and BTEX. The surface water was first collected in a decontaminated measuring cup with a pour spout, and then transferred to the sample containers to prevent the loss of preservative added by the laboratory. Every effort was made not to disturb bottom sediments prior to or during collection. Care was taken to prevent headspace in the sample containers for volatile analysis.

Sample information (sample ID, date, time, samplers, etc.) and field parameters (pH, temperature, total dissolved solids, turbidity, and conductivity) were recorded on a sample form (Appendix A) for each sample collected. Sample results are presented and discussed in Section 4.

2.2 Domestic Well Survey and Sampling

In accordance with the Work Plan, HCG field personnel identified all potential water supply sources and uses within a quarter mile of the former Mom and Pop's Grocery and Gas. Personnel conducted door to door interviews with willing occupants and property owners to collect water

data from private wells in the area. Four wells were indentified and a well survey form was completed by each well owner. The survey forms include pertinent and available information for the wells, including construction and usage details. Domestic water samples were collected from 3 of the 4 wells, with permission from the well owner. A domestic well survey form was completed for the 4th well; however, a sample could not be collected from the well because it was disconnected.

The water from each well was purged and water quality parameters were stabilized before samples were collected. All water samples were collected from a spigot before treatment equipment (e.g., filter or water softener). Drinking water samples MP10DW01, MP10DW02, and MP10DW03 were collected. All samples were analyzed for Volatile Organic Compounds (VOCs) by United States Environmental Protection Agency (EPA) method SW524.2. Sample locations are shown on Figure 4-1, with results summarized. The well sampling activities and domestic well survey forms are documented in the field notebook (Appendix A). Sample results are presented and discussed in Section 4.

2.3 Borehole Drilling and Soil Sampling

Five borings were drilled using a CME 75 HSA drill rig operated by Discovery Drilling of Anchorage, Alaska. Prior to drilling, borehole locations were checked against utility locations onsite to ensure safety. Two more borings were proposed in the Work Plan. These additional locations were northwest of the site, separated by the small stream, and were deemed unnecessary to delineate contaminant migration.

Borings were sampled in 2 foot split spoon intervals separated by a 0.5 foot gap between cores. This method was discussed and agreed upon by the drillers and the field team before drilling began. Soil lithology was classified in accordance with American Society for Testing and Materials (ASTM) D2488 Standard Practice for Description and Identification of Soil. Total volatile organic vapors were measured using a PID immediately upon opening the soil cores. Grab samples were collected from each 2 foot interval for headspace analysis. All headspace results are recorded on the borehole logs (Appendix A).

A total of 8 soil samples and one duplicate sample were collected with disposable stainless steel spoons from the five boreholes and were submitted for laboratory analysis. At three of the five borings, one soil sample was collected for analytical testing from the core interval just above the water table and a second sample was collected from the core interval exhibiting the highest contamination based on field screening. The soil recovery for two of the five boreholes (MW-1 and MW-3) was poor due to rocky material within the soil core; therefore, only a sample was from the core interval just above the water table was collected.

All samples were analyzed for DRO, RRO, GRO, and BTEX. BTEX and GRO samples were collected first to avoid loss of volatile compounds. The soil sample, MP10MW04SS2-5-7, containing the highest concentration of volatile organic vapors in headspace analysis was also analyzed for PAH. A duplicate sample, MP10MW04SS94-5-7, was also collected from this location. Soil samples were logged in the field notebook and any evidence of hydrocarbon staining or odor was noted on the borehole log forms. A description of each sample was recorded on the sample collection forms (Appendix A). Photos of the sampling process as well as the soil cores are included in Appendix B. Sample results are presented and discussed in Section 4.

2.4 Monitoring Well Installation

Five monitoring wells were installed at the site in ADOT&PF right-of-ways in accordance with ADEC guidelines (ADEC 2008). The borings for each soil sample were advanced below the water table and 2-inch monitoring wells were installed following soil sampling activities. Wells were completed as flush mounts by setting a circular flush mount well cover with a bolt mounted lid in a concrete pad. Construction details (e.g., screen interval, depth to water, materials used) are included on the Monitoring Well Construction Detail forms (Appendix A) for each well. Figure 4-1 shows co-locations for each borehole and well.

2.5 Groundwater Purging and Sampling

The monitoring wells were developed approximately 24 hours after installation. The Work Plan specified waiting 48 hours before well development; however, this timeline was altered for timely completion of the project. A surge block was used for approximately 10 minutes in each well before purging. Wells MW-1 and MW-2 were successfully purged using a submersible pump. Purge water was discharged to the ground surface. Water quality parameters were recorded on Monitoring Well Development Log forms (Appendix A). The purging of MW-3 and MW-4 could not be completed using a submersible pump. Slow recharge was encountered at MW-3 and technical difficulties were encountered at MW-4. Purging was completed using a disposable Teflon bailer at wells MW-3, MW-4, and MW-5. Purge water from MW-4 and MW-5 was containerized for further treatment due to suspected contamination at these wells. Refer to Appendix A.

Groundwater sampling from these wells began approximately 24 hours after purging, as specified in the Work Plan. An oil/water interface probe was used to determine depth to water and, if present, the observation of light non-aqueous phase hydrocarbon (LNAPL). Disposable Teflon bailers were used to collect the water for purging and sampling. A YSI 556 and a LaMotte 2020e water quality meter were calibrated and used to collect water quality parameters. Five groundwater samples and one duplicate sample was collected and analyzed for DRO/RRO, GRO, and BTEX. MP10MW04GW1 and its duplicate (MP10MW046W91) from MW-4 were also submitted for PAH analysis. This well corresponds to the borehole suspected of the highest soil contamination.

Silt in the containerized purge and sample water from MW-4 and MW-5 was left to settle prior to treatment with a Granular Activated Carbon (GAC) water filtration system. The filtered water was discharged to the ground and the remaining silt was added to the containerized soil left onsite after drilling. This soil will be disposed according to analytical results at Alaska Soil Recycling (ASR) in Anchorage, Alaska. Well sampling forms and notes are included in Appendix A. Well locations and results are shown on Figure 4-1. Sample results are presented and discussed in Section 4.

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3 DATA VALIDATION AND REPORTING

The full laboratory analytical reports are presented in Appendix C (CD). Data review was performed in accordance with ADEC quality assurance procedures for laboratory data (ADEC 2009) to ensure data quality objectives were satisfied. A Data Quality Assessment and ADEC Data Review Checklists are included in Appendix D. Data review indicates that overall data quality objectives for precision, accuracy, representativeness, comparability, completeness (100%), and sensitivity were met. The data were considered valid and usable for the intended purpose. Reference Appendix D for further detail regarding the data and any associated qualifications.

