United States Army
Corps of Engineers

Alaska District
PO Box 6898
Elmendorf AFB, AK
99506-6898

FUDS Closeout Report

Prison Site “A”
Nome Area Defense Region
Seward Peninsula, Alaska
Property F10AK0052, Project F10AK005209

20 December 2007

Blank Page

EXECUTIVE SUMMARY

During the period from 1985 through 1988, the United States Army Corps of Engineers, Alaska District (USACE-POA) investigated the Nome Defense Area Region. The property was identified by USACE-POA as eligible for cleanup under the Formerly Used Defense Sites (FUDS) program with a Findings and Determination of Eligibility (FDE) dated 23 October 1989. An Inventory Project Report (INPR) was prepared and subsequently approved by the USACE, Headquarters, in October 1989 (USACE 1989). Plans and specifications were prepared for site cleanup in 1991. Due to funding shortfalls, the project was postponed until 1993. In 1993, the plans and specifications were updated. An award was made to the USACE Kansas City District's indefinite delivery remedial action contractor International Technology Corporation (IT) on December 13, 1993.

The removal action preliminary remedial goals were risk-based and the action was considered a removal action. Due to the advancements in the field of petroleum cleanup approaches and risk-based cleanups, the USACE-POA and the Alaska Department of Environmental Conservation (ADEC) agreed to re-evaluate the site after the removal action. This re-evaluation was to consist of comparison of contamination remaining on site with residential screening values. The residential values were used regardless if the site was residential, industrial, or remote. Subsequent to that agreement, ADEC promulgated risk-based cleanup levels in 18 AAC 75.

In 2001, USACE and ADEC formally closed six of the sites in the Nome Area Defense Region. These six sites are Center Creek Road, Dexter Creek, Hotel Gulch, Nome Spit, Northeast Runway, and Settling Pond. These sites are documented in the "FUDS Sub-site Closeout Report, Nome Area Defense Region, Seward Peninsula, Alaska, Proposed Closure of the Following Sub-Sites: Center Creek, Dexter Creek, Hotel Gulch, Northeast Runway, Nome Spit, Settling Pond," 31 August 2001. The Icy View Site and Hospital Site were closed in 2006; and the Airport Site "U" and Field Site "R" were closed in 2007. The remaining sites in the Nome Area Defense Region are: DOT "J," Prison Site "A," and Tank Site "E."

This report documents the activities at the Prison Site "A" in Nome, Alaska.

The Environmental Protection Agency (EPA) identification number is AK0000262196. The Alaska Department of Environmental conservation (ADEC) contaminated site record key (reckey) number is listed as 199032X121506. The Prison Site "A" is not listed on the National Priorities List (NPL).

The primary objective of reducing risk to human health and the environment through implementation of effective, legally compliant, and cost-effective response actions has been met for the Prison Site 'A.' All eligible debris and containerized HTRW have been removed from the Prison Site 'A;' thus removing primary and secondary contaminant sources. Cumulative risks do not exceed the State's 1 x 10^{-5} criteria. A few small areas, which were formerly under 55-gallon drums, are still above ADEC 18 AAC 75 Method 2 cleanup levels for petroleum. The areal extent of the remaining contamination is a small percentage of the entire site and much less than the ADEC *deminimis* ½-acre criterion. Therefore, exposure potential is limited and no further action is recommended at this site. The Prison Site ‘A’ is being closed under section 4-7.1.3 of Engineering Regulation 200-3-1. This section states that a closeout decision is warranted “[w]hen the conclusion of a public health evaluation or baseline risk assessment states that there is no significant threat to public health, safety or the environment.”

ADEC has reviewed this Closeout Report and concurs with the closure decision.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF PHOTOGRAPHS

1 Summary of Site Conditions

1.1 Site Location and Description

The Nome area is located on the south coastal plain of the Seward Peninsula, adjacent to Norton Sound and the Bering Sea (Figures 1, 2 and 3). The coastal plain extends approximately 3.5 miles inland to the base of a series of hills and ridges that rise to 1,800 feet above sea level. The ridges are oriented predominantly north south and are separated by south-flowing primary drainages. The Nome area was subjected to alpine glaciation during the Pleistocene Epoch.

Paleozoic and tertiary metamorphic and igneous rocks in the Nome area are folded into broad anticlines and synclines. Several faults occur in the area, including a major northeast trending fault in the Anvil Creek Valley. Lower elevation areas are commonly mantled with colluvium, alluvium, glacial deposits, coastal plain sediments, and placer mine spoils.

