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July 9, 2009

emailed to:
hdtvwatt@hotmail.com

David Watts
233 Madcap Lane
Fairbanks, Alaska

ADEC File # 100.38.142

RE: Site Characterization Report
229/233 Madcap Lane, Fairbanks, Alaska

Dear Mr. Watts:

NORTECH Environmental Engineering, Health & Safety (***NORTECH***) is please to provide this site characterization report for the property located at 229/233 Madcap Lane in Fairbanks, Alaska (see Figures 1 through 3). The work outlined in this report was completed in general accordance with the work plan approved by ADEC in April 2008. This report details field work that was conducted in June 2008, as well as with ***NORTECH***'s observations, comments, and recommendations regarding the site.

BACKGROUND AND OBJECTIVES

Development at 229/233 Madcap Lane (the Site) consists of a four-unit residential structure and two detached garages; one northeast of the structure and one southeast of the structure as visible in Figure 3. In 1997, the buried heating oil fuel tank was removed and replaced. Upon the removal of the former tank, heating oil was observed at the bottom of the open excavation and in the sump of the nearby underground boiler room. A total of approximately 1,650 gallons of heating oil was recovered from the site; 826 gallons from a recovery well, 744 gallons from the sump in the underground boiler room located adjacent to the former tank, and 80 gallons from the bottom of the tank excavation. No additional site assessment or other release investigation activities were reported to ADEC following the tank removal.

In a letter dated October 26, 2006, ADEC requested that further actions be completed at the site. The following specific objectives were identified in the ADEC letter:

- Determination of the nature and extent of the petroleum releases to soil and/or groundwater within the property boundaries in accordance to a Department approved work plan.
- Determination of the nature and extent of all potential groundwater contamination that originates within the property boundaries and migrates off-site in accordance with a Department approved work plan.
- Prepare and obtain Department approval for a corrective action plan for all identified contaminant sources.
- Implement the corrective action plan in a timely manner.

METHODOLOGY

In response to these objectives, ***NORTECH*** provided a proposal to:

- Develop and obtain ADEC approval of a work plan to address the concerns outlined in the ADEC letter dated October 26, 2006
- Complete a release investigation to determine the potential impacts to the surrounding soils and/or groundwater located on the site
- Assess possible sources of contamination on site and determine whether contamination from on site sources extends off-site
- Prepare a site characterization report, including a summary of the field activities, sample locations, and analytical results, as well as analysis of the data and conclusions and recommendations about the site

The work plan was submitted to ADEC and approved in April 2008. The activities conducted during this site characterization effort were conducted in general accordance with the approved work plan and the ADEC Underground Storage Tank Procedures Manual and Standard Sampling Procedures (the SSP) dated November 2002.

Soil borings were advanced by GeoTek Alaska (GTA) using direct push methodology. Continuous soil cores were recovered in 5-foot increments to a depth of up to 20 feet below the ground surface. These soil cores were opened and the soil type, color, and composition were recorded as well as the presence/absence of visible petroleum staining and odor. Headspace field screening was completed on recovered soil cores using a handheld PhotoVac 2020 Hand-Held Air Monitor/ Photoionization Detector (PID). Laboratory soil samples were collected directly into laboratory provided glassware and stored on ice until delivery to SGS Environmental Services in Fairbanks. Laboratory samples were analyzed by methods AK102 for diesel range organics (DRO) and EPA 8021 for benzene, toluene, ethylbenzene, and xylenes (BTEX).

FIELD ACTIVITIES

NORTECH and GeoTek arrived at the site on June 24, 2008 and completed an initial site inspection. Soil borings were advanced in the locations proposed in the work plan. Groundwater was not encountered at the expected depth and soil borings were extended to 20 feet below grade in an effort to identify groundwater. Frozen ground consistent with permafrost was encountered in most of these borings and groundwater was not encountered in the borings. Due to these conditions, the soil boring program was expanded to identify soil contamination across the property to a depth of 20 feet below grade. The groundwater sampling portion of the work plan was not utilized as no groundwater was encountered.

A total of 14 soil borings were advanced in locations primarily east and west of the primary structure as shown in Figure 3. The location, rationale, and field observations (including PID results) for each boring are summarized below. Detailed logs for each

soil boring are also attached and include field screening results and laboratory sample locations. Depths referenced in this section refer to the distance below the ground surface at the specific location of the soil boring.

SB-01 – This boring was as close as possible to the former source area. SB-01 is located directly east of the structure between the north and south garages and adjacent to the location of the former UST. Soil was recovered to a depth of 20 feet and had a petroleum odor from 3-15 feet. The highest PID results was >2000 ppm at a depth of 7-8 feet and PID results were greater than 100 ppm between 3 and 13 feet below grade. PID readings were lowest at 1-2 feet (6.8 ppm) and 19-20 feet (10.3 ppm). Laboratory samples were collected from the following depths: 4-5 feet, 7-8 feet, and 17-18 feet.

SB-02 – This boring was located near the eastern property line, directly east of the source area and was selected to evaluate the potential migration towards Madcap Lane. The boring was advanced to a depth 10 feet, where the wastewater service line was encountered and the boring was discontinued. No odor or soil staining was observed in recovered soil and the highest of the four PID readings was 5.4 ppm.

SB-03 – This boring was located on the northeast property boundary of the site and was selected to evaluate the potential for off-site migration towards Madcap Lane and Ballaine Creek. The boring was advanced to a depth of 20 feet. No odor or staining was observed in recovered soil and the highest PID reading was 3.1 ppm, within the background range.

SB-05 – This boring was located directly west of the structure, between the house and Farmers Loop Road. SB-05 was located approximately six feet west of the side of the structure and was intended to evaluate the potential for contaminant migration beneath the structure. The total depth of boring was 20 feet. A petroleum odor was detected in the soil recovered from 10-15 feet below grade and this was confirmed with a PID reading of 512 ppm (14-15 feet). Field screening results from the surface to 10 feet were generally less than 10 ppm (generally considered background) and the lowest result of 3.9 ppm was observed at 19-20 feet. Laboratory samples were collected at 14-15 and 17-18 feet.

SB-07 – This boring was located on the southeast boundary of the property to evaluate the potential for off-site migration in this direction. The total depth of the boring was 20 feet and no olfactory or visual evidence of contamination was observed. The highest PID result was 3.1 ppm and each result was considered in the background range.

SB-08 – This boring was located approximately 80 feet northwest of the primary structure with the goal of identifying a clean limit in this direction. The soil boring was advanced to a depth of 20 feet and no odor or soil discoloration was observed in recovered soils. The highest PID result was 4.2 ppm and each result was considered in the background range.

SB-10 – SB-10 is located adjacent to the southeast corner of the north garage, slightly northwest of the release location. The total depth of the boring was 20 feet and an odor was detected in recovered soils to a depth of 15 feet. PID results at the surface and below 15 feet were below 10 ppm, while results between 3 feet and 15 feet ranged from 334 ppm to 1082 ppm. One laboratory sample was collected at a depth of 10-11 feet.

SB-11 – This boring is located adjacent to the northeast corner of the south garage, slightly southeast of the release location. The total depth of the soil boring was 20 feet, but no soil was recovered from the 15-20 foot interval. PID results increased from 3.4 ppm at 2-3 feet to 13.9 ppm at 9-10 feet, generally near the upper level of the background range. A slight odor was observed in the 10-15 foot interval and the PID reading was 121 ppm. One laboratory sample was collected at a depth of 13.5-14.5 feet.

SB-12 – This boring is located directly east of SP-10 and north of SB-2, near the eastern boundary of the property. SB-12 was intended to evaluate the potential for contaminant migration to the east and northeast. The total depth of the soil boring was 20 feet, but no soil was recovered from the 15-20 foot interval. An odor was observed from soil in the 5-10 foot interval and PID readings in this interval ranged between 464 ppm and 477 ppm. Field screening results at 2-3 feet were in the background range (4.2 ppm), while results at 12-13 feet were slightly elevated at 13.1 ppm. Field screening results at 14-15 feet were elevated at 151 ppm. Two laboratory samples were collected at 6-7 and 14-15 feet.

SB-13 – This boring is located directly east of SP-11and south of SB-2, near the eastern boundary of the property. SB-13 was intended to evaluate the potential for contaminant migration to the east and southeast between SB-2 and SB-7. The soil boring was advanced to a depth of 20 feet and no odor or soil discoloration was observed in recovered soils. The highest PID result was 6.3 ppm and each result was considered in the background range.

SB-14 – SB-14 is located directly east of the northern garage along the eastern property boundary, to evaluate the conditions between SB-3 (no evidence of contamination) and SB-12 (some evidence of contamination). The soil boring was advanced to 10 feet and encountered refusal consistent with impenetrable permafrost. No odor or visible staining was observed in the soils recovered between the surface and 10 feet. The highest PID result was 6.4 ppm at 8-9 feet.

SB-15 – This boring was located near the northwest corner of the primary structure to delineate potential contamination beneath the structure and contaminant migration to the northwest. The boring was advanced to a depth of 20 feet. No odor or staining was observed in recovered soil and the highest PID reading was 6.2 ppm, within the background range.

SB-16 – This boring was located near the southwest corner of the primary structure to delineate potential contamination beneath the structure and contaminant migration to the southwest. The boring was advanced to a depth of 20 feet. No odor or staining was observed in recovered soil and the highest PID reading was 5.7 ppm, within the background range.

SB-17 – This boring was located west of SB-5 and the primary structure to evaluate contaminant migration to the west beyond SB-5. The boring was advanced to a depth of 15 and encountered refusal consistent with impenetrable permafrost. No odor or staining was observed in recovered soil and the highest PID reading was 5.4 ppm, within the background range.

LABORATORY SOIL RESULTS AND QUALITY CONTROL

A total of ten laboratory soil samples (including the field duplicate) were collected and submitted to SGS Laboratories Inc. of Anchorage, Alaska and analyzed for diesel range organics (DRO) and benzene, toluene, ethylbenzene, xylenes (BTEX). The laboratory results are presented briefly below and summarized in Table 1. Field duplicate quality control is also summarized in Table 1. The ADEC laboratory quality control checklist for this lab report is attached along with a complete copy of the laboratory report.

The laboratory data suggests that DRO and benzene are the primary contaminants of concern at the site. Seven of the nine soil samples exceed the ADEC Method 2 soil cleanup level for DRO (250 mg/kg). In these seven samples, the DRO concentrations ranged from 382 mg/kg to 20,100 mg/kg with most samples having concentrations greater than 2,000 mg/kg. Nine of the ten soil samples exceed the ADEC Method 2 soil cleanup level for benzene (0.025 mg/kg). In these nine samples, the benzene concentration ranged from 0.067 mg/kg to 1.42 mg/kg.

One sample (01 7-8) had an ethylbenzene concentration (7.57 mg/kg) exceeding the ADEC Method 2 cleanup level (5.4 mg/kg). Ethylbenzene was detected in five of the other nine samples at concentrations below the ADEC cleanup level. Toluene was detected in four of the ten samples, but these concentrations were below the ADEC cleanup level. Similarly, xylenes were detected below the ADEC cleanup level in nine of the ten samples.

One field duplicate was collected during characterization efforts and the field duplicate quality control summary is shown in Table 1. Field duplicate precision is acceptable for the soil duplicate pair. No specific quality control issue was noted with the sample collection or laboratory analysis and these field duplicates indicate the data can be used for the purposes described in this report.

A laboratory quality review checklist has been completed for the laboratory report and both of these documents are included as attachments. The case narrative for the laboratory report is located on Page 2 of the laboratory report. Surrogate recovery was biased high due to hydrocarbon interference in the one sample, which also had the highest concentrations of contaminants. This is expected as the high concentrations of contaminants mask the lower concentrations of the surrogate and this recovery bias does not significantly impact the data. No other quality control issues were noted and all data was considered usable for the purposes described in this report.

ANALYSIS

Sources and Source Control

The documented source of contamination at this site is a former buried heating oil tank that was removed in 1997. The former tank was located east of the main structure and between the north and south garages. Heating oil was observed in the sump of the nearby underground boiler room and at the bottom of the open excavation during tank removal. A total of approximately 1,650 gallons of heating oil were reportedly recovered from the site: 826 gallons from a recovery well, 744 gallons from the sump in the underground boiler room located adjacent to the former tank, and 80 gallons from the bottom of the tank excavation. Free product has not been recoverable since approximately 2004. The tank was replaced with a new tank and no additional releases have been reported at the site.

The highest concentrations of DRO contamination observed during this investigation were in close proximity to the former location of the buried heating oil tank. The highest DRO soil contamination concentration of 20,100 mg/kg was located in SB-01, directly adjacent to the former location of the buried heating oil tank. This soil sample had the highest field screening result observed during the project and was located 7-8 feet below ground surface. Field screening results indicated that lower levels of contamination were present in SB-01 near the surface and to a depth of 19 feet below grade. Contaminant concentrations also generally decrease with distance from the former tank location. Laboratory notes indicate that the DRO is consistent with a weathered middle distillate, such as heating oil.

Based on the available data, no other primary sources of contamination are believed to be present. Free product is no longer reported to be present in recoverable quantities in the monitoring well or the sump in the underground boiler room. Secondary source soils remain in the vicinity of the underground boiler room and are generally inaccessible without significant structural disruption to the underground boiler room and other utilities and structures at the site.

Contaminated Media and Area

The soil profile at the site was relatively uniform across the investigation area and includes very fine sands and silt. The top two feet is generally fine sands mixed with silt. Dark brown and grey silts extend from approximately two feet below grade to 16 - 18 feet below grade. The silt layers at most locations included thin silty/organic bands between 16 and 20 feet below grade. Field screening and laboratory results of the soil indicated that contamination concentrations generally decrease with depth and is very limited more than about 16 feet below the surface.

Groundwater was not encountered in any of the soil borings. Frozen ground was encountered as shallow as 16-18 inches below ground surface in many soil boring locations. This study was not geotechnical in nature and shallow seasonal frost was not differentiated from permafrost, but frozen silt more than three or four feet below grade is generally considered permafrost. A layer of suprapermafrost water (liquid water present at the top of the permafrost) was not observed at the site. This indicates that future assessment activities should be focused solely on characterization of subsurface soil.

Based on the data available, contaminants have moved both horizontally and vertically through the soil from the source area. The field screening data and soil logs have been used to develop several cross sections at the site indicate the extent of contamination. The cross sections locations are shown in Figure 3 and are described by the soil borings at the end of each cross section. Detailed cross sections results are shown in Figures 4 through 6 and each is discussed in more detail below.

Cross section 17-2 is shown in Figure 4 and runs from west to east through the middle of the structure and source area to the eastern property boundary. This cross section shows the contamination appears basically as a cone with a peak at the former tank location. Contamination generally gets deeper with distance from the tank and extends beneath the structure and towards the eastern property boundary over a distance of at least 100 feet. Laboratory and/or field screening results that represent clean limits were present at 20 feet beneath the source area and west of the house, while samples could not be recovered at this depth from the other two borings in this cross section. Overall, these results are generally consistent with the documented release and gravitational migration of contaminants in silty material. These results also suggest that soil contamination has migrated offsite at the eastern property boundary. Additional data near SB-17 would provide better definition of this western edge, but is not considered crucial to the understanding of the site. Additional soil data between 10 and 25 feet near and offsite to the east of SB-2 is necessary to confirm the eastern edge of the contamination.

Cross section 7-3 is shown in Figure 5 and runs from south to north near the eastern edge of the property. This cross section basically shows contamination migrating to the eastern boundary in the vicinity of SB-12, generally east and northeast of the source

area. SB-12 had no recovery due to permafrost below 15 feet and a clean lower limit was not identified. The adjacent borings, SB-2 (south) and SB-14 (north) were clean to 10 feet, but no data was collected below 10 feet due to refusal. Borings near the property corners, SB-7 (south) and SB-3 (north) confirm that the contamination has not migrated off the property in these directions. These results generally confirm the gradual deepening of contamination with distance from the source area seen in cross section 17-2. These results also suggest that soil contamination has extends offsite beyond the eastern property boundary. Additional characterization (up to four borings) should be completed to verify the depth and north-south extents of the soil contamination along the eastern boundary.

Cross section 16-15 runs from south to north slightly west of the residential structure. This cross section shows a narrow band of contaminated of soil between 13 and 18 feet below grade with clean soil observed above and below this band. This band does not appear to extend much to the north and south of the center of the house. This data combined with nearby SB-17 supports the theory of contaminant migration in a conical shape from the release location at the former tank. No additional assessment is considered necessary on the west side of the structure.

Cross section 11-10 runs from south to north through the source area between the two garages. Results from SB-11 indicate that the depth of the top of the contamination is dropping off to the south to a depth of approximately 13 feet at SB-11. Frozen ground prevented soil recovery below 15 feet. To the north of the source area, SB-10 shows contamination extending from about four feet below grade to a depth of 16 feet below grade. This is consistent with the observations from the soil boring to the east (SB-12). Overall, these observations also support the theory of migration down and away from the source area. Additional delineation (two borings) of contaminants on the northern and southern sides of the garages or near the eastern corners of the house (north and south of the house) is recommended to verify the limits of contamination remain within the property boundaries in these directions.

