Corrective Action Report

Decommissioned Power Plant Demolition and Contaminated Soil Removal — NOAA Site 18/TPA Site 9c
St. Paul Island, Alaska

April 1, 2008

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ACRONYMS AND ABBREVIATIONS

AA	Alaska Abatement Corporation
AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
AST	above ground storage tank
bgs	below ground surface
BSE	Bering Sea Eccotech, Inc.
BTEX	benzene, toluene, ethylbenzene, and total xylenes
CAP	corrective action plan
CAR	corrective action report
CESI	Columbia Environmental Sciences, Inc.
CFR	Code of Federal Regulations
cm	centimeter
CSM	conceptual site model
CY	cubic yard
DPP	decommissioned power plant
DRO	diesel-range organics
e^2M	engineering-environmental Management, Inc.
E&E	Ecology & Environment
EPA	U.S. Environmental Protection Agency
ft	feet
GIS	geographic information system
GPS	global positioning system
GRO	gasoline-range organics
IDW	investigation-derived waste
LBP	lead-based paint
MDL	method detection limit
mg/kg	milligram per kilogram
mg/L	milligram per liter
MS/MSD	matrix spike/matrix spike duplicate
LCG	Larson Consulting Group
NOAA	National Oceanic and Atmospheric Administration
PAH	polynuclear aromatic hydrocarbon
PCS	petroleum contaminated soil
PID	photo ionization detector
PPO	Pribilof Project Office
QAP	quality assurance plan
RRO	residual-range organics
SGS	SGS Environmental Services, Inc. of Anchorage, Alaska
TCLP	Toxicity Characteristic Leaching Procedure
TLC	thin-layer chromatography
TPA	Two-Party Agreement
Tutka	Tutka Services LLC
UST	underground storage tank
VOCs	volatile organic compounds

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EXECUTIVE SUMMARY

The U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), through its Office of Response and Restoration, Pribilof Project Office (PPO) is responsible for site characterization and restoration activities on St. Paul Island, Alaska (Figure 1). The PPO conducts these activities at several sites on the Pribilof Islands according to the Two Party Agreement (TPA) between NOAA and the State of Alaska. This corrective action report details corrective actions conducted at the Decommissioned Power Plant site (NOAA Site 18/TPA Site 9c), including the adjacent pump house, on St. Paul Island. This report was prepared by NOAA.

The Decommissioned Power Plant (DPP) was located at the base of Village Hill, just northwest of the former Municipal Garage building (Figure 2). The building was the location of the island's primary power generating facility from approximately 1960 to 1998. The DPP was most recently used by NOAA for storage of equipment, supplies, and miscellaneous items. The adjacent pump house was constructed in 1963 and water from its two wells was reportedly used for processing fur-seal pelts, in fish processing, and/or as coolant for electrical generators in the DPP.

Diesel underground storage tanks (USTs) were previously located on the south and southeast sides of the building. Pipelines transferred diesel fuel from a Diesel Tank Farm (NOAA Site 30/TPA Site 11) atop Village Hill to the diesel USTs, and conveyance pipes from the USTs fed electrical generators within the DPP building and an adjacent annex building (NOAA Site 19/TPA Site 9d). A raceway was constructed within the concrete floor, stem wall, and footing system for the building.

Accidental releases of diesel fuel previously stored and/or transferred by pipelines to the site led to environmental contamination. Also, wastes may have been spilled or dumped into the floor raceway. Investigations and past corrective action work at the site indicated the presence of diesel-range organic compounds (DRO) in soil at concentrations above site cleanup levels. Since the DPP had become structurally compromised due to a deteriorating roof, NOAA determined to demolish the structure. NOAA also determined to demolish the adjacent pump house structure, since it would potentially become damaged during DPP demolition activities. With the structure

demolished, it was then necessary for NOAA to remove the petroleum contaminated soil (PCS) known to exist underneath.

NOAA selected Bering Sea Eccotech Inc. (BSE) to implement the corrective action for the demolition of the buildings and removal of PCS at the site. Based on past investigations and corrective actions for this site, the specific contaminants of concern are gasoline-range organic compounds (GRO), diesel-range organic compounds (DRO), residual-range organic compounds (RRO), benzene, toluene, toluene, ethylbenzene, total xylenes, and select polynuclear aromatic hydrocarbons (PAHs). NOAA's site cleanup levels for soil were based on applying Alaska Department of Environmental Conservation (ADEC) Ten Times Rule levels for GRO, DRO, and toluene; applying the 1991 ADEC cleanup level for benzene, consistent with a Two-Party Agreement between NOAA and ADEC; and applying ADEC's Method Two cleanup levels for all other contaminants.

The DPP and pump house were demolished, and the building demolition debris was placed in the City of St. Paul landfill. Minor amounts of asbestos in the DPP were removed, containerized, and either shipped off-island, and or disposed in a permitted asbestos monofill. During the corrective action, BSE removed approximately 800 cubic yards of PCS from the site and transported it to NOAA's ADEC-approved landspreading area at the National Weather Service property on the island. BSE backfilled the PCS excavation to its original grade, using approximately 970 cubic yards of clean fill material.

After completing the removal of PCS at the DPP site, confirmation samples collected from the excavation bottom and side walls indicated concentrations of DRO exceeded its site cleanup level within the southeastern half of the excavation, on the excavation bottom. No other contaminants exceeded their site cleanup levels in confirmation samples. More PCS could not be removed because it was located 18 feet below ground surface and beyond the reach limit of the excavator, or extended into areas with buried utilities and existing roadways where excavation is not required by ADEC.

As a result of this cleanup action, all specified contamination has been removed and no exposure routes remain for human receptors or the environment. NOAA is therefore requesting in this Corrective Action Report/Conditional Closure Request that ADEC agree further remedial action

from NOAA is no longer required at the DPP site since the primary sources of contamination have been removed and analytical data indicate that PCS has been excavated to the maximum extent practicable.

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1.0 INTRODUCTION

The U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), through its Office of Response and Restoration, Pribilof Project Office is responsible for site characterization and restoration on St. Paul Island, Alaska. St. Paul Island is located north of the Aleutian Islands chain in the Bering Sea, approximately 800 miles west-southwest of Anchorage, Alaska (Figure 1).

Public Law 104-91 of 1996 and Public Law 106-562 of 2000 provide the mandate for these activities. A Two-Party Agreement (TPA), signed in 1996 by NOAA and the State of Alaska, provides the framework for corrective action on St. Paul Island (NOAA 1996). The State of Alaska provides TPA oversight through the Alaska Department of Environmental Conservation (ADEC). Under the TPA, NOAA is required to comply with State of Alaska regulations in effect in 1991 (ADEC 1991); however, with ADEC agreement, NOAA has chosen to follow more current regulations whenever possible.

This corrective action report (CAR) documents the 2007 corrective action work performed at the St. Paul Island Decommissioned Power Plant (DPP), designated by NOAA as Site 18,, and also known as TPA Site 9c. The DPP site is located at the base of Village Hill, just northwest of the former Equipment Shed (Figure 2). During this corrective action, the DPP and a small adjacent pump house were demolished and petroleum contaminated soil (PCS) was removed from the site, followed by backfilling with clean soil. Except as noted in this CAR, field activities for this work were carried out in accordance with the following documents:

- Corrective Action Plan Addendum #2 For The Removal of Petroleum Contaminated Soil at the Decommissioned Power Plant (NOAA Site 18, TPA Site 9c) St. Paul Island, Alaska. (NOAA 2006a)
- Master Quality Assurance Plan (QAP) (NOAA 2006b)
- NOAA's Master Investigation Derived Waste Plan (NOAA 2003)
- Master Health and Safety Plan (NOAA 2004a)
- Operations Work Plan, Petroleum Contaminated Soil Remediation by Landspreading (NOAA 2004b)

NOAA performed this corrective action to address environmental impacts resulting from past operations conducted in and around the DPP. ADEC does not require that existing buildings be

demolished to remediate environmental contamination underneath them. The DPP had not been properly maintained for several years and corrosion and leakage had damaged some of the roofing, possibly requiring major repairs. The building posed a potential liability had it remained on the property when transferred to the Tanadgusix Corporation under a Transfer of Property Agreement (NOAA 1984).

Because of these problems, NOAA determined to demolish the DPP structure. Due to its proximity to the DPP, NOAA also determined to demolish the adjacent pump house as it would potentially sustain damage during DPP demolition activities. An earlier survey that NOAA conducted of the building (e^2M 2006) had determined that several building parts were painted with lead-based paint (LBP), and some of the interior drywall joint compound contained asbestos. NOAA had discovered a band of Transite asbestos siding covered the roof fascia around the exterior of the roof. NOAA collected samples of representative parts of the DPP and pump house prior to demolition and analyzed them using the Toxicity Characteristic Leaching Procedure (TCLP), EPA Method 1311 (40 Code of Federal Regulations [CFR] 261.23). The results showed that these parts did not exceed allowable limits for lead leachability, thus would not be a Resource Conservation and Recovery Act (RCRA) hazardous waste if removed without treatment. Cleanup of the known PCS underneath the DPP building was required by State of Alaska Regulations if the building were to be removed. The pump house had no known PCS beneath it.

Therefore, the objectives of the corrective action were as follows:

- Remove and store or dispose of several items stored inside the building
- Remove asbestos fascia siding and interior drywall joint compound and dispose as a regulated asbestos waste
- Remove sediments in the utility trenches and dispose as PCS
- Demolish the DPP and pump house and dispose of the wood and concrete debris in the City of St. Paul Landfill
- Remove PCS from under the building and dispose it by land spreading on the island at the National Weather Service land spread area
- Conduct all soil excavation under the oversight of an archaeologist
- Collect field screening samples for analysis by photoionization detector (PID) and thin-layer chromatography (TLC)

- Collect confirmation samples for fixed laboratory analyses
- Restore the site to grade with clean fill
- Incorporate site features and sampling locations and results into a geographic information system (GIS) database
- Report corrective action activities and results to ADEC for acknowledgement of proper site closure.

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2.0 BACKGROUND

The following subsections provide a description of the site background, site geology, site hydrogeology, and previous investigations for the DPP site.

2.1 SITE BACKGROUND

The DPP was located at the base of Village Hill, just northwest of the former Municipal Garage, on the southerly side of Haul Road (57° 7' 25.72" N latitude, 170° 16' 57.30" W longitude; Figure 2). The structure and area of excavation are located in the northern portion of Tract 46, Township 35 south, Range 132 west, Section 25 of the Seward Meridian, Alaska, as shown on the dependent resurvey of a portion of the U.S. Survey No. 4943, Alaska, Tract “A”, St. Paul Townsite, officially filed June 3, 1997. The federal government currently owns the surface and subsurface estate of Tract 46.

The DPP foundation and primary load-bearing walls were constructed of reinforced concrete, covered with a corrugated metal roofing system. The north and south portions of the building were constructed of wood framing and corrugated metal siding. The building was the location of the electrical power generating plant for the island dating back to 1960 (Hart Crowser 1997), until 1998 when the power generation activity ended. The DPP was most recently used by NOAA for storage of an old fire engine, drying racks for seal pelts, and miscellaneous items. A small pump house was located near the southwest corner of the building (Figure 2). The pump house was constructed in 1963 and water from its two wells was reportedly used for processing fur-seal pelts, in fish processing, and/or as coolant for electrical generators in the DPP (CESI 1999, NOAA 1990). Three above ground storage tanks (ASTs) and two 10,000-gallon underground storage tanks (USTs) originally serviced the facility (Hart Crowser 1997).

2.2 SITE GEOLOGY

St. Paul Island was formed as a result of volcanic eruptions of basaltic lavas onto the southern edge of the Bering Sea Shelf. The island has never been glaciated, and many cinder cones with steep slopes and sharp crater rims are present on the island. The island soil is characterized primarily as volcanic deposits consisting of scoria of varying sizes (pebbles to cobbles) and colors (lenses of gray, red, and black) with fractured basalt occurring at depth (Barth 1956).