Nome lies in a region of discontinuous permafrost. Except for mined areas and alluvial sand and gravels associated with streams and rivers, the coastal plain is underlain with continuous or near-continuous permafrost. The dominant soils within the area are poorly drained and shallow over sediment. The surface is commonly patterned with solifluction lobes on sloping areas, frost scars on low knolls, and polygons in some of the nearly level valleys bottoms. The vegetation is typically tundra dominated by sedges, mosses, lichens, and low shrubs.

The sub-arctic climate of the Bering Straits Region varies between cold, predominantly dark winter days and mild, long summer days warmed by nearly 24 hours of sunlight. The climate over much of the Seward Peninsula is of maritime type when the Bering Sea is ice-free, roughly from May to October. The freezing of Kotzebue Sound (northeast of the Seward Peninsula) and Norton Sound (south and east of the Seward Peninsula) in November causes an abrupt change to a continental climate. During ice-free periods along the coast, cloudy skies prevail, fog occurs, daily temperatures are relatively uniform, and westerly winds predominate. January temperatures range from -3° to 11°F; July temperatures are typically 44° to 65 °F. Average annual precipitation is 18 inches, including 56 inches of snowfall. The coastal areas experience temperatures cooler in summer and warmer in winter than interior areas. Precipitation amounts and snow depths are strongly influenced by wind patterns.

The City of Nome is located along the Bering Sea, on the south coast of the Seward Peninsula, facing Norton Sound. It lies approximately 510 air miles from Anchorage. Nome is a first class city with a population of 3,540 (2006 Department of Commerce, Community, and Economic Development certified population). Malemuit, Kamuweramiut, and Unalikmiut Eskimos have occupied the Seward Peninsula historically, with a well-developed culture adapted to the environment. Gold findings at nearby Council in 1897 and on the sandy beaches of Norton Sound in 1898 brought thousands of prospectors to Nome and created a boomtown. The gradual depletion of gold, a major influenza epidemic in 1918, the depression, and finally World War II (WWII), have each influenced Nome's population.

The population of Nome is about 59% Native. Although many employment opportunities are available, subsistence activities are prevalent in the community. Former villagers from King Island also live in Nome. Nome is the finish line for the 1,100-mile Iditarod Sled Dog Race from Anchorage, held each March.

Nome is the center of the Bering Strait/Seward Peninsula region. Government services provide the majority of employment. Sixty residents hold commercial fishing permits. Retail services, transportation, mining, medical and other businesses provide year-round income. Subsistence activities contribute to the local diet. Nome is the regional center of transportation for surrounding villages. There are two State-owned airports in Nome. Scheduled jet flights are available, as well as charter and helicopter services. A port and berthing facilities accommodate vessels up to 18 feet of draft. Lighterage services distribute cargo to area communities.

In 2001, the U.S. Army Corps of Engineers (USACE) and the Alaska Department of Environmental Conservation (ADEC) formerly closed six of the sites in the Nome Area Defense Region. These six sites are Center Creek Road, Dexter Creek, Hotel Gulch, Nome Spit, Northeast Runway, and Settling Pond. These sites are documented in the "FUDS Sub-site Closeout Report, Nome Area Defense Region, Seward Peninsula, Alaska, Proposed Closure of the Following Sub-Sites: Center Creek, Dexter Creek, Hotel Gulch, Northeast Runway, Nome Spit, Settling Pond," 31 August 2001. The Icy View Site and Hospital Site were closed in 2006; the Airport Site "U" and Field Site "R" Site were closed in 2007. The remaining sites in the Nome Area Defense Region are DOT "J," Prison Site "A," and Tank Site "E."

This report describes the Prison Site "A" activities. The Prison Site "A" (PSA) has an area of approximately 40 acres. This is located one-mile north of Nome. The Anvil Mountain Correctional Facility is located on the east end of the site (See Photo 6). The Environmental Protection Agency (EPA) identification number is AK0000262196. The Alaska Department of Environmental conservation (ADEC) contaminated site record key (reckey) number is listed as 199032X121506. The Prison Site "A" is not listed on the National Priorities List (NPL). The Alaska Gold Company and Alascom own the land (remedial activities did not occur on Alascom property).

Topography of the site is hummocky with old dredge ponds and tailings piles throughout the site. Gravel laden soil pads comprise three quarters of the site with the remainder made up of ponds and tundra. Surface drainage is internal with surface runoff flowing to on-site and nearby ponds and marshes. No streams are present on-site. Vegetation is concentration mainly in the wet areas where grasses and willow form a thick brush. The dry high areas are more sparsely vegetated with willows and grasses. High areas adjacent to dredge ponds are in places devoid of vegetation. These areas are composed of mine spoil and have very little soil development. Permafrost is present in the undisturbed area and generally is lacking in areas with previous construction or mining.

