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SOIL REMEDIATION CONSTRUCTION COMPLETION REPORT FORMER COASTAL DRILLING SITE SOLDOTNA, ALASKA

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Prepared for:
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June, 2016

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FORMER COASTAL DRILLING SITE
SOLDOTNA, ALASKA

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Source: Google Earth

FORMER COASTAL DRILLING SITE

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ACRONYMS & ABBREVIATIONS

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
BGS	Below Ground Surface
CY	cubic yards
DRO	Diesel-range organics
LCS	lab control sample
MRL	method reporting limits
MS/MSD	matrix spike/matrix spike duplicate
MSL	mean sea level
PCB	polychlorinated biphenyls
PQL	practical quantitation limit
QA	quality assurance
QC	quality control
RRO	Residual-range organics
TSCA	Toxic Substances Control Act
USEPA	U.S. Environmental Protection Agency

EXECUTIVE SUMMARY

This report documents soil remediation activities based on a six-year site investigation funded by the property owner and an approved cleanup plan at the Former Coastal Drilling site in Soldotna, Alaska. Remediation at the site began July 1, 2014, and soil excavation was completed on August 14, 2015.

Three areas on site were addressed as a part of these remediation activities:

- The Open Pit: This area was dewatered; intact and broken batteries and lead impacted soil were segregated and placed in 55-gallon drums for disposal. Non impacted debris was excavated and transported to the Kenai Borough Municipal Landfill.

- Covered Pit: Operations here were limited to exposing the end of the pipe from the Drill Shop Sump and collecting a soil sample for analysis.

- Drill Shop Sump: This involved significant soil excavation due to the presence of soil impacted by polychlorinated biphenyls (PCBs) in excess of the amount originally anticipated. This soil was distinctly different in appearance than surrounding native soils. It is therefore probable that the soil was contaminated at some off site location and brought on site for use as fill, rather than the contamination resulting from a release on site.

Excavated materials were transported for disposal on November 23, 2015. Waste streams removed from the site included:

- Intact batteries recycled through Gary's Auto Electric in Soldotna, Alaska.

- Battery plates from broken batteries transported to the Chemical Waste Management facility in Arlington, Oregon, where they were stabilized prior to disposal in a RCRA permitted landfill cell. These totaled approximately 1,800 pounds.

- Lead impacted soil associated with broken batteries and plates transported to the Chemical Waste Management facility in Arlington, Oregon, where they were stabilized prior to disposal in a RCRA permitted landfill cell. These totaled approximately 1,200 pounds.

- Soil containing less than 50 ppm PCBs was transported under Non-Hazardous Waste Manifest to the Chemical Waste Management facility in Arlington, Oregon, where they were placed in an appropriately permitted landfill cell. A total of 80.56 tons was so disposed.

- Soil containing 50 ppm or more transported under Hazardous Waste to the Chemical Waste Management facility in Arlington, Oregon, where they were placed in TSCA permitted landfill cell. A total of 26.1 tons was so disposed.

Results of this remediation effort can be summarized as follows:

- The objective of removing lead impacts and miscellaneous debris from the Open Pit was achieved.

- No evidence of PCB impacts was found at the discharge end of the line from the Drill Shop Sump to the Covered Pit.

- Remaining PCB impacts at the Drill Shop Sump area have a mean concentration of 0.154 mg/Kg PCBs with a maximum value of 2.005 mg/Kg.

- DRO impacted soils remain in the Drill Shop Sump area in excess of ADEC's Migration to Groundwater criteria, however the presence of MW-1 with no past detections of DRO at above ADEC cleanup levels inside the footprint of the excavation area suggests that the migration to groundwater pathway is incomplete.

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1.0 INTRODUCTION

This report has been prepared by ALTA Geosciences, Inc. (ALTA) of Bothell, Washington, on behalf of Kenai Spur Investments, LLC., to document soil remediation work at the former Coastal Drilling Site in Soldotna, Alaska (Site). The purpose of this report is to present the results of soil remediation conducted in 2014 and 2015 at the site

A complete copy of this report is included on a CD is in PDF format attached to the back cover of this report. All appendixes are included on that CD.

This work was performed in accordance with the *Site Cleanup Plan Former Coastal Drilling Site, Soldotna Alaska* (ALTA, April 2014, hereafter referred to as the Cleanup Plan). ADEC subsequently provided comments to the Cleanup Plan in a letter dated May 23, 2014. ALTA provided responses to these comments in a letter dated June 2, 2014 (*Response to Comments, Former Coastal Drilling Site, Soldotna, Alaska*). ADEC approved the Cleanup Plan, as amended by letter dated June 26, 2014.

All field work was performed under the direct supervision of a "qualified person" as required under 18 AAC 75.

1.1 SITE LOCATION

The former Coastal Drilling facility is located at mile 0.5 Kenai Spur Road, Soldotna, Alaska. The legal description of the Property is described as the eastern half of Section 29, T5N, R10W, Seward Meridian as shown on Figure 1. The entire property includes several adjacent parcels totaling approximately 7 acres as shown on Figure 2.

The report is documents site cleanup activities primarily on the area within the chain link fence also shown on Figure 2 as well as the "grate sump" area located adjacent to the southwest corner of the fenced area.

1.2 BACKGROUND

The site was first developed by Coastal Drilling Company in 1957. Coastal Drilling Company conducted their oil and gas well drilling business from the site. Operations at the site consisted of drill rig maintenance and cleaning. Drilling company operations at the site ceased about 1981, although various companies have continued to operate the machine shop (presently vacant). The Coastal Drilling Company has since gone bankrupt. Mr. Donald Jack acquired the property in 1988. Mr. Jack had no prior ownership or operational involvement with the Coastal Drilling Company.

Prior reports indicate that site development included digging a debris disposal pit and constructing a machine shop, a drilling shop, and an office building. During the time the drilling companies operated the site, scrap iron, engines, lumber, and other drilling rig junk

were placed in the debris disposal pit. A grate and drain associated with the drilling shop (now demolished) is also reported to have received rig wash water which was conducted to the disposal pit via a 6-inch pipe (referred to as the "grate area"). This pit was subsequently filled and is referred to as the "covered pit". A second pit was excavated and remains open. This second pit is referred to as the "open pit" and is visible on the air photo in the frontispiece to this report.

All development and all operation of these improvements that would have contributed to contamination occurred prior to Mr. Jack's acquiring the property.

2.0 SUMMARY OF PRIOR INVESTIGATIONS

2.1 PRIOR INVESTIGATIONS

Prior reports on the site include the following:

- 1988: *Preliminary Site Investigation*. ENSR Consulting and Engineering, Inc. (ENSR) performed an investigation for property transfer for the Federal Savings and Loan Insurance Corporation that included a geophysical survey, backhoe test pits, soil borings, and installation of monitoring wells.

- 1987: *Preliminary Assessment Report*. Tryck, Nyman, Hayes. This was primarily a site reconnaissance with no sampling or laboratory analyses.

- June, 1990: *Final Report Coastal Drilling Site Investigation, Soldotna, Alaska*. Harding Lawson Associates (HLA). HLA's investigation program included test pits and borings for soils sampling and installation of groundwater monitoring wells.

- August 1992*: Environmental Site Investigation Coastal Drilling Facility Soldotna, Alaska.* Shannon & Wilson, Inc. (S&W). S&W's site investigation included more test pits, soil borings, and monitoring wells.

- December, 1993: *Feasibility Study, Coastal Drilling Site, Soldotna, Alaska*. This study by HLA evaluated various remediation strategies for the site.