4 MOM AND POP'S GROCERY AND GAS SAMPLING RESULTS

4.1 Purpose of Sampling

To the extent possible, given access limitations at the former site, the purpose of sampling the right-of-way property adjacent to Mom and Pop's Grocery and Gas was to delineate the nature and extent of contamination.

4.2 Surface Water Results

One surface water sample was collected and evaluated relative to 18 AAC 70 AWQS and NOAA SQuiRT criteria for freshwater. The sample was collected from a slightly flowing section of the stream and analyzed for DRO/RRO, GRO, and BTEX.

There were no compounds detected in the surface water sample, MP10SW01, submitted for analysis. The location and results are shown on Figure 4-1 and provided in Table 4-1.

4.3 Drinking Water Results

Drinking water samples were evaluated relative to 18 AAC 80 MCLs. Three drinking water samples were collected from private wells in the area of the site and analyzed for VOCs. Two samples were collected from private residences and the third was collected from a private business, Alaska Automotive.

There were no compounds detected in the drinking water samples submitted for analysis. The locations of the properties from which the samples were collected are shown on Figure 4-1 and analytical results are provided in Table 4-2.

4.4 Soil Results

A PID was utilized for initial field screening and headspace analysis of the soil borings. The purpose for using the PID was to test for the presence of hydrocarbon contamination by analyzing samples for total volatile organic vapors. These screening results were then used to select analytical sampling locations. The primary screening criteria for analytical results is the cleanup level corresponding to the lowest value for direct contact or inhalation of soils as listed in 18 AAC 75, Tables B1 and B2, (Method Two cleanup levels) for the under 40 inch climate zone. Sample concentrations were also compared with the Migration to Groundwater soil cleanup levels as secondary screening criteria. All sample locations are shown on Figure 4-1 and analytical results are provided in Table 4-3.

PID readings collected in this area ranged from approximately 0 to 2,951 parts per million (ppm). There were no PID results above 0 ppm detected at MW-1 or MW-2 and the highest detection at MW-3 was 0.9 ppm. PID detections above 1.0 ppm were limited to MW-4 and MW-5. The overall maximum reading of 2,951 was recorded at MW-4. At MW-5 a high reading of 998.5 was recorded. The highest PID headspace results for both of these boreholes were collected just above the water table [approximately 7.5 feet (ft) bgs]. Hydrocarbon odor was observed at this depth in both boreholes. PID headspace sample notes and results are provided in Appendix A on the Borehole/Monitoring Well Details Log forms.

A total of 8 soil samples and one duplicate sample were collected and analyzed for DRO/RRO, GRO, and BTEX. A duplicate sample was collected from MW-4 at 5-7 ft bgs. The parent, MP10MW04SS2-5-7, and duplicate sample, MP10MW04SS92-5-7, was counted as a single

sample, represented by the higher of the two values for the purpose of counting detections and exceedances. This sample was also analyzed for PAH because of suspected contamination based on headspace analysis.

DRO, RRO, GRO, BTEX, and PAH compounds were detected in the soil at the former Mom and Pop's Grocery and Gas site. DRO results ranged from nondetect to 623 mg/Kg, RRO from 10.2 mg/Kg to 864 mg/Kg, and GRO from nondetect to 6,110 mg/Kg. All DRO and RRO results were below Method Two Cleanup Levels for ingestion and inhalation. For DRO, the Method Two Migration to Groundwater Cleanup Level of 250 mg/Kg was exceeded at one sample location (MW-4 from 5-7 feet bgs), with a sample concentration of 623 mg/Kg and a duplicate concentration of 327 mg/kg. For GRO, the Method Two Cleanup Level of 1,400 mg/Kg was exceeded at the same location and depth (MW-4 at 5-7 feet bgs), with a sample concentration of 6,110 mg/Kg and a duplicate concentration of 4,260 mg/Kg.

BTEX concentrations at MW-4 also exceeded ADEC Method Two Cleanup Levels at 5-7 feet bgs. Benzene (29.2 mg/Kg), toluene (364 mg/Kg), ethylbenzene (134 mg/Kg), and total xylene (1,810 mg/Kg) exceeded the cleanup levels of 11 mg/Kg, 220 mg/Kg, 110 mg/Kg, and 63 mg/Kg, respectively. Notable concentrations of BTEX were also detected in a sample collected at 2.5 to 4.5 feet bgs. Total xylene exceeded the Method Two Cleanup Level with a concentration 80.7 mg/Kg. Benzene (3.16 mg/Kg) and toluene (17.3 mg/Kg) were above Method Two Migration to Groundwater Cleanup Levels of 0.025 mg/Kg and 6.5 mg/Kg.

PAHs were also detected at MW-4 from 5 to 7 feet bgs. Except for Napthalene, all concentrations were below screening criteria. The maximum concentration of 9.86 mg/Kg for Napthalene was well below Method Two ingestion, inhalation, and migration to groundwater cleanup levels, but did exceed one-tenth of the most stringent Method Two ingestion or inhalation Cleanup Level of 2.8 mg/Kg with a concentration of 9.86 mg/Kg. One-tenth the Cleanup Level is applicable for the calculation of cumulative risk.

All analytical soil sample results and locations are shown on Figure 4-1 and in Table 4-3.

4.5 Groundwater Results

The cleanup level for groundwater corresponds to 18 AAC 75, Table C. Five samples and one duplicate sample were collected and analyzed for DRO/RRO, GRO, and BTEX. GRO, DRO, RRO, and BTEX were all detected. MP10MW04GW1 (MW-4), which corresponds to the borehole containing the highest headspace results for soil, was also analyzed for PAH compounds. The PAH compounds 1- and 2-Methylnapthalene, Acenaphthene, Fluorene, Naphthalene, and Phenanthrene were detected.