1.2 History

During WWII, the Nome Area Defense Region served two main purposes. First, it was the last major airport for Russian pilots ferrying aircraft across to Siberia. Generally, the planes would be piloted by Russians from Fairbanks to Nome and then across the Bering Strait. Approximately 7,000 aircraft were transported to the Soviet Union during WWII as part of the Lend Lease Program. The Lend Lease Program was a wartime effort to provide materiel aid (e.g. aircraft, jeeps, ships, etc.) to America's allies. Secondly, Nome, being the best-maintained arctic port in the region, served as a headquarters for anti-submarine and ship patrols in the Bering Sea against potential Japanese vessels and aircraft. In order to support these two major missions of a Lend Lease logistic site and naval warfare center, in addition to other smaller objectives, many sites for communications, aircraft maintenance, ship docking/repair, and airfield security were established in the Nome area.

The Prison Site “A” was a troop readiness and radio relay post in the 1940s. Detailed army site activities are not known, however, on-site buildings included a vehicle maintenance garage, a laundry, a recreation building, and an incinerator. This area included the ACS Receiver Site and the ACS Radio Relay Annex itemized in the original FDE Report. The Bush Report (USACE 1984) also identifies this area as a Post Utilities site.

2 Remedial Planning Activities

2.1 General

During the period from 1985 through 1988, the USACE-POA investigated the Nome Defense Area Region. The property was identified by USACE-POA as eligible for cleanup under the FUDS program with a Findings and Determination of Eligibility (FDE) dated 23 October 1989. An Inventory Project Report (INPR) was prepared and subsequently approved by the USACE, Headquarters, in October 1989 (USACE 1989).

Based on 1989 remedial investigation work by James M. Montgomery, Consulting Engineers (JMM) under contract to USACE-POA, areas of contamination and probable contamination were identified. JMM conducted investigations at the following sites: Airport ‘U,” DOT “J,” Field “R,” Prison “A,” Tank “E,” and the Nome Spit.

Plans and specifications were prepared for site cleanup in 1991. Due to funding shortfalls, the project was postponed until 1993. In 1993, the plans and specifications were updated. An award was made to the USACE Kansas City District's indefinite delivery remedial action contractor International Technology Corporation (IT) on December 13, 1993 (Contract No. DACW41-89-D0133, Delivery Order No. 15). About 750 CYs from the IT landfarm at Tank Site ‘E’ did not meet cleanup levels for diesel range organics (DRO) at the end of the contract in 1996. These 750 CYs included about 9 CYs from the Prison ‘A’ site. This soil was treated under a separate contract in 1997 and 1998. Sampling in 2003 showed contaminant levels under ADEC cleanup levels. Table 4 provides a chronology of significant events that have taken place in the planning and implementation of the Nome Area Defense Region site remedial action.

2.2 Significant Chemical Data

Data collected from the investigations conducted identified contamination at most of the Nome Area Defense Region sites. The primary media affected was soil contaminated with petroleum fuels and their chemical constituents. Tables 7 through 12 summarize the significant chemical data obtained from the Prison "A." Table 6 provides descriptions of chemicals detected at the site.

The initial 1989 investigation by JMM was performed to identify the extent and nature of contamination in the soil, water and sediment. Additional sampling was conducted in 1994, 1995, and 1996 during remedial actions by IT. USACE conducted follow-up soil and surface water sampling in 2005 and 2007. Sampling performed during 1989, 1994, 1995, 1996, 2005 and 2007 analyzed for Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX); Volatile Organics (VOCs), Semi-Volatile Organics (SVOCs), Pesticides/PCBs, Hydrocarbons Fuel Scan (which included diesel, gasoline, Bunker C, kerosene, and jet fuel), Total Petroleum Hydrocarbons (TPH), Diesel Range Organics (DRO); Gasoline Range Organics (GRO) and total metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver). The sampling of the soil piles in 2003 analyzed for GRO, DRO, RRO, BTEX, and PAHs. Surface water sampling occurred 1994 to 2001 as part of the ADEC landfill permit.

During remedial action (RA) activities, photoionization detector (PID) readings were taken for health and safety concerns and to rapidly screen for potential soil contamination. Headspace samples were taken to further assess site conditions, based upon the PID reading and visual evidence of possible contamination at a specific area. The headspace results served as a qualitative indicator of soil contamination and assisted in the selection of samples for further analysis. EnSys immunoassay tests were also used during field screening. Analytical samples were collected to accurately determine the level of petroleum and other contaminants in the soil, surface water, groundwater, and sediment. Various other tests were used for waste characterization prior to disposal.