- 2010: *Focused Site Investigation Report*. ALTA Geosciences, Inc. (ALTA). The ALTA investigation included test pits in the open and covered pit areas with soil sampling and analysis for GRO, DRO, RRO, volatile organic compounds (VOCs, including BTEX), polychlorinated biphenyls (PCBs), total lead, total chromium, and hexavalent chromium. In addition, a site topographic survey was conducted to provide a baseline map for future work and the density and relative compaction of the fill soils in the covered pit was evaluated.

- In addition, a number of groundwater monitoring events have been performed on behalf of ADEC. The most recent report which we have found was performed in 2006 by Hart Crowser (*Groundwater Sampling, Coastal Drilling Facility, Soldotna, Alaska*).

The reports from 1992 and earlier are of limited usefulness due to:

- Poor to nonexistent documentation of sample locations

- Questionable sampling procedures, such as collecting water samples from test pits

- Outdated analytical methodologies for petroleum hydrocarbons (quantified as "Total Petroleum Hydrocarbons" (TPH) rather than Gasoline-range, Diesel-range, or

Residual Range Organics (GRO, DRO, or RRO)) and benzene, toluene, ethylbenzene, and xylenes (BTEX) which are sometimes reported as "Total BTEX" rather than speciated to individual compounds.

2.2 SUMMARY PRIOR INVESTIGATIONS

Although much of the data provided in early reports lacks sufficient specificity as to the location the sample was taken and other factors cited above, these data together with the data reported in the ALTA 2010 report were considered in establishing the cleanup plan for the site.

Based on these prior investigations, three areas of concern warrant consideration for site remediation:

- Covered Pit area
- Open Pit area
- Drill Shop Sump area

Analytical results from prior investigations from these areas are summarized on Table 1. This data is then reorganized and presented by area of concern on Table 2.

2.2.1 Covered Pit

Prior investigations indicate that the covered pit includes approximately five feet of imported fill placed on top of mixed soil and waste material and debris. Compounds of concern (COCs) exceeding ADEC Method 2 criteria include:

- **PCBs:** PCBs were detected at a maximum concentration of 33 mg/Kg in one sample. One sample contained 13 mg/Kg PCBs, while the other seven samples contained PCB concentrations ranging from non-detect to 2.5 mg/Kg.
- **Lead:** Lead was detected eight samples at a concentration ranging from 9 mg/Kg to 1,260 mg/Kg. Six of the eight samples contained Lead at less than 400 mg/Kg (ADEC method 2 criteria for direct contact/ingestion).
- **Volatile Organic Compounds (VOCs):** Trichloroethene (TCE) and tetrachloroethene (TCE) were detected in two of eight samples at concentrations of up to 0.88 mg/Kg. Six samples contained less than 0.018 mg/Kg, with five samples being non-detect.
- **Petroleum hydrocarbons:** Seven of the ten analyses for petroleum hydrocarbons were made using EPA method 418.1, which does not quantitate the carbon range of the analytes and may include hydrocarbons beyond the GRO/DRO/RRO range. Nevertheless, some results were quite high, ranging up to 260,000 parts per million

(ppm). The three analyses which were performed using ADEC methods AK101, AK103, and AK103 showed GRO concentrations up to 41 mg/Kg, DRO concentrations up to 1,240 mg/Kg and RRO concentrations up to 2,620 mg/Kg. Considering the site history and the later analyses, it is likely that the early TPH analyses reflect high levels of DRO and RRO.

The geotechnical data for the covered pit soil cap shows that it is a silty sand with a maximum density of 130 pounds per cubic foot.

2.2.2 Open Pit

The Open Pit is 10 to 11 feet deep and contains a heterogeneous mix of debris including large amounts of pallets, tires, drums, lumber, cables, and scrap iron as well as miscellaneous items such as a desk and miscellaneous parts of vehicles and other machinery. The debris generally appears to be uncontaminated solid waste except in one location where several vehicle batteries and battery parts were observed and hydrocarbon-impacted soils were encountered at a depth of about 10 feet. COCs exceeding ADEC Method 2 criteria include:

- **Lead:** Of the six analyses performed, only one exceeded 100 mg/Kg (Shannon & Wilson sample PS-2, 800 mg/Kg). The presence of lead-acid batteries and battery parts is also significant.

- **Petroleum hydrocarbons:** Two of the seven samples analyzed indicate levels of petroleum hydrocarbons at levels of concern: Shannon & Wilson sample B6-S1 (10,800 mg/Kg as TPH); and ALTA sample 09TP-03 (323 mg/Kg GRO and 9,650 mg/Kg DRO).

2.2.3 Drill Shop Sump

The drill shop sump itself is a comparatively small feature approximately two feet square. It is also sometimes referred to as the “Grate Area” as there was originally a steel grate on the sump. A pipe led from the sump to the covered pit. Samples taken from around the sump identified the following COCs:

- **PCBs:** Three of eight samples from this area detected PCBs in excess of 1 mg/Kg, however only one sample contained greater than 10 mg/Kg PCBs (Harding Lawson sample MW01, 21 mg/Kg from one foot deep).

- **Petroleum hydrocarbons:** Seven samples have been analyzed for petroleum hydrocarbons, all of which were analyzed only for total petroleum hydrocarbons by EPA method 418.1. Six of the seven samples contained significantly elevated TPH results, with reported concentrations as high as 140,000 mg/Kg. Considering the past use of the sump it is likely that these represent predominantly DRO and RRO range constituents.

2.3 GROUNDWATER

A shallow perched zone of water is reported to be present beneath the site, and creates occasional flooding of the pit(s). It is likely that this perched water condition results from the prior dumping of drilling mud into the pits which has effectively sealed the pits, creating a "bathtub" effect. Over a broader area outside the pits, the normal groundwater depth is approximately 31 to 34 feet below the ground surface.

Previous groundwater sampling events have not encountered any contaminant impacts in groundwater monitoring wells.

3.0 REMEDIAL ACTION OBJECTIVES

As described in the Cleanup Plan, the Remedial Action Objectives for the site are summarized as follows:

- Prevent migration of COCs to groundwater that would result in exceedances of ADEC/EPA criteria for drinking water.
- Prevent contact, ingestion or inhalation (directly or via fugitive dust) of COCs in site soils which may contain COCs above ADEC and EPA criteria
- Remove Lead-acid batteries, battery debris, and Lead impacted soils that could potentially constitute hazardous waste under the Resource Conservation and Recovery Act (RCRA).
- To the extent practicable, remove and properly recycle or dispose of the miscellaneous debris (solid waste) presently in the open pit.

4.0 CLEANUP PLAN OBJECTIVES

As described in the Cleanup Plan, the objectives of the soil remediation were as follows:

4.1 COVERED PIT

The Covered Pit will be capped using an asphalt pavement capping system. The asphalt cap would preclude surface water infiltration thus further reducing the potential for migration of COPCs to groundwater and prevent inhalation/ingestion/contact exposure pathways. The details of the asphalt cap will be provided separately in a set of engineering plans and specification stamped by a civil engineer licensed in the State of Alaska.

In addition, prior to placing the asphalt cap, the discharge point of the pipe from the Drill Shop Sump area (see below) will be excavated and any PCB impacted soils will be excavated and properly disposed of.