As suggested above, these observations are consistent with the conical spread of contamination through a fine grained soil. Due to the presence of fine grained soils and frozen ground, contaminant migration is most likely occurring through capillary migration and gravity. The difficulty recovering soil below 15 feet at some locations and clean results at other locations suggest that the frozen ground is denser at this depth and is acting to limit the migration of contamination. Groundwater and/or suprapermafrost water were not observed and do not appear to be significant contaminant transport pathways at this site.

Contaminants of Concern

The documented release consisted of heating oil and diesel range organics (DRO) and benzene, toluene, ethylbenzene, and xylenes compounds (BTEX) are the primary suspected contaminants of concern at the site. Laboratory results confirmed that the

compounds are present in many locations across the site. In the source area, DRO and benzene exceed the ADEC cleanup levels by about two orders of magnitude and ethylbenzene is slightly above the cleanup levels. DRO and benzene were also observed above the ADEC cleanup levels at locations farther from the source, while ethylbenzene was below the cleanup level. Based on the results, DRO and benzene are the specific compounds of most concern and pose the greatest risk at the site.

ADEC regulations indicate that polycyclic aromatic hydrocarbon (PAH) analysis is also necessary for releases of heating oil if the total contaminant concentration remaining in place at the site exceeds 500 mg/kg. A single PAH sample from the 7-8 feet below grade in the source area (SB-1) is recommended during future assessment activities at the site. A second PAH sample is recommended from the internal with the highest field screening results in the new borings recommended near SB-2 and SB-12.

Updated Conceptual Site Model

A draft conceptual site model (CSM) was submitted with the work plan that documented potential exposures from soil and groundwater. This CSM has been revised to reflect that no groundwater is present at the site and the revised CSM scoping form and graphic are attached. This scoping form indicates that the incidental soil ingestion and inhalation of both indoor and outdoor air are the exposure pathways known to be complete at this time. PAH analysis has not been completed at this time and is recommended to evaluate the dermal absorption from soil exposure pathway. Potential receptors include residents, workers (including construction workers) and visitors (including trespassers) to the contaminated area.

Risk Evaluation and Reduction Strategies

The release that caused the contamination at this site was stopped more than 12 years ago and free product recovery efforts yielded more than 1,600 gallons of heating oil, providing the most cost-effective means to reduce the long-term risk from the contamination. Groundwater is not present at the site, limiting the potential for contaminant migration and contact with the contaminants. The remaining soil contamination that is present is around buried structures and utilities and beneath buildings. Additionally, most of this contamination is in soil that is at or below freezing throughout the year. While excavation and treatment of contaminated soil is normally the best way to achieve significant risk reduction from all exposure pathways, the presence of structures would prevent removal of most of the contaminant mass and leave most of the risks substantially unchanged.

The CSM has identified two potential exposure pathways from direct contact with the soil: incidental ingestion of the soil and dermal absorption of contaminants from the soil. The contamination is at least four feet below the surface and the most contaminated material is six to eight feet below the surface. This is below the standard definition of surface soil (up to two feet below the surface) and contact with this material, while possible, is extremely unlikely except for during construction or remediation. Also,

dermal absorption is limited to PAH compounds, which have not been tested for at this time. Even if PAHs are present, the depth of the relative concentrations of PAHs compared to their cleanup levels are expected to indicate that DRO and benzene are much more significant risks from the subsurface contamination present at this site. While these are considered potentially complete pathways, these are not considered a significant risk to residents or visitors to the site. Active remediation would probably present a more significant short-term risk to potential receptors through direct contact pathways than the long-term risk posed by leaving the contamination in place.

The two complete pathways that are considered the most significant risks are volatilization from the contaminated soil to outdoor and indoor air. In general, the potential for volatilization is considered to be lower at this site than other sites because the extent of frozen ground observed. The potential for accumulation of vapors in the outdoor air is considered minimal due to natural air mixing. This may be reduced during winter air inversions, but these conditions are also expected to lead to an overall decrease in volatilization of contaminants to the outdoor air. Also, regional air quality is typically poor during these inversion events and the presence of airborne contaminants migrating to the site from Farmers Loop Road is expected to increase the concentrations of the expected contaminants in the outdoor air. A subsurface vapor extraction system could be used to manage this risk by controlling the release point of the volatile contaminants to atmosphere. This would potentially quicken the pace of mass reduction of the contaminants, but would also discharge these contaminants to a location that could create an increased potential for inhalation.

The migration to indoor air pathway is considered the most significant risk at the site as the release location is surrounded by buildings. The site also has numerous buried utility conduits to these buildings that may provide preferential pathways for vapors to migrate toward and/or through the existing foundations. Additionally, the ground floor of the residential units in the primary residential structure begins four to five feet below the exterior ground surface which creates a relatively large foundation area for vapor intrusion to occur within and a thawed area in which vapors could accumulate. The data suggests that this is more of a concern on the eastern side of the house than the western side of the house, where contamination is present between 14 and 18 feet below grade.

These factors lead to a significant potential for vapor intrusion from the contamination present at the site. The best way to quantify this potential issue is through a vapor intrusion study that includes indoor and outdoor air testing. Alternatively, a vapor intrusion mitigation system could be installed and this system could be tested to see if vapor are collected by this system. If vapors are found in the system, then the system could be turned on and evaluated periodically to determine if vapors continue to accumulate in the system. A review of the existing documentation on the foundation is recommended to determine the most appropriate way to evaluate and/or mitigate the potential risk from vapor intrusion.

Standard vapor intrusion mitigation systems depressurize the soil beneath the slab with some type of venting system that pulls air and any airborne contaminants out from beneath the slab and away from the occupied spaces. These can be installed around the perimeter or retrofitted into the interior of existing structures. In addition to the reduction of health risks inside the structure, these systems also quicken the pace of contaminant mass reduction in the subsurface. The foundation review should be used to evaluate the potential success of the different styles of vapor mitigation installations at this site.

CONCLUSIONS & RECOMMENDATIONS

NORTECH has completed a site characterization associated with a historical release of heating oil at 233 Madcap Lane in the 1990s. The work plan for the investigation was submitted and approved by ADEC in April and May 2008. The objective was to complete a subsurface soil and groundwater characterization to document the current conditions of the site and identify reasonable future site management strategies. Field screening, soil sampling, and laboratory soil sampling analyses as approved in the work plan were undertaken to complete the characterization of the contamination associated with the former buried heating oil tank.

Based on the results of these activities, ***NORTECH*** has developed the following conclusions about the Site:

Site Characterization and Conceptual Site Model

- The source was a former buried heating oil tank that was removed in 1997
  - The tank was adjacent to an underground boiler room for the facility
  - Approximately 1,650 gallons of heating oil were reportedly recovered between 1997 and 2004
- Soil contamination remaining in place in the vicinity of the underground boiler room and other structures
  - The highest concentrations of DRO observed during this investigation were at the former tank location
  - Soil contamination is consistent with a weathered middle distillate
  - Contamination adjacent to the boiler extends from four feet to 19 feet below grade
  - The highest levels of contamination are at least seven feet below grade
  - The spread of contamination in the soil appears generally conical:
    - Contaminant concentrations generally decrease with distance from the former tank location
    - The top of the contaminated soil gets deeper with distance from the former tank location
    - The bottom of the contaminated soil stays generally level between 15 and 18 feet below grade

  - Additional excavation in the source area will result in significant structural disruption to site structures
- The soil at the site consist of the following general layers
  - Fine sand with silt at the surface to a depth of two feet
  - Dark brown and grey silt layers extend from two feet to at least 20 feet below grade
  - Thin silty/organic bands are present between 16 and 20 feet
- Groundwater was not encountered in any soil boring
- Frozen ground was encountered in most borings
  - Frozen ground started as shallow as 16-18 inches in some borings
  - Frozen silt more than three or four feet below grade is considered permafrost
  - An active layer of suprapermafrost water was not observed at the site
  - Refusal consistent with dense permafrost was encountered below 15 feet in several locations
- DRO and benzene are the primary contaminants of concern that exceed the ADEC cleanup level
  - Ethylbenzene also exceeds the ADEC cleanup level in the source area
  - Other BTEX compounds meet the ADEC cleanup levels across the site

Risk Evaluation

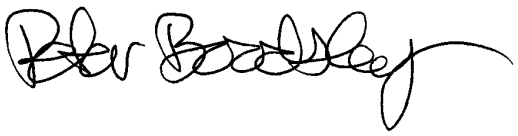
- The CSM has been revised to reflect that no groundwater is present
  - Potentially complete exposure pathways include:
    - Incidental soil ingestion
    - Dermal contact with soil (need PAH results to eliminate)
    - Inhalation of indoor air
    - Inhalation of outdoor air
  - Potential receptors include:
    - Residents,
    - Workers (including construction workers)
    - Visitors (including trespassers)
- Under current site conditions, qualitative review of the site characteristics indicates that the following pathway/receptor combinations are unlikely:
  - Incidental soil ingestion by residents and visitors
  - Dermal contact by residents and visitors
  - Inhalation of outdoor air by residents and visitors
- Under current site conditions, the following potential pathways require additional assessment and/or mitigation:
  - Inhalation of indoor are by residents and visitors

Recommended Site Characterization and Risk Reduction Strategies

- Submit this report to ADEC for future management of the site
- Additional delineation of DRO/BTEX contamination is recommended:
  - Use methodology from existing work plan to minimize planning expenses
  - Four additional borings to 25 feet are recommended in the vicinity of SB-2, SB-12, SB-13, and east of SB-2
  - Two additional boring to 25 feet are recommended adjacent to the western ends of the garages near the corners of the main structure
- Two PAH samples are recommended to verify that these are not contaminants of concern and that the dermal contact pathway is incomplete:
  - One sample from the SB-1 area at 7-8 feet below grade
  - One sample from the new borings in the SB-2/SB-12 area at the highest field screening location
- Complete a feasibility study for installing a sub-slab depressurization system that includes:
  - Inspect the foundation for utility penetrations and cracks
  - Identification of exterior and sub-slab utility locations
  - Identify potential subsurface and sub-slab extraction locations
  - Identify potential discharge locations

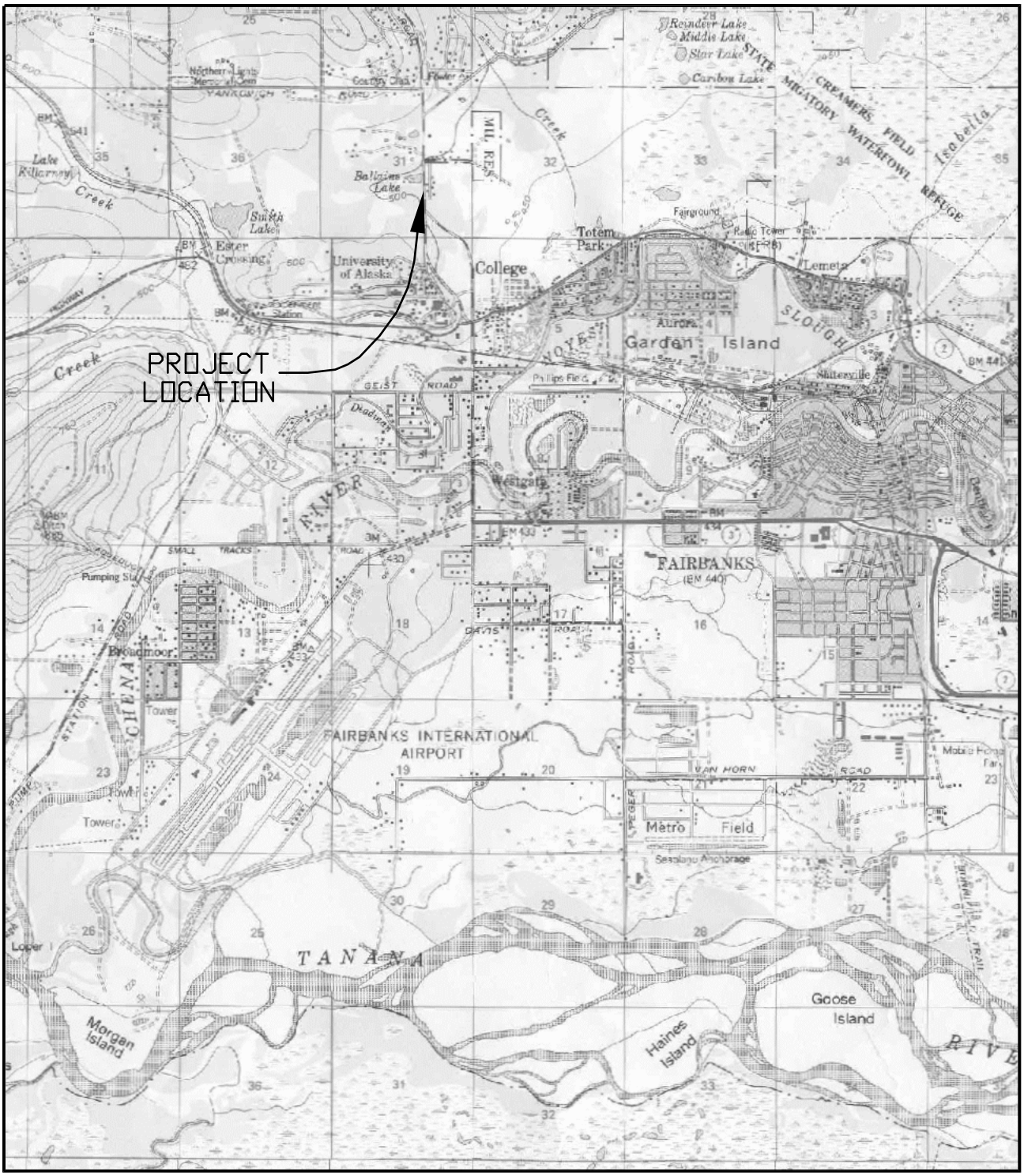
We trust that this information is sufficient for your needs at the present time. If you have any questions or comments or wish to revise the schedule or scope of our services, please contact me. We look forward to the opportunity to work with you on this project and appreciate your confidence in our Firm.

Sincerely,
NORTECH



Peter Beardsley, PE
Environmental Engineer

Attachments
Figures 1 – 6
Table 1
Photo Log
Revised CSM Scoping Document and Graphic
Soil Boring Logs
Copy of Laboratory Report
ADEC Laboratory Quality Control Checklist



NORTECH
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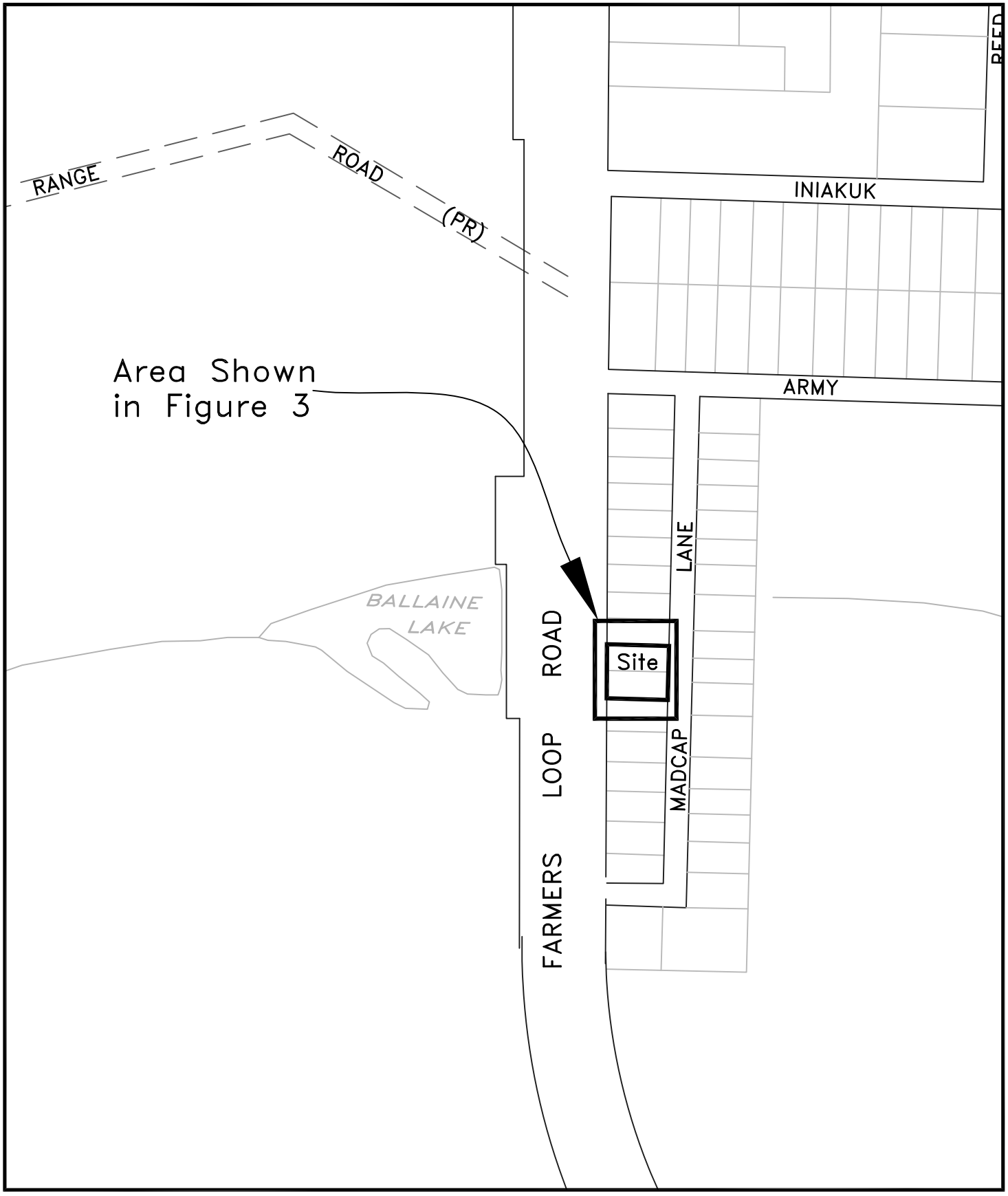
(907) 452-5688 FAX: (907) 452-5694