The site is approximately 20 feet (ft) above mean sea level. Soils in the vicinity of the DPP generally consist of sandy topsoil from the surface to a depth of 1.5 to 2 ft below ground surface (bgs). This is underlain by varying layers of red and black scoria to depths of approximately 16 to 20 ft, followed by fractured basalt. Bedrock in this area consists of basalt.

2.3 SITE HYDROGEOLOGY

Groundwater in the vicinity of the DPP is present at approximately 20 ft bgs and likely flows to the north-northwest toward Village Cove (Mitretek 2005).

2.4 CLEANUP LEVELS

NOAA performed a Groundwater Use and Classification Study of St. Paul Village in 2002 due to the brackish/non-potable water having been contaminated by petroleum releases for which NOAA is responsible (Mitretek 2002). Groundwater beneath the City of St. Paul is considered brackish and is therefore not potable (Mitretek 2002, ADEC 2002a). NOAA demonstrated the groundwater is not drinkable (potable) regardless of the past petroleum releases because of high total dissolved contents, primarily salt (Mitretek 2002). Using groundwater sampling data available in 2002, NOAA found groundwater in the village exceeded ADEC Table C cleanup levels for gasoline-range organic compounds (GRO), diesel-range organic compounds (DRO), benzene, toluene, tetrachloroethene, chromium, and lead.

NOAA requested ADEC to approve alternative groundwater and soil cleanup criteria allowed under (18 Alaska Administrative Code [AAC] 75.345). ADEC approval would allow groundwater cleanup criteria and soil cleanup criteria related to protection of groundwater to increase to ten times the Table C and Method Two (18 AAC 75.341) cleanup levels for those compounds listed above (ADEC 2002a). ADEC concurred with NOAA's request contingent upon NOAA providing for appropriate institutional controls as required under 18 AAC 75.350. NOAA applied to Alaska Department of Natural Resources (ADRN) for a Critical Water Management Area (CWMA) determination under 11 AAC 93.500 - 11 AAC 93.530 (ADNR 2006). Such a determination would enable application of the ADEC required institutional control. Following numerous regulatory procedures, ADNR determined a CWMA was appropriate for the areas with groundwater contamination in the old village. The CWMA

determination allowed NOAA to apply the alternative cleanup levels under the Ten Times Rule (ADEC 2002a).

Subsequent to ADEC's 2002 conditional approval to use the Ten Times Rule, NOAA demonstrated that tetrachloroethene and lead did not persist above Table C limits and that the chromium was actually the less toxic trivalent form, with concentrations below the Table C cleanup level. NOAA also subsequently found that ethylbenzene exceeded its Table C cleanup level in village groundwater (Tetra Tech 2005, Tutka 2007).

Additionally, the 1996 TPA provided NOAA to clean up contaminated media on the Pribilof Islands consistent with ADEC regulations at that time. The benzene cleanup level for soil in 1996 was based on the 0.5 milligrams per kilogram (mg/kg) level established in ADEC 1991 promulgated regulations. As a result, NOAA applied the 0.5 mg/kg as its benzene cleanup level instead of 0.2 mg/kg under the Ten Times Rule or 0.02 mg/kg under ADEC Method Two.

Based on past investigations and corrective actions for this site (Section 2.5), the specific contaminants of concern are GRO; DRO; residual-range organic compounds (RRO); benzene, toluene, toluene, ethylbenzene, total xylenes (BTEX); and select polynuclear aromatic hydrocarbons (PAHs). NOAA's site cleanup levels for soil were based on applying Alaska Department of Environmental Conservation (ADEC) Ten Times Rule levels for GRO, DRO, and toluene; applying the 1991 ADEC cleanup level for benzene, consistent with a Two-Party Agreement between NOAA and ADEC; and applying ADEC's Method Two cleanup levels for all other contaminants.

2.5 PREVIOUS INVESTIGATIONS

In 1990, NOAA identified two 10,000-gallon USTs at the DPP. One UST was determined to be empty, and the other serviced the then-active power plant (NOAA 1990).

Ecology and Environment, Inc. (E&E) identified two 10,000-gallon UST tanks ("UST No. 3" and "UST No. 4") in the area of the southeast corner of the DPP building in a 1992 preliminary assessment. This assessment noted that 13 gallons of diesel fuel/water mix had been removed from UST No. 3, while UST No. 4 was still in use, though scheduled to be abandoned in early 1993 (E&E 1993).

Woodward-Clyde Consultants, Inc. (Woodward-Clyde) performed a site inspection at the DPP in 1993. Woodward-Clyde dug a trench along the west side of the power plant up to the northeast corner of the power plant's annex building to locate a drain line but did not encounter a line nor any indication of petroleum contamination. Woodward-Clyde took hand auger borings near the large power plant doors and a valve box on the east side of the building. The suite of laboratory analyses on samples from these locations did not include DRO, but Woodward-Clyde reported detecting a diesel odor in a sample collected along the east side of the building. Woodward-Clyde determined that all analytes were well below human health risk-based concentrations (Woodward-Clyde 1994).

During a 1996 expanded site investigation, Hart Crowser, Inc. (Hart Crowser) collected samples from a test pit (TP-4) and hand auger borings (HA-2, HA-3, and HA-4) in the vicinity of the DPP (Hart Crowser 1997). With the exception of the location of HA-4, where refusal was encountered at 5.5 ft bgs, samples were collected to approximately 10 ft bgs. DRO was detected above its ADEC Method Two soil cleanup level in two samples collected from location HA-3; a sample collected from 0 to 0.5 ft bgs contained 2,600 mg/kg DRO, and a sample collected from 10 to 10.5 ft bgs contained 900 mg/kg DRO.

Columbia Environmental Sciences, Inc. (CESI) performed site investigation activities in the vicinity of the DPP January 25 through February 4, 1999 (CESI 1999). One emphasis of the investigation was obtaining water quality data from saltwater wells installed during the commercial fur-sealing days for process water. Non-aqueous phase liquid ("free product") was found in the west DPP well (WDPP), the east DPP well (EDPP), the west Old Sealing Plant well (WOSP), and the east Old Sealing Plant well (EOSP) (Figure 2). Of the wells, EDPP contained the most free product, a viscous, paint-like, floating free product. A sample of the product contained 59,000 milligrams per liter (mg/L) DRO and 510,000 mg/L residual-range organic compounds (RRO). In groundwater samples collected from WDPP, WOSP, and EOSP, gasoline-range organics (GRO) exceeded the ADEC Table C cleanup level (1.3 mg/L) only in EOSP. DRO exceeded the cleanup level (1.5 mg/L) in all three groundwater samples. Data indicated that the RRO cleanup level was exceeded in samples from WDPP and WOSP; however, there is no ADEC approved method for analyzing RRO in groundwater. Groundwater salinity in the

three wells varied from 4 to 14 parts per thousand. No groundwater sample was collected from EDPP.

During 2000 and continuing into 2001, CESI conducted a site characterization (CESI 2001). Soil samples were collected at several depth intervals at five locations about the DPP: DPP-WRC2, DPP-WRC4, SS46-2-2, DPPSB-2, and DPPSB-1. DRO was the only petroleum hydrocarbon detected above Method Two soil cleanup levels, with exceedances in two places. A sample collected from 2 to 3 ft bgs at location DPP-WRC4 contained 490 mg/kg DRO, and a sample collected from 11 to 12.5 ft bgs at DPPSB-1 contained 2,300 mg/kg DRO.

During 2003, NOAA tasked Tetra Tech EM Inc. (Tetra Tech) to monitor groundwater wells in several locations on St. Paul Island, including near the DPP. Tetra Tech found groundwater cross-gradient from the DPP was contaminated with benzene, DRO and GRO above their Ten Times Rule groundwater cleanup levels, and toluene and ethylbenzene above their ADEC Table C cleanup levels. Tetra Tech also found groundwater upgradient from the DPP was contaminated with benzene and DRO above their ADEC Table C cleanup level, but below their Ten Times Rule groundwater cleanup level (Tetra Tech 2005). Tetra Tech did not observe any free product as had CESI.

During 2005, NOAA tasked engineering-environmental Management, Inc. (e^2M) with performing a Phase I Environmental Site Assessment, as well as asbestos and LBP building inspections, for the DPP, the adjacent pump house, and all other structures located on NOAA's Tract 46 parcel. e^2M identified LBP on a red gantry crane and its supports in the central "great room" of the DPP, on blue doors and door frames in the DPP interior, and on one window frame on the pump house. e^2M also found that drywall inside the room at the north corner of the DPP interior and siding used as roof fascia around the building contained asbestos; the pump house was not found to contain asbestos (e^2M 2006).

During 2006, NOAA tasked Bering Sea Eccotech (BSE) with implementing long-term groundwater monitoring on St. Paul Island, consistent with the ADEC-approved monitoring plan (NOAA 2005a). BSE subcontracted Tutka Services LLC (Tutka) to perform the monitoring work with BSE. Tutka found groundwater contamination similar to Tetra Tech's earlier findings (Tutka 2007).

2.6 PREVIOUS CORRECTIVE ACTIONS

During 1997, NOAA arranged to remove one UST and decommissioned the other in place by removing its liquid contents and then filling the tank with clean sand (Bristol 1997). ASTs were not present on site at the time of a 2002 corrective action, though it is not known when or by whom they were removed. During 2002 NOAA removed the 10,000 gallon UST that had been closed in place in 1997. The UST was found oriented partially beneath the southern end of the building along the east/west building axis and contained sand, oily residue, and diesel-contaminated water. To access the UST, NOAA demolished the wood framed southern portion of the DPP building and its concrete foundation. NOAA also removed an estimated 328 cubic yards (CY) of PCS from the site. Confirmation samples at two locations south of the DPP building exceeded the site cleanup levels for DRO, however the excavator encountered refusal at approximately 11 ft bgs (SNP9CSS02) and 13 ft bgs (SNP9CSS39), preventing further excavation. A confirmation sample at one location along the new southern extent of the building perimeter (SNP9CSS45) exceeded the site cleanup levels for DRO at approximately 8 ft bgs[1]; however the presence of the building prevented further excavation. A confirmation sample at one location along the east side of the excavation (SNP9CSS44) exceeded the site cleanup levels for DRO at approximately 8 ft bgs[2]; however the presence of a pipe valve box and the adjacent road prevented further excavation (NOAA 2004c). Subsequent the 2002 corrective action, NOAA received concurrence from ADEC that no further remedial actions were necessary based on the available data and the presence of the building (NOAA 2005b).

[1] The listed sample depth is based on Photograph 17 from NOAA 2004c, since NOAA's contractor did not record this sample depth.

[2] Id.

3.0 REMOVAL OBJECTIVES AND APPROACH

The PCS removal objective for this site involved the removal of all PCS beneath the footprint of the DPP building (including its concrete footings and floor), PCS cleanup levels for the site are detailed in the Corrective Action Plan (CAP) prepared for the 2002 PCS removal activities (NOAA 2002). The cleanup criteria are based upon NOAA's application of the Ten Times Rule and the 1991 ADEC benzene cleanup level as described in section 2.4 above. These levels are listed in Table 3-1. The site cleanup levels listed in the CAP Addendum (NOAA 2006a) included typographical errors for GRO and DRO. The errors are listed with site cleanup levels equal to their ADEC Method Two cleanup levels instead of levels based on applying the Ten Times Rule. One should also note that contaminated soil represented by two 2002 confirmation samples along the southern edge of the building footprint exceeded the site specific cleanup levels (Figure 3). This soil was not excavated in 2002 due to its proximity to the building. NOAA's objective was to remove and temporarily stockpile the clean backfill that had been placed over these 2002 confirmation sample locations, then resume excavation of this PCS even though a portion of it may extend outside the building footprint.

NOAA anticipated the removal of PCS contamination during 2007 at the DPP would be limited by sidewall sloping requirements to prevent damaging adjacent utilities or structures including the electrical transformers to the north and west, and the roads surrounding the site (Figures 4 and 5). Also, NOAA did not plan the excavation to extend deeper than 15 ft bgs due to impracticability associated with such deep excavating.