2.3 Establishment of Remedial Action Objectives

The primary objective for sites in the FUDS program is to reduce risk to human health and the environment through implementation of effective, legally compliant, and cost-effective response actions. The original (1991) Remedial Action Objectives (RAOs) established for the Nome Area Defense Region specify categories and specific goals for the protection of human health. The categories of concern at the Nome Area Defense Region were containerized hazardous, toxic and radiological waste (CONHTRW), building demolition and debris removal (BD/DR), and hazardous, toxic and radiological waste (HTRW). The RAOs were developed by the USACE-POA in concurrence with the requirements of the INPR and State of Alaska regulations. RAOs were established which were protective of human health and complied with Applicable or Relevant and Appropriate Requirements (ARARs) as defined in the then current state and federal regulations. The original RAOs included thermal remediation of the soil to 100 milligrams per kilogram (mg/kg) of DRO. This was based on a regulatory level. The CONHTRW and BD/DR projects have been closed. This report is to document the closure of the Prison 'A' HTRW project.

Between 1991 and 1993, the science of petroleum remediation advanced to include innovative technology (bioremediation) and risk-based cleanup approaches. Risk-based cleanup levels are those calculated through standard U.S. Environmental Protection Agency (EPA) methods that are protective of human health. In lieu of a default regulatory level (e.g., 100 mg/kg), site-specific cleanup levels are calculated that consider the people who are on, or may be on, the property in question and their exposure to the chemicals that are on the site. Risk-based cleanup levels are used to prioritize sites and expend the financial resources at the sites that pose the most risk to people. Thus, the RAOs for Nome area sites were updated using risk-based goals in 1993 prior to the remedial action contract awarded to IT. The 1993 RAOs for each of the Nome area sites ranged from 1,000 mg/kg to 5,000 mg/kg DRO. In 1995, additional sites were added to the IT contract. The RAO's for these additional Nome Area sites were also risk-based but included some of the individual chemical constituents of fuels. Due to the changing technology in the area of petroleum risk evaluation, the ADEC and the USACE-POA agreed to proceed with the proposed RAO's with reevaluation of final on-site concentrations after the removal action. On August 26, 1996, the USACE-POA and ADEC met to discuss this reevaluation. It was agreed that for sites with petroleum contamination below the appropriate ADEC matrix levels (ADEC 1991a), no further evaluation would be required. Those sites with petroleum contamination that exceed matrix levels or sites with compounds of concern other than petroleum, further risk evaluation would be required. This risk evaluation was to be based on screening final contaminant levels following EPA Soil Screening Guidance (EPA 1996b) or screening using the EPA Region III Risk-Based Concentration Table (EPA 1997) for compounds not in the Soil Screening Guidance. Petroleum levels were to be screened against levels determined using methodology from the ADEC draft Petroleum Cleanup Guidance (ADEC 1996). However, in the late 1990's, ADEC promulgated risk-based cleanup levels in Title 18, Chapter 75, Alaska Administrative Code (18 AAC 75). The current ADEC cleanup levels for DRO are 10,250 mg/kg for the ingestion pathway, 12,500 mg/kg for the inhalation pathway and 250 mg/kg for the migration to groundwater pathway (ADEC 2006). These recently promulgated values are used to evaluate eligibility for closeout at each of the Nome sites. See the Cleanup Evaluation section for further information.

3 Remedial Construction Activities

The major RA at the Nome Area Defense Region occurred during 1994, 1995, and 1996 construction seasons. All field activities were performed under the oversight of a USACE-POA representative. During remedial action, identified contaminated areas were re-located and re-sampled.

All original sites required the removal of debris, which consisted of 55-gallon drums (empty and product bearing), Quonset hut remains, and other miscellaneous items. Also included in the RA were the removal and/or treatment of contaminated soils. A landfill (ADEC Permit #93332-BA007) was constructed at the Prison Site "A" where most of the debris from the Nome Area and some debris from other Seward Peninsula sites were placed for disposal. A landfarm was constructed at the Tank Site where the more heavily contaminated soils were placed for treatment. In addition, product found within the product-bearing drums was consolidated and disposed at off-site facilities. Contaminated drums were washed at the Drum Cleaning facility at the PSA prior to crushing and disposal in the PSA landfill.

The remediation at the PSA was conducted in three seasons (1994, 1995, and 1996). Four areas were defined within the site: the Eastern Area, the Western Area, the Support Area, and the Extension Area. The following sections are a summary of the work done. Appendix B (Field Activities and Sampling Rationale) is a copy of the Section 3 (Field Activities) and Section 4 (Sampling Rationale) from the IT reports. This appendix provides details on the remedial action work. Also, see Figures 4 through 10 for locations of drums, soil samples and contaminated soil.