Location Map
229/233 Madcap Lane
Fairbanks, Alaska

USGS Fairbanks (D-2, SW), AK
1992

FIGURE 1

DATE:	06/06/09
DESIGN:	PLB
DRAWN:	PLB
PROJECT NO:	08-1014
DWG:	081014a(01)
SCALE:	1" = 1mi



NORTECH

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Vicinity Map
229/233 Madcap Lane
Fairbanks, Alaska

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FIGURE 2

DATE:	06/06/09
DESIGN:	PLB
DRAWN:	PLB
PROJECT NO:	08-1014
DWG:	081014a(02)
SCALE:	1" = 300'

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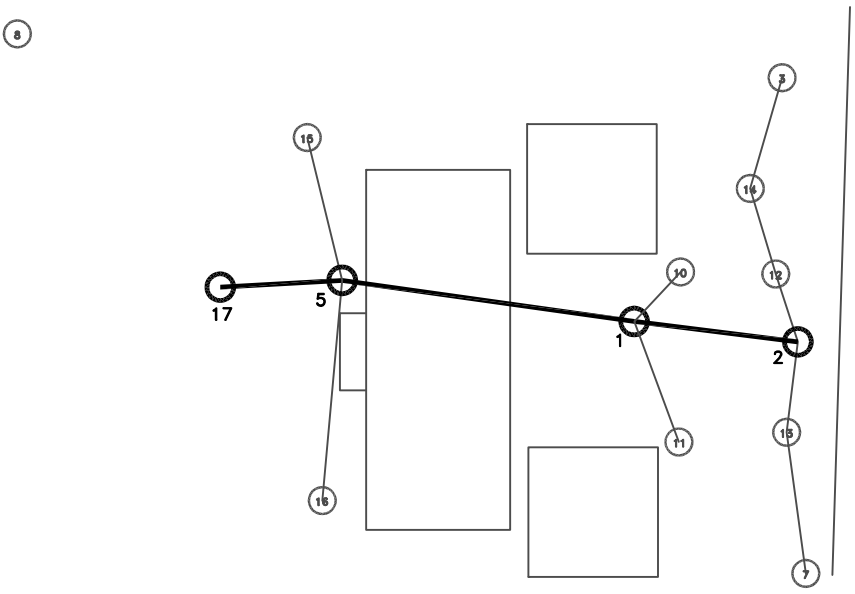
Site Map and Sampling Locations
229/233 Madcap Lane
Fairbanks, AK

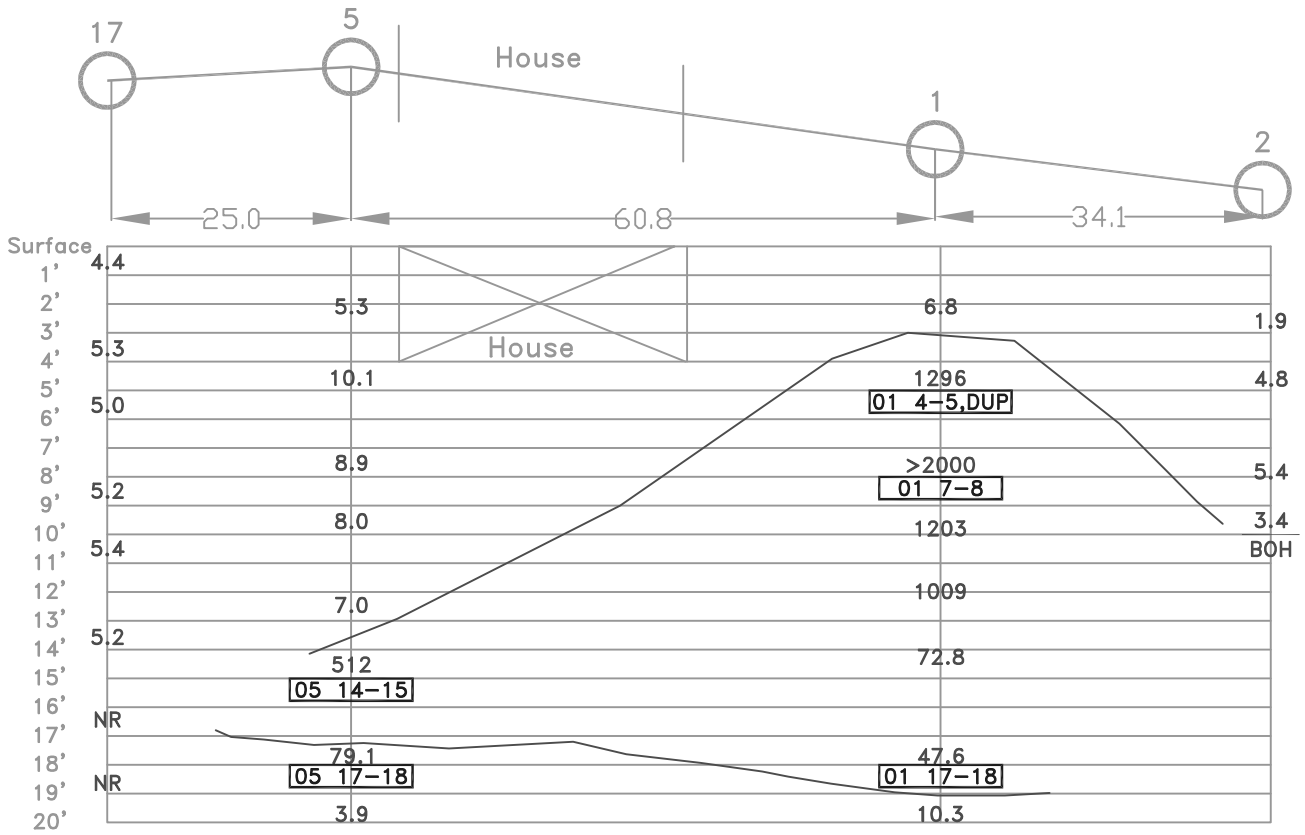
N

FIGURE 3

DATE:	06/06/09
DESIGN:	PLB
DRAWN:	PLB
PROJECT NO:	08-1014
DWG:	081014a(03)
SCALE:	1" = 25'



Cross-section Location 1" = 40'



Horizontal Scale 1" = 20' Vertical Scale As Shown (3x Vertical Exaggeration)

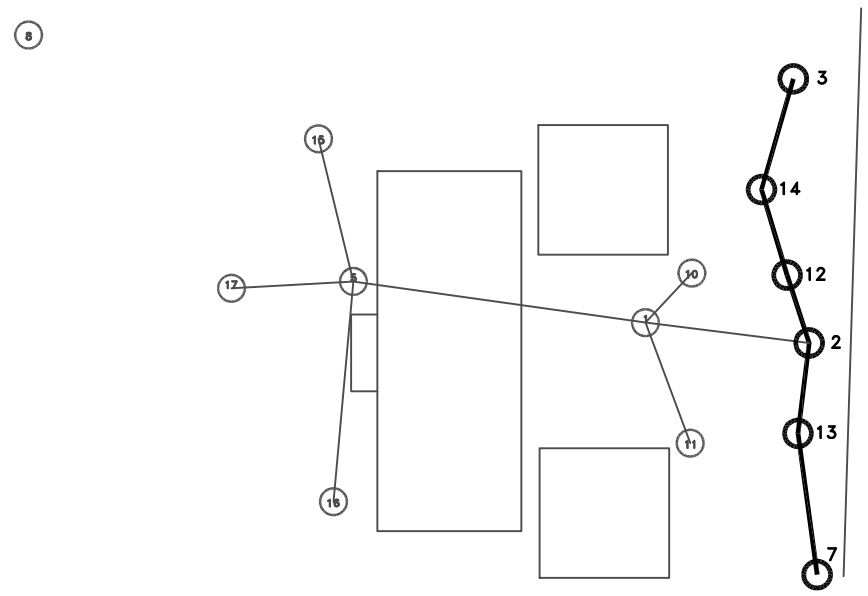
NORTECH
ENVIRONMENTAL & ENGINEERING CONSULTANTS
2400 College Road, Fairbanks, Alaska 99709
(907) 452-5688 FAX: (907) 452-5694

Site Map and Sampling Locations
229/233 Madcap Lane
Fairbanks, AK

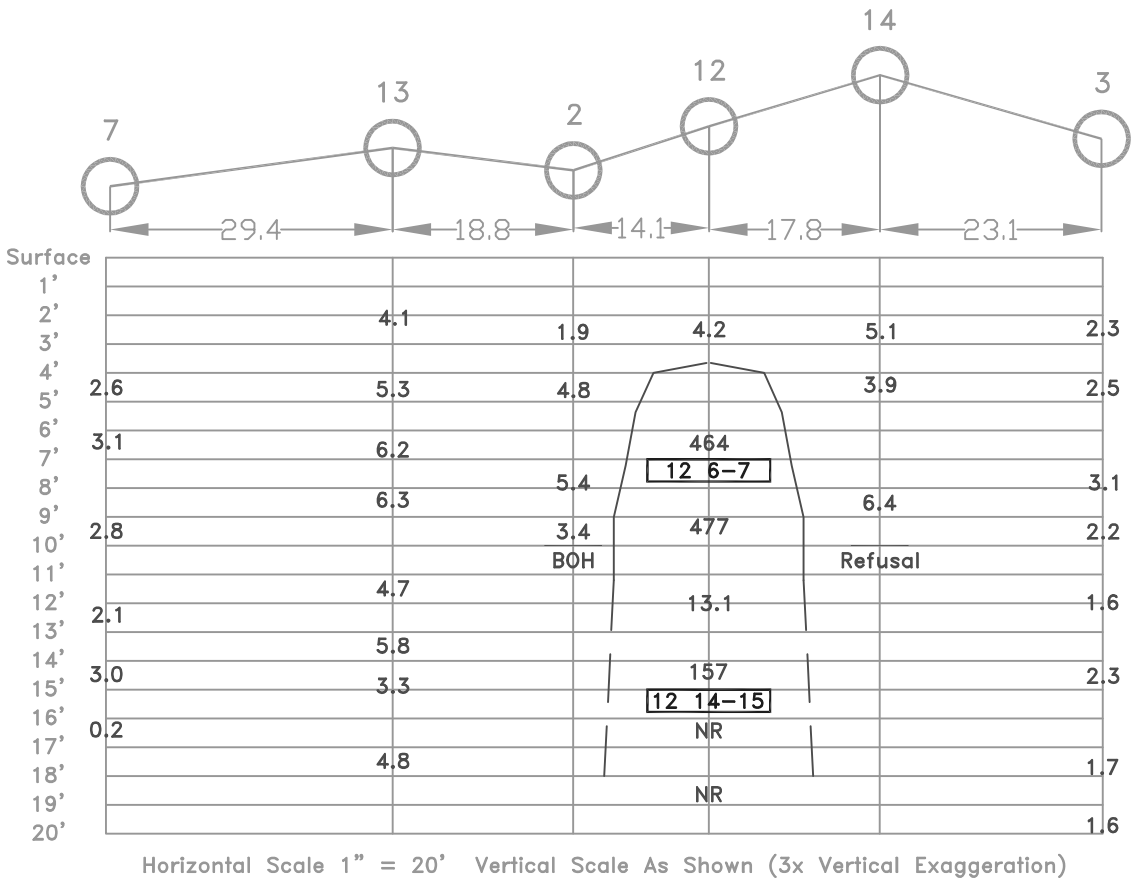
N

FIGURE 4

DATE:	06/06/09
DESIGN:	PLB
DRAWN:	PLB
PROJECT NO:	08-1014
DWG:	081014a(04)
SCALE:	As Shown



Cross-section Location 1" = 40'



Horizontal Scale 1" = 20' Vertical Scale As Shown (3x Vertical Exaggeration)

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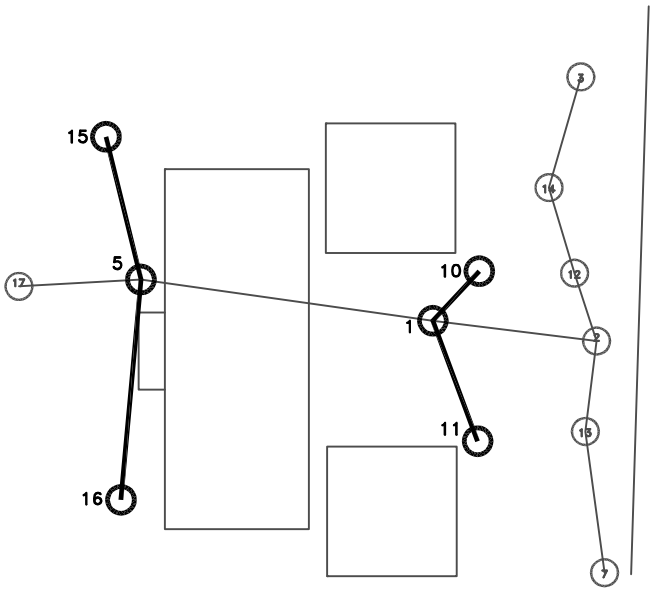
ENVIRONMENTAL & ENGINEERING CONSULTANTS
2400 College Road, Fairbanks, Alaska 99709
(907) 452-5688 FAX: (907) 452-5694

Site Map and Sampling Locations
229/233 Madcap Lane
Fairbanks, AK

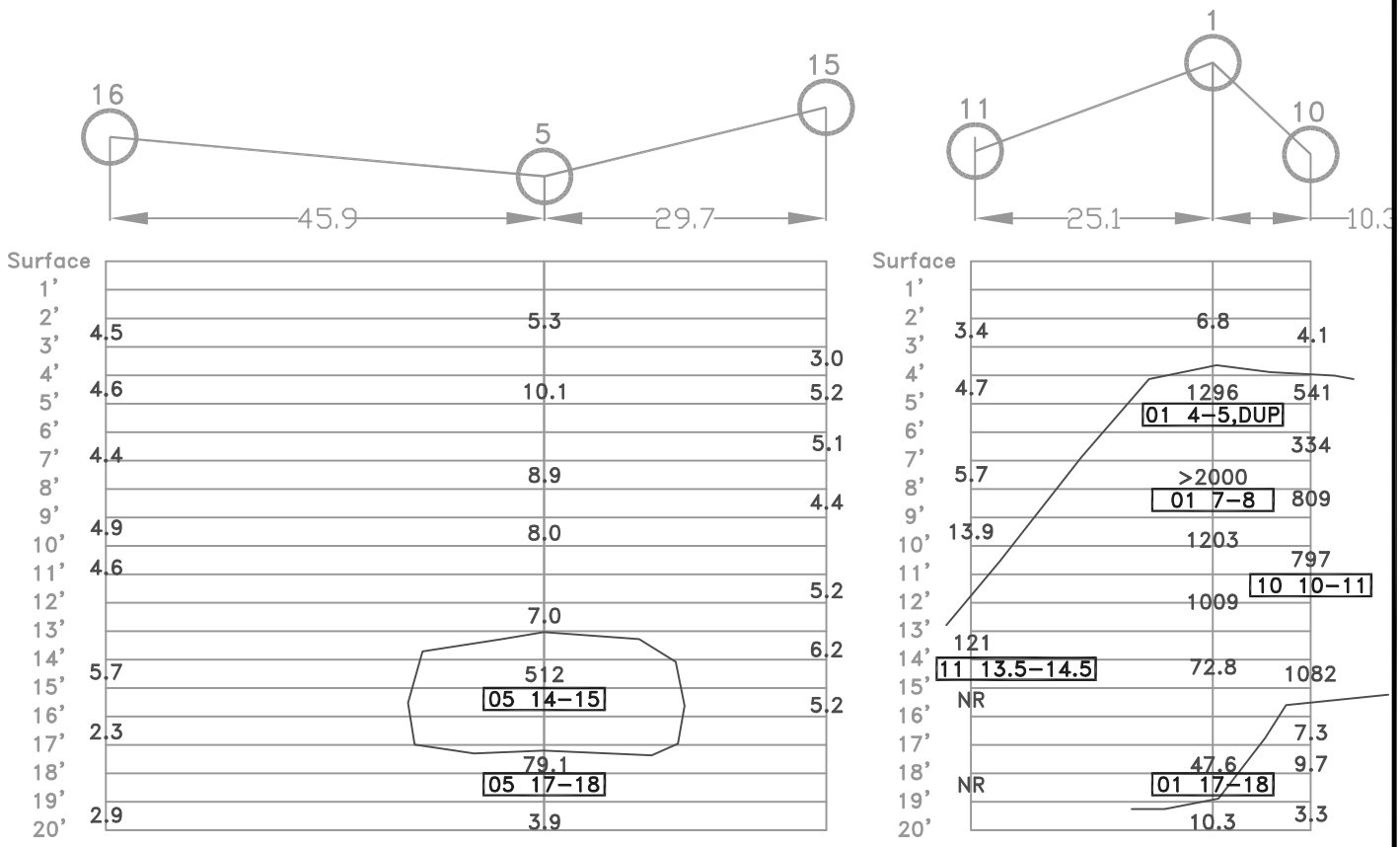
N

FIGURE 5

DATE: 06/06/09
DESIGN: PLB
DRAWN: PLB
PROJECT NO: 08-1014
DWG: 081014a(05)
SCALE: As Shown



Cross-section Location 1" = 40'