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4.0 FIELD ACTIVITIES

The following subsections summarize the equipment used and the activities performed during this corrective action. Appendix A provides photographic documentation of the corrective action. Appendix B provides copies of the weekly reports as well as logbook notes generated during the corrective action.

4.1 CONTRACTORS AND EQUIPMENT

BSE provided overall site management via its subcontractor Larsen Consulting Group (LCG), including the direction of demolition, excavation and hauling activities, engineering services, and preparation of weekly reports. Alaska Abatement Corporation (AA) removed asbestos-containing building materials (ACBM) associated with the DPP, and coordinated its disposal at a permitted off-island facility. The collection of screening, characterization, and confirmation samples during implementation of the corrective action was performed by Tutka. BSE provided most of the equipment used during the corrective action, but NOAA furnished some government-owned equipment. BSE/LCG conducted health and safety meetings before the commencement of each day's activities. Tutka and NOAA performed PID and TLC analyses, respectively, of screening samples. In addition, NOAA staff provided survey support using real-time kinematic GPS techniques and equipment. BSE subcontracted laboratory analytical services to SGS Environmental Services Inc. of Anchorage, AK (SGS), an ADEC-approved laboratory.

Equipment used on site during field activities included the following:

- Hitachi EX150 excavator (BSE)
- Hitachi ZX200LC Excavator (BSE)
- 5-10 CY dump trucks (BSE and NOAA)
- Volvo L-70 Front End Loader (BSE)
- CAT 966 Front End Loader (BSE)
- Flat Bed Truck (BSE)
- Telescoping Rough Terrain Fork Lift (BSE)
- Trimble Total Station R8 GPS (NOAA)

4.2 ASBESTOS AND LBP REMOVAL

Photograph 1 shows a west-facing view of the eastern portion of the DPP in August 2007, prior to removing the Transite siding along the roofline fascia. Concrete flooring associated with the southern wooden portion of the DPP is visible in the foreground. AA mobilized to the site on September 17, 2007 and removed ACBM along with the removal of 400 square feet (SF) of drywall located along the west, inside wall of the DPP, and approximately 220 SF of Transite siding used as fascia along the exterior roof line. The ACBM was transported to the Anchorage area via air cargo and disposed in a permitted asbestos monofill. AA demobilized from the site on September 20, 2007. Photograph 2 shows a similar west-facing view in late September 2007, after removing the Transite siding along the roofline fascia.

During demolition preparation activities on October 5, 2007, BSE/LCG identified potential ACBM in the form of approximately 64 SF of 9-inch by 9-inch floor tiles inside a DPP room along the north portion of the building interior. This material was not identified during e^2M's asbestos building inspection (e^2M 2006), as the floor tiles were covered by approximately ten wooden racks built for drying Northern fur seal pelts. BSE/LCG found the tiles when relocating the racks. BSE/LCG designated the floor tile area "off limits" until the tiles could be sampled and analyzed for asbestos, and if necessary until AA could mobilize to remove the tiles. As described in LCG's Weekly Report #3 (Appendix B), most of the floor tiles were found missing from the DPP floor the morning of October 9, 2007. BSE determined the floor tiles were ACBM. AA mobilized to the site on October 11, 2007 and worked with BSE/LCG and NOAA to investigate the disappearance of approximately 60 SF of floor tiles; the missing tiles were not located, however BSE/LCG determined they had not been disposed with DPP building demolition debris at the City of St. Paul landfill. AA carefully removed the remaining tiles (Photograph 3), wetted and containerized the tiles consistent with federal and state regulations, and transported them to the Anchorage area with the ACBM removed in September 2007. The ACBM was disposed in a permitted asbestos monofill.

BSE removed the gantry crane and rails, blue doors and frames, and window and frame covered with LBP during demolition activities the week of October 7, 2007. BSE disposed of these items in the City of St. Paul Landfill.

4.3 BUILDING DEMOLITION

Photograph 4 shows a view of the DPP (in center) and pump house (left) taken from the base of Village Hill in 2002 during the partial building demolition, UST removal, and PCS removal (see Section 2.5). NOAA's contractor BSE began demolition work at the site on October 5, 2007. BSE drained liquids from the AST located inside the DPP building, containing them in a 55-gallon drum. BSE then decommissioned the AST by cutting it in pieces, and disposed of the pieces in the City of St. Paul landfill. BSE determined the liquid was primarily water with a small amount of oil, and the liquid did not contain chlorinated compounds exceeding 50 mg/kg. BSE disposed of the liquid atop the soil cap, at Landfill Cell C in NOAA's Tract 42 at the location of disposal trenches used in 2006 and 2007 to dispose of NOAA abatement, demolition, and lead contaminated soil waste (Figure 6). BSE removed an estimated 150 gallons of oily water and oily sludge from the DPP raceway and disposed of this water and sludge atop the soil cap. BSE then removed several remaining items owned by NOAA from the building's interior and stored or disposed of them at the permitted community landfill.

Next, BSE demolished the roof and walls of the DPP building. BSE removed soil around the exterior of the foundation stem walls and footings, providing access for workers to cut the stem walls and footings into approximately 8 foot long segments (Photograph 5). In some instances, the wall or footing was too thick to fully cut even from two sides. In these cases, the cuts served to deeply score the concrete and make it easier for BSE's excavator to break the concrete into the segments. BSE hauled concrete debris to the City of St. Paul's landfill, where it used the concrete to extend a concrete rubble-built berm to expand the capacity of the City's landfill disposal cell (Photograph 6). Three concrete vibration pads, each measuring approximately 5 ft by 12 ft by 2 ft, were too large to place in the City's berm. The City agreed to accept ownership of the pads for their eventual re-use as traffic barriers. BSE hauled the pads to the City's appliance and metal debris staging area atop Landfill Cell A (Photograph 7).

BSE demolished the above ground wooden structure of the pump house, hauling it to the City's landfill for disposal. The concrete stem walls for the pump house were removed so that the only remaining foundation elements were the footings, found approximately two ft bgs. BSE cut the steel well riser pipe at approximately two ft bgs. No further pump house removal was performed.

4.4 EXCAVATION ACTIVITIES

In 2006, NOAA contracted an archaeologist to evaluate the DPP site and its historical background in preparation for the PCS excavation work (Mobley 2006). The archaeologist identified a potential for significant archaeological deposits underneath or near the DPP where soil was not already disturbed by prior remedial actions. The archaeologist's report provided a monitoring plan that NOAA's excavation contractor used to plan and conduct archaeological monitoring during the PCS excavation.

All soil excavation activities at the DPP site proceeded under the supervision of an archaeologist to ensure proper conservation and management of any significant archaeological deposits unearthed during excavation. The archaeologist monitored all excavation at the site with the authority to halt excavation and consult with the Alaska State Historical Preservation Office upon the discovery of significant archaeological deposits. With the exception of one mid 20th century bottle, the only cultural items that were observed during the course of the archaeological monitoring were wires, pipes and pieces of concrete associated with the power plant. The archaeologist did not deem any "significant archaeological deposits", and the excavation proceeded without interruption. The archaeologist's monitoring report (Pipken 2007) is included as Appendix C.

BSE began excavation of approximately 800 CY of PCS (Photograph 8) from under the DPP building footprint and along the exterior of the south wall on October 16 and terminated on October 19, 2007 (Photograph 8). No PCS excavation was needed at the pump house, consistent with the CAP Addendum (NOAA 2006b). Most of the 2007 footprint of the DPP building was contaminated; however, only the northwest ¼ of the footprint contained PCS exceeding the site cleanup levels to a depth of 3 to 5 ft bgs. The southwest ¼ of the footprint only contained PCS exceeding the site cleanup levels to a depth of 12 ft bgs. The eastern ½ of the footprint contained PCS exceeding the site cleanup levels to at least the vertical limit of excavation, approximately 18 ft bgs. Further vertical excavation of the eastern half of the footprint was not practicable due to the reach limit of the excavator (Photograph 9). Further horizontal excavation eastward and northward of the eastern half of the footprint was not practicable due to adjacent buried utilities and roads along the north and east sides of the building (Figures 4 and 5). The excavation was

backfilled, compacted, and graded between October 19 and October 20, 2007, following collection of confirmation samples.

4.5 SOIL DISPOSAL

During the DPP corrective action, NOAA's contractors transported PCS directly to NOAA's National Weather Service landspreading area (Figure 7). The PCS was spread no more than 0.5 ft plus or minus (±) 3 inches deep, to promote volatilization and photodegradation. NOAA spread soils with the highest apparent levels of volatile organics separately at the landspreading area, with similar soils from the Municipal Garage PCS removal. NOAA's contractor will till the contaminated soil to promote evaporation of volatile organic compounds (VOCs) during the spring of 2008. The landspreading area with the DPP PCS will be fertilized and seeded with native grasses to promote revegetation after the tilling is complete.

4.6 BACKFILLING AND SITE RESTORATION

Backfilling the excavation began after soil screening with PID and TLC screening sample analyses indicated contaminant concentrations were below ADEC Method Two cleanup levels or further excavation was not practicable, and fixed laboratory confirmation samples had been collected. Backfill operations involved transporting clean fill from an on-island scoria pit to the site, dumping the material into the excavation, and compacting the fill material. Samples of the backfill material were collected and sent to a fixed laboratory for analysis, which showed no petroleum or PAHs present above State of Alaska Method Two cleanup standards for soil. Approximately 970 CY of scoria were used to backfill the DPP excavation and cover the remaining foundation and riser pipe of the pump house with a minimum of 2 ft of soil. The backfilled area was leveled to the surrounding grade (Photograph 10).

4.7 INVESTIGATION-DERIVED WASTE MANAGEMENT

Investigation-derived waste generated during this corrective action included:

- Used nitrile sampling gloves, which were placed in trash bags and disposed as municipal solid waste.
- Plastic bags and glassware, which were emptied of soil and disposed as municipal solid waste.

- Soil not extracted during TLC screening sample analyses, which was disposed at the landspreading site.
- Spent methylene chloride and small vials of soil extracted with methylene chloride from TLC analyses, which were containerized in glass jars, placed in lab pack containers and stored to be shipped off-island for disposal as hazardous waste in 2008.
- Silica gel plates spotted with methylene chloride during TLC analyses, which were containerized in glass jars and placed in lab pack containers, then prepared to be shipped off-island for disposal as hazardous waste in 2008.

All such wastes were or will be disposed according to NOAA's Master Investigation Derived Waste Plan (NOAA 2004)

4.8 SITE SURVEYING

NOAA representatives surveyed sampling locations, benchmarks, excavation extents, and buildings using a survey-grade Trimble Total Station® R8 differential GPS. The Trimble Total Station® R8 is a GPS and GIS data collection and mapping system that combines a high-performance, dual-channel GPS receiver and antenna with a local base station and real-time differential correction system to provide survey-grade accuracy in real time. NOAA's survey-grade GPS determines horizontal positions of soil sampling locations and excavation boundaries to within approximately ± 1 centimeter (cm), and elevations to within approximately ± 2 cm. NOAA collected survey data in latitude and longitude referenced to the World Geodetic System 84 Datum, Universal Transverse Mercator Zone 2 coordinate system in meters. However, many confirmation samples were collected near potentially unstable excavation sidewalls inside the excavation and it was unsafe to enter the excavation to survey the exact location. Consequently, NOAA surveyed some of these samples at a point on the upper rim of the excavation, as close to the actual sample location as deemed safe to approach. Several samples were collected from the excavation bottom and not near the excavation side wall. In those instances, NOAA and Tutka personnel estimated sample locations using swing ties from a nearby electrical transformer. Therefore, many survey point for these samples is displaced approximately 2 to 3 ft laterally, and up to 18 ft vertically higher than the actual sample location.

5.0 FIELD SCREENING AND ANALYTICAL SAMPLING

During this corrective action, BSE collected screening and analytical confirmation samples in accordance with the CAP Addendum (NOAA 2006b) and 18 AAC 78 (ADEC 2006). For petroleum contamination, NOAA performed TLC screening sample analyses, and provided the results to BSE to direct excavation activities and identify locations for analytical confirmation samples; BSE performed PID screening sample analyses for petroleum contamination. Based on evaluation of the TLC and PID screening sample results, BSE selected analytical sampling locations where the greatest potential for residual contamination existed.