3.1 Drums and Debris

Approximately 318 empty 55-gallon drums were removed from the PSA. These drums were oxidized or severely deteriorated. In addition, removed from this site were approximately 84 drums containing product. The contents of the drums included oils (fuel and lubricating), fuels (jet, diesel, and light), oily water, and asphalt. Approximately 1,893 CY of wood debris were removed from this site. These included remnants from demolished Quonset huts, miscellaneous lumber and utility poles. Approximately 1,276 CY of metal debris, which included scrap sheet metal, Quonset hut frames, and other miscellaneous scrap metal, was removed from the site. Approximately 1,402 CY of miscellaneous debris, including well casings, concrete, and miscellaneous piping, were also removed.

The empty drums were taken to the drum handling station for cleaning (if the drums were intact) and crushing prior to disposal in the ADEC-permitted PSA landfill. The contents of the product drums were bulked with like substances and staged at the drum storage area for disposal off-site. The resulting drums were cleaned and crushed at the drum handling station prior to disposal at the PSA landfill. The wood debris was burned on-site except for five CY of creosote-treated wood, which was disposed in the PSA landfill. The metal and miscellaneous debris was disposed in the PSA landfill.

3.2 Contaminated Media

Approximately 10.7 CY of POL-contaminated soil was removed from various locations throughout the Prison Site “A.” These soils were located beneath 55-gallon drums. In addition, 4.4 CY of soil containing high levels of lead was removed from this site, where battery fragments were found. POL-contaminated soils not excavated were remediated by in situ methods through the construction of biovents. See the Biovent Construction section.

A petroleum contaminated soil stockpile (about 750 CYs) remained after the 1994-1996 removal action. These 750 CYs included about 9 CYs from the Prison ‘A’ site. Under a separate contract, a different contractor thermally treated this soil in 1997 and 1998. Testing of this stockpile in 2003 documented contamination below ADEC cleanup levels.

3.3 Asbestos

Asbestos was found within the Western area of PSA. During the 1994 work season, piping containing asbestos was found. The non-friable asbestos pipe was wetted down, wrapped in polyethylene sheeting and consolidated for transportation and disposal off-site.

A large boiler, containing asbestos, was also found in the same area as the pipe. An open-air asbestos abatement was initiated to remove asbestos within the boiler and from a 30’ x 30’ area around and below the boiler. Approximately 57,000 pounds of asbestos-containing material (ACM) and the associated soil was consolidated and transported for off-site disposal. ACM-contaminated soil remaining in this area was capped and left in place. A 70’ x 60’ area was covered by a polyethylene (PE) liner and capped with 120 CY of clean soil. The soil was graded over the PE lined area with a minimum of six inches. The soil cover was extended approximately ten feet to the west, to the edge of an existing concrete pad. The area was revegetated as described in the Revegetation Section.

In addition, within the Western area, a woodpile containing ACM-contaminated fiberboard was removed. Approximately 17,800 pounds of ACM and associated soil was removed and consolidated with other site ACM for transportation and disposal at a certified facility. The PPE worn by workers during the abatement operation was disposed with other ACM.

During the 1995 work season, two small piles of debris including metal furnace panels containing ACM were encountered in the Extension Area of the site. The ACM was encapsulated with an approved asbestos encapsulant. A plastic construction fence was erected around the perimeter of the area and posted with appropriate asbestos warning signs.

During the 1996 work season, this ACM was abated. The panels were placed on two layers of polyethylene. Each panel was wetted down thoroughly, then separated and split using a pry bar, two-pound hammer, and metal shears. Water was continuously sprayed during the separation and splitting of the panels. Once the panel was split, the wet asbestos was removed and double-bagged for disposal. The metal sections were wetted again, scraped, and finesse cleaned with water spray and a stiff bristle brush. A visual inspection was performed to confirm removal of all ACM after the finesse cleaning. The panels were then placed in clean polyethylene, encapsulated, moved outside the fenced area and laid on clean polyethylene to dry. All the encapsulated metal panels were placed in the PSA landfill for disposal. The ground in the fenced areas was handpicked visually clean. A six-inch layer of soil was then spread over these areas.

3.4 Landfill

A State of Alaska-permitted solid waste landfill was constructed within the Support Area of the site during the 1994 work season for the disposal of non-hazardous debris for all of the Nome Area Sites. The PSA landfill was constructed in accordance with Solid Waste Disposal Permit No. 9132-BA008 (No. 9332-BA007 and 9532-BA003 are renewals of the initial permit) issued by ADEC. The landfill extended 200 feet north and 200 feet west at a depth of six feet. The landfill cell provided for a total capacity of

7,400 cubic yards. Excavated soil was stockpiled for use as cover material. Soil lithology consists of mine tailings; a mixture of sand, silts, and gravel, with no evidence of groundwater intrusion.

During the 1994 work season, approximately 6,700 CY of debris was placed in the landfill. All debris was compacted weekly using heavy equipment. At the end of the 1994 work season, a 6” seasonal cover was placed on top of the landfill, bringing it to grade.