4.2 OPEN PIT

The open pit area was to be cleared of brush and trees which were to be recycled elsewhere on the site. Non-hazardous debris was to be excavated and placed in trucks for offsite disposal in a municipal landfill. Any large metallic objects (e.g. engine blocks, drill pipes, etc.) that can be separated and recycled, were to be recycled if practical or disposed of at the local landfill.

If dewatering was to be required, water in the pit would be sampled and analyzed for DRO, GRO, VOCs, PAHs, and Lead and the results submitted to ADEC for review prior to dewatering the pit.

Known potentially hazardous materials, such as Lead vehicle batteries, were to be recycled at a licensed battery recycling facility, if in whole condition. Broken batteries, Lead plates, battery sludge and battery parts which cannot be accepted for recycling were to be drummed and sent under manifest for disposal at a permitted hazardous waste disposal facility. Any treatment required to meet Federal Land Disposal Regulations for Lead will be completed at the landfill site. Soils beneath locations where broken batteries, Lead plates, battery sludge and battery parts are found will be sampled and analyzed for Lead. Soils which fail the Toxicity Characteristic Leaching Criteria for Lead will be excavated, containerized (drums or bulk lift bags) and sent under manifest for disposal at a permitted hazardous waste disposal facility.

The open pit was to be evaluated for DRO and GRO impacts after removal of the above described debris in accordance with ADECs guidance document *Guidance for Cleanup of Petroleum Contaminated Sites* (September, 2000). All samples will be analyzed for DRO/GRO and Lead.

Soil found to exceed the DRO and/or GRO cleanup criteria (250 mg/Kg DRO and 300 mg/Kg GRO per 18 AAC 75.341) were to be excavated, tested in stockpile for disposal purposes, and ultimately shipped for thermal treatment.

After the cleanup is completed, the open pit was to be backfilled with clean imported soil to conform to the surrounding grades.

4.3 DRILL SHOP SUMP AREA

The grate and associated sump were believed to be quite small, no more than two feet square. Construction of the sump was uncertain. The soils from three feet from all sides of the grate area (including the grate and associated sump) were to be excavated to the depth of the sump and at least two feet below the present ground surface. Soils and grate/sump materials were to be placed in a separate stockpile area and sampled and analyzed to evaluate appropriate disposal options. The resultant excavation was to be sampled in accordance with ADECs guidance document *Guidance for Cleanup of Petroleum Contaminated Sites* (September, 2000). At least one sample was to be collected from each excavation sidewall and immediately below the former sump location. All samples were to be analyzed for GRO/DRO/RRO and PCBs. If any results exceeded ADEC Method 2 criteria, the excavation was to be expanded in one-foot increments and the affected area resampled and analyzed.

Once the excavation achieved the cleanup criteria, the stockpiled soils were to be sampled and analyzed as needed to evaluate disposal options. If the soils were found to contain greater than one mg/Kg PCBs but less than 50 mg/Kg PCBs they were to be transported to and disposed of at an appropriately permitted Subtitle D facility in the lower 48 states. If the soils were found to contain 50 mg/Kg PCBs or greater, they were to be transported under hazardous waste manifest to a landfill permitted under the provisions of 40 CFR 761.

5.0 REMEDIATION ACTIVITIES

5.1 CLEARING

Prior to further remediation work, the open pit and covered pit were cleared of vegetation. The vegetation was cut and stacked in windrows in other portions of the site.

5.2 OPEN PIT

A sample of the water in the open pit was collected on May 12, 2014. The sample was analyzed for:

- GRO (ADEC method AK-101)
- DRO (ADEC method AK-102)
- VOCs (EPA method 8260B)
- PAHs (EPA method 8270 SIM)
- Lead (EPA method 6020A)

The only analyte detected was Lead at 36.2 ug/L. This data was reported to ADEC in a letter dated May 21, 2014. Based on these results, ADEC authorized the open pit to be dewatered with the water being land applied on site with the provision that such dewatering be monitored to ensure it did not run off from the site. The open pit was dewatered accordingly on June 7, 2014.

Removal of the debris from the open pit began on July 2, 2014 and was completed on July 10, 2014. Recovered intact batteries, broken batteries and battery plates, and associated soil are described in Section 7.0. See Photos 1 through 4.

5.3 COVERED PIT

On June 9, 2014, the location of the pipe running from the drill shop sump to the covered pit was identified about 20 feet southwest of it's termination in the covered pit. The pipe was approximately 3.5 feet bgs. The pipe outlet was excavated together with a small amount of soil that was placed on the soil stockpile. Further excavation could not be performed due to the presence of several car bodies and other debris

A soil sample was collected from the soil at the pipe outlet. The sample was analyzed for PCBs, Lead, GRO, DRO and VOCs. The sample (laboratory id 1152738-003) contained no detectable PCBs. Detected analytes included:

- Lead 3,780 mg/Kg

- DRO 88,600 mg/Kg
- GRO 53 mg/Kg
- 1,2,4-Trimethylbenzene 7.69 mg/Kg
- 1,3,5-Trimethylbenzene 4.95 mg/Kg
- 4-Isopropyltoluene 0.772 mg/Kg
- O-Xylene 0.78 mg/Kg

Of these, only Lead and DRO exceed ADEC cleanup levels.

Note that the sample was incorrectly labelled as “CD-17” in the field.

5.4 DRILL SHOP SUMP

Based on surface observations, the Drill Shop Sump was assumed to be a small structure (see Photos 5 and 6). Excavation of the Drill Shop Sump began on July 15, 2014. After removal of the grate and initial soil excavation, it was immediately apparent that this structure was considerably more extensive than originally anticipated. A timber crib approximately four feet square on the west side of the sump. The pipe leading to the covered pit was located on the north side of the crib (see Photo 7).

Approximately 60 cubic yards (CY, in-place volume) of soil and debris were removed in eight stages between July 2014 and August 2015 from an excavation covering a total of approximately 730 square feet. The excavated soil was placed in a covered stockpiled on the concrete pad adjacent to the excavation pending transport and disposal.

The excavated soil was distinctly different from the native soils exposed on either side and the bottom of the excavation. This material therefore appears to have been imported fill which was contaminated at some off site location and then brought to the site in a contaminated form rather than the contamination resulting from an on site release.

Figure 4 shows the approximate grate area excavation limits as of August 4, 2015. Sample locations and PCB concentrations are also shown on Figure 4. Note that an underlined sample concentration indicates that the soil represented by the sample was subsequently excavated. All soil sample results are summarized in Table 1. Table 2 shows only PCB results for clarity. The excavation work proceeded as described below.

- **July 15, 2014**. The grate and underlying wood crib was removed. A 6-inch steel pipe running from the crib to the covered pit was left in place. PCBs exceeded 1 mg/Kg on the bottom and west sidewall of the excavation (samples CD-3 and CD-6). Hydrocarbon impacts are present on the east and south sides of the excavation, but

PCB was not detected (samples CD4 and CD-5). PCBs were also not detected immediately below the 6-inch pipe leading to the covered pit (sample CD-1).