The following subsections describe the instrumentation used and procedures followed during the collection of screening and analytical confirmation samples.

5.1 SCREENING SAMPLES

NOAA used three different technologies to screen soil samples in the field in order to facilitate rapid decision making, as described below.

5.1.1 PID SCREENING SAMPLES FOR PETROLEUM CONTAMINATION

As excavation of contaminated soil progressed and the remaining soil was no longer obviously contaminated with petroleum hydrocarbons as determined by visual and olfactory inspection, BSE collected field screening samples of soil from the bottom (or sidewalls) of the excavation, as directed by the on-site NOAA representative. BSE used a PID as a first screening method to determine whether remaining soil was still contaminated as specified by the CAP (NOAA 2003c). The soil sample was first warmed to approximately room temperature while sealed inside a plastic bag, and then the PID was inserted into the bag to sample any VOC vapors that may have been released. The PID was used because it can detect low levels of VOCs, and can detect moderate and high concentrations of DRO that had been detected in the soil at the DPP by previous NOAA laboratory analyzed samples. A PID cannot distinguish between the main VOC constituents that had previously been found to exceed ADEC cleanup standards (such as benzene) and other VOCs such as toluene, ethylbenzene, and xylenes. Nevertheless, if VOCs were detected above background levels, the soil represented by the sample was assumed to be contaminated above site cleanup levels and was removed. If the soil sample did not show

elevated VOC levels according to the PID reading, then a second aliquot of the sample was given to NOAA to perform TLC analysis as described below.

5.1.2 THIN-LAYER CHROMATOGRAPHY SCREENING SAMPLES FOR PETROLEUM CONTAMINATION

TLC is the use of solid-liquid chromatography for the semi-quantitative analysis of DRO in soil. A specific analytical method designed by NOAA, TLC, was originally used in support of field efforts during a crude oil spill in the State of Washington (NOAA 2006b).

The procedure involves the solvent extraction of soil screening samples in a field laboratory and subsequent comparison of the extracts to a range of standard diesel concentrations. By using standards that include diesel concentrations equal to, above, and below site-specific cleanup levels, the analyst determines whether the sample contains concentrations above or below the site cleanup level; in addition, the analyst is able to determine an approximate concentration of DRO in each sample.

TLC screening samples were collected throughout the corrective action by placing a small amount of soil (at least 20 grams) into a clean, re-sealable plastic bag. Each sample was homogenized and kept cool until it could be processed at the NOAA field laboratory.

5.2 CONFIRMATION SAMPLES

Once petroleum screening samples indicated that the remaining soil did not contain elevated VOCs or DRO from the PID and TLC testing, or further excavation was impracticable, Tutka collected a confirmation sample by placing a split of the screening sample into appropriate containers for fixed laboratory analyses by SGS to verify concentrations of contaminants remaining in soil in the excavation. Confirmation samples were packaged and shipped to SGS via Alaska Central Express air cargo company to Anchorage Airport, picked up by either a courier or a BSE employee for transport to SGS. SGS conducted the following analyses:

- BTEX by EPA Method 8260B
- GRO by ADEC Method AK101
- DRO by ADEC Method AK102
- RRO by ADEC Method AK103

- PAHs by EPA SW-846 (EPA 1996) Method 8270C, Selected Ion Monitoring[3]

BSE collected 16 petroleum contamination confirmation samples, plus two duplicate samples during corrective action activities at the DPP site. SGS analyzed all the samples for BTEX, GRO, DRO, RRO, and one of the samples for select PAHs per the methods listed above. Figure 4 illustrates the approximate sampling locations, with location uncertainty as described in Section 4.8.

5.3 WASTE CHARACTERIZATION SAMPLES

BSE collected 9 characterization samples, plus one duplicate sample from the 800 CY of PCS excavated from the site. SGS analyzed all the samples for BTEX, GRO, DRO, RRO, and one of the samples for select PAHs per the methods listed in Section 5.2.

5.4 BACKFILL CHARACTERIZATION SAMPLES

BSE collected three characterization samples from scoria available at the Lake Hill scoria pit and used as backfill for the excavation at both the Municipal Garage site (NOAA 2008a) and the DPP site. Backfill characterization samples were analyzed by SGS for BTEX, GRO, DRO, RRO, and select PAHs.

[3] The corrective action plan addendum (NOAA 2006), and by reference the original corrective action plan (NOAA 2002), indicate all samples would be analyzed for BTEX, GRO, DRO, RRO, and select PAHs. In 2003 NOAA began requesting that ADEC approve less frequent analyses for select PAHs (e.g., 20% of the samples), given their infrequent detection and St. Paul Island cleanup sites and the significant cost of PAHs analyses. NOAA did not request ADEC approval for a lesser PAHs frequency. NOAA erroneously directed its contractor to use a lesser frequency. Section 7.0 addresses data usability issues related to the PAHs analysis frequency.

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6.0 ANALYTICAL RESULTS

The following subsections summarize the analytical results for samples collected during corrective action activities at the Municipal Garage. Tables 6-1 and 6-2 provide an analytical data summary. Appendix D includes the analytical data for soil samples collected during the corrective action.

6.1 CONFIRMATION SAMPLES

Table 6-1, Table 6-2, Figure 4, and Figure 5 summarize the confirmation sample results. Soil within the northwestern half of the excavation did not exceed the site cleanup levels, or the ADEC Method Two cleanup levels for any contaminants for which NOAA is using an alternative cleanup level. Confirmation samples collected from the bottom and side walls of the excavation at the site indicated concentrations of DRO exceeded the site cleanup level of 2,500 mg/kg in three locations[4] on the bottom of the southeastern half of the excavation, at a maximum concentration of 14,400 mg/kg. Two additional confirmation samples taken on the southeastern excavation bottom contained DRO exceeding the ADEC Method Two cleanup level, but below the site cleanup level. Confirmation samples in four other locations indicated benzene contamination less than the 1991-based site cleanup level of 0.5 mg/kg but greater than the ADEC Method Two cleanup level of 0.02 mg/kg, with two of these four locations also exceeding the Ten Times Rule-based cleanup level of 0.2 mg/kg. Benzene was found at a maximum concentration of 0.359 mg/kg. The five DRO-containing and five benzene-containing samples described above were all found within the southeastern half of the excavation at depths greater than 15 ft bgs, with further excavation impracticable due to the reach limitation of the excavator.

[4] One of the three confirmation samples exceeding the DRO site cleanup level was SP18-CS-101-180, which is a field duplicate of project sample SP18-CS-017-180. This project sample had a DRO concentration of 1,690 mg/kg, which is above the ADEC Method Two cleanup level but below the Ten Times Rule-based site cleanup level for this site. The difference found between the project sample and its field duplicate is reasonable given these two duplicate samples were not homogenized in the field prior to placing in sample jars. NOAA used the higher result in the discussion above, as well as in Figure 4.

Contamination at these depths likely continues further northeast and southeast, however further excavation was not practicable due to buried utilities and adjacent roadways

All other contaminants were either not detected (i.e., below laboratory method detection limits [MDLs]), or were detected at concentrations below ADEC Method Two cleanup levels.

6.2 CHARACTERIZATION SAMPLES

Characterization samples collected from PCS removed from the site contained two constituents that exceeded the site cleanup levels: DRO with concentrations that varied from 144 mg/kg to 9,350 mg/kg, and RRO with concentrations that varied from 89 mg/kg to 41,800 mg/kg. All other contaminants were either not detected (i.e., below laboratory MDLs), or were detected at concentrations below ADEC Method Two cleanup levels (Tables 6-1 and 6-2).

6.3 BACKFILL CHARACTERIZATION SAMPLES

Backfill characterization samples collected from the Lake Hill scoria pit indicated concentrations of all clean backfill-specific analytes below the ADEC Method Two cleanup levels (Tables 6-1 and 6-2).

7.0 QUALITY ASSURANCE AND QUALITY CONTROL

To ensure that information obtained from field and laboratory procedures is an accurate and defensible representation of site conditions, quality assurance and quality control (QA/QC) procedures were implemented. NOAA followed the operational guidelines set forth in the ADEC Environmental Laboratory Data and Quality Assurance Requirements memorandum (ADEC 2006a) as well as those stipulated in the Pribilof Islands site restoration Master Quality Assurance Plan (NOAA 2006c). These documents provide detailed QA/QC information pertaining to each quality control item discussed in this section. Appendix D includes a completed copy of the ADEC-required Laboratory Data Review Checklist (ADEC 2006b).

Based on the data quality review detailed in Table 7-1, all project chemical data presented in Section 5 met project data quality requirements and are satisfactory for decision-making purposes. As indicated in the Section 6.1 footnote, NOAA did not analyze all project samples for select PAHs. The CAP Addendum (NOAA 2006a) indicated NOAA would analyze all samples for select PAHs. NOAA had previously received ADEC approval for a lesser frequency of select PAHs analyses at other sites near the DPP based on NOAA not having quantified any select PAHs above their ADEC Method Two cleanup levels at any site in St. Paul Village prior to 2006. NOAA erroneously failed to request a lesser frequency of select PAHs analyses in the CAP Addendum. NOAA directed its contractor to analyze samples for select PAHs at a lesser frequency, having assumed NOAA had requested and ADEC had approved a lesser frequency.

Accordingly, SGS analyzed five of the total 28 project samples for select PAHs, including one confirmation sample, one removed PCS characterization sample, and all three clean backfill characterization samples (Table 6-2). The confirmation sample and removed PCS characterization sample did not contain any select PAHs exceeding their site cleanup levels, with no PAH exceeding one-tenth of its ADEC Method Two cleanup level for ingestions or inhalation risk. These two samples contained DRO significantly above its Ten Times Rule-based site cleanup level, indicating the presence of high hydrocarbons concentrations and the representativeness of the samples relative to the potential presence of select PAHs at the site.

The sample results document residual site contamination that cannot be practicably removed due to its depth and proximity to existing roads and utilities, and the concentration of contaminants

disposed at the landspreading area. The lack of additional select PAHs results does not affect data usability for decisionmaking purposes.

8.0 CONCEPTUAL SITE MODEL

A conceptual site model (CSM) is used to evaluate exposure pathways for human health and ecological receptors (ADEC 2002b). The following subsections provide an evaluation for each of the elements of the CSM for the Decommissioned Power Plant site, including historical contamination sources, release mechanisms, impacted media, migration pathways, exposure routes, potential receptors, and a cumulative risk assessment.

8.1 HISTORICAL SOURCES OF CONTAMINATION

Historical sources of contamination (e.g., raceway within building, ASTs, USTs, and fuel pipelines around the outside of the building) were removed from this site. The resulting contamination (i.e., PCS) was mostly removed from the site during the 2002 and 2007 field seasons.

8.2 RELEASE MECHANISMS

Potential release mechanisms include wastes released into the raceway, and leaks and spills from the ASTs, USTs, and pipelines.

8.3 IMPACTED MEDIA

As a result of past releases, NOAA identified PCS during site investigations. During the 2002 field seasons, NOAA removed PCS from areas on 2 sides of the site to depths up to 15 ft bgs. Contaminated soil was left behind in the 2002 excavation because the contamination continued beneath the DPP building, at refusal depths of 11 ft bgs and 13 ft bgs, toward an adjacent road, or close to buried utilities. In 2007, NOAA removed the DPP building, then removed PCS that had been underneath the building, reaching PCS excavation depths of 18 ft bgs. Analytical data for confirmation samples indicates that contamination remains in some areas at 18 ft bgs.

8.4 MIGRATION PATHWAYS

NOAA removed PCS to a maximum depth of 13 ft bgs in 2002 and 18 ft bgs in 2007. The majority of PCS, however, has been removed from this site, and the source volume has been significantly reduced.