The USACE contractor requested an upward expansion of the landfill after the end of the 1994 work season. The upward expansion increased debris height by 3’4” and extended the landfill boundaries 20 feet to the north. The ADEC landfill permit renewal (No. 9532-BA003) increased the landfill dimensions to 200’ x 220’ x 10’ deep.

During the 1995 work season, an additional 894 CY of debris was placed in the PSA landfill. All debris was compacted weekly using heavy equipment. At the end of the 1995 work season, a 6” seasonal cover was placed on top of the landfill, bringing it to grade.

The PSA landfill was operated and maintained during the 1996 work season for the disposal of non-hazardous debris for all the Nome Area and other Seward Peninsula sites. A total of 5,906 drums, 35 CY of metal debris, 137 CY of concrete, and 92 CY of miscellaneous debris were placed in the landfill during the 1996 work season. This debris was evenly distributed across the surface of the landfill and compacted with heavy equipment to a maximum height of five feet above the ground surface prior to closure.

The PSA landfill was closed at the end of the 1996 work season. A four-foot soil cap was placed over the debris and graded to drain. The material was placed in 12-inch lifts and compacted with heavy equipment by tracking over the fill a minimum of four times. The landfill cover was seeded and fertilized; see the Revegetation Section for details.

In 2001, the landfill was inspected for signs of damage or potential damage from settlement, ponding, leakage, erosion, or operations at this site. The landfill did not show signs of erosion and the revegetative grass grew well, only being sparser on the top of the landfill (See Photos 5 and 6). The ADEC landfill permit required site inspections and surface water sampling for five years after closure. Inspections and sampling was conducted in 1997, 1998, 1999, 2000, and 2001. Surface water samples were collected from three ponds adjacent to the landfill. Samples were analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX), chemical oxygen demand (COD), total dissolved solids (TDS), ten metals (arsenic, barium, cadmium, chromium, copper, lead, mercury, selenium, silver, and zinc), plus pH and conductivity. This landfill was formally closed in 2006 and ‘retired’ from ADEC records in January 2007.

3.5 Soil Stockpile Containment Cells

At the beginning of the 1994 work season, an interim soil stockpile was constructed to retain POL-contaminated soils that were excavated from within the proposed landfill area, to allow for construction of the PSA landfill. This interim stockpile was constructed upon an existing concrete slab by placing a sheet of 30-mil

PVC on the concrete slab as a bottom liner. The liner extended beyond the berm and anchored in place with sandbags. Upon completion, 15 CY of POL-contaminated soil excavated prior to the construction of the proposed landfill was placed in this stockpile, covered with a 30-mil PVC sheet, and secured with sandbags. The edges of the cover extended beyond the one-foot soil berm. The interim soil stockpile was decommissioned after the POL-contaminated soils were transported to the newly constructed ADEC-approved soil stockpile containment cell. The cover and liner were removed and washed at the cleaning facility prior to disposal in the PSA landfill. The concrete slab was visually inspected; no evidence of staining or contamination was noted. No additional sampling was performed.

An ADEC-approved soil stockpile containment cell was constructed during the 1994 work season to replace the interim stockpile. This ADEC–approved soil stockpile was constructed in accordance with the approved Prison Site “A” Stockpile Plan to contain soils over the winter until activities resumed in the 1995 work season. This cell extended 14 feet south and 80 feet east. The 14’ x 80’ containment cell was constructed on compacted ground by installing a two-foot soil berm on the ground surface to provide an enclosure for a containment liner. A 40-mil HDPE liner was laid in the cell, extended beyond the berm, and anchored in place with sandbags and soil. Upon completion, approximately 115 cubic yards of material was placed in the containment cell. The cell was covered by placing a 30-mil PVC cover on the material, with the edges of the cover extending beyond the two-foot soil berm, and secured with sandbags until the 1995 work season.

This ADEC-approved soil stockpile containment cell was decommissioned at the end of the 1995 work season after all the stored soil was transported to the landfarm at Tank Site “E” for treatment. The construction materials were removed and washed at the cleaning facility prior to disposal in the PSA landfill.