- **September 22, 2014**. The excavation was extended ~4 feet west and was deepened at sample location CD-6. The west sidewall sample collected at this point (sample CD-7) contained 3.70 mg/Kg PCB. A wood board crib and pipe was exposed along the north side of the excavation. Field screening by photoionization detector (PID) head space readings indicated minimal hydrocarbon impacts in this area (PID readings of 1.1 to 6.0 parts per million (ppm)).
- **October 9, 2014**. The excavation was extended ~3 feet further west and south. Soil relationships observed at this point suggest that PCB-impacted material was deposited as fill at the site as opposed being contaminated in place. Two distinct zones of fill covering native silt was apparent on the west sidewall. A pit-run gravel layer predates gravel plus debris that appears to have been dumped in a shallow trench cut through the pit-run material into native silt. PID screening of the gravel plus debris material showed elevated head space readings of 35 to 120 parts per million (ppm), and sample CD-8 from the gravel and debris zone contained 19.8 mg/Kg PCBs and 23,000 mg/Kg DRO. In contrast, PID readings in the pit-run layer and native silt were 0.3 to 8.0 ppm, and sample CD-9 of the silt contained no detectable PCBs and 356 mg/Kg DRO.
- **October 20, 2014**. The excavation was extended 10 feet further west following the PCB-impacted gravel plus debris zone. The depth of the zone decreased to the west from ~4 feet at sample location CD-8 to ~2 feet at location CD-12. Native silt immediately below the gravel plus debris material was characterized by bottom sample CD-11 which contained no detectable PCBs and 77 mg/Kg DRO. The gravel plus debris material on the west side wall (sample CD-12) contained 5.54 mg/Kg PCBs. A refrigerated connex unit blocked further excavation to the west at this time.
- **November 3, 2014**. The connex was moved and the excavation extended 6 feet further west following the PCB-impacted gravel plus debris zone to its apparent end. Sidewall sample CD-13 was collected on the gravel plus debris zone trend past its apparent end, but contained 2.77 mg/Kg PCB. Sample CD-14 was collected ~3 feet to the south and contained 0.190 mg/Kg PCBs. Both sample locations had low PID readings and low DRO concentrations (109 to 183 mg/Kg).
- **June 9, 2015**. The excavation was extended 7 to 10 feet west to the edge of a storage connex. Eight to 12 inches of gravel from immediately below the concrete was removed. West sidewall sample CD-15 contained 84.6 mg/Kg PCB. The sample was collected from a 4- to 5-feet wide zone of medium to dark gray sand and gravel that was distinguished from otherwise similar light gray soil to the north and south. The sample contained 6,620 mg/Kg DRO, but the head-space PID reading for the sample was 0.0 ppm. Bottom sample CD-16 did not contain detectable PCB.

- **June 29, 2015**. The excavation was extended approximately 12 feet further west to the edge of another storage connex. The excavation removed approximately 12 inches of sand and gravel occurring between the bottom of the concrete and native soil as well as up to 6 inches of native silt. Soil from this stage of the excavation was placed on the west end of the stockpile. West sidewall samples CD-17 and CD-18 contained, respectively 0.635 and 24.1 mg/Kg PCB. Bottom sample CD-19 was native silt soil and contained 8.87 mg/Kg PCB.
- **August 4, 2015**. The excavation was extended approximately 10 feet west to the edge of the warehouse building and was deepened on the east end to remove soil at sample location CD-19. The soil from this phase of excavation was segregated from the existing stockpile using plastic sheet as a separator. Bottom sample CD-20 was collected in native silt and did not contain detectable PCB indicating that impacted soil at location CD-19 was removed. West sidewall sample CD-21 collected adjacent to the building foundation did not contain detectable PCB. West sidewall sample CD-22 contained 2.005 mg/Kg PCB, and soil characterized by this sample remains in place.

Sample CD-1 contained very high levels of DRO and RRO, but represented only a very small area directly below the pipe opening. To verify this, two additional samples were collected from either side of the CD-1 sample on October 29, 2015, designed CD-23 and CD-24. These samples contained much lower concentrations of DRO and RRO as shown on Table 1.

6.0 SAMPLING & ANALYSIS

Sampling and analysis was performed in accordance with the *Field Sampling/Quality Assurance Project Plan, Former Coastal Drilling Site, Soldotna, Alaska* (ALTA, June 2014). Samples were submitted under chain of custody procedures.

All samples were analyzed by SGS Environmental Services of Anchorage, Alaska, an Alaska certified analytical laboratory. Analysis results are shown on Table 3. Laboratory analysis certificates in Appendix A. Data quality assurance (QA) review reports together with ADEC's Laboratory Data Review Checklists are presented Appendix B.

The QA evaluation included a review, where appropriate, of holding times, blanks, matrix spike (MS) and laboratory control sample (LCS) recoveries, duplicate sample relative percent differences (RPDs), reporting limits, and overall assessment of data in the sample event.

Field samples were reviewed to determine overall precision of sampling and analysis as well as matrix heterogeneity for PCBs.

Laboratory data were evaluated using laboratory-supplied control criteria. In the following method-specific discussions, only the criteria exceedances that impact data qualification or require assessment beyond laboratory documentation are discussed.

The following summary highlights the data evaluation findings for this sampling event:

- No data are rejected.
- The completeness objectives (greater than 85 percent complete) for this project are met.
- The precision and accuracy of the laboratory data, as measured by laboratory quality control indicators, suggest that the data are useable as qualified for the purposes of this project.
- The precision measurements for result comparisons between primary and duplicate field samples are generally acceptable for the purpose of this project.

All other sample results are considered to be valid with no data qualifiers assigned.

7.0 WASTE MANAGEMENT & DISPOSAL

Waste disposal quantities are summarized on Table 3. Manifests and Certificates of Disposal are contained in Appendix C. The following waste streams were managed as described below:

- Intact batteries: Six standard vehicle size batteries, 1 heavy equipment size battery and 1 motorcycle size battery were recovered from the Open Pit. These were recycled through Gary's Auto Electric in Soldotna, Alaska.

- Battery plates from broken batteries: These were collected into three 55-gallon drums totaling 1,800 pounds. These were manifested as D008 Hazardous Waste and transported to the Chemical Waste Management facility in Arlington, Oregon, where they were stabilized prior to disposal in a RCRA permitted landfill cell.

- Lead impacted soil associated with broken batteries and plates: These were collected into two 55-gallon drums totaling 1,200 pounds. These were manifested as D008 Hazardous Waste and transported to the Chemical Waste Management facility in Arlington, Oregon, where they were stabilized prior to disposal in a RCRA permitted landfill cell.

- Soil containing less than 50 ppm PCBs: These were initially placed in a covered stockpile on the concrete slab on site. At the end of the project, they were loaded into covered bins and transported under Non-Hazardous Waste Manifest to the Chemical Waste Management facility in Arlington, Oregon, where they were placed in an appropriately permitted landfill cell. A total of 80.56 tons was so disposed.

- Soil containing 50 ppm or more PCBs: These were initially placed in a covered stockpile on the concrete slab on site. At the end of the project, they were loaded into covered bins and transported under Hazardous Waste to the Chemical Waste Management facility in Arlington, Oregon, where they were placed in a TSCA permitted landfill cell. A total of 26.1 tons was so disposed.

8.0 DISCUSSION OF RESULTS

Soil remaining from the Drill Shop Sump excavation are characterized by 13 samples which contain an average concentration of 0.154 mg/Kg PCBs. These soils do contain elevated levels of DRO and RRO. Excluding sample CD-1 due to the small volume represented, the mean concentrations are 1,776 mg/Kg DRO and 5,522 mg/Kg RRO. The DRO levels exceed ADEC's Migration to Groundwater criteria (250 mg/Kg) but are well below the ingestion/inhalation criteria (10,250 mg/Kg). That DRO has never been detected in MW-1 (inside the excavation footprint) at levels of concern strongly suggests that the migration to groundwater pathway is incomplete. Therefore it is reasonable to leave these soils on site subject to institutional controls.