Petroleum-contaminated surface soil has been removed by NOAA, and no overland transport pathway is available to PCS remaining at depths exceeding 15 ft bgs. Small amounts of DRO contamination remain shallower than 15 ft bgs due refusal and PCS proximity to utilities and roads as encountered during the 2002 corrective action. PCS that was not removed from the vadose zone continues to be a potential source of contamination to groundwater, which is found at approximately 20 ft bgs at the DPP site.

8.5 EXPOSURE ROUTES

NOAA assumes contamination found deeper than 15 ft bgs has no complete exposure pathway for inhalation and ingestion based on current and anticipated future land uses in this commercial and industrial area of St. Paul Village. NOAA has removed nearly all PCS down to a depth of 18 ft bgs. Minor amounts of DRO contamination remain shallower than 15 ft bgs, at levels exceeding the site cleanup level of 2,500 mg/kg. This cleanup level is based on applying the Ten Times Rule for protection of groundwater; the inhalation and ingestion cleanup levels for the site based on ADEC Method Two are 10,250 mg/kg and 12,500 mg/kg, respectively. Residual DRO contamination shallower than 15 ft bgs does not exceed the cleanup levels for ingestion and inhalation. While direct exposure pathways such as dermal contact with or incidental ingestion of PCS may for soil shallower than 15 ft bgs, there would be no unacceptable exposure since soil contamination does not exceed the risk-based cleanup levels for those pathways. Inhalation and ingestion of contaminated groundwater are not considered viable exposure routes because no potable or non-potable water production wells are located in the vicinity; therefore, exposure to contaminated groundwater is unlikely. Given the proximity of the site to the harbor and the direction of groundwater flow in the site's vicinity, it is possible that the contaminated groundwater could migrate to the surface water of the harbor; however, there is no indication this is occurring. NOAA is conducting long term groundwater monitoring of wells that are located between the site and the harbor and will be able to detect any such migration if it should occur (NOAA 2005a).

8.6 POTENTIAL RECEPTORS

Potential exposure pathways have been mitigated, and indirect exposure routes are not considered viable given existing site conditions, thus no potential receptors have been identified.

8.7 CUMULATIVE RISK ASSESSMENT

Cumulative risk is defined as the sum of risks resulting from multiple sources and pathways to which humans are exposed. When more than one hazardous substance is present at a site or multiple exposure pathways exist, the cleanup levels in Table B1 of 18 AAC 75.341 and Table C of 18 AAC 75.345 may need to be adjusted downward. In accordance with the requirements outlined in 18 AAC 78.600, NOAA must ensure that the cumulative cancer risk remaining after the completion of the corrective action does not exceed 1 in 100,000 (1×10^{-5}) and that the cumulative non-carcinogenic hazard index does not exceed 1.0. Each contaminant detected above one-tenth of the Table B1 inhalation or ingestion cleanup levels (excluding DRO, GRO, and RRO) must be included in cumulative risk calculations (ADEC 2002b).

No contaminants with complete exposure pathways exceed one-tenth of their Table B1 inhalation or ingestion cleanup levels (excluding DRO, GRO, and RRO), and no complete exposure pathways exist. Therefore cumulative risk calculations are not required.

8.8 MONITORING WELL NETWORK

Monitoring wells located in the vicinity of the site include MW46-5, MW46-6, MW46-9, MW46-28, MW46-14, MW46-28, and MW46-30 (Figure 8).

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9.0 CONCLUSIONS AND RECOMMENDATIONS

The following subsections present conclusions and recommendations for the Decommissioned Power Plant site on field activities performed and analytical findings obtained from corrective action activities conducted during the 2007 field season.

9.1 CONCLUSIONS

NOAA and its contractors removed approximately 800 CY of PCS from the Decommissioned Power Plant site in 2007. Although confirmation sample data indicated that DRO concentrations remain above the site cleanup level in some portions of the bottom of the excavation, further excavation was not practicable due to the depth of excavation relative the reach limitation of the excavator. Also, PCS remains in areas proximate to buried utilities and roadways (18 AAC 75.325(f), 18 AAC 75.990(93)). Because of the great depth of the remaining contamination (18 ft bgs), there is no complete exposure pathway to humans or the environment, and therefore site contaminants do not pose unacceptable risks. Groundwater in the vicinity of the site is being monitored to ensure detection of unacceptable changes in contaminant conditions.

9.2 RECOMMENDATION

Because the primary sources of contamination have been removed and the objectives of the CAP addendum have been met for the Decommissioned Power Plant, NOAA is requesting with this report that ADEC grant a conditional closure not requiring further remedial action from NOAA for soil contamination at this site. NOAA requests that ADEC concur with this request by providing NOAA with a signed copy of the conditional closure approval letter attached at the end of this report as Appendix E.

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TABLES

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TABLE 3-1
SITE CLEANUP LEVELS FOR SOIL AT THE DECOMMISSIONED POWER PLANT SITE UNDER THE TEN TIMES RULE OR 1991 ADEC PROMULGATED REGULATIONS

Analysis Type	Laboratory Method	Cleanup Level, mg/kg
Acenaphthene[a]	EPA 8270C	210
Anthracene[a]	EPA 8270C	4,300
Benzo(a)anthracene[a]	EPA 8270C	6
Benzo(b)fluoranthene[a]	EPA 8270C	11
Benzo(k)fluoranthene[a]	EPA 8270C	110
Benzo(a)pyrene[a]	EPA 8270C	1
Chrysene[a]	EPA 8270C	620
Dibenzo(a,h)anthracene[a]	EPA 8270C	1
Fluorene[a]	EPA 8270C	270
Indeno(1,2,3-c,d)pyrene[a]	EPA 8270C	11
Naphthalene[a]	EPA 8270C	43
Pyrene[a]	EPA 8270C	1,500
GRO[b]	AK-101	1,400
DRO[b]	AK-102	2,500
RRO[b]	AK-103	10,000
Benzene[b]	AK-101/EPA 8260B	0.5
Toluene[b]	AK-101/EPA 8260B	54
Ethylbenzene[a]	AK-101/EPA 8260B	5.5
Total Xylenes[a]	AK-101/EPA 8260B	78

[a] These contaminants are still subject to the cleanup levels under Method Two, the chemical-specific cleanup levels for the PAHs indicated must be met unless ADEC determines that those cleanup levels need not be met to protect human health, safety, and welfare, and the environment (Note 15 to Method Two Tables B1 and B2).

[b] ADEC has approved the use of the Ten Times Rule for these contaminants. NOAA will elect to cleanup benzene in soils at 0.5 mg/kg in accordance with the TPA (see Section 2.4), and NOAA may elect to cleanup GRO, DRO, and other contaminants as appropriate under the Ten Times Rule (see Section 2.4).

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TABLE 6-1

ANALYTICAL DATA SUMMARY - BTEX, GRO, DRO, AND RRO
NOAA SITE 18/TPA SITE 9c - DECOMMISSIONED POWER PLANT
ST. PAUL ISLAND, ALASKA

Sample Number	Sample Depth (feet bgs)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	GRO (mg/kg)	DRO (mg/kg)	RRO (mg/kg)
2007 Confirmation Samples								
SP18-CS-002-180	18	0.359	0.247 J	3.34	18.9	481 CL	**6,650**	296 J,CL
SP18-CS-004-180	18	0.223	0 ND	3.43	9.8	316 CL	**14,400** CL	360 J,CL
SP18-CS-007-170	17	0 ND	0 ND	0.0355	0.1591 J	37 CL	1,130	129 CL
SP18-CS-008-175	17.5	0 ND	0 ND	0 ND	0.0179 J	1 J	1,100	8,150 CL
SP18-CS-010-115	11.5	0 ND	0 ND	0 ND	0 ND	0 ND	3.17 J	13.6 J
SP18-CS-011-050	5	0 ND	0 ND	0 ND	0 ND	0.503 J	3.55 J	13 J
SP18-CS-013-030	3	0.0077 J	0 ND	0 ND	0 ND	0.759 J	43	234
SP18-CS-014-030	3	0 ND	0 ND	0 ND	0 ND	0 ND	5.34 J	49 CL,B
SP18-CS-015-030	3	0.0053 J	0.0158 J	0 ND	0 J	0.855 J	51	200
SP18-CS-017-180	18	0.176	0.112	1.48	4.12	192 CL	1,690	177 J,CL
SP18-CS-101-180[a]	18	0.0844	0.042	0.627	3.093	64.4 CL	**2,900**	104 J,CL
SP18-CS-018-060	6	0 ND	0 ND	0 ND	0 ND	1.16 J	88.1 J,CL	80.1 J,CL
SP18-CS-019-060	6	0 ND	0 ND	0 ND	0 ND	0.478 J	0 ND	38 J,CL
SP18-CS-021-120	12	0 ND	0 ND	0 ND	0 ND	0 ND	24.5 J,CL	154 CL
SP18-CS-022-080	8	0 ND	0 ND	0 ND	0 ND	0.821 J	3.39 J	8.06 J,CL
SP18-CS-023-180	18	0.0111 J	0 ND	0.0248 J	0.1066	5.38	20.1 J	15.7 J,CL
SP18-CS-102-180[b]	18	0.022	0.0199 J	0.153	0.6111	37.8 CL	18.1 J	17.5 J,CL
SP18-CS-024-075	7.5	0 ND	0 ND	0 ND	0 ND	0 ND	13.3 J	42.4 CL
2007 Excavated PCS Characterization Samples								
SP18-CH-001	--	0 ND	0 ND	0 ND	0 ND	20.9 CL	**9,350** CL	397 J,CL
SP18-CH-003	--	0.0627	0.0454 J	1.34	5.303	231 CL	**4,750** CL	867 CL
SP18-CH-005	--	0.0957	0.0421 J	0.892	3.985	63.8 CL	**2,500**	**11,800** CL
SP18-CH-006	--	0.13	0.229	0.542	3.33	24.2	**6,760** CL	**41,800** CL
SP18-CH-009	--	0 ND	0 ND	0.0363	0.1819	20.8 CL	210	117 CL
SP18-CH-012	--	0.0045 J	0.0131 J	0.0094 J	0.059	1.49 J	281 CL	1,520
SP18-CH-016	--	0.169	0.124	1.26	4.466	190 CL	1,490	197 J,CL
SP18-CH-020	--	0.0821	0.044 J	0.838	4.69	126 CL	**2,600**	613 CL
SP18-CH-100[c]	--	0.0041 J	0 ND	0.0454	0.2404	25.3 CL	144	89 J,CL
2007 Clean Backfill Samples								
SP20-CB-005[d]	--	0.017	0.0 ND	0 ND	0 ND	0.743 J	2.64 J	17.3 J
SP20-CB-006[d]	--	0 ND	0 ND	0 ND	0.0 ND	0 ND	0 ND	10.6 J
SP20-CB-007[d]	--	0 ND	0 ND	0 ND	0 ND	0 ND	2.68 J	13 J
2007 Trip Blank Samples								
Trip Blank VW 726-	--	0 ND	0 ND	0 ND	0 ND	0.507 J	NA	NA
Method Two Cleanup Level [e]		*0.02*	*5.4*	*5.5*	*78*	*300*	*250*	*10,000*
Alternative Cleanup Level [f]		*0.5* [g]	*54*	*NA*	*NA*	*1,400* [h]	*2,500*	*NA*