Prior to the end of the 1996 work season, another ADEC-approved soil stockpile was constructed to contain POL-contaminated soils for future remediation. These soils included those from the landfarm at the Tank Site “E.” The rectangular cell extended 70 feet west and 100 feet north, with a maximum height of five feet. The cell was constructed with geotextile fabric and 40-mil HDPE liner. Prior to installation of the soil stockpile, the area was graded, and covered with a four-inch sand layer, and a two-foot high berm was constructed. A 40-mil HDPE sheet was used as a bottom liner for the stockpile. The soil stockpile was covered with 40-mil HDPE sheet, which was then welded to the bottom liner. An additional two feet of soil was placed over the outer edge of the liner to prevent movement during the winter. Sandbags were placed on top of the liner for additional security. Plastic orange construction fencing surrounds the soil stockpile. In 1997, this stockpile was inspected by the USACE-POA. This stockpile was remediated in 1997 – 1998. Verification sampling took place in 2003. The 2003 sampling had a 95% upper confidence limit of 115 mg/kg for DRO. See Photograph 7.

3.6 Biovent Construction and Maintenance

Two biovent cells, one large and one small, were installed at Prison Site “A” during the 1994 work season due to visual evidence of POL contamination, which was confirmed through laboratory analysis.

The large biovent was constructed in the Eastern Area. The biovent had a rectangular area totaling 1,431 square feet (27’ x 53’). This area was visually identified to contain POL contamination. Laboratory results from surface and subsurface indicated elevated DRO concentrations between 2,800 and 8,000 mg/kg within this biovent area.

The small biovent was constructed within the Western Area; totaling 332 square feet. At this location, a six-foot diameter area was visually identified containing petroleum-stained soil. Laboratory results from soil samples indicated elevated DRO concentrations ranging from 5,960 to 12,100 mg/kg within the biovent area.

Preparation of the ground before the biovent installation consisted of tilling the ground to a depth of 12 inches with a backhoe. The 12-inch depth was based on limits of contamination from previous sampling. The soil lithology consisted of mine tailings and sandy silt with a thin layer of topsoil. During tilling Restore 375™ (a nutrient) was uniformly blended in with the soil. The larger biovent was constructed by placing a 40-mil high-density polyethylene (HDPE) sheet over the tilled soil. Two biovent pipes were installed through the HDPE, equally dividing the biovent. Each vent pipe was constructed with 4-inch PVC pipe by gluing a four-foot section of pipe together with a three-foot slotted section. Each pipe was then inserted through the HDPE into a ten-inch wide, three-foot borehole (the deeper borehole depth was required for vent stability), with the slotted sections down. Local soil was used to backfill the boreholes to 12 inches below the ground surface. A bentonite seal was used to backfill the final 12 inches of each borehole. Upon completion, a wind turbine ventilator was screwed to the top of each PVC pipe, guy wires were attached to the vents with reflective covers for visibility, and the HDPE was anchored down with a perimeter soil berm. The smaller biovent was constructed in the same manner as the large biovent but used only one vent stack.

Initial maintenance was conducted at the biovent cells early in the 1995 work season. Maintenance at both the large and small biovent included stabilizing the biovent riser, wind turbine, guy wires and PVC liners. The biovent cells were also tilled biweekly during the 1995 work season and watered to keep the soil moisture at operating conditions.

Sampling analysis indicated that the large biovent met the cleanup objectives in autumn 1995. The large biovent was decommissioned on August 5, 1995. The materials used to construct the large biovent cell were removed and recycled for future use and/or disposal. All components of the biovent system were removed with the exception of the sand pack and bentonite plug that were abandoned in place. The remaining open vent hole was plugged with a bentonite grout in accordance with ADEC guidelines. Restore 375™ nutrient was tilled into the soil and saturated with water to dissolve. The area was revegetated according to Work Plan specifications. Approximately 170 CY of POL-contaminated soil was remediated using in situ bioremediation at the large biovent cell.

Sampling results for the 1995 work season indicated that the small biovent met the cleanup objectives. This small biovent was decommissioned during the 1996 work season. The materials used to construct the biovent cell, including the liner, were removed and transported to the drum cleaning facility for steam cleaning. The liner was folded and returned to the warehouse for future reuse or disposal. The sand pack and bentonite plug were abandoned in place, and the borehole was plugged with bentonite grout. Approximately, 40 CY of POL-contaminated soil was remediated using in situ bioremediation at the small biovent cell.

3.7 Drum Handling Station

A drum handling station was established during the 1994 work season in the Support Area. The drum handling station consisted of a drum staging area, a drum deheading station, a cleaning facility, and drum crushing station.

The drum handling station was erected on an existing concrete slab measuring 80’ x 40’, previously used as a Quonset hut foundation. The concrete slab and associated footers were divided into three sections, with the southern portion used as the drum deheading station, the central portion as the cleaning facility, and the northern portion supporting a drum crushing station. A soil berm measuring approximately one foot was constructed on the concrete slab to separate the three sections. A PVC liner was placed over the entire area, extending beyond the concrete footers and secured with sandbags.

The drum handling station and all its components were decommissioned at the end of the 1996 work season. The concrete footers were removed and 18 CY of concrete debris was placed in the PSA landfill for disposal. The concrete slab was inspected for visual evidence of staining; none was noted.