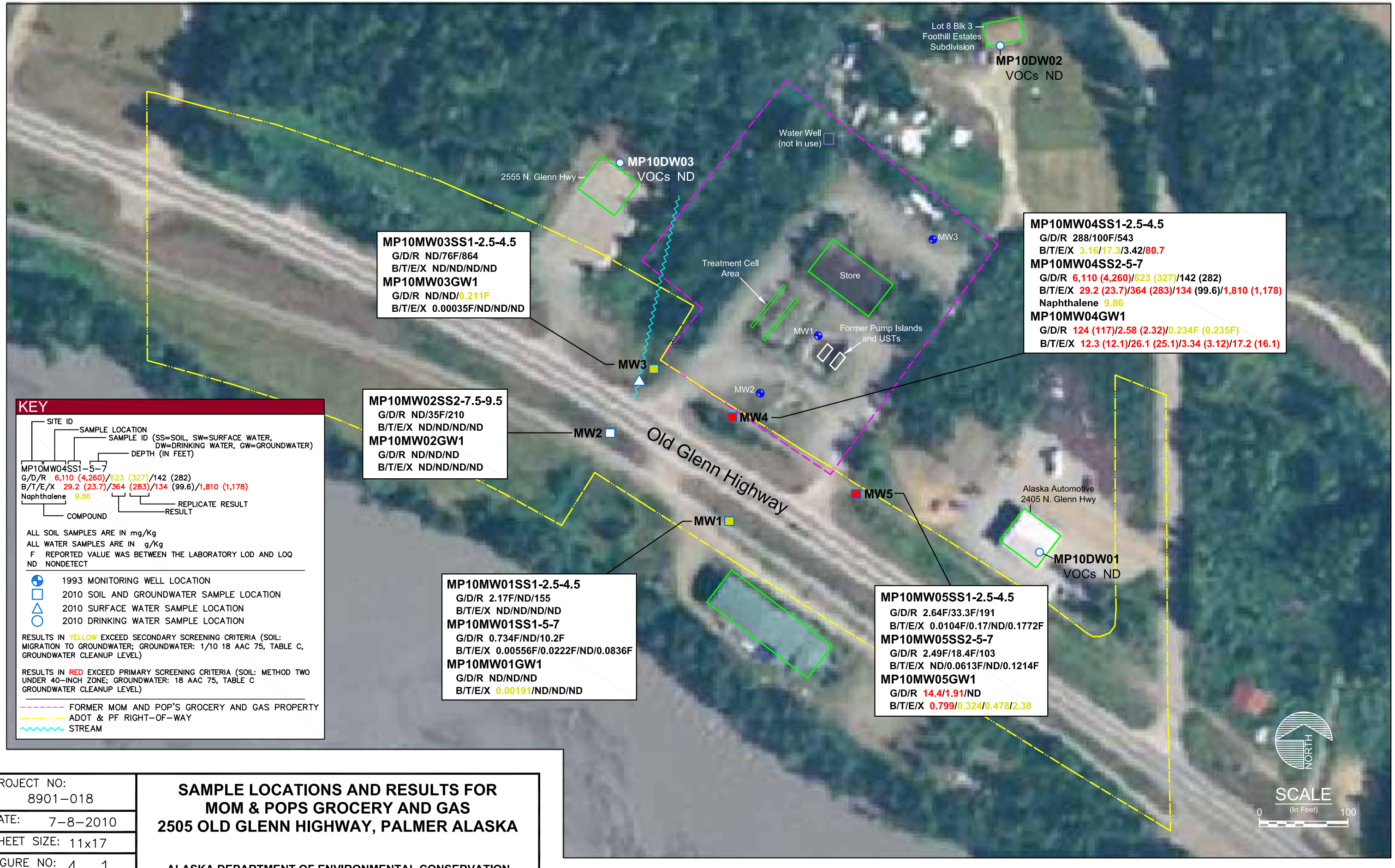
Notable concentrations of GRO, DRO, and BTEX were detected in sample MP10MW04GW1 and its duplicate MP10MW4GW91 collected from MW-4, and in MP10MW05GW1 collected from MW-5. In general, detections were nondetect to well below 18 AAC 75 Table C Cleanup Levels in MW-1, MW-2, and MW-3. MW-4 and MW-5 had concentrations which exceeded Table C criteria for GRO (124 mg/L and 14.4 mg/L) DRO (2.58 mg/L and 1.91 mg/L) and Benzene (12.3 mg/L and 0.799 mg/L), respectively, with MW-4 having the highest concentrations.

Ethylbenzene, toluene, and total Xylenes also exceeded Table C Criteria in MW-4 with concentrations of 3.34 mg/L, 26.1 mg/L and 17.2 mg/L respectively. In MW-5, these three compounds were above one-tenth the Method Two Cleanup Levels at 0.47 mg/L, 0.324 mg/L,

and 2.38 mg/L, respectively. One-tenth Method Two Cleanup Levels are applicable to the calculation of cumulative risk. Benzene was detected above this criteria in sample MW10MW01GW1 collected from MW-1.

PAHs were detected in the sample, MP10MW04GW1, submitted for analysis. The compounds detected were 1- and 2-Methylnapthalene, Acenaphthene, Fluorene, Naphthalene, and Phenanthrene. The maximum concentrations for these compounds were well below screening criteria.

All sample locations and groundwater results are shown on Figure 4-1 and in Table 4-4.



KEY

SITE ID
SAMPLE LOCATION
SAMPLE ID (SS=SOIL, SW=SURFACE WATER, DW=DRINKING WATER, GW=GROUNDWATER)
DEPTH (IN FEET)

MP10MW04SS1–5–7
G/D/R 6,110 (4,260)/623 (327)/142 (282)
B/T/E/X 29.2 (23.7)/364 (283)/134 (99.6)/1,810 (1,178)
Naphthalene 9.86

REPLICATE RESULT
RESULT
COMPOUND

ALL SOIL SAMPLES ARE IN mg/Kg
ALL WATER SAMPLES ARE IN g/Kg
F REPORTED VALUE WAS BETWEEN THE LABORATORY LOD AND LOQ
ND NONDETECT

- 1993 MONITORING WELL LOCATION
- 2010 SOIL AND GROUNDWATER SAMPLE LOCATION
- 2010 SURFACE WATER SAMPLE LOCATION
- 2010 DRINKING WATER SAMPLE LOCATION

RESULTS IN YELLOW EXCEED SECONDARY SCREENING CRITERIA (SOIL: MIGRATION TO GROUNDWATER; GROUNDWATER: 1/10 18 AAC 75, TABLE C, GROUNDWATER CLEANUP LEVEL)

RESULTS IN RED EXCEED PRIMARY SCREENING CRITERIA (SOIL: METHOD TWO UNDER 40–INCH ZONE; GROUNDWATER: 18 AAC 75, TABLE C GROUNDWATER CLEANUP LEVEL)