9.0 CONCLUSIONS

The soil remediation described herein substantially met the goals outlined in the Cleanup Plan. The volume of PCB impacted soil encountered at the drill shop sump area was far larger than originally anticipated. This soil appears to have been contaminated at some off site location and then brought on site as fill, rather than the contamination resulting from a release at the site.

At this time we are requesting that ADEC approve the capping plan to be submitted by others and issue a determination of “Cleanup Complete – Institutional Controls” for the site.

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10.0 REFERENCES

ALTA Geosciences, Inc., June 2014, April 2014, *Site Cleanup Plan - Former Coastal Drilling Site, Soldotna Alaska*

ALTA Geosciences, Inc., June 2014, *Field Sampling/Quality Assurance Project Plan, Former Coastal Drilling Site, Soldotna, Alaska*

ALTA Geosciences, Inc., 2010: *Focused Site Investigation Report, Former Coastal Drilling Site, Soldotna, Alaska*.

ENSR, Inc., 1988: *Preliminary Site Investigation*.

Harding Lawson Associates, June 1990: *Final Report Coastal Drilling Site Investigation, Soldotna, Alaska*.

Harding Lawson Associates, December, 1993: *Feasibility Study, Coastal Drilling Site, Soldotna, Alaska.*

Hart Crowser, 2006: *Groundwater Sampling, Coastal Drilling Facility, Soldotna, Alaska*

Shannon & Wilson, Inc., August 1992*: Environmental Site Investigation Coastal Drilling Facility Soldotna, Alaska.*

Tryck, Nyman, Hayes, Inc., 1987: *Preliminary Assessment Report*.

TABLES

Table 1. Summary of soil sample analytical results (mg/kg)

Sample ID	Sample Location	Lab ID	Date Sampled	Status	Location		PCBs (total)	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selimium	Silver	GRO	DRO	RRO	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	4-Isopropyltoluene	Benzene	Ethylbenzene	Isopropylbenzene	n-Butylbenzene	n-Propylbenzene	Naphthalene	sec-Butylbenzene	Toluene	Trichloroethene	Xylenes (total)
						criteria[1] →	1	4.5	20300	79	300	400	18	510	510	1400	10250	10000	49	42	--	11	110	62	42	--	28	41	220	0.57	63
						criteria[2] →	1	3.9	1100	5	$>10^6$	--	1.4	3.4	11.2	300	250	11000	23	23	--	0.025	6.9	51	15	--	20	12	6.5	0.02	63
CD-01	**CD-01**	**1143168-1**	**7/16/14**	**Meets criteria**	**N sidewall**		0.647	**7.30**	964	1.16	39.2	499	0.0665	<1.14	<0.227	354	**36400**	**59600**	110	56.5	2.63	**0.0378**	0.505	2.13	0.898	2.21	6.84	2.13	2.67	**0.0445**	40.6
CD-02	**CD-02**	**1143168-2**	**7/16/14**	**Meets criteria**	**S sidewall**		0.331	**7.57**	118	<0.224	41.9	23.5	0.0558	<1.12	<0.224	98.2	**3120**	1750	0.584	0.398	0.772	<.016	<.032	<.032	0.205	0.0653	0.326	0.236	<.032	<.016	<.096
CD-03	**CD-03**	**1143755-1**	**8/11/14**	**Excavated 9/22/14**	**bottom**		**2.18**	--	--	--	--	95.2	--	--	--	45.1	**4600**	6690	--	--	--	--	--	--	--	--	--	--	--	--	--
CD-04	**CD-04**	**1143755-2**	**8/11/14**	**Meets criteria**	**E sidewall**		<0.562	--	--	--	--	257	--	--	--	23.9	**5330**	**11700**	--	--	--	--	--	--	--	--	--	--	--	--	--
CD-05	**CD-05**	**1143755-3**	**8/11/14**	**Meets criteria**	**E sidewall**		<0.547	--	--	--	--	99.7	--	--	--	<3.84	**1380**	5140	--	--	--	--	--	--	--	--	--	--	--	--	--
CD-06	**CD-06**	**1143755-4**	**8/11/14**	**Excavated 9/22/14**	**W sidewall**		**1.16**	--	--	--	--	337	--	--	--	122	**5860**	7330	--	--	--	--	--	--	--	--	--	--	--	--	--
CD-6D	**CD-06**	**1143755-5**	**8/11/14**	**Meets criteria**	**Dup**		0.816	--	--	--	--	238	--	--	--	92.2	**5550**	9770	--	--	--	--	--	--	--	--	--	--	--	--	--
CD-07	**CD-07**	**1144699-1**	**9/22/14**	**Excavated 10/9/14**	**W sidewall**		**3.70**	--	--	--	--	--	--	--	--	--	**6870**	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CD-08	**CD-08**	**1145068-1**	**10/9/14**	**Excavated 10/20/14**	**W sidewall**		**19.8**	--	--	--	--	--	--	--	--	--	**23000**	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CD-09	**CD-09**	**1145068-2**	**10/9/14**	**Meets criteria**	**S sidewall**		<0.306	--	--	--	--	--	--	--	--	--	**356**	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CD-10	**CD-08**	**1145068-3**	**10/9/14**	**Dup of CD-8**			**19.2**	--	--	--	--	--	--	--	--	--	**19700**	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CD-11	**CD-11**	**1145256-1**	**10/21/14**	**Meets criteria**	**bottom**		<0.0585	--	--	--	--	--	--	--	--	--	77.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CD-12	**CD-12**	**1145256-2**	**10/21/14**	**Excavated 11/3/14**	**W sidewall**		**5.54**	--	--	--	--	--	--	--	--	--	**2950**	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CD-13	**CD-13**	**1145499-1**	**11/3/14**	**Excavated 6/9/15**	**W sidewall**		**2.77**	--	--	--	--	--	--	--	--	--	183	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CD-14	**CD-14**	**1145499-2**	**11/3/14**	**Meets criteria**	**S sidewall**		0.190	--	--	--	--	--	--	--	--	--	109	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CD-15	**CD-15**	**1152738-1**	**6/9/15**	**Excavated 6/30/15**	**W sidewall**		**84.6**	--	--	--	--	--	--	--	--	--	**6620**	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CD-16	**CD-16**	**1152738-2**	**6/9/15**	**Meets criteria**	**bottom**		<0.561	--	--	--	--	--	--	--	--	--	417	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CD-17	**CD-17**	**1153302-1**	**6/30/15**	**Meets criteria, excavated 8/4/15**	**W sidewall**		0.635	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CD-18	**CD-18**	**1153302-2**	**6/30/15**	**Excavated 8/4/15**	**W sidewall**		**24.1**	--	--	--	--	--	--	--	--	--	**1160**	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CD-19	**CD-19**	**1153302-3**	**6/30/15**	**Excavated 8/4/15**	**bottom**		**8.87**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CD-20	**CD-20**	**115259-1**	**8/4/15**	**Meets criteria**	**bottom**		<0.0697	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CD-21	**CD-21**	**115259-2**	**8/4/15**	**Meets criteria**	**W sidewall**		<0.0525	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CD-22	**CD-22**	**115259-3**	**8/4/15**	**Remains in place**	**W sidewall**		**2.01**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CD-23	**CD-23**	**1156441-1**	**10/29/15**	**Remains in place**	**N sidewall**		--	--	--	--	--	--	--	--	--	--	484	2100	--	--	--	--	--	--	--	--	--	--	--	--	--
CD-24	**CD-24**	**1156441-2**	**10/29/15**	**Remains in place**	**N sidewall**		--	--	--	--	--	--	--	--	--	--	932	2670	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:

1. Criteria listed is the lesser of direct contact, outdoor inhalation, or ingestion criteria given in 18 AAC 75 Table B2.
2. Migration to groundwater criteria given in 18 AAC 75 Table B2.