Horizontal Scale 1" = 20' Vertical Scale As Shown (3x Vertical Exaggeration)

NORTECH
ENVIRONMENTAL & ENGINEERING CONSULTANTS
2400 College Road, Fairbanks, Alaska 99709
(907) 452-5688 FAX: (907) 452-5694

Site Map and Sampling Locations
229/233 Madcap Lane
Fairbanks, AK

N

FIGURE 6

DATE:	06/06/09
DESIGN:	PLB
DRAWN:	PLB
PROJECT NO:	08-1014
DWG:	081014a(06)
SCALE:	As Shown

Table 1

Soil Laboratory Results Summary
June 24, 2008

Sample ID	Boring ID	Depth	PID	DRO	Benzene	Toluene	Ethyl-benzene	Total Xylene
Units			ppm	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
ADEC Method 2 *				250	0.025	6.5	6.9	63
01 4-5	SB-01	4-5'	1296	**11100**	**0.236**	1.31	4.4	15.49
01 7-8	SB-01	7-8'	> 2000	**20100**	**1.42**	2.07	**7.57**	34.9
01 17-18	SB-01	17-18'	47.6	27.8U	**0.271**	0.0963U	0.0963U	0.251
10 10-11	SB-10	10-11'	797	**4890**	**0.46**	0.0774U	1.92	5.36
12 6-7	SB-12	6-7'	464	**2590**	**0.215**	0.0684U	1.02	1.952
12 14-15	SB-12	14-15'	157	**2480**	**0.0626**	0.0521U	0.0521U	0.115
11 13.5-14.5	SB-11	13.5-14.5'	121	49	**0.0607**	0.076U	0.076U	0.076U
05 14-15	SB-05	14-15'	512	**382**	**0.0902**	0.13	0.715	2.178
05 17-18	SB-05	17-18'	79.1	27.5U	0.0188U	0.0753U	0.0753U	0.419
DUP	SB-01	4-5'	1296	**11600**	**0.193**	0.978	3.61	13.34

Notes:

U	Analyte not detected at the listed detection limit
Shade	Analyte detected in concentration below the ADEC Cleanup level
Bold	Analyte detected in concentration exceeding the ADEC Cleanup level
DUP	Field Duplicate of sample colected from SB-01 (4-5')

* ADEC Method 2 Migration to Groundwater (under 40" Zone), 18 AAC 75 October 2008

Quality Control Summary

Sample ID	01 4-5	Dup	Average	Difference	RPD
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%
DRO	11100	11600	11350	500	4%
B	0.236	0.193	0.215	-0.043	-20%
T	1.310	0.978	1.144	-0.332	-29%
E	4.40	3.61	4.005	-0.790	-20%
X	15.49	13.34	14.42	-2.15	-15%

NA	The calculation is not applicable.
RPD	Relative percent difference

Photo Log
229/233 Madcap Lane, Fairbanks, Alaska

Photo 01 - Looking east at the west side of the primary structure

Photo 02 - Looking north along west side of structure at installation of SB-15

Photo Log
229/233 Madcap Lane, Fairbanks, Alaska

Photo 03 - Looking northwest at installation of SB-02; SB-01 location near drum in background

Photo 04 - Recovered soil core from 15-20 foot depth of SB-13, moist/saturated fine silt with organics, but is too fine to produce water

Photo 05 - Recovered soil core from 15-20 foot depth of SB-08, frozen fine silt with organics

Photo 06 - Shattered soil core sleeve with no recovery in frozen silt

Human Health Conceptual Site Model
Scoping Form

Site Name: Madcap Lane

File Number: 100.38.142

Completed by: Peter Beardsley

Introduction

The form should be used to reach agreement with the Alaska Department of Environmental Conservation (DEC) about which exposure pathways should be further investigated during site characterization. From this information, a CSM graphic and text must be submitted with the site characterization work plan.

General Instructions: Follow the italicized instructions in each section below.

1. *General Information:*

Sources *(check potential sources at the site)*

- ☑ USTs
- ☐ ASTs
- ☐ Dispensers/fuel loading racks
- ☐ Drums
- ☐ Vehicles
- ☐ Landfills
- ☐ Transformers
- ☐ Other: _____

Release Mechanisms *(check potential release mechanisms at the site)*

- ☑ Spills
- ☑ Leaks
- ☐ Direct discharge
- ☐ Burning
- ☐ Other: _____

Impacted Media *(check potentially-impacted media at the site)*

- ☐ Surface soil (0-2 feet bgs*)
- ☑ Subsurface Soil (>2 feet bgs)
- ☐ Air
- ☐ Groundwater
- ☐ Surface water
- ☐ Other: _____

Receptors (*check receptors that could be affected by contamination at the site)*

- ☐ Residents (adult or child)
- ☑ Commercial or industrial worker
- ☑ Construction worker
- ☐ Subsistence harvester (i.e., gathers wild foods)
- ☐ Subsistence consumer (i.e., eats wild foods)
- ☐ Site visitor
- ☑ Trespasser
- ☑ Recreational user
- ☐ Farmer
- ☐ Other: _____

* bgs – below ground surface

2. *Exposure Pathways:* *(The answers to the following questions will identify complete exposure pathways at the site. Check each box where the answer to the question is "yes".)*

a) Direct Contact –

1 Incidental Soil Ingestion

Is soil contaminated anywhere between 0 and 15 feet bgs? ☑

Do people use the site or is there a chance they will use the site in the future? ☑

If both boxes are checked, label this pathway complete: Complete

2 Dermal Absorption of Contaminants from Soil

Is soil contaminated anywhere between 0 and 15 feet bgs? ☑

Do people use the site or is there a chance they will use the site in the future? ☑

Can the soil contaminants permeate the skin? (Contaminants listed below, or within the groups listed below, should be evaluated for dermal absorption). ☐

Arsenic	Lindane
Cadmium	PAHs
Chlordane	Pentachlorophenol
2,4-dichlorophenoxyacetic acid	PCBs
Dioxins	SVOCs
DDT	

If all of the boxes are checked, label this pathway complete: unk

b) Ingestion –

1 Ingestion of Groundwater

Have contaminants been detected or are they expected to be detected in the groundwater, OR are contaminants expected to migrate to groundwater in the future? ☐

Could the potentially affected groundwater be used as a current or future drinking water source? *Please note, only leave the box unchecked if ADEC has determined the groundwater is not a currently or reasonably expected future source of drinking water according to 18 AAC 75.350.* ☐

If both the boxes are checked, label this pathway complete: _____

2 Ingestion of Surface Water

Have contaminants been detected or are they expected to be detected in surface water OR are contaminants expected to migrate to surface water in the future? ☐

Could potentially affected surface water bodies be used, currently or in the future, as a drinking water source? *Consider both public water systems and private use (i.e., during residential, recreational or subsistence activities).* ☐

If both boxes are checked, label this pathway complete: _____

3 Ingestion of Wild Foods

Is the site in an area that is used or reasonably could be used for hunting, fishing, or harvesting of wild food? ☐

Do the site contaminants have the potential to bioaccumulate (*see* Appendix A)? ☐

Are site contaminants located where they would have the potential to be taken up into biota? (i.e. the top 6 feet of soil, in groundwater that **could be** connected to surface water, etc.) ☐

If all of the boxes are checked, label this pathway complete: _____

c) Inhalation

1 Inhalation of Outdoor Air

Is soil contaminated anywhere between 0 and 15 feet bgs? ☑

Do people use the site or is there a chance they will use the site in the future? ☑

Are the contaminants in soil volatile (*See Appendix B*)? ☑

If all of the boxes are checked, label this pathway complete: Complete

2 Inhalation of Indoor Air

Are occupied buildings on the site or reasonably expected to be placed on the site in an area that could be affected by contaminant vapors? (i.e., within 100 feet, horizontally or vertically, of the contaminated soil or groundwater, <u>or</u> subject to "preferential pathways" that promote easy airflow, like utility conduits or rock fractures) ☑

Are volatile compounds present in soil or groundwater (*See Appendix C*)? ☑

If both boxes are checked, label this pathway complete: Complete

3. Additional Exposure Pathways: *(Although there are no definitive questions provided in this section, these exposure pathways should also be considered at each site. Use the guidelines provided below to determine if further evaluation of each pathway is warranted.)*

Dermal Exposure to Contaminants in Groundwater and Surface Water

Exposure from this pathway may need to be assessed only in cases where DEC water-quality or drinking-water standards are not being applied as cleanup levels. Examples of conditions that may warrant further investigation include:

- Climate permits recreational use of waters for swimming,
- Climate permits exposure to groundwater during activities, such as construction, without protective clothing, or
- Groundwater or surface water is used for household purposes.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

Inhalation of Volatile Compounds in Household Water

Exposure from this pathway may need to be assessed only in cases where DEC water-quality or drinking-water standards are not being applied as cleanup levels. Examples of conditions that may warrant further investigation include:

- The contaminated water is used for household purposes such as showering, laundering, and dish washing, and
- The contaminants of concern are volatile (common volatile contaminants are listed in Appendix B)

Check the box if further evaluation of this pathway is needed: ☐

Comments:

Inhalation of Fugitive Dust

Generally DEC soil ingestion cleanup levels in Table B1 of 18 AAC 75 are protective of this pathway, although this is not true in the case of chromium. Examples of conditions that may warrant further investigation include:

- Nonvolatile compounds are found in the top 2 centimeters of soil. The top 2 centimeters of soil are likely to be dispersed in the wind as dust particles.
- Dust particles are less than 10 micrometers. This size can be inhaled and would be of concern for determining if this pathway is complete.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

Direct Contact with Sediment

This pathway involves people's hands being exposed to sediment, such as during recreational or some types of subsistence activities. People then incidentally **ingest** sediment from normal hand-to-mouth activities. In addition, **dermal absorption of contaminants** may be of concern if people come in contact with sediment and the contaminants are able to permeate the skin (see dermal exposure to soil section). This type of exposure is rare but it should be investigated if:

- Climate permits recreational activities around sediment, and/or
- Community has identified subsistence or recreational activities that would result in exposure to the sediment, such as clam digging.

ADEC soil ingestion cleanup levels are protective of direct contact with sediment. If they are determined to be over-protective for sediment exposure at a particular site, other screening levels could be adopted or developed.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

4. Other Comments (*Provide other comments as necessary to support the information provided in this form.)*

Groundwater was not found in soil borings to 20 feet below grade at this site. Frozen ground was encountered starting between 2 and 6 feet of the surface in most locations.

Suprapermafrost water was not observed.

PAH data not available at this time.

APPENDIX A

BIOACCUMULATIVE COMPOUNDS

Table A-1: List of Compounds of Potential Concern for Bioaccumulation

Organic compounds are identified as bioaccumulative if they have a BCF equal to or greater than 1,000 or a log K_{ow} greater than 3.5. Inorganic compounds are identified as bioaccumulative if they are listed as such by EPA (2000). Those compounds in Table X of 18 AAC 75.345 that are bioaccumulative, based on the definition above, are listed below.

Aldrin	DDT	Lead
Arsenic	Dibenzo(a,h)anthracene	Mercury
Benzo(a)anthracene	Dieldrin	Methoxychlor
Benzo(a)pyrene	Dioxin	Nickel
Benzo(b)fluoranthene	Endrin	PCBs
Benzo(k)fluoranthene	Fluoranthene	
Cadmium	Heptachlor	Pyrene
Chlordane	Heptachlor epoxide	Selenium
Chrysene	Hexachlorobenzene	Silver
Copper	Hexachlorocyclopentadiene	Toxaphene
DDD	Indeno(1,2,3-c,d)pyrene	Zinc
DDE		

Because BCF values can relatively easily be measured or estimated, the BCF is frequently used to determine the potential for a chemical to bioaccumulate. A compound with a BCF greater than 1,000 is considered to bioaccumulate in tissue (EPA 2004b).

For inorganic compounds, the BCF approach has not been shown to be effective in estimating the compound's ability to bioaccumulate. Information available, either through scientific literature or site-specific data, regarding the bioaccumulative potential of an inorganic site contaminant should be used to determine if the pathway is complete.

The list was developed by including organic compounds that either have a BCF equal to or greater than 1,000 or a log K_{ow} greater than 3.5 and inorganic compounds that are listed by the United States Environmental Protection Agency (EPA) as being bioaccumulative (EPA 2000). The BCF can also be estimated from a chemical's physical and chemical properties. A chemical's octanol-water partitioning coefficient (K_{ow}) along with defined regression equations can be used to estimate the BCF. EPA's Persistent, Bioaccumulative, and Toxic (PBT) Profiler (EPA 2004) can be used to estimate the BCF using the K_{ow} and linear regressions presented by Meylan et al. (1996). The PBT Profiler is located at http://www.pbtprofiler.net/. For compounds not found in the PBT Profiler, DEC recommends using a log K_{ow} greater than 3.5 to determine if a compound is bioaccumulative.

APPENDIX B

VOLATILE COMPOUNDS

Table B-1: List of Volatile Compounds of Potential Concern
Common volatile contaminants of concern at contaminated sites. A chemical is defined as volatile if the Henry's Law constant is 1 x 10^{-5} atm-m^3/mol or greater and the molecular weight less than 200 g/mole (g/mole; EPA 2004a). Those compounds in Table X of 18 AAC 75.345 that are volatile, based on the definition above, are listed below.

Acenaphthene	1,4-dichlorobenzene	Pyrene
Acetone	1,1-dichloroethane	Styrene
Anthracene	1,2-dichloroethane	1,1,2,2-tetrachloroethane
Benzene	1,1-dichloroethylene	Tetrachloroethylene
Bis(2-chlorethyl)ether	Cis-1,2-dichloroethylene	Toluene
Bromodichloromethane	Trans-1,2-dichloroethylene	1,2,4-trichlorobenzene
Carbon disulfide	1,2-dichloropropane	1,1,1-trichloroethane
Carbon tetrachloride	1,3-dichloropropane	1,1,2-trichloroethane
Chlorobenzene	Ethylbenzene	Trichloroethylene
Chlorodibromomethane	Fluorene	Vinyl acetate
Chloroform	Methyl bromide	Vinyl chloride
2-chlorophenol	Methylene chloride	Xylenes
Cyanide	Naphthalene	GRO
1,2-dichlorobenzene	Nitrobenzene	DRO

APPENDIX C

COMPOUNDS OF CONCERN FOR VAPOR MIGRATION

Table C-1: List of Compounds of Potential Concern for the Vapor Migration

A chemical is considered sufficiently toxic if the vapor concentration of the pure component poses an incremental lifetime cancer risk greater than 10-6 or a non-cancer hazard index greater than 1. A chemical is considered sufficiently volatile if it's Henry's Law constant is 1 x 10^{-5} atm-m^3/mol or greater.