- FORMER MOM AND POP'S GROCERY AND GAS PROPERTY
- ADOT & PF RIGHT–OF–WAY
- STREAM

PROJECT NO:	8901–018
DATE:	7–8–2010
SHEET SIZE:	11x17
FIGURE NO:	4–1

SAMPLE LOCATIONS AND RESULTS FOR MOM & POPS GROCERY AND GAS 2505 OLD GLENN HIGHWAY, PALMER ALASKA

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION

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Table 4-1 - Former Mom and Pop's Grocery and Gas
Surface Water Sample Results

Compound in micrograms per liter (µg/L)	Screening Criteria		Sample Location [3]		Trip Blank		Maximum Concentration [4]		Frequency of Detection [5]	Frequency Above Primary Screening Criteria [5,6]	Contaminant of Concern [7]
	Primary: 18 AAC 70 Alaska Water Quality Standard Freshwater (µg/L) [1]	Secondary: NOAA SQuiRT Freshwater CCC (µg/L) [2] SQuiRT	MP10SW01 24-May-10 1102352010		Trip Blank 24-May-10 1102352014						
			Conc.	Flag	Conc.	Flag	Conc	Flag			
Fuels (AK101, AK102, and AK103)											
Gasoline Range Organics	--	--	[31]	ND	[031]	ND	[31]	ND	0/1	0/1	No
Diesel Range Organics	--	--	[250]	ND	--	--	[250]	ND	0/1	0/1	No
Residual Range Organics	--	--	[150]	ND	--	--	[150]	ND	0/1	0/1	No
BTEX (SW8021B)											
Benzene	5	46	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/1	0/1	No
Ethylbenzene	700	7.3	[0.62]	ND	[0.62]	ND	[0.62]	ND	0/1	0/1	No
o-Xylene	--	350	[0.62]	ND	[0.62]	ND	[0.62]	ND	0/1	0/1	No
P & M -Xylene	--	1.8	[0.62]	ND	[0.62]	ND	[0.62]	ND	0/1	0/1	No
Toluene	1,000	2	[0.62]	ND	[0.62]	ND	[0.62]	ND	0/1	0/1	No
Total Xylenes[8]	10,000	13	[0.62]	ND	[0.62]	ND	[0.62]	ND	0/1	0/1	No
Total BTEX[8]	10	--	[0.62]	ND	[0.62]	ND	[0.62]	ND	0/1	0/1	No

Notes:

1 -Primary screening values from 18 AAC.020b are adapted by reference from Alaska Water Quality Criteria Manual for Toxic and other Deleterious Organic and Inorganic Substances (December 12, 2008).

2 - NOAA SQuiRT values (secondary screening criteria) are shown for freshwater Criteria Continuous Concentration (CCC) unless otherwise indicated. Criteria Maximum Concentration (CMC) is shown if CCC is not available. SQuiRTs are intended for preliminary screening pruposes only and are not regulatory cleanup levels for surface water.

3 - The field sample identification number, date collected and laboratory sample identification number are provided.

4 - The maximum concentration of a detected analyte is shown. If an analyte was not detected, then the highest DL 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.020b - adapted by reference from Alaska Water Quality Criteria Manual for Toxic and other Deleterious Organic and Inorganic Substances (December 12, 2008).

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 DL was listed.

Data Flags

ND	nondetect, detection limit is presented in brackets to the left	=	A detected compound, concentration listed in column to the left

Abbreviations

--	Not applicable or screening criteria does not exist for this compound	COC	Contaminant of Concern
DL	Detection Limit	BTEX	benzene, toluene, ethylbenzene, and total xylenes
µg/L	micrograms per liter	AAC	Alaska Administrative Code
CCC	Criteria Chronic Concentration	ADEC	Alaska Department of Environmental Conservation
CMC	Criteria Maximum Concentration	NOAA	National Oceanic and Atmospheric Administration
		SQuiRT	Screening Quick Reference Tables

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Table 4-2 - Former Mom and Pop's Grocery and Gas
Domestic Water Sample Results

Compound micrograms per liter (µg/L)	Screening Criteria	Sample Locations[2]						Trip Blank		Maximum Concentration[3]		Frequency of Detection	Frequency Above Primary Screening Criteria[5,6]
	18 AAC 80[1]	MP10DW01 24-May-10 1102352011		MP10DW02 24-May-10 1102352012		MP10DW03 24-May-10 1102352013		Trip Blank 24-May-10 1102352014					
		Conc	Flag	Conc	Flag	Conc	Flag	Conc	Flag	Conc	Flag		
Volatile Organic Compounds (EPA 524.2)													
1,1,1,2-Tetrachloroethane	--	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
1,1,1-Trichloroethane	200	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
1,1,2,2-Tetrachloroethane	--	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
1,1,2-Trichloroethane	5	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
1,1-Dichloroethane	--	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
1,1-Dichloroethene	7	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
1,1-Dichloropropene	--	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
1,2,3-Trichlorobenzene	--	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
1,2,3-Trichloropropane	--	[0.18]	ND	[0.18]	ND	[0.18]	ND	[0.18]	ND	[0.18]	ND	0/3	0/3
1,2,4-Trichlorobenzene	70	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
1,2,4-Trimethylbenzene	--	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
1,2-Dibromo-3-chloropropane	--	[0.62]	ND	[0.62]	ND	[0.62]	ND	[0.62]	ND	[0.62]	ND	0/3	0/3
1,2-Dibromoethane	0.05	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
1,2-Dichlorobenzene	600	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
1,2-Dichloroethane	5	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
1,2-Dichloropropane	5	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
1,3,5-Trimethylbenzene	--	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
1,3-Dichlorobenzene	--	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
1,3-Dichloropropane	--	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
1,4-Dichlorobenzene	75	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
2,2-Dichloropropane	--	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
2-Chlorotoluene	--	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
4-Chlorotoluene	--	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
4-Isopropyltoluene	--	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
Benzene	5	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
Bromobenzene	--	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
Bromochloromethane	--	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
Bromodichloromethane	--	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
Bromoform	--	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
Bromomethane	--	[0.62]	ND	[0.62]	ND	[0.62]	ND	[0.62]	ND	[0.62]	ND	0/3	0/3
Carbon tetrachloride	5	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
Chlorobenzene	100	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
Chloroethane	--	[0.31]	ND	[0.31]	ND	[0.31]	ND	[0.31]	ND	[0.31]	ND	0/3	0/3
Chloroform	--	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
Chloromethane	--	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
cis-1,2-Dichloroethene	70	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
cis-1,3-Dichloropropene	--	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
Dibromochloromethane	--	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
Dibromomethane	--	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
Dichlorodifluoromethane	--	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
Ethylbenzene	700	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
Hexachlorobutadiene	--	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
Isopropylbenzene (Cumene)	--	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
Methylene chloride	5	[0.15]	ND	[0.15]	ND	[0.15]	ND	0.63	=	[0.15]	ND	0/3	0/3
Methyl-t-butyl ether	--	[0.5]	ND	[0.5]	ND	[0.5]	ND	[0.5]	ND	[0.5]	ND	0/3	0/3
Naphthalene	--	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
n-Butylbenzene	--	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
n-Propylbenzene	--	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
o-Xylene	--	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
P & M -Xylene	--	[0.18]	ND	[0.18]	ND	[0.18]	ND	[0.18]	ND	[0.18]	ND	0/3	0/3
sec-Butylbenzene	--	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
Styrene	100	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
tert-Butylbenzene	--	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
Tetrachloroethene	5	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
Toluene	1,000	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
Total Trihalomethanes[6]	80	[0.6]	ND	[0.6]	ND	[0.6]	ND	[0.6]	ND	[0.6]	ND	0/3	0/3
trans-1,2-Dichloroethene	100	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
trans-1,3-Dichloropropene	--	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
Trichloroethene	5	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
Trichlorofluoromethane	--	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	[0.15]	ND	0/3	0/3
Vinyl chloride	2	[0.12]	ND	[0.12]	ND	[0.12]	ND	[0.12]	ND	[0.12]	ND	0/3	0/3
Xylenes (total)[6]	10,000	[0.31]	ND	[0.31]	ND	[0.31]	ND	[0.31]	ND	[0.31]	ND	0/3	0/3