Table 6-1 Notes:

a	Duplicate of sample number SP18-CS-017-180
b	Duplicate of sample number SP18-CS-023-180
c	Duplicate of sample number SP18-CH-009
d	Sample collected during the 2007 corrective action for Site 20/TPA Site 9e - Municipal Garage, to characterize clean scoria from the Lake Hill scoria pit used for backfill. Scoria from the same source was used for backfill at the Decommissioned Power Plant in 2007. These samples are representative of backfill for both sites.
e	Cleanup level is obtained from Title 18 of the *Alaska Adminstrative Code* 75 "Oil and Hazardous Substances Pollution Control Regulations," published by the State of Alaska and amended through October 16, 2005, consistent with the Corrective Action Plan Addendum for this site (NOAA 2006a). Contaminants of concern for this site are limited to BTEX, GRO, DRO, and select PAHs; although not identified as contaminants of concern in the corrective action plan, RRO and lead are included because these analyses were conducted on some samples.
f	Cleanup level is obtained from ADEC Method Two based on the "Ten Times Rule" applied to the migration to groundwater pathway, as discussed in Section 5.0 of the corrective action plan (NOAA 2006a).
g	Under the TPA, NOAA is required to comply with the 1991 ADEC cleanup level for benzene (0.5 mg/kg).
h	Cleanup level selected based on the more stringent value associated with ingestion and inhalation pathways.
bold	Indicates concentration site cleanup level. Note that the ADEC Method Two cleanup levels are shown, as well as an alternative cleanup level if established for the site. The higher cleanup level shown for a contaminant is the site cleanup level.
B	EPA Flag - Analyte present in the blank and the sample
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and total xylenes
CL	Sample required dilution due to elevated concentrations of one or more contaminants, causing increase in MDL and PQL
DRO	Diesel-range organic compounds
GRO	Gasoline-range organic compounds
J	The analyte was positively identified, but the numerical value is an estimated concentration (i.e., above the MDL but
MDL	Method detection limit, which is the lowest concentration at which the laboratory can determine the presence or absence of a contaminant.
mg/kg	Milligram per kilogram
NA	Not analyzed
ND	The analyte was analyzed for but not detected above the MDL
NOAA	National Oceanic and Atmospheric Administration
PAH	Polynuclear aromatic hydrocarbon
PQL	Practical quantitation Limit, which is the concentration at or above which the laboratory can quantify a contaminant at the 95% upper confidence limit
RRO	Residual-range organic compounds
TPA	Two-Party Agreement

TABLE 6-2

ANALYTICAL DATA SUMMARY - POLYNUCLEAR AROMATIC HYDROCARBONS
NOAA SITE 18/TPA SITE 9c - DECOMMISSIONED POWER PLANT
ST. PAUL ISLAND, ALASKA

Sample Number	Sample Depth (feet bgs)	Naphthalene (mg/kg)		Acenaphthylene [c] (mg/kg)		Acenaphthene (mg/kg)		Fluorene (mg/kg)		Phenanthrene [c] (mg/kg)		Anthracene (mg/kg)		Fluoranthene [c] (mg/kg)		Pyrene (mg/kg)		Benzo(a)anthracene (mg/kg)		Chrysene (mg/kg)		Benzo(b)fluoranthene (mg/kg)		Benzo(k)fluoranthene (mg/kg)		Benzo(a)pyrene (mg/kg)		Indeno(1,2,3-cd)pyrene (mg/kg)		Dibenzo(a,h)anthracene (mg/kg)		Benzo(g,h,i)perylene [c] (mg/kg)	
Site 18/TPA Site 9d 2007 Confirmation Samples																																	
SP18-CS-002-180	18	4.05	CL	0	ND	0.482	CL	2.38	CL	3.67	CL	0.599	CL	0.119	CL	0.21	CL	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND
2007 Clean Backfill Samples																																	
SP20-CB-005[a]	--	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND
SP20-CB-006[a]	--	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND
SP20-CB-007[a]	--	0.0042	J	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND
Site 18/TPA Site 9d 2007 Excavated PCS Characterization Samples																																	
SP18-CH-001	--	0.0218	J,CL	0	ND	0	ND	0.124	CL	0.125	CL	0	ND	0.116	CL	0.199	CL	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0.005	U
Method Two Cleanup Level [b]		*43*		*NA*		*210*		*270*		*NA*		*4,300*		*2,100*		*1,500*		*6*		*620*		*11*		*110*		*1*		*11*		*1*		*NA*			

Notes

bgs	below ground surface
mg/kg	Milligram per kilogram
--	not applicable
TPA	Two-Party Agreement
J	The analyte was positively identified, but the numerical value is an estimated concentration (i.e., above the MDL but
ND	The analyte was analyzed for but not detected above the MDL
CL	Sample required dilution due to elevated concentrations of one or more contaminants, causing increase in MDL and
a	Sample collected from overburden material used to backfill the excavation
b	Cleanup level is obtained from Title 18 of the *Alaska Adminstrative Code* 75 "Oil and Hazardous Substances Pollution Control Regulations," published by
c	Not a select PAH required for analysis by ADEC under note 15 to Table B1 from 18 AAC 75. SGS quantified this contaminant as part of their own laboratory protocol for EPA Method 8270C. Results are reported, however it is not a site contaminant of concern and thus is not listed in Table 3-1 of this

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FIGURES

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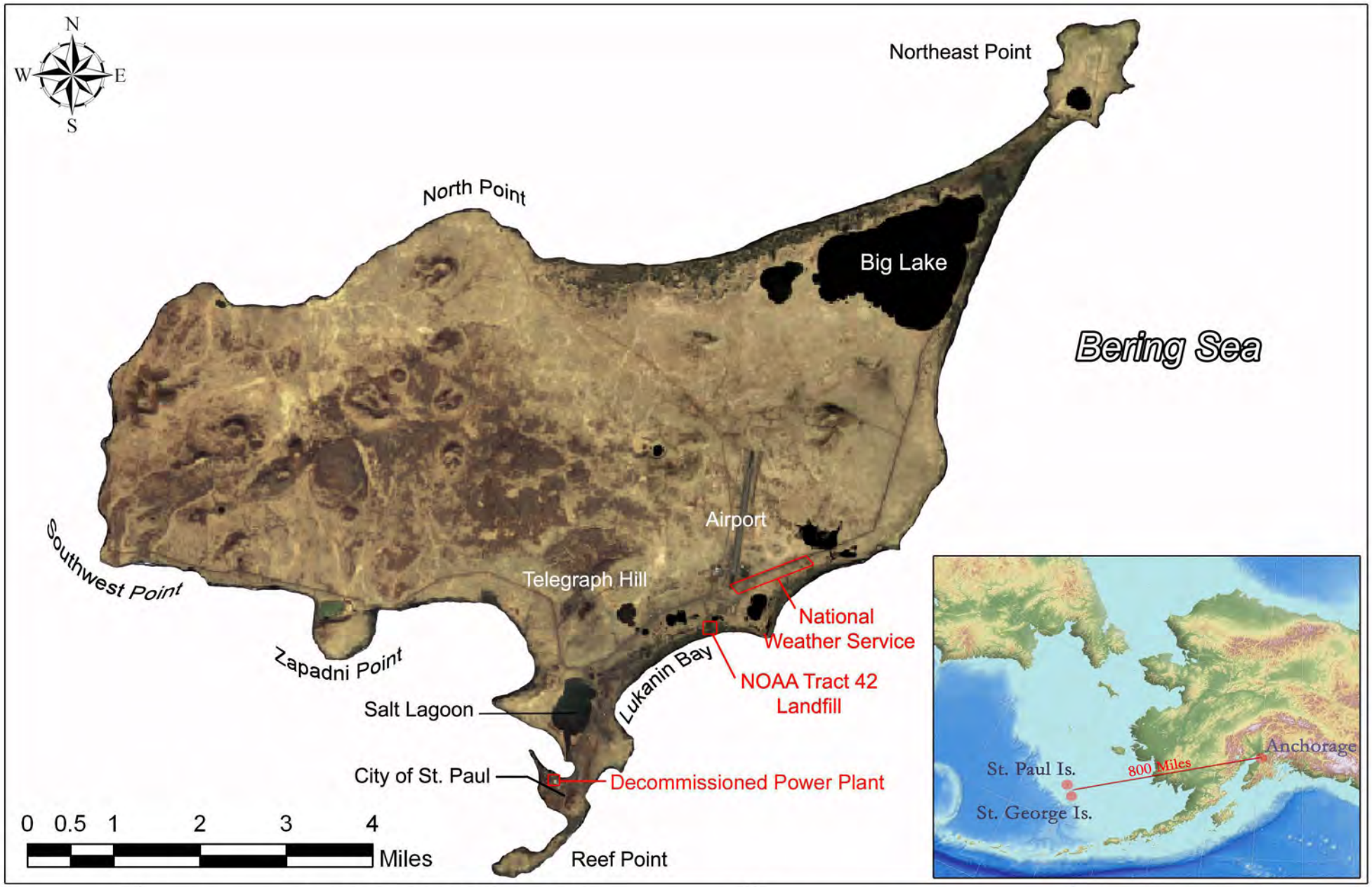

Figure 1	**St. Paul Island Vicinity Map** **Decommissioned Power Plant Demolition** **Corrective Action Report/Conditional Closure Request** **NOAA Site 18/TPA Site 9c** **St. Paul Island, Alaska**	**Source:** Ikonos Satellite Imagery (Space Imaging 2001) **Path:** C:\KP_GIS Data\Maps & Figures\ SNP\DPP Demolition CAR\ SNP Standard Fig 1 - DPP.psd **Date:** 2/29/2008

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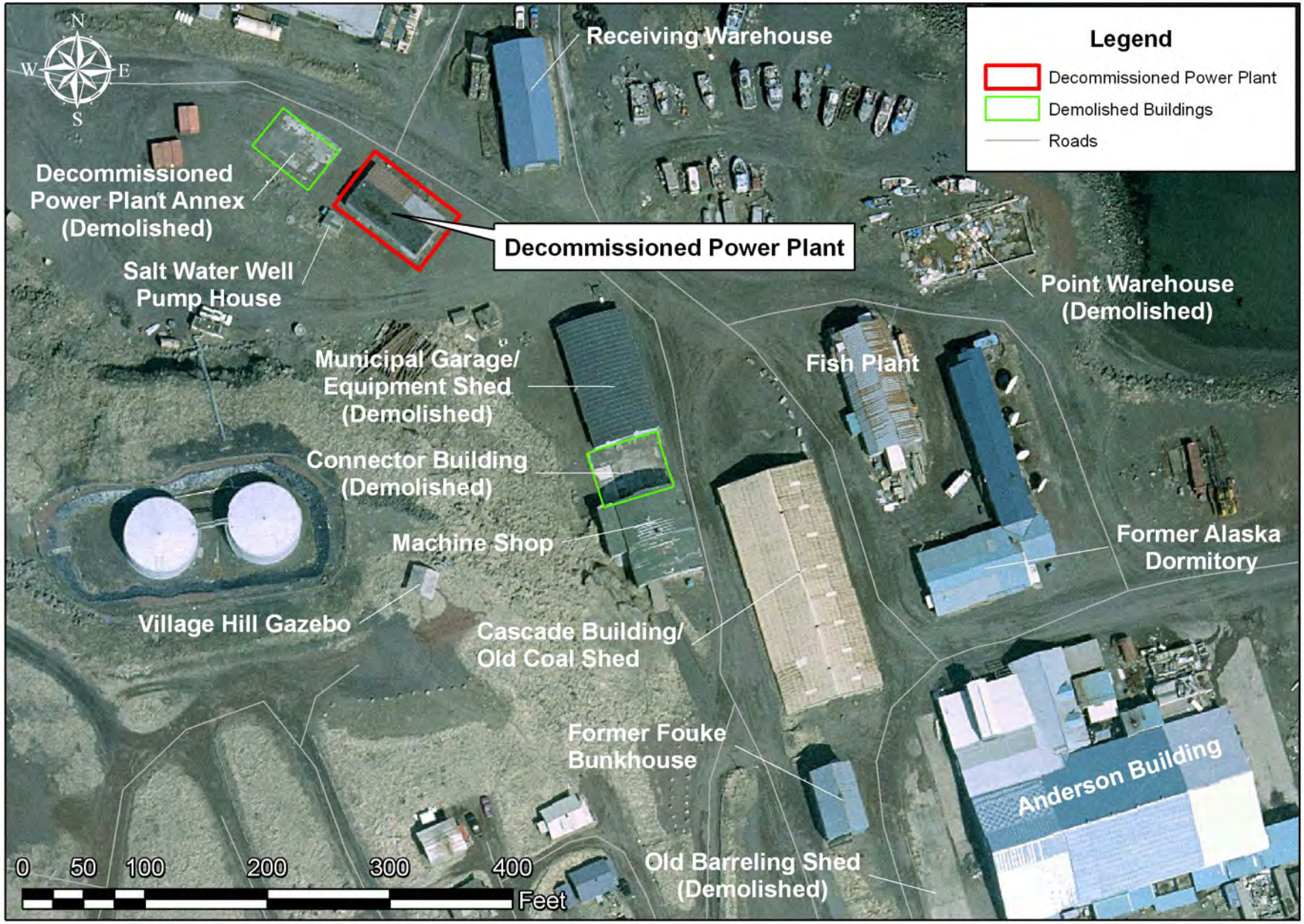