Acenaphthene	Dibenzofuran	Hexachlorobenzene
Acetaldehyde	1,2-Dibromo-3-chloropropane	Hexachlorocyclopentadiene
Acetone	1,2-Dibromoethane (EDB)	Hexachloroethane
Acetonitrile	1,3-Dichlorobenzene	Hexane
Acetophenone	1,2-Dichlorobenzene	Hydrogen cyanide
Acrolein	1,4-Dichlorobenzene	Isobutanol
Acrylonitrile	2-Nitropropane	Mercury (elemental)
Aldrin	N-Nitroso-di-n-butylamine	Methacrylonitrile
alpha-HCH (alpha-BHC)	n-Propylbenzene	Methoxychlor
Benzaldehyde	o-Nitrotoluene	Methyl acetate
Benzene	o-Xylene	Methyl acrylate
Benzo(b)fluoranthene	p-Xylene	Methyl bromide
Benzylchloride	Pyrene	Methyl chloride chloromethane)
beta-Chloronaphthalene	sec-Butylbenzene	Methylcyclohexane
Biphenyl	Styrene	Methylene bromide
Bis(2-chloroethyl)ether	tert-Butylbenzene	Methylene chloride
Bis(2-chloroisopropyl)ether	1,1,1,2-Tetrachloroethane	Methylethylketone (2-butanone)
Bis(chloromethyl)ether	1,1,2,2-Tetrachloroethane	Methylisobutylketone
Bromodichloromethane	Tetrachloroethylene	Methylmethacrylate
Bromoform	Dichlorodifluoromethane	2-Methylnaphthalene
1,3-Butadiene	1,1-Dichloroethane	MTBE
Carbon disulfide	1,2-Dichloroethane	m-Xylene
Carbon tetrachloride	1,1-Dichloroethylene	Naphthalene
Chlordane	1,2-Dichloropropane	n-Butylbenzene
2-Chloro-1,3-butadiene (chloroprene)	1,3-Dichloropropene	Nitrobenzene
Chlorobenzene	Dieldrin	Toluene
1-Chlorobutane	Endosulfan	trans-1,2-Dichloroethylene
Chlorodibromomethane	Epichlorohydrin	1,1,2-Trichloro-1,2,2-trifluoroethane
Chlorodifluoromethane	Ethyl ether	1,2,4-Trichlorobenzene
Chloroethane (ethyl chloride)	Ethylacetate	1,1,2-Trichloroethane
Chloroform	Ethylbenzene	1,1,1-Trichloroethane
2-Chlorophenol	Ethylene oxide	Trichloroethylene
2-Chloropropane	Ethylmethacrylate	Trichlorofluoromethane
Chrysene	Fluorene	1,2,3-Trichloropropane
cis-1,2-Dichloroethylene	Furan	1,2,4-Trimethylbenzene
Crotonaldehyde (2-butenal)	Gamma-HCH (Lindane)	1,3,5-Trimethylbenzene
Cumene	Heptachlor	Vinyl acetate
DDE	Hexachloro-1,3-butadiene	Vinyl chloride (chloroethene)

Source: EPA 2002.

HUMAN HEALTH CONCEPTUAL SITE MODEL

Site: 223 Madcap
Fairbanks, AK
99709

Completed By: Peter Beardsley
Date Completed: Revised - 07/02/09

Follow the directions below. Do not consider engineering or land use controls when describing pathways.

(1)
Check the media that could be directly affected by the release.

(2)
For each medium identified in (1), follow the top arrow and check possible transport mechanisms. Briefly list other mechanisms or reference the report for details.

(3)
Check exposure media identified in (2).

(4)
Check exposure pathways that are complete or need further evaluation. The pathways identified must agree with Sections 2 and 3 of the CSM Scoping Form.

(5)
Identify the receptors potentially affected by each exposure pathway: Enter "C" for current receptors, "F" for future receptors, or "C/F" for both current and future receptors.

Media	Transport Mechanisms	Exposure Media	Exposure Pathways	Current & Future Receptors: Residents (adults or children)	Commercial or industrial workers	Site visitors, trespassers, or recreational users	Construction workers	Farmers or subsistence harvesters	Subsistence consumers	Other
☐ Surface Soil (0-2 ft bgs)	☐ Direct release to surface soil — *check soil*									
	☐ Migration or leaching to subsurface — *check soil*									
	☐ Migration or leaching to groundwater — *check groundwater*									
	☐ Volatilization — *check air*									
	☐ Runoff or erosion — *check surface water*									
	☐ Uptake by plants or animals — *check biota*									
	☐ Other (*list*): Madcap Lane									
☑ Subsurface Soil (2-15 ft bgs)	☐ Direct release to subsurface soil — *check soil*									
	☐ *Migration to groundwater* — *check groundwater*									
	☑ *Volatilization* — *check air*									
	☐ *Other (list):* 100.38.142									
☐ Ground-water	☐ Direct release to groundwater — *check groundwater*									
	☐ *Volatilization* — *check air*									
	☐ *Flow to surface water body* — *check surface water*									
	☐ *Flow to sediment* — *check sediment*									
	☐ *Uptake by plants or animals* — *check biota*									
	☐ *Other (list):* Peter Beardsley									
☐ Surface Water	☐ Direct release to surface water — *check surface water*									
	☐ *Volatilization* — *check air*									
	☐ *Sedimentation* — *check sediment*									
	☐ *Uptake by plants or animals* — *check biota*									
	☐ *Other (list):*									
☐ Sediment	☐ Direct release to sediment — *check sediment*									
	☐ *Resuspension, runoff, or erosion* — *check surface water*									
	☐ *Uptake by plants or animals* — *check biota*									
	☐ *Other (list):*									
		☑ soil	☑ Incidental Soil Ingestion	C/F	F	C/F	F			
			☐ Dermal Absorption of Contaminants from Soil							
		☐ groundwater	☐ Ingestion of Groundwater							
			☐ Dermal Absorption of Contaminants in Groundwater							
			☐ Inhalation of Volatile Compounds in Tap Water							
		☑ air	☑ Inhalation of Outdoor Air	C/F	F	C/F	F			
			☐ Inhalation of Indoor Air	C/F	F	C/F	F			
			☐ Inhalation of Fugitive Dust							
		☐ surface water	☑ Ingestion of Surface Water							
			☐ Dermal Absorption of Contaminants in Surface Water							
			☐ Inhalation of Volatile Compounds in Tap Water							
		☐ sediment	☑ Direct Contact with Sediment							
		☐ biota	☑ Ingestion of Wild Foods							

NORTECH Environmental and Engineering Consultants Test Boring Log

PROJECT: **233 Madcap Ballaine Sub Petroleum**
LOCATION: **Fairbanks, Alaska**

JOB NO.	08-1014
HOLE NO.	SB-01
SHEET	1 of 14
START DATE	25-Jun-08
FINISH DATE	26-Jun-08
DRILLER	Elliot
HELPER	Russell
INSPECTOR	Ron/Jeff

	CASING		SAMPLE	CORE
TYPE				
SIZE (ID)				
HAMMER WT				
HAMMER FALL				

GROUNDWATER		DEPTH TO		
DATE	TIME	WATER	BOTTOM	BOTTOM OF HOLE

DEPTH IN FEET	CASING BLOWS PER FOOT	LAB SAMPLE NO	SAMPLE DEPTH (FT)	SAMPLE BLOWS PER 6 INCHES	RECOV-ERY (IN)	SOIL DESCRIPTION AND OTHER DATA	PID
0.0							
					3.5 feet	Topsoil, grass, & fine brown sand	6.8
2.5						Fine sand brown sand w/ gravel	6.8
						Very fine brown sand mixed w/ silt	1296
		01 4-5					1296
5.0		& DUP					1296
						Grey fine sand	
							>2000
7.5		01 7-8			5.0 feet		>2000
						Grey silt w/ very fine sands	>2000
							12.03
							1203
10.0							1203
						Grey very fine sand/silt w/ dark brown very fine sand	
							1009
							1009
							1009
12.5					5.0 feet		1009
						Fine grey silt/sands	1009
							72.8
							72.8
15.0							72.8
							47.6
17.5		01 17-18			4.0 feet		47.6
						Dark brown/black very fine sand/silt w/ trace organics	47.6
							10.3
							10.3
20.0							10.3

NOTES: Core logs listed from bottom to top. Dashed border indicates groundwater. H_2O saturated soils encountered at approximately 11-12 ft. bgs.

NORTECH Environmental and Engineering Consultants Test Boring Log

PROJECT: **233 Madcap Ballaine Sub Petroleum**
LOCATION: **Fairbanks, Alaska**

JOB NO.	08-1014
HOLE NO.	SB-02
SHEET	2 of 14
START DATE	25-Jun-08
FINISH DATE	26-Jun-08
DRILLER	Elliot
HELPER	Russell
INSPECTOR	Ron/Jeff

	CASING		SAMPLE	CORE
TYPE				
SIZE (ID)				
HAMMER WT				
HAMMER FALL				

GROUNDWATER		DEPTH TO		
DATE	TIME	WATER	BOTTOM	BOTTOM OF HOLE

DEPTH IN FEET	CASING BLOWS PER FOOT	LAB SAMPLE NO	SAMPLE DEPTH (FT)	SAMPLE BLOWS PER 6 INCHES	RECOV-ERY (IN)	SOIL DESCRIPTION AND OTHER DATA	PID
0.0							
						Topsoil, grass, w/ fine brown sand	
						Find brown sand w/ grey silt bands	
2.5					3.5 feet		1.9
						Grey silt	1.9
							1.9
							4.8
							4.8
5.0							4.8
7.5					3.5 feet	Fine Brown sand w/ silt	5.4
						Fill Material	5.4
							5.4
						Fine silt layers & brown/grey sand bands	3.4
							3.4
10.0							3.4
						BOH - Wastewater service line encountered	
12.5							
15.0							
17.5							
20.0							

NOTES: Core logs listed from bottom to top. Dashed border indicates groundwater.

NORTECH Environmental and Engineering Consultants Test Boring Log

PROJECT: **233 Madcap Ballaine Sub Petroleum**
LOCATION: **Fairbanks, Alaska**

JOB NO.	08-1014
HOLE NO.	SB-03
SHEET	3 of 14
START DATE	25-Jun-08
FINISH DATE	26-Jun-08
DRILLER	Elliot
HELPER	Russell
INSPECTOR	Ron/Jeff

	CASING		SAMPLE	CORE
TYPE				
SIZE (ID)				
HAMMER WT				
HAMMER FALL				

GROUNDWATER		DEPTH TO		
DATE	TIME	WATER	BOTTOM	BOTTOM OF HOLE

DEPTH IN FEET	CASING BLOWS PER FOOT	LAB SAMPLE NO	SAMPLE DEPTH (FT)	SAMPLE BLOWS PER 6 INCHES	RECOV-ERY (IN)	SOIL DESCRIPTION AND OTHER DATA	PID
0.0							
					4.5 feet	Topsoil, grass, gravel w/ brown sand	
						Fine grey sand	
2.5						Grey silt (frozen)	2.3
							2.3
							2.3
							2.5
							2.5
5.0							2.5
					4.0 feet	Grey very fine sand w/trace organics	
7.5						Grey Silt (frozen)	3.1
							3.1
							3.1
							2.2
							2.2
10.0							2.2
					4.0 feet	Dark very fine sand (brown/black)	
							1.6
12.5						Grey Silt (frozen)	1.6
							1.6
							2.3
							2.3
15.0							2.3
					3.5 feet		
						Dary grey silt (frozen)	1.7
							1.7
17.5							1.7
							1.6
							1.6
20.0							1.6

NOTES: Core logs listed from bottom to top. Dashed border indicates groundwater.

NORTECH Environmental and Engineering Consultants Test Boring Log

PROJECT: **233 Madcap Ballaine Sub Petroleum**
LOCATION: **Fairbanks, Alaska**

JOB NO.	08-1014
HOLE NO.	SB-05
SHEET	4 of 14
START DATE	25-Jun-08
FINISH DATE	26-Jun-08
DRILLER	Elliot
HELPER	Russell
INSPECTOR	Ron/Jeff

	CASING		SAMPLE	CORE
TYPE				
SIZE (ID)				
HAMMER WT				
HAMMER FALL				

GROUNDWATER		DEPTH TO		
DATE	TIME	WATER	BOTTOM	BOTTOM OF HOLE

DEPTH IN FEET	CASING BLOWS PER FOOT	LAB SAMPLE NO	SAMPLE DEPTH (FT)	SAMPLE BLOWS PER 6 INCHES	RECOV-ERY (IN)	SOIL DESCRIPTION AND OTHER DATA	PID
0.0							
					4.5 feet	Topsoil, grass, organics w/ brown sand	
						Brown fine sandy silt	
2.5						Brown silty sand (cold but not frozen)	5.3
							5.3
							5.3
						Dark brown silt (cold but not frozen)	10.1
							10.1
5.0							10.1
					Incomplete recovery		
							8.9
7.5							8.9
							8.9
							8
							8
10.0							8
					4 feet		
						Brown silt w/ dark bands interbedded	
							7
12.5							7
							7
							512
		05 14-15					512
15.0							512
						Brown silt (very moist)	
							79.1
17.5		05 17-18					79.1
							79.1
						Dark brown & black silt w/ trace organics	3.9
							3.9
20.0							3.9

NOTES: Core logs listed from bottom to top. Dashed border indicates groundwater.

NORTECH Environmental and Engineering Consultants Test Boring Log

PROJECT: **233 Madcap Ballaine Sub Petroleum**
LOCATION: **Fairbanks, Alaska**

JOB NO.	08-1014
HOLE NO.	SB-07
SHEET	5 of 14
START DATE	25-Jun-08
FINISH DATE	26-Jun-08
DRILLER	Elliot
HELPER	Russell
INSPECTOR	Ron/Jeff

	CASING		SAMPLE	CORE
TYPE				
SIZE (ID)				
HAMMER WT				
HAMMER FALL				

GROUNDWATER		DEPTH TO		
DATE	TIME	WATER	BOTTOM	BOTTOM OF HOLE

DEPTH IN FEET	CASING BLOWS PER FOOT	LAB SAMPLE NO	SAMPLE DEPTH (FT)	SAMPLE BLOWS PER 6 INCHES	RECOV-ERY (IN)	SOIL DESCRIPTION AND OTHER DATA	PID
0.0							
					3.0 feet	Topsoil, grass, gravel w/brown sand	
2.5						Brown fine sand	
					5.0 feet	Grey silt (frozen)	2.6
5.0							2.6
							2.6
							2.6
					5.0 feet	Grey/brown silt (frozen)	
7.5							3.1
							3.1
							3.1
10.0							2.8
							2.8
							2.8
					5.0 feet	Light brown silt (frozen)	
12.5							2.1
						Grey silt (frozen)	2.1
15.0							2.1
							3
							3
							3
					5.0 feet	Grey silt (frozen)	
17.5							0.2
							0.2
						Black silt w/ trace organics (frozen)	0.2
20.0						Grey silt (frozen)	

NOTES: Core logs listed from bottom to top. Dashed border indicates groundwater.

NORTECH Environmental and Engineering Consultants Test Boring Log

PROJECT: **233 Madcap Ballaine Sub Petroleum**
LOCATION: **Fairbanks, Alaska**

JOB NO.	08-1014
HOLE NO.	SB-08
SHEET	6 of 14
START DATE	25-Jun-08
FINISH DATE	26-Jun-08
DRILLER	Elliot
HELPER	Russell
INSPECTOR	Ron/Jeff

	CASING		SAMPLE	CORE
TYPE				
SIZE (ID)				
HAMMER WT				
HAMMER FALL				

GROUNDWATER		DEPTH TO		
DATE	TIME	WATER	BOTTOM	BOTTOM OF HOLE

DEPTH IN FEET	CASING BLOWS PER FOOT	LAB SAMPLE NO	SAMPLE DEPTH (FT)	SAMPLE BLOWS PER 6 INCHES	RECOV-ERY (IN)	SOIL DESCRIPTION AND OTHER DATA	PID
0.0							
					3.5 feet	Topsoil, grass, w/ brown sand	4.2
						Coarse brown sand w/ fine gravel	4.2
						Brown silty sand	4.2
							4.2
2.5						Brown silt	4.2
							0.8
						Grey silt	0.8
							0.8
5.0							
					4.0 feet	Brown/ grey silt	
						Grey silt	
							0.6
7.5							0.6
						Grey/ brown silt w/ trace organics	0.6
							0.4
							0.4
10.0							0.4
					5.0 feet	Light brown silt	
							2.8
12.5						Grey/ black silt	2.8
							2.8
							2.4
							2.4
15.0							2.4
					4.0 feet	Dark brown / grey silt (frozen)	
							2.5
							2.5
							2.5
17.5						Grey silt (frozen)	
							0.4
							0.4
20.0							0.4

NOTES: Core logs listed from bottom to top. Dashed border indicates groundwater.