Notes:

1 - This is the primary maximum contaminant level from 18 AAC 80.300 (November 20, 2009).
2 - The field sample identification number, date collected and laboratory sample identification number are provided.
3 - The maximum concentration of a detected analyte is shown. If an analyte was not detected, then the highest DL is shown. Trip blanks are not included.
4 - Screening criteria values are from 18 AAC 80.300 (November 20, 2009).
5 - Total values were the summation of detected compounds only. If compounds were not detected, then the highest DL was listed.

Data Flags

ND	nondetect, detection limit is presented in brackets to the left	=	A detected compound [concentration listed in column to the left]

Abbreviations

--	Not applicable or screening criteria does not exist for this compound	µg/L	micrograms per liter
DL	Detection Limit	AAC	Alaska Administrative Code
EPA	Environmental Protection Agency		

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Table 4-3 - Former Mom and Pop's Grocery and Gas
Soil Sample Results

Compound milligrams per kilogram (mg/Kg)	Screening Criteria			Sample Locations[4]																Trip Blank		Maximum Concentration[5]		Frequency of Detection[6]	Frequency Above Primary Screening Criteria[6,7]	Contaminant of Concern[8]
	Primary: Method Two Under 40-inch Zone[1]	Secondary		MP10MW01SS1-5-7 25-May-10 1102352001		MP10MW02SS1-2.5-4.5 25-May-10 1102352002		MP10MW02SS2-7.5-9.5 25-May-10 1102352003		MP10MW03SS1-2.5-4.5 25-May-10 1102352004		MP10MW04SS1-2.5-4.5 25-May-10 1102352005		**Primary** MP10MW04SS2-5-7 25-May-10 1102352006		**Duplicate** MP10MW04SS92-5-7 25-May-10 1102352007		MP10MW05SS1-2.5-4.5 25-May-10 1102352008		MP10MW05SS2-5-7 25-May-10 1102352009		TB VW7-110-9 17-May-10 1102352015						
		Migration to Groundwater[2]	One Tenth Method Two[3]	Conc	Flag	Conc	Flag	Conc	Flag	Conc	Flag	Conc	Flag	Conc	Flag	Conc	Flag	Conc	Flag	Conc	Flag	Conc	Flag	Conc	Flag			
Fuels (AK101, AK102, and AK103)																												
Gasoline Range Organics	1,400	300	--	0.734	F	2.17	F	[1.25]	ND	[1.78]	ND	288	=	**6,110**	=	**4,260**	=	2.64	F	2.49	F	[0.756]	ND	**6,110**	=	6/8	1/8	Yes
Diesel Range Organics	10,250	250	--	[6.63]	ND	[27.5]	ND	35	F	76	F	100	F	623	J	327	J	33.3	F	18.4	F	--	--	623	=	6/8	0/8	No
Residual Range Organics	10,000	11,000	--	10.2	F	155	=	210	=	864	=	543	=	142	J	282	J	191	=	103	=	--	--	864	=	8/8	0/8	No
BTEX (SW8021B)																												
Benzene	11	0.025	1.1	0.00556	F	[0.00984]	ND	[0.00668]	ND	[0.00951]	ND	3.16	=	**29.2**	=	**23.7**	=	0.0104	F	[0.00943]	ND	[0.00403]	ND	**29.2**	=	5/8	1/8	Yes
Ethylbenzene	110	6.9	11	[0.0124]	ND	[0.0369]	ND	[0.025]	ND	[0.0357]	ND	3.42	=	**134**	=	99.6	=	[0.0346]	ND	[0.0354]	ND	[0.0151]	ND	**134**	=	2/8	1/8	Yes
o-Xylene	--	--	--	0.021	F	[0.0369]	ND	[0.025]	ND	[0.0357]	ND	30.4	=	540	=	347	=	0.0502	F	0.0359	F	[0.0151]	ND	540	=	5/8	0/8	No
P & M -Xylene	--	--	--	0.0626	=	[0.0369]	ND	[0.025]	ND	[0.0357]	ND	50.3	=	1,270	=	831	=	0.127	=	0.0855	F	[0.0151]	ND	1,270	=	5/8	0/8	No
Toluene	220	6.5	22	0.0222	F	[0.0369]	ND	[0.025]	ND	[0.0357]	ND	17.3	=	**364**	=	**283**	=	0.17	=	0.0613	F	[0.0151]	ND	**364**	=	5/8	1/8	Yes
Total Xylenes[9]	63	63	6.3	0.0836	F	[0.0369]	ND	[0.025]	ND	[0.0357]	ND	**80.7**	=	**1,810**	=	**1,178**	=	0.1772	F	0.1214	F			**1,810**	=	5/8	1/8	Yes
Total BTEX[9]	--	--	--	0.11136	F	[0.0369]	ND	[0.025]	ND	[0.0357]	ND	104.6	=	2,337	=	1,584	=	0.3576	F	0.1827	F			2,337	=	5/8	0/8	No
Polynuclear Aromatic Hydrocrbons (SW8270D SIM)																												
1-Methylnaphthalene	280	6.2	28	--	--	--	--	--	--	--	--	--	--	1.26	=	0.783	=	--	--	--	--	--	--	1.26	=	1/1	0/1	No
2-Methylnaphthalene	280	6.1	28	--	--	--	--	--	--	--	--	--	--	2.33	=	1.43	=	--	--	--	--	--	--	2.33	=	1/1	0/1	No
Acenaphthene	2,800	180	280	--	--	--	--	--	--	--	--	--	--	0.025	=	0.0183	=	--	--	--	--	--	--	0.025	=	1/1	0/1	No
Acenaphthylene	2,800	180	280	--	--	--	--	--	--	--	--	--	--	[0.00194]	ND	[0.00185]	ND	--	--	--	--	--	--	[0.00194]	ND	0/1	0/1	No
Anthracene	20,600	3,000	2,060	--	--	--	--	--	--	--	--	--	--	0.0172	=	0.0129	=	--	--	--	--	--	--	0.0172	=	1/1	0/1	No