"--" = analyte not analyzed for

Table 2 - Summary of PCB analytical results in soil

Sample ID	Date	Location	Lab ID	PCBs	Discussion
CD1	7/16/14	N sidewall	1143168-1	0.647	Meets criteria
CD2	7/16/14	S sidewall	1143168-2	0.331	Meets criteria
CD-3	8/11/14		1143755-1	**2.18**	Excavated 9/22/14
CD-4	8/11/14	E sidewall	1143755-2	<0.562	Meets criteria
CD-5	8/11/14	E sidewall	1143755-3	<0.547	Meets criteria
CD-6	8/11/14	W sidewall	1143755-4	**1.16**	Excavated 9/22/14
CD-6D	8/11/14	Dup	1143755-5	0.816	Meets criteria
CD-7	9/22/14	W sidewall	1144699-1	**3.7**	Excavated 10/9/14
CD-8	10/9/14	W sidewall	1145068-1	**19.8**	Excavated 10/20/14
CD-9	10/9/14	S sidewall	1145068-2	<0.306	Meets criteria
CD-10	10/9/14	W sidewall	1145068-3	**19.2**	Dup of CD-8
CD-11	10/21/14	bottom	1145256-1	<0.0585	Meets criteria
CD-12	10/21/14	W sidewall	1145256-2	**5.54**	Excavated 11/3/14
CD-13	11/3/14	W sidewall	1145499-1	**2.77**	Excavated 6/9/15
CD-14	11/3/14	S sidewall	1145499-2	0.19	Meets criteria
CD-15	6/9/15	W sidewall	1152738-1	**84.6**	Excavated 6/30/15
CD-16	6/9/15	bottom	1152738-2	<0.561	Meets criteria
CD-17	6/9/15		1152738-3	<0.121	Meets criteria, pipe end sample
CD-17	6/30/15	W sidewall	1153302-1	0.635	Meets criteria, excavated 8/4/15
CD-18	6/30/15	W sidewall	1153302-2	**24.1**	Excavated 8/4/15
CD-19	6/30/15	bottom	1153302-3	**8.87**	Excavated 8/4/15
CD-20	8/4/15	bottom	115259-1	<0.0697	Meets criteria
CD-21	8/4/15	W sidewall	115259-2	<0.0525	Meets criteria
CD-22	8/4/15	W sidewall	115259-3	**2.005**	Remains in place

Notes:

###.## = (**BOLD**) Result >1 mg/kg PCBs

###.## = Result <1 mg/kg PCBs

###.## = Result 1-10 mg/kg PCBs

###.## = Result 10-25 mg/kg PCBs

###.## = Result 25-50 mg/kg PCBs

###.## = Result > 50 mg/kg PCBs

Table 3 - Waste disposal summary

HAZARDOUS WASTE SOIL (PCBs)

Manifest Number	Weight (kg)
013471511	7357
013471529	16311
TOTAL (kg):	23668
TOTAL (tons):	**26.1**

HAZARDOUS WASTE SOIL (Lead)

Manifest Number	Weight (tons)
013471572	0.6

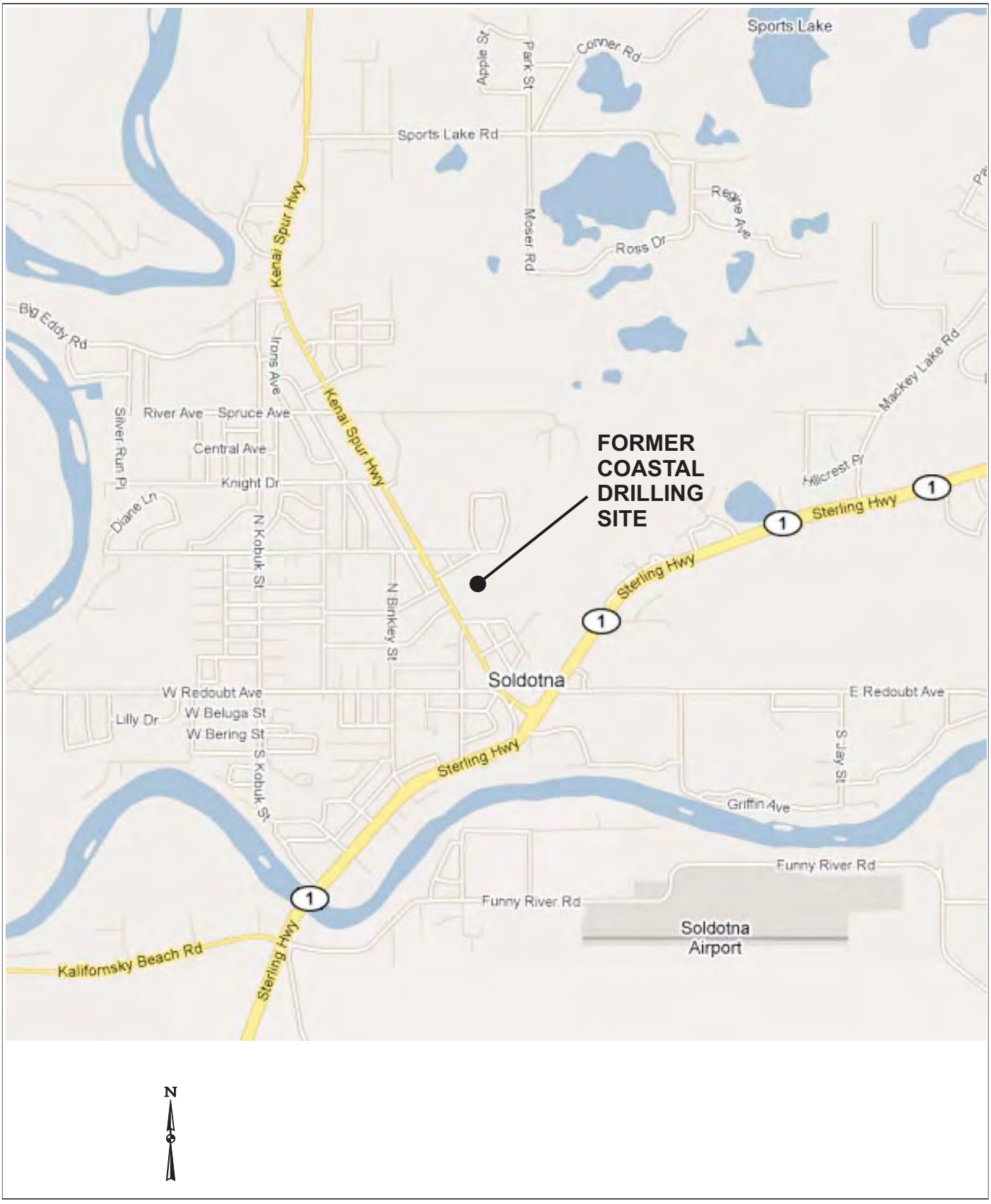
HAZARDOUS WASTE (Lead plates)