NORTECH Environmental and Engineering Consultants Test Boring Log

PROJECT: **233 Madcap Ballaine Sub Petroleum**
LOCATION: **Fairbanks, Alaska**

JOB NO.	08-1014
HOLE NO.	SB-10
SHEET	7 of 14
START DATE	25-Jun-08
FINISH DATE	26-Jun-08
DRILLER	Elliot
HELPER	Russell
INSPECTOR	Ron/Jeff

	CASING		SAMPLE	CORE
TYPE				
SIZE (ID)				
HAMMER WT				
HAMMER FALL				

GROUNDWATER		DEPTH TO		
DATE	TIME	WATER	BOTTOM	BOTTOM OF HOLE

DEPTH IN FEET	CASING BLOWS PER FOOT	LAB SAMPLE NO	SAMPLE DEPTH (FT)	SAMPLE BLOWS PER 6 INCHES	RECOV-ERY (IN)	SOIL DESCRIPTION AND OTHER DATA	PID
0.0							
						Topsoil, grass, gravel w/brown sand	
						Fine brown sand	
					4.0 feet	Brown gravely sand	4.1
2.5							4.1
						Brown silt (frozen)	4.1
							541
							541
5.0							541
						Light brown silt (frozen)	
						Light grey silt (frozen)	334
							334
							334
7.5					5.0 feet		
							809
							809
							809
10.0							797
		10 10-11				Light grey silt (frozen)	797
							797
12.5					3.5 feet		
							1082
							1082
15.0							1082
						Light grey silt (frozen)	
							7.3
							7.3
							7.3
17.5					3.0 feet	Dark black silt w/ trace organics (frozen)	9.7
							9.7
							9.7
							3.3
							3.3
20.0							3.3

NOTES: Core logs listed from bottom to top. Dashed border indicates groundwater.

NORTECH Environmental and Engineering Consultants Test Boring Log

PROJECT: **233 Madcap Ballaine Sub Petroleum**
LOCATION: **Fairbanks, Alaska**

JOB NO.	08-1014
HOLE NO.	SB-11
SHEET	8 of 14
START DATE	25-Jun-08
FINISH DATE	26-Jun-08
DRILLER	Elliot
HELPER	Russell
INSPECTOR	Ron/Jeff

	CASING		SAMPLE	CORE
TYPE				
SIZE (ID)				
HAMMER WT				
HAMMER FALL				

GROUNDWATER		DEPTH TO		
DATE	TIME	WATER	BOTTOM	BOTTOM OF HOLE

DEPTH IN FEET	CASING BLOWS PER FOOT	LAB SAMPLE NO	SAMPLE DEPTH (FT)	SAMPLE BLOWS PER 6 INCHES	RECOV-ERY (IN)	SOIL DESCRIPTION AND OTHER DATA	PID
0.0							
					4.5 feet	Topsoil, grass, organics, w/brown sand	
						Fine brown sand	
						Brown /grey silt (frozen)	3.4
2.5							3.4
							3.4
							4.7
							4.7
5.0							4.7
					5.0 feet	Light brown silt (frozen)	
							5.7
7.5						Grey silt (frozen)	5.7
							5.7
							13.9
							13.9
10.0							13.9
					2.5 feet		
12.5						Grey silt (frozen)	
		11					121
		13.5-14.5					121
							121
15.0							
					No Recovery		
17.5							
20.0							

NOTES: Core logs listed from bottom to top. Dashed border indicates groundwater.

NORTECH Environmental and Engineering Consultants Test Boring Log

PROJECT: **233 Madcap Ballaine Sub Petroleum**
LOCATION: **Fairbanks, Alaska**

JOB NO.	08-1014
HOLE NO.	SB-12
SHEET	9 of 14
START DATE	25-Jun-08
FINISH DATE	26-Jun-08
DRILLER	Elliot
HELPER	Russell
INSPECTOR	Ron/Jeff

	CASING		SAMPLE	CORE
TYPE				
SIZE (ID)				
HAMMER WT				
HAMMER FALL				

GROUNDWATER		DEPTH TO		
DATE	TIME	WATER	BOTTOM	BOTTOM OF HOLE

DEPTH IN FEET	CASING BLOWS PER FOOT	LAB SAMPLE NO	SAMPLE DEPTH (FT)	SAMPLE BLOWS PER 6 INCHES	RECOV-ERY (IN)	SOIL DESCRIPTION AND OTHER DATA	PID
0.0							
					5.0 feet	Topsoil, grass, organics w/ brown sand	
						Brown fine sand	
						Brown silt (frozen)	4.2
2.5							4.2
						Brown & grey silt (frozen)	4.2
5.0							
					4.0 feet		
						Brown fine sand	464
		12 6-7					464
							464
7.5						Grey silt (frozen)	
							477
							477
10.0							477
					5.0 feet	Light Brown fine silt	
						Dark brown/ black silt w/ trace organics	13.1
12.5							13.1
							13.1
							157
		12 14-15					157
15.0							157
					No Recovery		
17.5							
20.0							

NOTES: Core logs listed from bottom to top. Dashed border indicates groundwater.

NORTECH Environmental and Engineering Consultants Test Boring Log

PROJECT: **233 Madcap Ballaine Sub Petroleum**
LOCATION: **Fairbanks, Alaska**

JOB NO.	08-1014
HOLE NO.	SB-13
SHEET	10 of 14
START DATE	25-Jun-08
FINISH DATE	26-Jun-08
DRILLER	Elliot
HELPER	Russell
INSPECTOR	Ron/Jeff

	CASING		SAMPLE	CORE
TYPE				
SIZE (ID)				
HAMMER WT				
HAMMER FALL				

GROUNDWATER		DEPTH TO		
DATE	TIME	WATER	BOTTOM	BOTTOM OF HOLE

DEPTH IN FEET	CASING BLOWS PER FOOT	LAB SAMPLE NO	SAMPLE DEPTH (FT)	SAMPLE BLOWS PER 6 INCHES	RECOV-ERY (IN)	SOIL DESCRIPTION AND OTHER DATA		PID	
0.0									
					4.0 feet	Topsoil, grass, w/ fine brown sand			
						Find brown sand w/ grey silt bands			
						Brown and gray silt		4.1	
2.5								4.1	
								4.1	
								5.3	
								5.3	
5.0								5.3	
					5.0 feet	Gray Silt			
								6.2	
								6.2	
								6.2	
7.5									
								6.3	
						Brown Silt		6.3	
								6.3	
10.0						Gray silt			
					4.0 feet	Gray/Black silt w/ trace organics			
						Gray Silt		4.7	
								4.7	
						Brown silt		4.7	
12.5									
								5.8	
								5.8	
						Brown silt (very moist)		5.8	
15.0								3.3	
					4.0 feet	Brown silt (saturated)		3.3	
								3.3	
						Dark gray to black silt (saturated) w/ trace organics			
								4.8	
17.5								4.8	
						Gray and brown silt (saturated)		4.8	
						Gray and brown silt (very moist)			
20.0									

NOTES: Core logs listed from bottom to top. Dashed border indicates groundwater.

NORTECH Environmental and Engineering Consultants Test Boring Log

PROJECT: **233 Madcap Ballaine Sub Petroleum**
LOCATION: **Fairbanks, Alaska**

JOB NO.	08-1014
HOLE NO.	SB-14
SHEET	11 of 14
START DATE	25-Jun-08
FINISH DATE	26-Jun-08
DRILLER	Elliot
HELPER	Russell
INSPECTOR	Ron/Jeff

	CASING		SAMPLE	CORE
TYPE				
SIZE (ID)				
HAMMER WT				
HAMMER FALL				

GROUNDWATER		DEPTH TO		
DATE	TIME	WATER	BOTTOM	BOTTOM OF HOLE

DEPTH IN FEET	CASING BLOWS PER FOOT	LAB SAMPLE NO	SAMPLE DEPTH (FT)	SAMPLE BLOWS PER 6 INCHES	RECOV-ERY (IN)	SOIL DESCRIPTION AND OTHER DATA	PID
0.0							
					2.5 feet	compacted gravel (driveway fill material)	
						Brown gravelley sand	5.1
2.5							5.1
							5.1
						Brown & gray silt (frozen)	3.9
							3.9
5.0							3.9
					4.0 feet		
						Gray silt (frozen)	
7.5							
							6.4
							6.4
							6.4
10.0							
					No Recovery		
12.5							
15.0							
					No Recovery		
17.5							
20.0							

NOTES: Core logs listed from bottom to top. Dashed border indicates groundwater.

NORTECH Environmental and Engineering Consultants Test Boring Log

PROJECT: **233 Madcap Ballaine Sub Petroleum**
LOCATION: **Fairbanks, Alaska**

JOB NO.	08-1014
HOLE NO.	SB-15
SHEET	12 of 14
START DATE	25-Jun-08
FINISH DATE	26-Jun-08
DRILLER	Elliot
HELPER	Russell
INSPECTOR	Ron/Jeff

	CASING		SAMPLE	CORE
TYPE				
SIZE (ID)				
HAMMER WT				
HAMMER FALL				

GROUNDWATER		DEPTH TO		
DATE	TIME	WATER	BOTTOM	BOTTOM OF HOLE

DEPTH IN FEET	CASING BLOWS PER FOOT	LAB SAMPLE NO	SAMPLE DEPTH (FT)	SAMPLE BLOWS PER 6 INCHES	RECOV-ERY (IN)	SOIL DESCRIPTION AND OTHER DATA	PID
0.0							
					3.0 feet	Topsoil, grass, organics w/ brown sand	
						Brown fine sand	
						Brown silt/ very fine sand	
2.5							
							3
							3
							3
							5.2
5.0							5.2
					5.0 feet	Brown silt w/ fine sands	5.2
							5.1
							5.1
							5.1
7.5						Brown silt	
							4.4
							4.4
							4.4
10.0							
					5.0 feet	Fine brown silt w/ grey bands interbeded	
							5.2
							5.2
							5.2
12.5							
						Dary grey silt	6.2
							6.2
							6.2
15.0							5.2
					5.0 feet	Brown silt	5.2
							5.2
17.5						Dark grey/ black silt w/ trace organics (frozen)	
							5.6
							5.6
20.0							5.6

NOTES: Core logs listed from bottom to top. Dashed border indicates groundwater.

NORTECH Environmental and Engineering Consultants Test Boring Log

PROJECT: **233 Madcap Ballaine Sub Petroleum**
LOCATION: **Fairbanks, Alaska**

JOB NO.	08-1014
HOLE NO.	SB-16
SHEET	13 of 14
START DATE	25-Jun-08
FINISH DATE	26-Jun-08
DRILLER	Elliot
HELPER	Russell
INSPECTOR	Ron/Jeff

	CASING		SAMPLE	CORE
TYPE				
SIZE (ID)				
HAMMER WT				
HAMMER FALL				

GROUNDWATER		DEPTH TO		
DATE	TIME	WATER	BOTTOM	BOTTOM OF HOLE

DEPTH IN FEET	CASING BLOWS PER FOOT	LAB SAMPLE NO	SAMPLE DEPTH (FT)	SAMPLE BLOWS PER 6 INCHES	RECOV-ERY (IN)	SOIL DESCRIPTION AND OTHER DATA	PID
0.0							
					3.5 feet	Topsoil, grass, organics w/ brown sand	
						Brown sand	
						Fine brown sand/silt	4.5
2.5							4.5
							4.5
							4.6
							4.6
5.0							4.6
					5.0 feet	Brown silt	
							4.4
						Dark brown/grey silt	4.4
							4.4
7.5							
							4.9
							4.9
10.0							4.9
					5.0 feet	Brown silt w/ dark bands interbedded	4.6
							4.6
							4.6
12.5							
							5.7
							5.7
15.0							5.7
					5.0 feet	Brown silt (saturated)	
							2.3
							2.3
							2.3
17.5						Dark brown & black silt w/ trace organics	
							2.9
							2.9
20.0							2.9

NOTES: Core logs listed from bottom to top. Dashed border indicates groundwater.

NORTECH Environmental and Engineering Consultants Test Boring Log

PROJECT: **233 Madcap Ballaine Sub Petroleum**
LOCATION: **Fairbanks, Alaska**

JOB NO.	08-1014
HOLE NO.	SB-17
SHEET	14 of 14
START DATE	25-Jun-08
FINISH DATE	26-Jun-08
DRILLER	Elliot
HELPER	Russell
INSPECTOR	Ron/Jeff

	CASING		SAMPLE	CORE
TYPE				
SIZE (ID)				
HAMMER WT				
HAMMER FALL				

GROUNDWATER		DEPTH TO		
DATE	TIME	WATER	BOTTOM	BOTTOM OF HOLE

DEPTH IN FEET	CASING BLOWS PER FOOT	LAB SAMPLE NO	SAMPLE DEPTH (FT)	SAMPLE BLOWS PER 6 INCHES	RECOV-ERY (IN)	SOIL DESCRIPTION AND OTHER DATA	PID
0.0							
					3.5 feet	Topsoil, grass, organics, w/ brown sand	
						Brown sand	4.4
							4.4
						Fine brown sand	4.4
2.5							
							5.3
							5.3
							5.3
5.0							5
					4.5 feet	Brown silt	5
						Grey silt w/ fine brown sand	5
7.5							
							5.2
							5.2
							5.2
10.0							5.4
					5.0 feet	Brown silt (saturated)	5.4
							5.4
12.5							
						Grey silt w/ bands of darker silt w/ trace organics	5.2
							5.2
							5.2
15.0							
					No Recovery		
17.5							
20.0							

NOTES: Core logs listed from bottom to top. Dashed border indicates groundwater.

SGS Environmental Services
Alaska Division
Level II Laboratory Data Report

Project:	Madcap 08-1014
Client:	Nortech
SGS Work Order:	1082647

Released by: Stephen C. Ede 2008.07.14 10:20:57 -08'00'

Alaska Division Technical Director

Contents:

Note:
Unless otherwise noted, all quality assurance/quality control criteria is in compliance with the standards set forth by the proper regulatory authority, the SGS Quality Assurance Program Plan, and the National Environmental Accreditation Conference.

Client	NORTECH	Nortech	**Printed Date/Time**	7/14/2008	9:33
Workorder	1082647	Madcap 08-1014			

Sample ID	Client Sample ID

Refer to the sample receipt form for information on sample condition.

1082647001 PS 01 4-5

AK102 - The pattern is consistent with a weathered middle distillate.

1082647002 PS 01 7-8

AK102 - 5a-Androstane (surrogate) recovery is outside QC goals (biased high) due to hydrocarbon interference.
AK102 - The pattern is consistent with a weathered middle distillate.

1082647004 PS 10 10-11

AK102 - The pattern is consistent with a weathered middle distillate.

1082647005 PS 12 6-7

AK102 - The pattern is consistent with a weathered middle distillate.

1082647006 PS 12 14-15

AK102 - The pattern is consistent with a weathered middle distillate.

1082647007 PS 11 13.5-14.5

AK102 - The pattern is consistent with a weathered middle distillate.

1082647008 PS Dup

AK102 - The pattern is consistent with a weathered middle distillate.

1082647009 PS 05 14-15

AK102 - The pattern is consistent with a weathered middle distillate.

840251 MB MB for HBN 202442 [XXX/19601]

AK103 - MB result is greater than one-half the PQL, but less than PQL.

Laboratory Analysis Report

200 W. Potter Drive
Anchorage, AK 99518-1605
Tel: (907) 562-2343
Fax: (907) 561-5301
Web: http://www.us.sgs.com

Ron Pratt
Nortech
2400 College Rd.
Fairbanks, AK 99709

Work Order:	1082647
	Madcap 08-1014
Client:	Nortech
Report Date:	July 14, 2008

Released by:

Alaska Division Technical Director

Stephen C. Ede
2008.07.14
10:21:14 -08'00'

Enclosed are the analytical results associated with the above workorder.

As required by the state of Alaska and the USEPA, a formal Quality Assurance/Quality Control Program is maintained by SGS. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request.

The laboratory certification numbers are AK971-05 (DW), UST-005 (CS) and AK00971 (Micro) for ADEC and 001992 for NELAP (RCRA methods: 1020A, 1311, 6010B, 7470A, 7471A, 9040B, 9045C, 9056, 9060, 9065, 8015B, 8021B, 8081A/8082, 8260B, 8270C).

Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP, the National Environmental Laboratory Accreditation Program and, when applicable, other regulatory authorities.

If you have any questions regarding this report or if we can be of any other assistance, please contact your SGS Project Manager at 907-562-2343.

The following descriptors may be found on your report which will serve to further qualify the data.

PQL	Practical Quantitation Limit (reporting limit).
U	Indicates the analyte was analyzed for but not detected.
F	Indicates value that is greater than or equal to the MDL.
J	The quantitation is an estimation.
ND	Indicates the analyte is not detected.
B	Indicates the analyte is found in a blank associated with the sample.
*	The analyte has exceeded allowable regulatory or control limits.
GT	Greater Than
D	The analyte concentration is the result of a dilution.
LT	Less Than
!	Surrogate out of control limits.
Q	QC parameter out of acceptance range.
M	A matrix effect was present.
JL	The analyte was positively identified, but the quantitation is a low estimation.
E	The analyte result is above the calibrated range.
R	Rejected

Note: Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content.

SGS Ref.#	1082647001	**All Dates/Times are Alaska Standard Time**	
Client Name	Nortech	**Printed Date/Time**	07/14/2008 9:33
Project Name/#	Madcap 08-1014	**Collected Date/Time**	06/25/2008 13:40
Client Sample ID	01 4-5	**Received Date/Time**	06/28/2008 10:40
Matrix	Soil/Solid (dry weight)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

AK102 - The pattern is consistent with a weathered middle distillate.