Benzo(a)Anthracene	4.9	3.6	0.49	--	--	--	--	--	--	--	--	--	--	0.0174	=	0.0126	=	--	--	--	--	--	--	0.0174	=	1/1	0/1	No
Benzo[a]pyrene	0.49	2.1	0.049	--	--	--	--	--	--	--	--	--	--	0.0127	=	0.00921	=	--	--	--	--	--	--	0.0127	=	1/1	0/1	No
Benzo[b]Fluoranthene	4.9	12	0.49	--	--	--	--	--	--	--	--	--	--	0.0252	=	0.0187	=	--	--	--	--	--	--	0.0252	=	1/1	0/1	No
Benzo[g,h,i]perylene	1,400	38,700	140	--	--	--	--	--	--	--	--	--	--	0.0166	=	0.0114	=	--	--	--	--	--	--	0.0166	=	1/1	0/1	No
Benzo[k]fluoranthene	49	120	4.9	--	--	--	--	--	--	--	--	--	--	0.00619	F	0.00453	F	--	--	--	--	--	--	0.00619	F	1/1	0/1	No
Chrysene	490	360	49	--	--	--	--	--	--	--	--	--	--	0.0216	=	0.0149	=	--	--	--	--	--	--	0.0216	=	1/1	0/1	No
Dibenzo[a,h]anthracene	0.49	4	0.049	--	--	--	--	--	--	--	--	--	--	0.00318	F	0.0025	F	--	--	--	--	--	--	0.00318	F	1/1	0/1	No
Fluoranthene	1,900	1,400	190	--	--	--	--	--	--	--	--	--	--	0.0711	=	0.0471	=	--	--	--	--	--	--	0.0711	=	1/1	0/1	No
Fluorene	2,300	220	230	--	--	--	--	--	--	--	--	--	--	0.251	J	0.126	J	--	--	--	--	--	--	0.251	=	1/1	0/1	No
Indeno[1,2,3-c,d] pyrene	4.9	41	0.49	--	--	--	--	--	--	--	--	--	--	0.011	=	0.00745	=	--	--	--	--	--	--	0.011	=	1/1	0/1	No
Naphthalene	28	20	2.8	--	--	--	--	--	--	--	--	--	--	9.86	J	2.54	J	--	--	--	--	--	--	9.86	=	1/1	0/1	No
Phenanthrene	20,600	3,000	2,060	--	--	--	--	--	--	--	--	--	--	0.238	J	0.135	J	--	--	--	--	--	--	0.238	=	1/1	0/1	No
Pyrene	1,400	1,000	140	--	--	--	--	--	--	--	--	--	--	0.076	=	0.051	=	--	--	--	--	--	--	0.076	=	1/1	0/1	No
Total Solids (SM2540G)																												
Total Solids	--	--	--	93.5	=	89.8	=	89.6	=	91.2	=	70.6	=	76.7	=	80	=	93.3	=	93.1	=	--	--	--	--	--	--	--

Notes:

1 - This is the primary cleanup level and corresponds to values listed in 18 AAC 75.341 Tables B1 and B2 (Method Two Soil Cleanup Levels) for the Under 40 Inch Zone (January 2009), most stringent inhalation or ingestion.
2 - The cleanup level corresponds to Migration to Groundwater as listed in 18 AAC 75.341, Tables B1 and B2, (Method Two cleanup levels) for the Under 40 Inch Zone (January 2009)
3 - The cleanup level corresponds to one-tenth the Method Two cleanup level. Per 18 AAC 75.341. a chemical≥ this value must be included in cumultive risk calculations. This requirement is not applicable to GRO, DRO, RRO, and lead
4 - The field sample identification number, date collected and laboratory sample identification number are provided.
5 - The maximum concentration of a detected analyte is shown. If an analyte was not detected, then the highest DL is shown. Trip blanks are not included
6 - 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
7 - Screening criteria values are from 18 AAC 75.341 Method Two Soil Cleanup Levels for the Under 40 Inch Zone, Tables B1 and B2 .
8 - A compound is considered a COC if it exceeds the primary screening criteria and/or if it contributes to an exceedance of ADEC risk management standards
9 - Total values were the summation of detected compounds only. If compounds were not detected, then the highest DL was listed

Data Flags

ND	nondetect, method detection limit is presented in brackets to the left	=	A detected compound [concentration listed in column to the left]
F	reported value was between the laboratory DL and LOQ	J	The quantitation was an estimate. Where appropriate a "+" or "-" was used to indicate bias

Abbreviations

--	Not applicable or screening criteria does not exist for this compound	GRO	Gasoline Range Organics
DL	Detection Limit	DRO	Diesel Range Organics
LOQ	Limit of Quantitation	RRO	Residual Range Organics
mg/Kg	milligrams per kilogram	BTEX	benzene, toluene, ethylbenzene, and total xylenes
SIM	Selective Ion Monitoring	AAC	Alaska Administrative Code

shaded - The value exceeds the secondary screening criteria, 18 AAC 75 Migration to Groundwater cleanup level or one-tenth the 18 AAC 75 Method Two Cleanup level
Bold and shaded - the value exceeds the primary screening criteria, 18 AAC 75 Method Two cleanup level

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Table 4-4 - Former Mom and Pop's Grocery and Gas
Groundwater Sample Results