Manifest Number	Weight (tons)
013471572	0.9

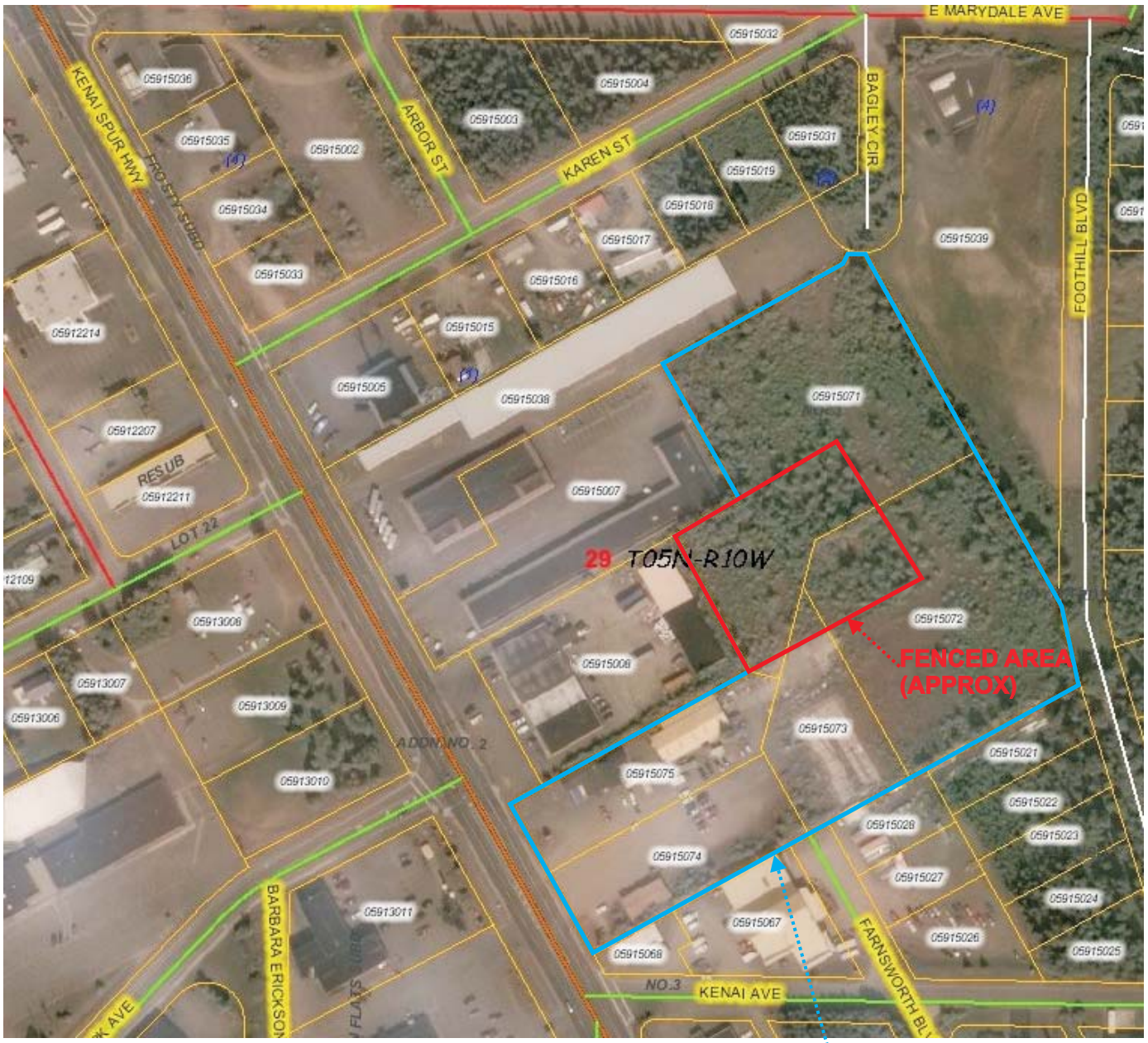
NON-HAZARDOUS WASTE SOIL

Manifest Number	Weight (tons)
FCDS-001	22.21
FCDS-002	16.65
FCDS-003	21.06
FCDS-004	20.64
TOTAL (tons):	**80.56**

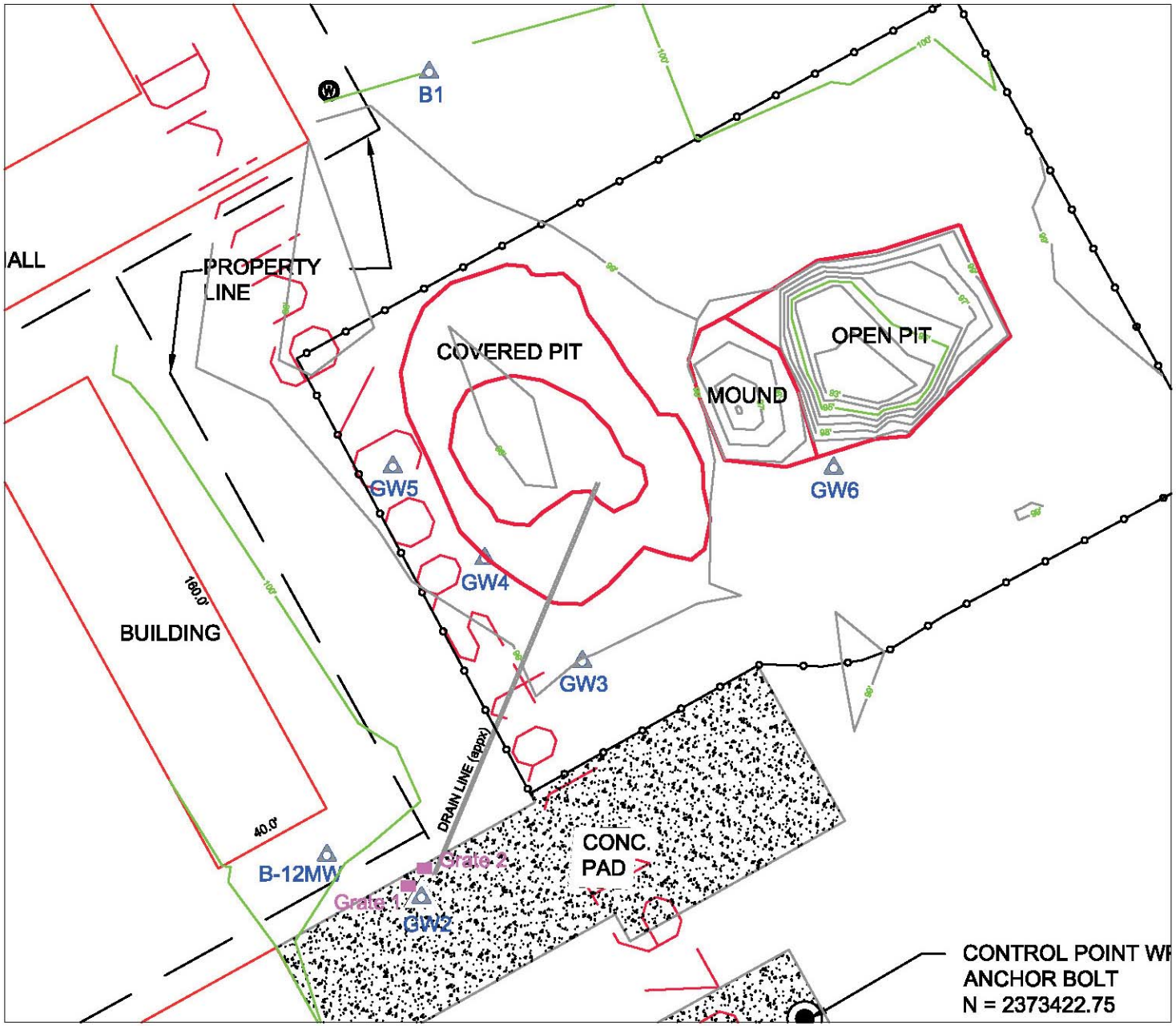
FIGURES



ALTA GEOSCIENCES, INC. Bothell, Washington *Prepared For:* *Reeves Amodio LLC*	**FORMER COASTAL DRILLING SITE** **SOLDOTNA, ALASKA** **SITE LOCATION**	**FIGURE** **1**