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department									
Benzene	236	233	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
Toluene	1310	931	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
Ethylbenzene	4400	931	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
o-Xylene	8770	931	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
P & M -Xylene	6720	931	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
Surrogates									
1,4-Difluorobenzene <surr>	87.3		%	SW8021B	A	80-120	06/25/08	07/01/08	HM
Semivolatile Organic Fuels Department									
Diesel Range Organics	11100	485	mg/Kg	AK102	B		07/08/08	07/10/08	BME
Surrogates									
5a Androstane <surr>	119		%	AK102	B	50-150	07/08/08	07/10/08	BME
Solids									
Total Solids	82.5		%	SM20 2540G	A			07/01/08	KDC

SGS Ref.#	1082647002	**All Dates/Times are Alaska Standard Time**	
Client Name	Nortech	**Printed Date/Time**	07/14/2008 9:33
Project Name/#	Madcap 08-1014	**Collected Date/Time**	06/25/2008 13:45
Client Sample ID	01 7-8	**Received Date/Time**	06/28/2008 10:40
Matrix	Soil/Solid (dry weight)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

AK102 - 5a-Androstane (surrogate) recovery is outside QC goals (biased high) due to hydrocarbon interference.

AK102 - The pattern is consistent with a weathered middle distillate.

Parameter	Results		PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department										
Benzene	1420		187	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
Toluene	2070		749	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
Ethylbenzene	7570		749	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
o-Xylene	14600		749	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
P & M -Xylene	20300		749	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
Surrogates										
1,4-Difluorobenzene <surr>	86.4			%	SW8021B	A	80-120	06/25/08	07/01/08	HM
Semivolatile Organic Fuels Department										
Diesel Range Organics	20100		1030	mg/Kg	AK102	B		07/08/08	07/10/08	BME
Surrogates										
5a Androstane <surr>	183	!		%	AK102	B	50-150	07/08/08	07/10/08	BME
Solids										
Total Solids	76.7			%	SM20 2540G	A			07/01/08	KDC

SGS Ref.#	1082647003	**All Dates/Times are Alaska Standard Time**	
Client Name	Nortech	**Printed Date/Time**	07/14/2008 9:33
Project Name/#	Madcap 08-1014	**Collected Date/Time**	06/25/2008 14:00
Client Sample ID	01 17-18	**Received Date/Time**	06/28/2008 10:40
Matrix	Soil/Solid (dry weight)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department									
Benzene	271	24.1	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
Toluene	ND	96.3	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
Ethylbenzene	ND	96.3	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
o-Xylene	ND	96.3	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
P & M -Xylene	251	96.3	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
Surrogates									
1,4-Difluorobenzene <surr>	89.2		%	SW8021B	A	80-120	06/25/08	07/01/08	HM
Semivolatile Organic Fuels Department									
Diesel Range Organics	ND	27.8	mg/Kg	AK102	B		07/08/08	07/10/08	BME
Surrogates									
5a Androstane <surr>	62.3		%	AK102	B	50-150	07/08/08	07/10/08	BME
Solids									
Total Solids	71.8		%	SM20 2540G	A			07/01/08	KDC

SGS Ref.#	1082647004	**All Dates/Times are Alaska Standard Time**	
Client Name	Nortech	**Printed Date/Time**	07/14/2008 9:33
Project Name/#	Madcap 08-1014	**Collected Date/Time**	06/25/2008 15:35
Client Sample ID	10 10-11	**Received Date/Time**	06/28/2008 10:40
Matrix	Soil/Solid (dry weight)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

AK102 - The pattern is consistent with a weathered middle distillate.

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department									
Benzene	460	19.3	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
Toluene	ND	77.4	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
Ethylbenzene	1920	77.4	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
o-Xylene	3640	77.4	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
P & M -Xylene	1720	77.4	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
Surrogates									
1,4-Difluorobenzene <surr>	91.6		%	SW8021B	A	80-120	06/25/08	07/01/08	HM
Semivolatile Organic Fuels Department									
Diesel Range Organics	4890	266	mg/Kg	AK102	B		07/08/08	07/10/08	BME
Surrogates									
5a Androstane <surr>	110		%	AK102	B	50-150	07/08/08	07/10/08	BME
Solids									
Total Solids	74.9		%	SM20 2540G	A			07/01/08	KDC

SGS Ref.#	1082647005	**All Dates/Times are Alaska Standard Time**	
Client Name	Nortech	**Printed Date/Time**	07/14/2008 9:33
Project Name/#	Madcap 08-1014	**Collected Date/Time**	06/25/2008 16:40
Client Sample ID	12 6-7	**Received Date/Time**	06/28/2008 10:40
Matrix	Soil/Solid (dry weight)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

AK102 - The pattern is consistent with a weathered middle distillate.

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department									
Benzene	215	17.1	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
Toluene	ND	68.4	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
Ethylbenzene	1020	68.4	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
o-Xylene	1760	68.4	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
P & M -Xylene	192	68.4	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
Surrogates									
1,4-Difluorobenzene <surr>	88.6		%	SW8021B	A	80-120	06/25/08	07/01/08	HM
Semivolatile Organic Fuels Department									
Diesel Range Organics	2590	130	mg/Kg	AK102	B		07/08/08	07/10/08	BME
Surrogates									
5a Androstane <surr>	94		%	AK102	B	50-150	07/08/08	07/10/08	BME
Solids									
Total Solids	76.5		%	SM20 2540G	A			07/01/08	KDC

SGS Ref.#	1082647006	**All Dates/Times are Alaska Standard Time**	
Client Name	Nortech	**Printed Date/Time**	07/14/2008 9:33
Project Name/#	Madcap 08-1014	**Collected Date/Time**	06/25/2008 16:55
Client Sample ID	12 14-15	**Received Date/Time**	06/28/2008 10:40
Matrix	Soil/Solid (dry weight)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

AK102 - The pattern is consistent with a weathered middle distillate.

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department									
Benzene	62.6	13.0	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
Toluene	ND	52.1	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
Ethylbenzene	ND	52.1	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
o-Xylene	115	52.1	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
P & M -Xylene	ND	52.1	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
Surrogates									
1,4-Difluorobenzene <surr>	87.1		%	SW8021B	A	80-120	06/25/08	07/01/08	HM
Semivolatile Organic Fuels Department									
Diesel Range Organics	2480	122	mg/Kg	AK102	B		07/08/08	07/10/08	BME
Surrogates									
5a Androstane <surr>	90.7		%	AK102	B	50-150	07/08/08	07/10/08	BME
Solids									
Total Solids	81.2		%	SM20 2540G	A			07/01/08	KDC

SGS Ref.#	1082647007	**All Dates/Times are Alaska Standard Time**	
Client Name	Nortech	**Printed Date/Time**	07/14/2008 9:33
Project Name/#	Madcap 08-1014	**Collected Date/Time**	06/25/2008 17:40
Client Sample ID	11 13.5-14.5	**Received Date/Time**	06/28/2008 10:40
Matrix	Soil/Solid (dry weight)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

AK102 - The pattern is consistent with a weathered middle distillate.

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department									
Benzene	60.7	19.0	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
Toluene	ND	76.0	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
Ethylbenzene	ND	76.0	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
o-Xylene	ND	76.0	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
P & M -Xylene	ND	76.0	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
Surrogates									
1,4-Difluorobenzene <surr>	87.2		%	SW8021B	A	80-120	06/25/08	07/01/08	HM
Semivolatile Organic Fuels Department									
Diesel Range Organics	49.4	26.9	mg/Kg	AK102	B		07/08/08	07/10/08	BME
Surrogates									
5a Androstane <surr>	66.2		%	AK102	B	50-150	07/08/08	07/10/08	BME
Solids									
Total Solids	73.9		%	SM20 2540G	A			07/01/08	KDC

SGS Ref.#	1082647008	**All Dates/Times are Alaska Standard Time**	
Client Name	Nortech	**Printed Date/Time**	07/14/2008 9:33
Project Name/#	Madcap 08-1014	**Collected Date/Time**	06/25/2008 0:00
Client Sample ID	Dup	**Received Date/Time**	06/28/2008 10:40
Matrix	Soil/Solid (dry weight)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

AK102 - The pattern is consistent with a weathered middle distillate.

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department									
Benzene	193	182	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
Toluene	978	729	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
Ethylbenzene	3610	729	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
o-Xylene	7230	729	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
P & M -Xylene	6110	729	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
Surrogates									
1,4-Difluorobenzene <surr>	81.1		%	SW8021B	A	80-120	06/25/08	07/01/08	HM
Semivolatile Organic Fuels Department									
Diesel Range Organics	11600	486	mg/Kg	AK102	B		07/08/08	07/10/08	BME
Surrogates									
5a Androstane <surr>	108		%	AK102	B	50-150	07/08/08	07/10/08	BME
Solids									
Total Solids	82.3		%	SM20 2540G	A			07/01/08	KDC

SGS Ref.#	1082647009	**All Dates/Times are Alaska Standard Time**	
Client Name	Nortech	**Printed Date/Time**	07/14/2008 9:33
Project Name/#	Madcap 08-1014	**Collected Date/Time**	06/26/2008 8:30
Client Sample ID	05 14-15	**Received Date/Time**	06/28/2008 10:40
Matrix	Soil/Solid (dry weight)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

AK102 - The pattern is consistent with a weathered middle distillate.

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department									
Benzene	90.2	15.9	ug/Kg	SW8021B	A		06/26/08	07/01/08	HM
Toluene	130	63.5	ug/Kg	SW8021B	A		06/26/08	07/01/08	HM
Ethylbenzene	715	63.5	ug/Kg	SW8021B	A		06/26/08	07/01/08	HM
o-Xylene	1440	63.5	ug/Kg	SW8021B	A		06/26/08	07/01/08	HM
P & M -Xylene	738	63.5	ug/Kg	SW8021B	A		06/26/08	07/01/08	HM
Surrogates									
1,4-Difluorobenzene <surr>	85.9		%	SW8021B	A	80-120	06/26/08	07/01/08	HM
Semivolatile Organic Fuels Department									
Diesel Range Organics	382	25.9	mg/Kg	AK102	B		07/08/08	07/10/08	BME
Surrogates									
5a Androstane <surr>	84.6		%	AK102	B	50-150	07/08/08	07/10/08	BME
Solids									
Total Solids	76.9		%	SM20 2540G	A			07/01/08	KDC

SGS Ref.#	1082647010	**All Dates/Times are Alaska Standard Time**	
Client Name	Nortech	**Printed Date/Time**	07/14/2008 9:33
Project Name/#	Madcap 08-1014	**Collected Date/Time**	06/26/2008 8:40
Client Sample ID	05 17-18	**Received Date/Time**	06/28/2008 10:40
Matrix	Soil/Solid (dry weight)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department									
Benzene	ND	18.8	ug/Kg	SW8021B	A		06/26/08	07/01/08	HM
Toluene	ND	75.3	ug/Kg	SW8021B	A		06/26/08	07/01/08	HM
Ethylbenzene	103	75.3	ug/Kg	SW8021B	A		06/26/08	07/01/08	HM
o-Xylene	ND	75.3	ug/Kg	SW8021B	A		06/26/08	07/01/08	HM
P & M -Xylene	419	75.3	ug/Kg	SW8021B	A		06/26/08	07/01/08	HM
Surrogates									
1,4-Difluorobenzene <surr>	87.1		%	SW8021B	A	80-120	06/26/08	07/01/08	HM
Semivolatile Organic Fuels Department									
Diesel Range Organics	ND	27.5	mg/Kg	AK102	B		07/08/08	07/10/08	BME
Surrogates									
5a Androstane <surr>	69.8		%	AK102	B	50-150	07/08/08	07/10/08	BME
Solids									
Total Solids	72.3		%	SM20 2540G	A			07/01/08	KDC

SGS Ref.#	1082647011	**All Dates/Times are Alaska Standard Time**	
Client Name	Nortech	**Printed Date/Time**	07/14/2008 9:33
Project Name/#	Madcap 08-1014	**Collected Date/Time**	06/25/2008 13:40
Client Sample ID	TB	**Received Date/Time**	06/28/2008 10:40
Matrix	Soil/Solid (dry weight)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Volatile Fuels Department									
Benzene	ND	12.7	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
Toluene	ND	50.7	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
Ethylbenzene	ND	50.7	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
o-Xylene	ND	50.7	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
P & M -Xylene	ND	50.7	ug/Kg	SW8021B	A		06/25/08	07/01/08	HM
Surrogates									
1,4-Difluorobenzene <surr>	88.8		%	SW8021B	A	80-120	06/25/08	07/01/08	HM
Solids									
Total Solids	100		%	SM20 2540G	A			07/01/08	KDC

SGS Ref.#	839069	Method Blank	**Printed Date/Time**	07/14/2008	9:33
Client Name	Nortech		**Prep Batch**		
Project Name/#	Madcap 08-1014		**Method**		
Matrix	Soil/Solid (dry weight)		**Date**		

QC results affect the following production samples:

1082647001, 1082647002, 1082647003, 1082647004, 1082647005, 1082647006, 1082647007, 1082647008, 1082647009, 1082647010, 1082647011

Parameter	Results	Reporting/Control Limit	MDL	Units	Analysis Date
Solids					
Total Solids				%	07/01/08
Batch	SPT7697				
Method	SM20 2540G				
Instrument					

SGS Ref.#	839142	Method Blank	**Printed Date/Time**	07/14/2008	9:33
Client Name	Nortech		**Prep Batch**	VXX18328	
Project Name/#	Madcap 08-1014		**Method**	SW5035A	
Matrix	Soil/Solid (dry weight)		**Date**	07/01/2008	

QC results affect the following production samples:

1082647001, 1082647002, 1082647003, 1082647004, 1082647005, 1082647006, 1082647007, 1082647008, 1082647009, 1082647010, 1082647011

Parameter	Results	Reporting/Control Limit	MDL	Units	Analysis Date
Volatile Fuels Department					
Benzene	ND	12.5	4.00	ug/Kg	07/01/08
Toluene	ND	50.0	15.0	ug/Kg	07/01/08
Ethylbenzene	ND	50.0	15.0	ug/Kg	07/01/08
o-Xylene	ND	50.0	15.0	ug/Kg	07/01/08
P & M -Xylene	ND	50.0	15.0	ug/Kg	07/01/08
Surrogates					
1,4-Difluorobenzene <surr>	89.4	80-120		%	07/01/08

Batch VFC9039
Method SW8021B
Instrument HP 5890 Series II PID+FID VCA

SGS Ref.#	840251	Method Blank	**Printed Date/Time**	07/14/2008	9:33
Client Name	Nortech		**Prep Batch**	XXX19601	
Project Name/#	Madcap 08-1014		**Method**	SW3550C	
Matrix	Soil/Solid (dry weight)		**Date**	07/08/2008	

QC results affect the following production samples:

1082647001, 1082647002, 1082647003, 1082647004, 1082647005, 1082647006, 1082647007, 1082647008, 1082647009, 1082647010

Parameter	Results	Reporting/Control Limit	MDL	Units	Analysis Date
Semivolatile Organic Fuels Department					
Diesel Range Organics	3.09 J	19.9	1.99	mg/Kg	07/10/08
Surrogates					
5a Androstane <surr>	90.8	60-120		%	07/10/08
Batch	XFC8037				
Method	AK102				
Instrument	HP 5890 Series II FID SV A F				

SGS Ref.#	839071	Duplicate	**Printed Date/Time**	07/14/2008	9:33
Client Name	Nortech		**Prep Batch**		
Project Name/#	Madcap 08-1014		**Method**		
Original	1083111005		**Date**		
Matrix	Soil/Solid (dry weight)				

QC results affect the following production samples:

1082647001, 1082647002, 1082647003, 1082647004, 1082647005, 1082647006, 1082647007, 1082647008, 1082647009, 1082647010, 1082647011

Parameter	Original Result	QC Result	Units	RPD	RPD Limits	Analysis Date
Solids						
Total Solids	96.5	96.2	%	0	(< 15)	07/01/2008

Batch SPT7697
Method SM20 2540G
Instrument

SGS Ref.#	839143	Lab Control Sample	**Printed Date/Time**	07/14/2008	9:33
	839144	Lab Control Sample Duplicate	**Prep Batch**	VXX18328	
Client Name	Nortech		**Method**	SW5035A	
Project Name/#	Madcap 08-1014		**Date**	07/01/2008	
Matrix	Soil/Solid (dry weight)				

QC results affect the following production samples:

1082647001, 1082647002, 1082647003, 1082647004, 1082647005, 1082647006, 1082647007, 1082647008, 1082647009, 1082647010, 1082647011

Parameter		QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date
Volatile Fuels Department								
Benzene	LCS	1290	103	(80-125)			1250 ug/Kg	07/01/2008
	LCSD	1360	109		5	(< 20)	1250 ug/Kg	07/01/2008
Toluene	LCS	1240	99	(85-120)			1250 ug/Kg	07/01/2008
	LCSD	1320	106		6	(< 20)	1250 ug/Kg	07/01/2008
Ethylbenzene	LCS	1250	100	(85-125)			1250 ug/Kg	07/01/2008
	LCSD	1350	108		8	(< 20)	1250 ug/Kg	07/01/2008
o-Xylene	LCS	1210	97	(85-125)			1250 ug/Kg	07/01/2008
	LCSD	1310	105		8	(< 20)	1250 ug/Kg	07/01/2008
P & M -Xylene	LCS	2500	100	(85-125)			2500 ug/Kg	07/01/2008
	LCSD	2700	108		8	(< 20)	2500 ug/Kg	07/01/2008
Surrogates								
1,4-Difluorobenzene <surr>	LCS		96	(80-120)				07/01/2008
	LCSD		96		0			07/01/2008

Batch	VFC9039
Method	SW8021B
Instrument	HP 5890 Series II PID+FID VCA

SGS Ref.#	840252	Lab Control Sample	**Printed Date/Time**	07/14/2008	9:33
	840253	Lab Control Sample Duplicate	**Prep Batch**	XXX19601	
Client Name	Nortech		**Method**	SW3550C	
Project Name/#	Madcap 08-1014		**Date**	07/08/2008	
Matrix	Soil/Solid (dry weight)				

QC results affect the following production samples:

1082647001, 1082647002, 1082647003, 1082647004, 1082647005, 1082647006, 1082647007, 1082647008, 1082647009, 1082647010

Parameter		QC Results	Pct Recov	LCS/LCSD Limits	RPD	RPD Limits	Spiked Amount	Analysis Date
Semivolatile Organic Fuels Department								
Diesel Range Organics	LCS	162	98	(75-125)			166 mg/Kg	07/10/2008
	LCSD	153	92		6	(< 20)	166 mg/Kg	07/10/2008
Surrogates								
5a Androstane <surr>	LCS		102	(60-120)				07/10/2008
	LCSD		96		6			07/10/2008

Batch XFC8037
Method AK102
Instrument HP 5890 Series II FID SV A F

SGS 1082647

CHAIN OF CUSTODY RECORD
SGS Environmental Services Inc.