Coupound milligrams per liter (mg/L)	Screening Criteria		Sample Locations[3]												Trip Blank		Maximum Concentration[4]		Frequency of Detection[5]	Frequency Above Primary Screening Criteria[5, 6]	Contaminant of Concern[7]
	Primary: 18 AAC 75, Table C, Groundwater Cleanup Levels[1]	Secondary: 1/10 18 AAC 75, Table C, Groundwater Cleanup Level[2]	MP10MW01GW1 27-May-10 1102407001		MP10MW02GW1 27-May-10 1102407002		MP10MW03GW1 27-May-10 1102407003		Primary MP10MW04GW1 27-May-10 1102407004 1102406001 (PAH)		Duplicate MP10MW04GW91 27-May-10 1102407005 1102406002 (PAH)		MP10MW05GW1 27-May-10 1102407006		TB 27-May-10 1102407007						
			Conc.	Flag	Conc.	Flag	Conc.	Flag	Conc.	Flag	Conc.	Flag	Conc.	Flag	Conc.	Flag	Conc	Flag			
Fuels (AK101, AK102, and AK103)																					
Gasoline Range Organics	2.2	--	[0.031]	ND	[0.031]	ND	[0.031]	ND	**124**	J+	**117**	J+	**14.4**	J+	[0.031]	ND	**124**	J+	2/5	2/5	Yes
Diesel Range Organics	1.5	--	[0.265]	ND	[0.25]	ND	[0.255]	ND	**2.58**	=	**2.32**	=	**1.91**	=	--	--	**2.58**	=	2/5	2/5	Yes
Residual Range Organics	1.1	--	[0.159]	ND	[0.15]	ND	0.211	F	0.234	F	0.235	F	[0.15]	ND	--	--	0.235	F	2/5	0/5	No
BTEX (SW8021B)																					
Benzene	0.005	0.0005	0.00191	=	[0.00015]	ND	0.00035	F	**12.3**	=	**12.1**	=	**0.799**	=	[0.00015]	ND	**12.3**	=	4/5	2/5	Yes
Ethylbenzene	0.7	0.07	[0.00062]	ND	[0.00062]	ND	[0.00062]	ND	**3.34**	=	**3.12**	=	0.478	=	[0.00062]	ND	**3.34**	=	2/5	1/5	Yes
o-Xylene	--	--	[0.00062]	ND	[0.00062]	ND	[0.00062]	ND	4.81	=	4.54	=	0.433	=	[0.00062]	ND	4.81	=	2/5	0/5	No
P & M -Xylene	--	--	[0.00062]	ND	[0.00062]	ND	[0.00062]	ND	12.4	=	11.6	=	1.95	=	0.00072	F	12.4	=	2/5	0/5	No
Toluene	1.0	0.1	[0.00062]	ND	[0.00062]	ND	[0.00062]	ND	**26.1**	=	**25.1**	=	0.324	=	[0.00062]	ND	**26.1**	=	2/5	1/5	Yes
Total Xylenes[8]	10	1.0	[0.00062]	ND	[0.00062]	ND	[0.00062]	ND	**17.2**	=	**16.1**	=	2.38	=	0.00072	F	**17.2**	=	2/5	1/5	Yes
Polynuclear Aromatic Hydrocarbons (8270D SIMS)																					
1-Methylnaphthalene	0.15	0.015	--	--	--	--	--	--	0.00249	J+	0.00214	J+	--	--	--	--	0.00249	J+	1/1	0/1	No
2-Methylnaphthalene	0.15	0.015	--	--	--	--	--	--	0.00421	=	0.00356	=	--	--	--	--	0.00421	=	1/1	0/1	No
Acenaphthene	2.2	0.22	--	--	--	--	--	--	[0.000015]	ND	0.0000494	F	--	--	--	--	0.0000494	F	1/1	0/1	No
Acenaphthylene	2.2	0.22	--	--	--	--	--	--	[0.000015]	ND	[0.000015]	ND	--	--	--	--	[0.000015]	ND	0/1	0/1	No
Anthracene	11	1.1	--	--	--	--	--	--	[0.000015]	ND	[0.000015]	ND	--	--	--	--	[0.000015]	ND	0/1	0/1	No
Benzo(a)Anthracene	0.0012	0.00012	--	--	--	--	--	--	[0.000015]	ND	[0.000015]	ND	--	--	--	--	[0.000015]	ND	0/1	0/1	No
Benzo[a]pyrene	0.0002	0.00002	--	--	--	--	--	--	[0.000015]	ND	[0.000015]	ND	--	--	--	--	[0.000015]	ND	0/1	0/1	No
Benzo[b]Fluoranthene	0.0012	0.00012	--	--	--	--	--	--	[0.000015]	ND	[0.000015]	ND	--	--	--	--	[0.000015]	ND	0/1	0/1	No
Benzo[g,h,i]perylene	1.1	0.11	--	--	--	--	--	--	[0.000015]	ND	[0.000015]	ND	--	--	--	--	[0.000015]	ND	0/1	0/1	No
Benzo[k]fluoranthene	0.012	0.0012	--	--	--	--	--	--	[0.000015]	ND	[0.000015]	ND	--	--	--	--	[0.000015]	ND	0/1	0/1	No
Chrysene	0.12	0.012	--	--	--	--	--	--	[0.000015]	ND	[0.000015]	ND	--	--	--	--	[0.000015]	ND	0/1	0/1	No
Dibenzo[a,h]anthracene	0.00012	0.000012	--	--	--	--	--	--	[0.000015]	ND	[0.000015]	ND	--	--	--	--	[0.000015]	ND	0/1	0/1	No
Fluoranthene	1.5	0.15	--	--	--	--	--	--	[0.000015]	ND	[0.000015]	ND	--	--	--	--	[0.000015]	ND	0/1	0/1	No
Fluorene	1.5	0.15	--	--	--	--	--	--	0.000145	=	0.000122	=	--	--	--	--	0.000145	=	1/1	0/1	No
Indeno[1,2,3-c,d] pyrene	0.0012	0.00012	--	--	--	--	--	--	[0.000015]	ND	[0.000015]	ND	--	--	--	--	[0.000015]	ND	0/1	0/1	No
Naphthalene	0.73	0.073	--	--	--	--	--	--	0.0276	=	0.0226	=	--	--	--	--	0.0276	=	1/1	0/1	No
Phenanthrene	11	1.1	--	--	--	--	--	--	0.0000621	=	0.000058	=	--	--	--	--	0.0000621	=	1/1	0/1	No
Pyrene	1.1	0.11	--	--	--	--	--	--	[0.000015]	ND	[0.000015]	ND	--	--	--	--	[0.000015]	ND	0/1	0/1	No
Total PAHs[8]	--	--	--	--	--	--	--	--	0.0345	J+	0.0285	F, J+	--	--	--	--	0.0345	J+	1/1	0/1	No