Figure 2	**Decommissioned Power Plant and Vicinity Decommissioned Power Plant Demolition Corrective Action Report/Conditional Closure Request NOAA Site 18/TPA Site 9c St. Paul Island, Alaska**	Source: Aero-Metric 2006 1 ft Aerial Photo, NOAA GIS Island wide layers Path: C:\KP_GIS Data\Maps & Figures\ SNP\DPP Demolition CAR\ DPP_Demolition_Fig2.mxd Date: 3/27/2008 @ 9:51:34 AM

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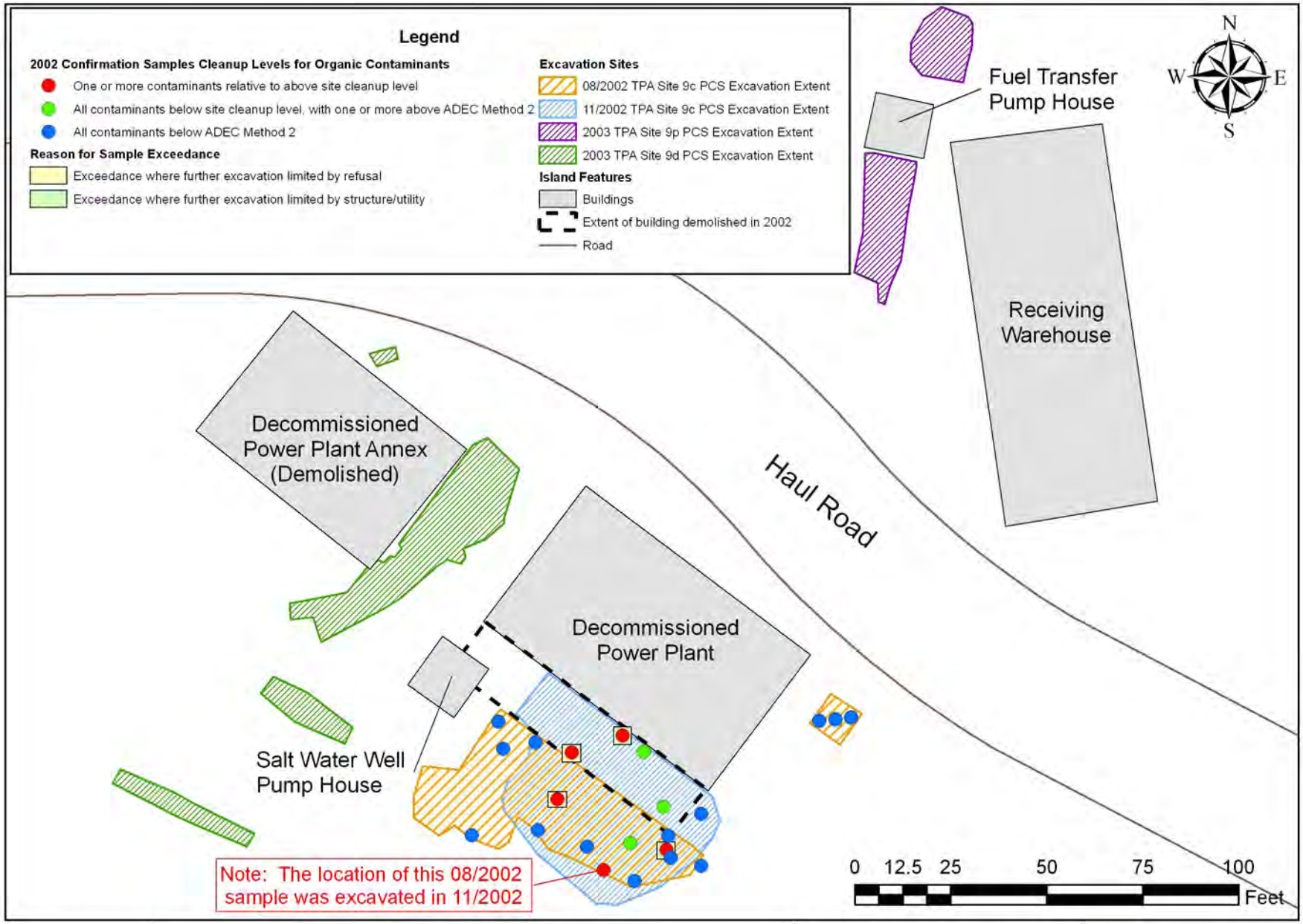

Figure 3	Areas of Previous Excavations Decommissioned Power Plant Demolition Corrective Action Report/Conditional Closure Request NOAA Site 18/TPA Site 9c St. Paul Island, Alaska	Sources: Building, Samples, Excavation Extents (NOAA GIS), Road (Hart Crowser CAD 2001). Path: C:\KP_GIS Data\Maps & Figures\SNP\DPP Demolition CAR\PreviousExcavated_DPP_Fig3.mxd Date: 4/10/2008 @ 9:08:54 AM

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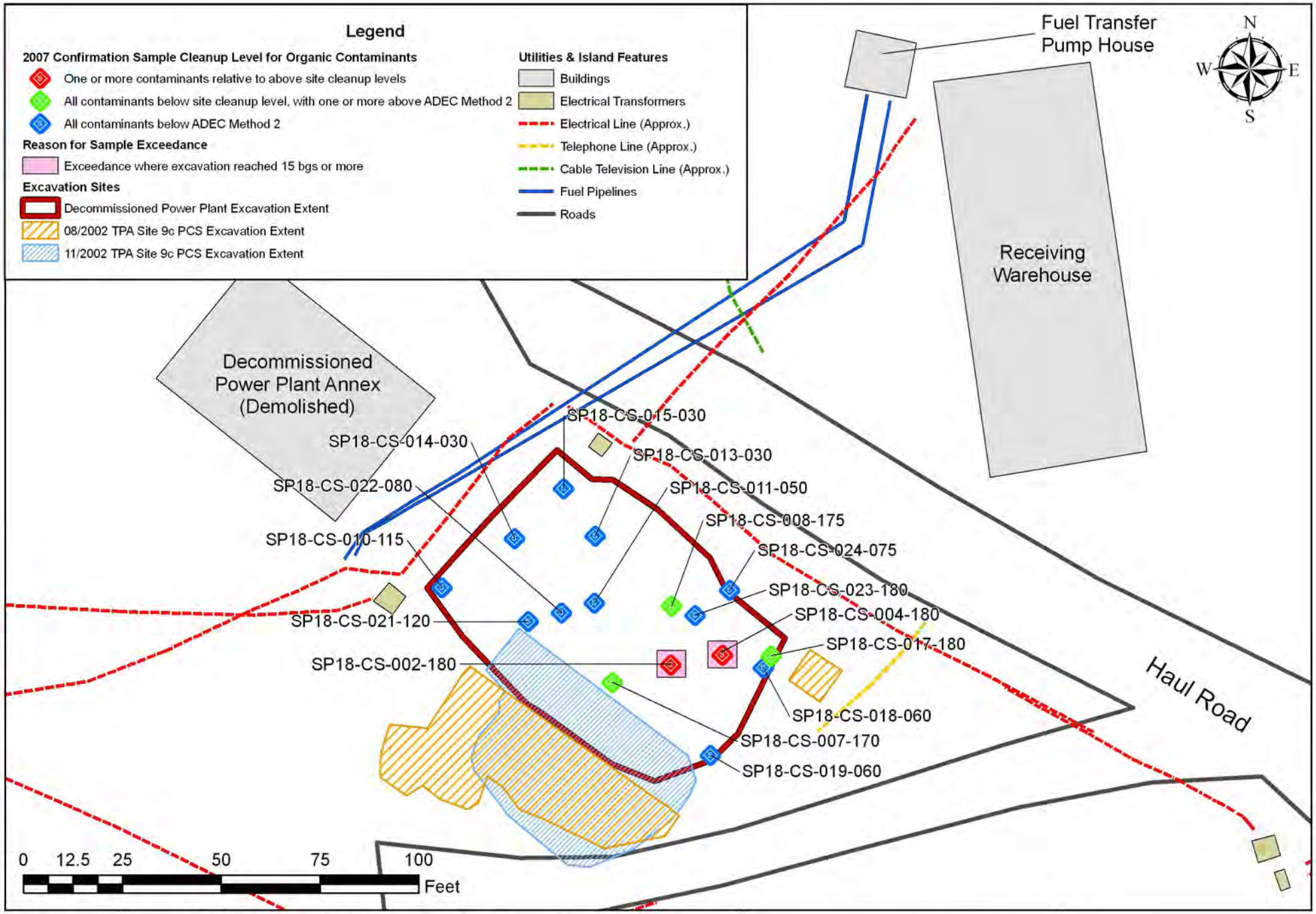

Figure 4	2007 Excavation Extent & Confirmation Results Decommissioned Power Plant Demolition Corrective Action Report/Conditional Closure Request NOAA Site 18/TPA Site 9c St. Paul Island, Alaska	Sources: Buildings, Samples, Utilities Roads, Excavation Extents (NOAA GIS 2007) Path: C:\KP_GIS Data\Maps & Figures\SNP\ DPP Demolition CAR\Utilities&07PCS_Fig4.mxd Date: 3/27/2008 @ 12:15:31 PM	NOAA Pribilof Islands Restoration Project