Locations Nationwide
- Alaska
- Hawaii
- Ohio
- Maryland
- New Jersey
- North Carolina
- West Virginia

www.us.sgs.com

085456

(1)
CLIENT: NORTECH
CONTACT: Ron Poeth PHONE NO:( ) 452 5688
PROJECT: Madcap 08.1014 SITE/PWSID# :
REPORTS TO: NORTECH E-MAIL:
FAX NO.:( ) 452 5694
INVOICE TO: NORTECH, 2400 College Rd, Fairbanks, AK QUOTE #
P.O. NUMBER

SGS Reference:

PAGE 1 OF 2

(2)

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	No CONTAINERS	SAMPLE TYPE (C=COMP G=GRAB)	Preservatives Used		Analysis Required (3) DRO AK102	BTEX 8021								REMARKS
								MeOH										
1 A,B	Ø1 4-5	6/25	1340	Soil	2	G			X	X								
2	Ø1 7-8	6/25	1345	Soil	2	G			X	X								
3	Ø1 17-18	6/25	1400	Soil	2	G			X	X								
4	10 10-11	6/25	1535	Soil	2	G			X	X								
5	12 6-7	6/25	1640	Soil	2	G			X	X								
6	12 14-15	6/25	1655	Soil	2	G			X	X								
7	11 13.5-14.5	6/25	1740	Soil	2	G			X	X								
8	DUP	6/25		Soil	2	G			X	X								
9	Ø5 14-15	6/26	0830	Soil	2	G			X	X								
10	Ø5 17-18	6/26	0840	Soil	2	G			X	X								

(5)

Collected/Relinquished By:(1)	Date	Time	Received By:	Date	Time
	6/27/08	1520	Christine McCabe	6-27-08	15:20
Relinquished By: (2) Christine McCabe	Date/ 6-27-08	Time 16:30	Received By:	Date	Time
Relinquished By: (3)	Date	Time	Received By:	Date	Time
Relinquished By: (4)	Date	Time	Received By:	Date 5/28/08	Time 1040

(4)

Shipping Carrier: FBXB
Shipping Ticket No:
Samples Received Cold? (Circle) YES NO TB
Temperature IC: 3.2 T 1.0
Special Deliverable Requirements:
Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT
Special Instructions:
Requested Turnaround Time:
☐ RUSH _____ Date Needed ☐ STD

☐ 200 W. Potter Drive Anchorage, AK 99518 Tel: (907) 562-2343 Fax: (907) 561-5301
☐ 5500 Business Drive Wilmington, NC 28405 Tel: (910) 350-1903 Fax: (910) 350-1557
☐ 1270 Greenbrier Street Charleston, WV 25311 Tel: (304) 346-0725 Fax: (304) 346-0761

SGS 1082647

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- Maryland
- New Jersey
- North Carolina
- West Virginia

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085437

(1)

CLIENT: NORTECH

CONTACT: Ron Pratt PHONE NO:(907) 452 -5688

PROJECT: Madcap 08-1014 SITE/PWSID# :

REPORTS TO: NORTECH E-MAIL:
2400 College Rd
Fairbanks AK FAX NO.:( ) 452-9644

INVOICE TO: NORTECH QUOTE #

P.O. NUMBER

SGS Reference:

PAGE 2 OF 2

(2)

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	No CONTAINERS	SAMPLE TYPE (C=COMP G=GRAB)	Preservatives Used	Analysis Required (3) BTEX 8021	REMARKS
(1) A	Trip Blank							X	

(5)

	Date	Time	Received By:	Date	Time
Collected/Relinquished By:(1)	6/27/08	1520	Christine McCabe	6-27-08	15:20
Relinquished By: (2) Christine McCabe	6-27-08	16:30			
Relinquished By: (3)					
Relinquished By: (4)				6/27/08	1040

(4)

Shipping Carrier: FBX B

Shipping Ticket No:

Samples Received Cold? (Circle) YES NO

Temperature °C: 3.2 r 1.0

Special Deliverable Requirements:

Chain of Custody Seal: (Circle)
INTACT BROKEN ABSENT

Special Instructions:

Requested Turnaround Time:
☐ RUSH _____ (Date Needed) ☐ STD

Page 22 of 26

☐ 200 W. Potter Drive Anchorage, AK 99518 Tel: (907) 562-2343 Fax: (907) 561-5301
☐ 5500 Business Drive Wilmington, NC 28405 Tel: (910) 350-1903 Fax: (910) 350-1557
☐ 1270 Greenbrier Street Charleston, WV 25311 Tel: (304) 346-0725 Fax: (304) 346-0761

White - Retained by Lab
Yellow - Returned with Report
Pink - Retained by Sampler

1082647

SGS

SAMPLE RECEIPT FORM

SGS WO#:

Yes	No	NA		
___	✓	___	Are samples **RUSH**, priority or *w/in 72 hrs* of **hold time**?	**TAT (circle one):** Standard -or- Rush
___	___	✓	If yes, have you done *e-mail ALERT notification*?	**Received Date:** 6-27-08
___	✓	___	Are samples *within 24 hrs.* of **hold time** or **due date**?	**Received Time:** 15:20
___	___	✓	If yes, have you also *spoken with* supervisor?	Is **date/time conversion** necessary? NO
___	✓	___	Archiving bottles (if req'd): Are they properly marked?	# of hours to AK Local Time: N/A
___	✓	___	Are there any **problems**? PM Notified? _____	**Thermometer ID:** FBX B
___	___	✓	Were samples preserved correctly and pH verified?	

Cooler ID	Temp Blank	Cooler Temp
1	1.0 °C	3.2 °C
	°C	°C
	°C	°C
	°C	°C
	°C	°C

Note: Temperature readings include thermometer correction factors

___	✓	___	If this is for PWS, provide **PWSID.** _____	
___	✓	___	Will courier charges apply?	
			Method of payment? _____	
✓	___	___	Data package required? (Level: 1 / 2 / 3 / 4)	
			Notes: _____	
___	✓	___	Is this a DoD project? (USACE, Navy, AFCEE)	

Delivery method (circle all that apply): Client / Alert Courier / UPS / FedEx / USPS / DHL / AA Goldstreak / NAC / ERA / PenAir / Carlile/ Lynden / SGS / Other: _____

Airbill # _____

Additional Sample Remarks: *(√if applicable)*

_____ Extra Sample Volume?
_____ Limited Sample Volume?
_____ MeOH field preserved for volatiles?
_____ Field-filtered for dissolved _____
_____ Lab-filtered for dissolved _____
_____ Ref Lab required? _____
_____ Foreign Soil?

This section must be filled out for DoD projects (USACE, Navy, AFCEE)

Yes	No	
___	___	Is received temperature 4 ± 2°C?
		Exceptions: Samples/Analyses Affected:
___	___	If temperature(s) <0 °C, were containers ice-free? N/A
		Notify PM immediately of any ice in samples.
___	___	Was there an airbill? *(Note # above in the right hand column)*
___	___	Was cooler sealed with custody seals?
		# / where: _____
___	___	Were seal(s) intact upon arrival?
___	___	Was there a COC with cooler?
___	___	Was COC sealed in plastic bag & taped inside lid of cooler?
___	___	Was the COC filled out properly?
___	___	Did the COC indicate USACE / Navy / AFCEE project?
___	___	Did the COC and samples correspond?
___	___	Were all sample packed to prevent breakage?
		Packing material: _____
___	___	Were all samples unbroken and clearly labeled?
___	___	Were all samples sealed in separate plastic bags?
___	___	Were all VOCs free of headspace and/or MeOH preserved?
___	___	Were correct container / sample sizes submitted?
___	___	Is sample condition good?
___	___	Was copy of CoC, SRF, and custody seals given to PM to fax?

This section must be filled if problems are found.

Yes	No	
___	___	Was client notified of problems?

Individual contacted: _____
Via: Phone / Fax / Email (*circle one*)
Date/Time: _____
Reason for contact: _____

Change Order Required? _____
SGS Contact: _____

Notes: client is aware of low cooler temp and wants to proceed with analysis. CM 6-27-08

Completed by (sign): _____ **(print):** Christine McCabe

Login proof (check one): waived ____ required ____ performed by: _____

SGS

SGS WO#: 1082647

SAMPLE RECEIPT FORM FOR TRANSFERS
From
FAIRBANKS, ALASKA OR HONOLULU, HAWAII
To
ANCHORAGE, AK

TO BE COMPLETED IN ANCHORAGE UPON ARRIVAL FROM FAIRBANKS OR HAWAII. NOTES RECORDED BELOW ARE ACTIONS NEEDED UPON ARRIVAL IN ANCHORAGE.

Notes: _____

Receipt Date / Time: 6/28/08 1040

Is Sample Date/Time Conversion Necessary? Yes _____ **No** ✓

Number of Hours From Alaska Local Time: —

Foreign Soil? Yes _____ **No** ✓

Delivery method to Anchorage (*circle all that apply*):

Alert Courier / UPS / FedEx / USPS / AA Goldstreak / NAC / ERA / PenAir / Carlile / ~~Lynden~~ / SGS

Other: _____

Airbill # _____

COOLER AND TEMP BLANK READINGS*

Cooler ID	Temp Blank (°C)	Cooler (°C)	Cooler ID	Temp Blank (°C)	Cooler (°C)
1	5.7	3.1			

CUSTODY SEALS INTACT: ~~YES~~ / **NO**

 # / WHERE: 2, 1 on front + 1 on back

COMPLETED BY: ~~CH~~ DD Joe Ruf.

**Temperature readings include thermometer correction factors.*

SGS

SAMPLE RECEIPT FORM (page 2)

SGS WO#: 1082647

#	Container ID	Matrix	Test	QC	TB	Container Volume: 1 L	500 mL	250 mL	125 mL	60 mL	40 mL	8oz (250 mL)	4oz (125 mL)	Other	Container Type: AG	CG	HDPE	Nalgene	Cubie	Coli	Septa	Other	Preservative: None	HCl	HNO_3	H_2SO_4	MeOH	$Na_2S_2O_3$	NaOH	Other
1-10	A	2	Btex										10		✓						✓						✓			
	B	2	DRO										10		✓								✓							
																												✓		
11	A	2	Btex		✓								1		✓						✓						✓			

Bottle Totals								21	

Completed by: _____ Date: 6/30/08

Form # F004r16 revised 03/10/08

SGS Environmental

CUSTODY SEAL WO# 2647

Signature: _____ Date/Time: 6-27-08 16:45

SGS Environmental

CUSTODY SEAL WO# 2647

Signature: _____ Date/Time: 6-27-08 16:45

Laboratory Data Review Checklist

Completed by:	Ronald J. Pratt
Title:	Environmental Scientist
Date:	June 03, 2009
CS Report Name:	Madcap/Ballaine Sub Petroleum
Report Date:	July 14, 2008
Consultant Firm:	NORTECH
Laboratory Name:	SGS
Laboratory Report Number:	1082647
ADEC File Number:	
ADEC RecKey Number:	

1. Laboratory

   a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?

   ☑ Yes ☐ No Comments:

   yes

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   ☐ Yes ☐ No Comments:

   Not applicable

2. Chain of Custody (COC)

   a. COC information completed, signed, and dated (including released/received by)?

   ☑ Yes ☐ No Comments:

   yes

b. Correct analyses requested?

☑ Yes ☐ No Comments:

yes

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?

☐ Yes ☑ No Comments:

cooler w/in range upon arrival in Fairbanks, but cooler temp. low upon arrival at lab in Anchorage

b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

☑ Yes ☐ No Comments:

yes

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

☑ Yes ☐ No Comments:

yes

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

☑ Yes ☐ No Comments:

yes

e. Data quality or usability affected? Explain.

Comments:

Data quality/usability not affected

4. Case Narrative

a. Present and understandable?

☑ Yes ☐ No Comments:

yes

b. Discrepancies, errors or QC failures identified by the lab?

☑ Yes ☐ No Comments:

yes, one sample had surrogate recovery results that did not meet the QC goals (biased high)

c. Were all corrective actions documented?

☑ Yes ☐ No Comments:

yes

d. What is the effect on data quality/usability according to the case narrative?

Comments:

Surrogate recovery value was biased high due to hydrocarbon interference, but does not adversly affect the data quality/usability of the sample

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

☑ Yes ☐ No Comments:

yes

b. All applicable holding times met?

☑ Yes ☐ No Comments:

yes

c. All soils reported on a dry weight basis?

☑ Yes ☐ No Comments:

not applicable

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?

☑ Yes ☐ No Comments:

yes

e. Data quality or usability affected? Explain.

Comments:

data quality/usability not affected

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

yes

☒ Yes ☐ No Comments:

ii. All method blank results less than PQL?

☒ Yes ☐ No Comments:

yes

iii. If above PQL, what samples are affected?

Comments:

Not applicable

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☒ Yes ☐ No Comments:

Not applicable

v. Data quality or usability affected? Explain.

Comments:

data quality/usability not affected

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples?

☒ Yes ☐ No Comments:

yes

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

☐ Yes ☐ No Comments:

Not applicable

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

☒ Yes ☐ No Comments:

yes

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

yes

☒ Yes ☐ No Comments:

v. If %R or RPD is outside of acceptable limits, what samples are affected?
Comments:

Not applicable

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?
☒ Yes ☐ No Comments:

Not applicable

vii. Data quality or usability affected? Explain.
Comments:

data quality/usability not affected

c. Surrogates – Organics Only
i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?
☒ Yes ☐ No Comments:

yes

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)
☐ Yes ☒ No Comments:

no

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?
☒ Yes ☐ No Comments:

yes

iv. Data quality or usability affected? Explain.
Comments:

data quality/usability not adversly affected; surrogate recovery of one "hot" sample submitted was biased high due to hydrocarbon interference

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

i. One trip blank reported per matrix, analysis and cooler?

☑ Yes ☐ No Comments:

yes

ii. All results less than PQL?

☑ Yes ☐ No Comments:

yes

iii. If above PQL, what samples are affected?

Comments:

Not applicable

iv. Data quality or usability affected? Explain.

Comments:

data quality/usability not affected

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

☑ Yes ☐ No Comments:

yes

ii. Submitted blind to lab?

☑ Yes ☐ No Comments:

yes

iii. Precision – All relative percent differences (RPD) less than specified DQOs? (Recommended: 30% water, 50% soil)

RPD (%) = Absolute value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

☑ Yes ☐ No Comments:

yes

iv. Data quality or usability affected? Explain.

Comments:

data quality/usability not affected

f. Decontamination or Equipment Blank (if applicable)

☐ Yes ☐ No ☐ Not Applicable

i. All results less than PQL?

☐ Yes ☐ No Comments:

Not applicable

ii. If above PQL, what samples are affected?

Comments:

Not applicable

iii. Data quality or usability affected? Explain.

Comments:

Not applicable

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?

☐ Yes ☐ No Comments:

Not applicable