Notes:
1 - This is the primary cleanup level for groundwater and corresponds to values listed in 18 AAC 75.345 Table C, January 2009.
2 - The value corresponds to one-tenth the 18 AAC 75.345. A chemical≥ this value must be included in cumultive risk calculations. This requirement is not applicable to GRO, DRO, RRO, and lead.
3 - The field sample identification number, date collected and laboratory sample identification number are provided.
4 - The maximum concentration of a detected analyte is shown. If an analyte was not detected, then the highest DL 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 include
6 - Screening criteria values are from 18 AAC 75.345 Table C, Groundwater Cleanup Levels (January 2009)
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 DL was listed

Data Flags

ND	nondetect, method detection limit is presented in brackets to the left	=	A detected compound [concentration listed in column to the left]
F	reported value was between the laboratory DL and LOQ	J	The quantitation was an estimate. Where appropriate a "+" or "-" was used to indicate bias.

Abbreviations

--	Not applicable or screening criteria does not exist for this compound	GRO	Gasoline Range Organics
DL	Detection Limit	DRO	Diesel Range Organics
mg/L	milligrams per liter	RRO	Residual Range Organics
PAH	Polynuclear Aromatic Hydrocarbons	BTEX	benzene, toluene, ethylbenzene, and total xylenes
SIM	Selective Ion Monitoring		
AAC	Alaska Administrative Code		

shaded - The value exceeds the secondary screening criteria, one-tenth 18 AAC 75 Table C
Bold and shaded - The value exceeds the primary screening criteria, 18 AAV 75 Table C.

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5 WASTE MANAGEMENT

Investigation derived waste (IDW) consisted of soil cuttings generated from drilling activities, well development and purge water, decontamination water, personal protective equipment (PPE), and disposable sampling equipment used during sampling activities.

Soil cuttings suspected of petroleum contamination were placed directly into 55-gallon drums. Drums were temporarily staged at a location onsite designated by ADEC pending laboratory analytical results. Drums containing IDW failing to meet regulatory standards will be transported to Alaska Soil Recycling (ASR) for disposal.

Purge, well development, and decontamination water was treated using a two-stage (sediment and GAC) water filtration system and discharged to the ground surface. PPE and disposable sampling equipment used during sampling activities were placed in trash bags and disposed of in Anchorage, Alaska by HCG.

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6 CONCLUSION AND RECOMMENDATIONS

6.1 Property Uses and Potential Sources of Contamination

The subject property (Mom and Pops Grocery and Gas) is currently inactive and covers approximately 97,600 square ft. The site is bound by residential property to the north, the Old Glenn Highway to the south, and mixed development (i.e., clearing, residential and business buildings) to the east and west (Figure 1-1). The potential sources of contamination for this area are the former site itself, residential properties adjacent to the site, the privately owned automotive shop adjacent to the property, and vehicular traffic on the Old Glenn Highway. An UST system was used at the site and consisted of two 10,000-gallon gasoline tanks. Based on previous investigations, these tanks and/or damaged product lines were the cause of contamination indentified and previously addressed at the Mom and Pop's Grocery and Gas. Site features are shown on Figure 4-1. Features remaining of the former Mom and Pop's Grocery and Gas are an excavated pit and the associated soil stockpile. The grocery building also remains. Photos of the area are included in Appendix B.

6.2 Investigation Summary

ADEC was not able to obtain permission to access the subject property to conduct this field investigation. Therefore, surface water, domestic well water, soil, and groundwater samples were collected within the right-of-way adjacent to the site in order to delineate the nature and extent of contamination to the extent possible. All samples were analyzed for petroleum hydrocarbons. The domestic well water samples were analyzed for volatile organic compounds in drinking water.

No contaminants were identified in the surface water or domestic well water. Petroleum hydrocarbons (GRO, DRO, BTEX, and Napthalene) were detected above screening criteria at one of five borehole locations, MW-4. Concentrations of GRO and BTEX in a sample collected from 5 to 7 feet bgs exceeded Method Two cleanup levels for ingestion and inhalation. This borehole was located near the southwest property boundary. Petroleum hydrocarbons (GRO, DRO, and BTEX) were detected above screening criteria at two of five monitoring well locations, MW-4 and MW-5 with trace levels of benzene at MW-1. The highest concentrations were at MW-4 which is also the location of the soil exceedances. Concentrations at MW-5 were significantly lower but still above Table C groundwater cleanup levels. MW-5 is located to the southeast of the southern corner of the property boundary.

Based on data, releases from the former Mom and Pop's Grocery and Gas appear to have impacted the soil and groundwater in the immediate vicinity of the release(s) which, left untreated, has migrated vertically and horizontally. However, based on the data results, the extent of contamination seems to be limited. This is illustrated by the relatively small area of impacted soil (Figure 4-1). All of the surface and domestic water samples collected show no signs of contamination, and the soil results collected from four of the five boreholes did not exceed screening criteria.

6.3 Human Health Conceptual Site Model

A human health CSM is presented in Appendix E. The CSM was completed in accordance with the ADEC policy guidance on developing CSMs (ADEC 2005), and is based on the laboratory soil sample results and the CSM Scoping Form.

The potential exposure media at the site is soil, groundwater, and air. Potential exposure routes identified are incidental soil ingestion, ingestion of groundwater, inhalation of volatile compounds in tap water, and inhalation of outdoor air. The site is an inactive area under private property ownership. It is not certain whether or not the land use status at the site is not anticipated to change in the near future. Further investigation is necessary in order to determine the exposure pathways and risk that the former Mom and Pop's Grocery and Gas property present to human health and the environment.

6.4 Recommendations

There was no contamination found in the surface or domestic water samples. Therefore, no additional surface water or domestic water sampling is necessary based on investigation results. The extent of soil and groundwater contamination is limited to an area on the southeast side of the right-of-way that was sampled as part of this delineation investigation. This contaminated area is the suspected approximate location of a past fuel release(s) from the former Mom and Pop's Grocery and Gas property. The suspect origin of the contamination is located on private property to which access was not granted. Sampling at MW-4 and MW-5 should be continued to monitor contaminant levels in the groundwater.

7 REFERENCES

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