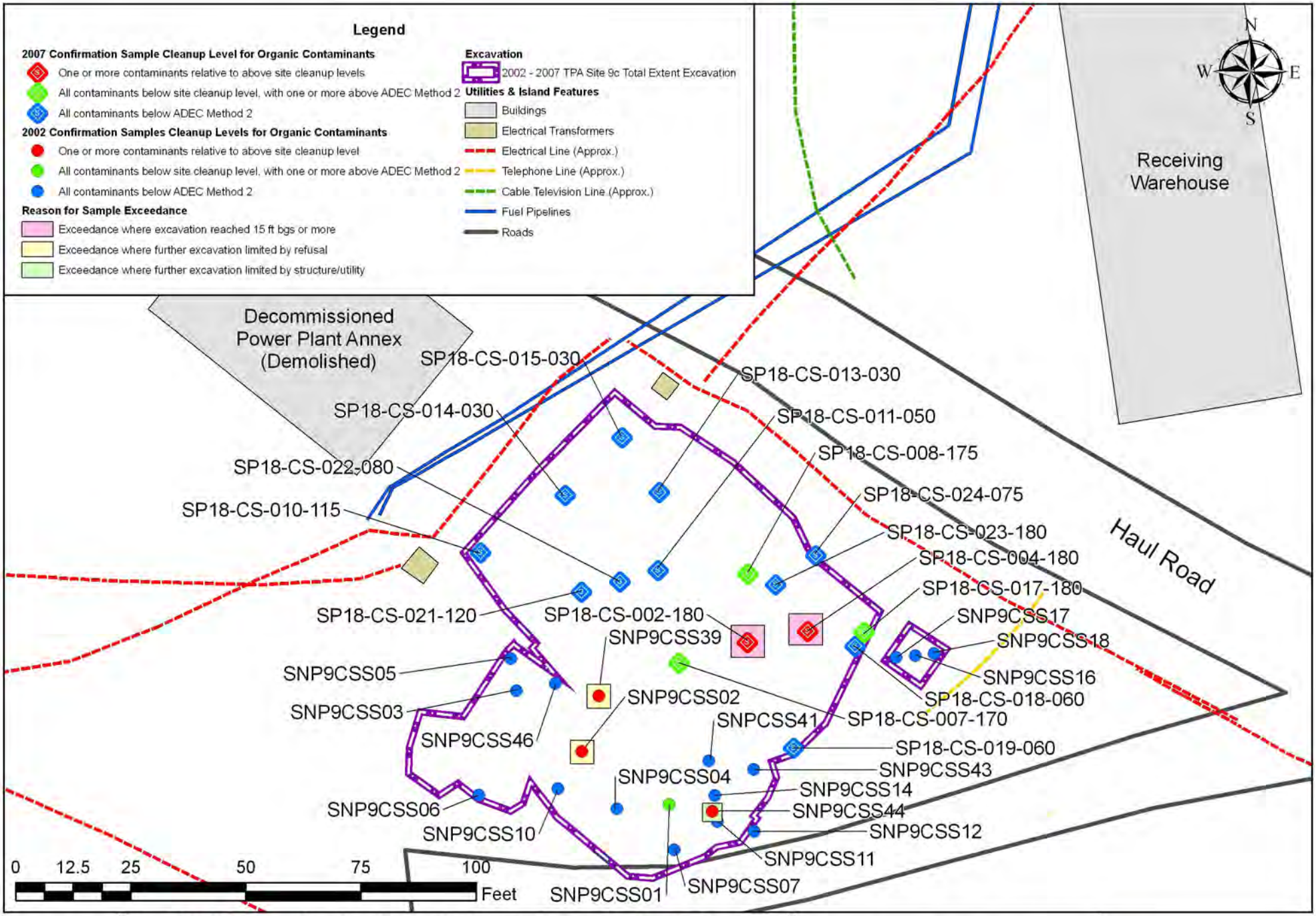

Figure 5

Residual Contamination & Total Extent of Excavation 2002 - 2007
Decommissioned Power Plant Demolition
Corrective Action Report/Conditional Closure Request
NOAA Site 18/TPA Site 9c
St. Paul Island, Alaska

Sources: Buildings, Samples, Utilities
Roads, Excavation Extents (NOAA GIS '02-'07)
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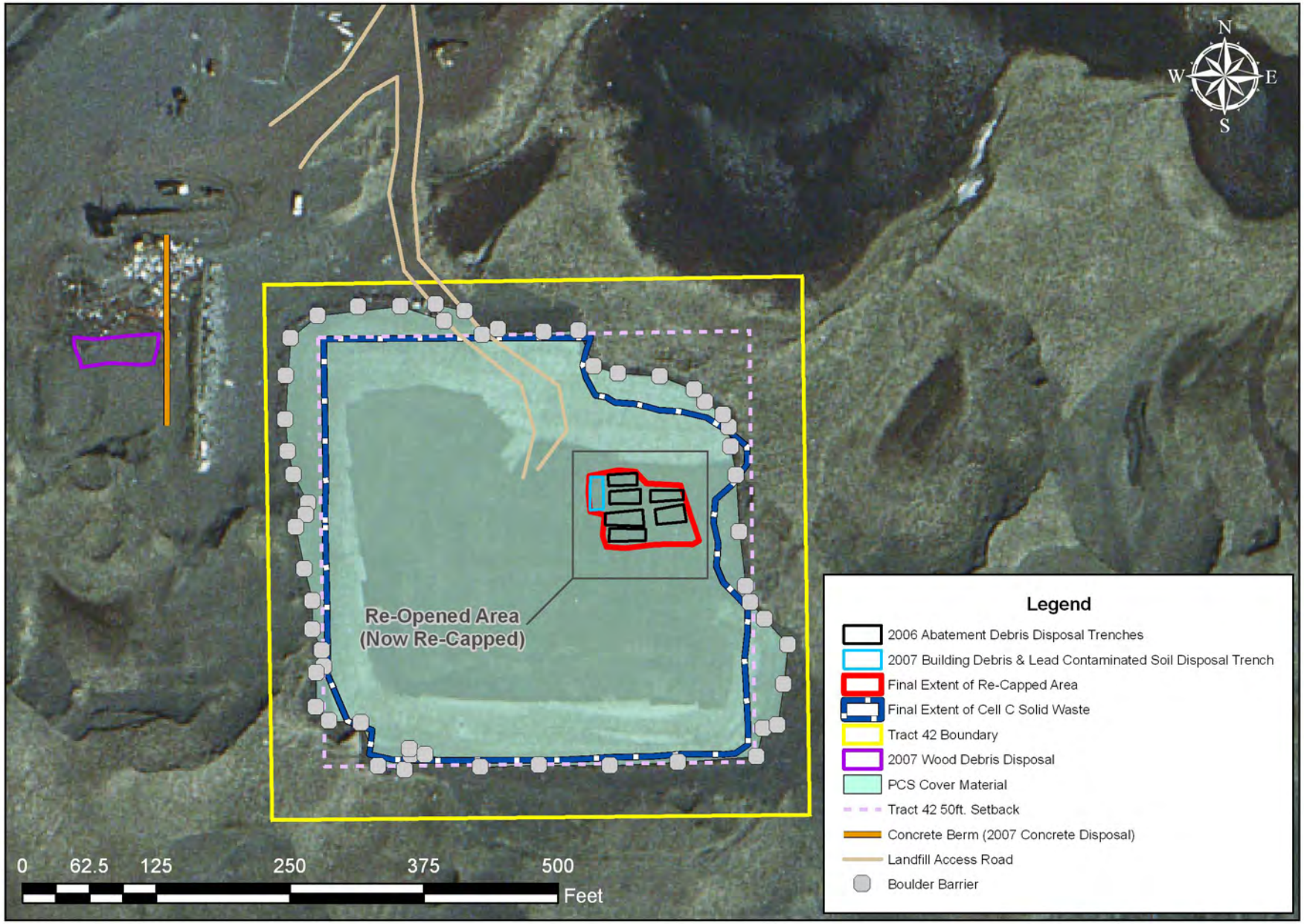

Figure 6	Select Waste Disposal Locations Decommissioned Power Plant Demolition Corrective Action Report/Conditional Closure Request NOAA Site 18/TPA Site 9c St. Paul Island, Alaska	Sources: Aero-Metric 2006 2ft Aerial Photo, GIS Layers (NOAA GIS & PPO Database 2007) Path: C:\KP_GIS Data\Maps & Figures\ SNP\DPP Demolition CAR\ DisposalCell_Fig6.mxd Date: 3/27/2008 @ 10:29:07 AM

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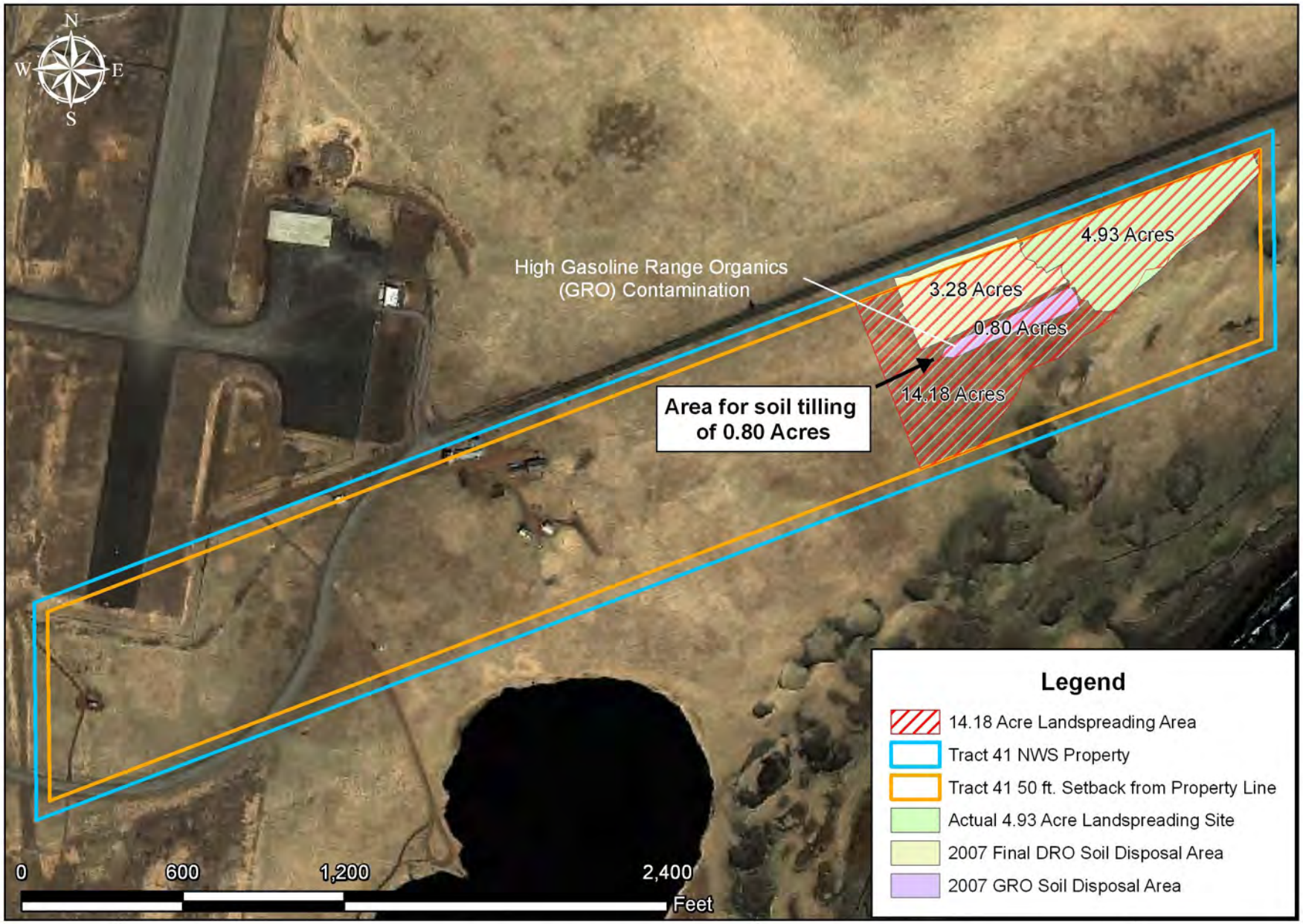

Figure 7	National Weather Service Landspreading Area Decommissioned Power Plant Demolition Corrective Action Report/Conditional Closure Request NOAA Site 18/TPA Site 9c St Paul Island, Alaska	Source: Ikonos 2001 Satellite Imagery GIS Layers (NOAA Pribilof Project Database); Path: C:\KP_GIS Data\Maps & Figures\SNP\DPP Demolition CAR\ContaminatedSoilTask11_Fig7.mxd Date: 3/26/2008 @ 11:00:19 AM Note: Calculations for landspreading and disposal areas are of estimated values.

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Figure 8	Current Monitoring Network Decommissioned Power Plant Demolition Corrective Action Report/Conditional Closure Request NOAA Site 18/TPA Site 9c St. Paul Island, Alaska	Sources: Well locations (GIS Layer), Aero-Metric 2006 2 ft Aerial Photo Path: C:\KP_GIS Data\Maps & Figures\SNP\DPP Demolition CAR\MonitoringWells_Fig8.mxd Date: 3/27/2008 @ 10:51:07 AM

Pribilof Islands Restoration Project

APPENDIX E

ADEC APPROVAL LETTER FOR CONDITIONAL CLOSURE

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For the National Oceanic and Atmospheric Administration

John Lindsay
National Oceanic and Atmospheric Administration
Pribilof Project Manager

April 1, 2008
Date

Approvals: In accordance with Paragraph 59 of the Two Party Agreement, this is to confirm that all corrective action has been completed at the St. Paul Island Alaska Decommissioned Power Plant, TPA Site 9c/TPA Site 18, in accordance with the Agreement and that no plan for further remedial action is required.

For the Alaska Department of Environmental Conservation

Louis Howard
Alaska Department of Environmental Conservation
Remedial Project Manager

April 8, 2008
Date

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