ALTA GEOSCIENCES, INC. Bothell, Washington *Prepared For:* *Reeves Amodio LLC*	**FORMER COASTAL DRILLING SITE** **SOLDOTNA, ALASKA** **SITE PLAN**	**FIGURE** **2**



Explanation

- GW5 — Monitoring well location
- Water well location
- Survey Monument
- 09TP-2 — 2009 test pit location with orientation and approximate length indicated
- Disposal pit boundaries, top and deepest part, based on airphoto mapping
- Fence
- 98' — Elevation, 1-ft contour interval
- Shallow soil sample location

NORTH

Scale

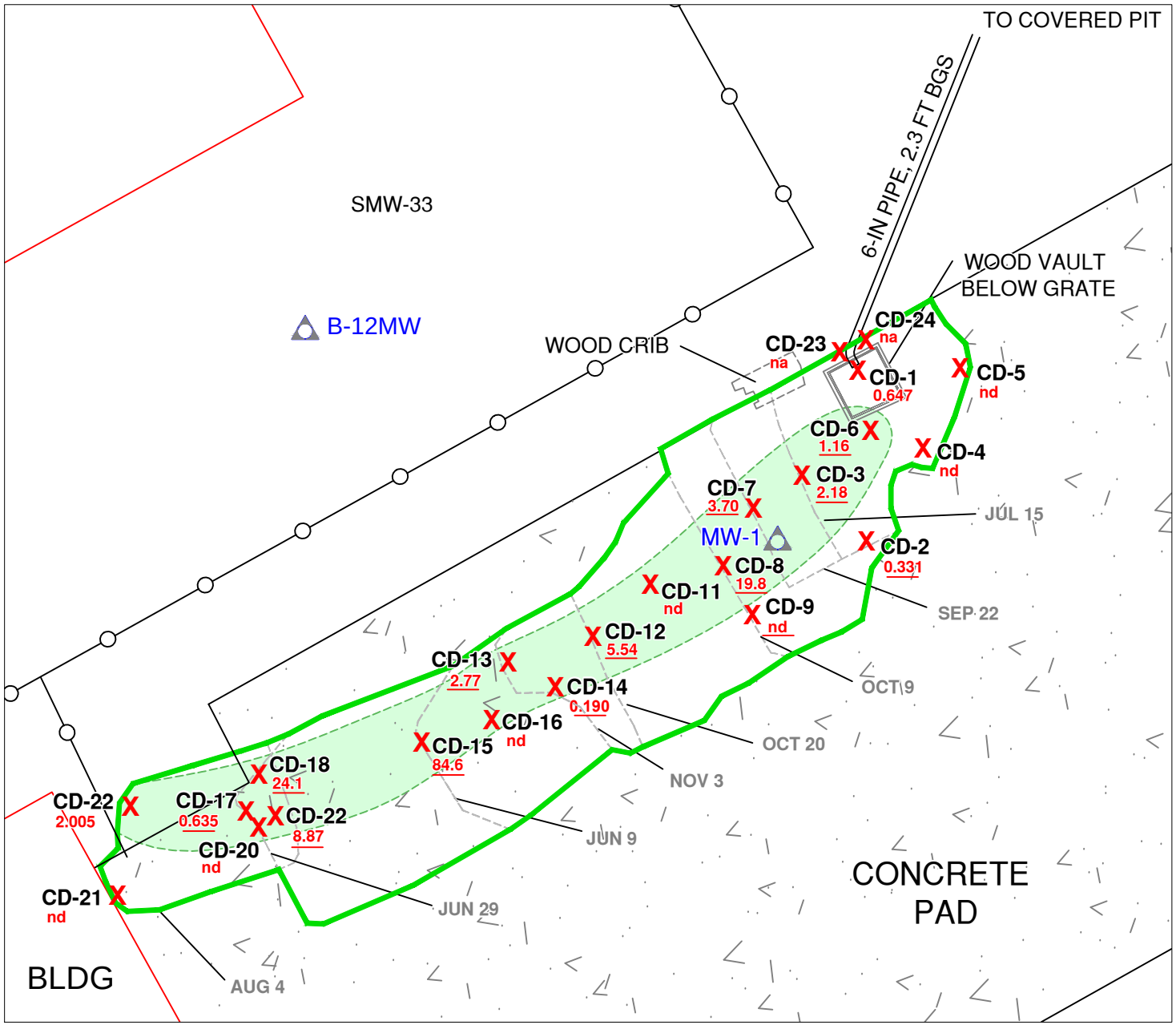
0 50 100 feet

ALTA GEOSCIENCES, Inc.
Environmental & Geotechnical Solutions
Bothell, Washington

Former Coastal Drilling Site

SITE FEATURES AND SURVEY DATA

FIGURE 3



Explanation

- MW-1 — Monitoring well location
- Fence
- Excavation extent (approximate)
- PCB greater than 1 mg/Kg (approximate)
- CD-7 X 1.16 — Soil sample location with PCB concentration (mg/Kg) posted. Underline indicates that sample location was subsequently excavated.

NORTH

Scale

0 10 20 feet

ALTA Geosciences, Inc.
Environmental & Geotechnical Solutions
Bothell, Washington

Former Coastal Drilling Site
2014 and 2015 Grate Area Soil Excavation

Sample Location and PCB Results Map

FIGURE
4

PHOTOGRAPHS

ALTA GEOSCIENCES, Inc.

Photo 1. Open pit, recovered intact battery. 7/1/2014

Photo 2. Dewatering open pit. 6/7/2014

Photo 3. Open pit, broken battery plates prior to being placed in drums. 7/1/2014

Photo 4. Open pit, debris removal. 7/7/2014

Photo 5. Drill shop sump area prior to excavation. 7/15/2014

Photo 6. Drill shop sump prior to excavation. 7/15/2014

PHOTO SHEET 1.
Remediation Activity Photos
Former Coastal Drilling Site
Soldotna, Alaska

Photo 7. Drill shop sump initial excavation showing drain line to covered pit. 7/15/2014

Photo 8. Drill shop sump excavation. Note timber cribbing. 7/16/2014

Photo 9. Continued excavation 9/11/2014

Photo 10. Looking northeast, 9/11/2014

Photo 11. Continued excavation, 9/11/2014

Photo 12. Continued excavation. MW-1 in foreground. 9/22/2014

PHOTO SHEET 2.
Remediation Activity Photos
Former Coastal Drilling Site
Soldotna, Alaska

Photo 13. Continued excavation. 10/9/2014

Photo 14. Continued excavation. 10/9/2014

Photo 15. Continued excavation. 10/20/2014

Photo 16. Continued excavation. 10/20/2014

Photo 17. Final excavation, 8/14/2015

Photo 18. Final excavation, 8/14/2015

PHOTO SHEET 3.
Remediation Activity Photos
Former Coastal Drilling Site
Soldotna, Alaska