3.7.1 Drum Staging Area

In conjunction with drum removal activities from all Nome Area and other Seward Peninsula sites, a drum staging area was established during the 1994 work season adjacent to the drum handling station. This interim drum staging area, measuring 130’ x 80’, was bermed and lined with PVC. It was used for the interim staging of empty drums prior to deheading and cleaning.

During the 1995 work season, the drum staging area encompassed a 40’ x 40’ area. This staging area was significantly reduced in size compared to the 1994 work season based on the lower number of drums handled. An HDPE liner was placed over the bermed area. A six-layer of sand was placed on top of the liner to prevent damage to the liner while moving drums.

At the end of the 1996 work season the sand, totaling approximately 40 CY, was removed and placed into the interim soil stockpile. The HDPE liner was removed and packaged for off-site disposal at the Roosevelt Regional Landfill in Washington State.

3.7.2 Drum Deheading Station

Empty drums (containing less than one inch of residual product) were transferred from the drum staging area to the drum deheading station. (Residual product was removed from drums prior to staging at the cleaning facility, and bulked according to product compatibility.) Prior to deheading, the lower explosive limit (LEL) and percent oxygen levels were labeled on each drum to eliminate the risk of fire or explosion during deheading.

For drums not containing any residual product, with 0% LEL and at least 20% oxygen levels, a demolition saw was used to cut a 1’ x 1’ observation port in the side. If no evidence of contamination was visible (either internal or external), the drum was transported to the drum crushing facility. If non-combustible contamination was discovered in the drum, it was deheaded with a demolition saw and staged for cleaning prior to crushing and disposal.

Drums containing residual product, elevated LEL, or below 20% oxygen, were first rinsed at the cleaning station. Drums, which still had an elevated LEL or decreased oxygen levels (after the interior rinse) were filled with water and then deheaded with a beryllium chisel, attached to a pneumatic air gun. Drums that contained flammable residual product were deheaded with a beryllium chisel and transferred to the cleaning facility for washing.

3.7.3 Cleaning Facility

A cleaning facility was established during the 1994 work season for washing drums and other material. The cleaning facility was enclosed in a wood-faced structure with PVC-covered walls to prevent migration of airborne contaminants. Two drum racks were constructed at an angle to hold the drums during the cleaning procedure and to facilitate draining of the rinsate. The floor was constructed using wooden pallets placed on top of PVC liner for personnel to stand upon. This facility was equipped with two Hotsy powerwashers used to steam clean drums and debris. A sump pump was placed in the northeast corner of the cleaning facility to transfer rinsate into a 2,000-gallon module tank. A six gallon per minute (gpm) water treatment plant was erected on the eastern side of the drum handling station to process rinsate prior to discharge.

Empty drums (containing less than one inch of residual product), debris and other materials were powerwashed at the cleaning facility. The cleaned drums were transferred to the drum crushing facility at the north end of the drum handling station for crushing prior to disposal in the PSA landfill. A total of 10,000 gallons of rinsate were generated during the 1994 work season through the operation of the cleaning facility.

One water sample was collected from treated wastewater stored in the 2,000-gallon module tank. The analysis included TPH and total aromatic hydrocarbons (TAH) as required by the ADEC Wastewater General Permit. Based on the results, which were above the allowable discharge parameters, the rinsate was transported to Tank Site “E” and consolidated for additional treatment at the Water Treatment Plant (WTP). The cleaning facility was dismantled and winterized at the end of the 1994 work season.

The cleaning facility was reassembled in spring 1995 with the installation of one Hotsy powerwasher and a 1,400 gallon module tank. Rinsate was temporarily stored in the module tank and periodically transported to Tank Site “E” for treatment at the WTP. A total of 3,240 gallons of wastewater was generated during the 1995 work season.

During the 1995 work season, approximately 27 cubic yards of debris, including drums, scrap metal, and liners were washed at the cleaning facility. All of these materials were transported to the PSA landfill for disposal. At the end of the 1995 work season, the cleaning facility was broken down and winterized.

The cleaning facility was re-established early in spring 1996. The facility was reassembled over the existing polyvinyl chloride (PVC) liner, and completed with the installation of one Hotsy powerwasher and two module tanks with a combined storage capacity of 3,400 gallons. Rinsate was temporarily stored in the module tanks and periodically transported to Tank Site “E” for treatment at the WTP. Approximately 2,962 drums were washed during the 1996 work season at the cleaning facility generating a total of 16,445 gallons of rinsate.

The drum cleaning facility was decommissioned at the end of the 1996 work season. The wooden walls and floor were removed and properly packaged for transportation and disposal off site. The water contained within the PVC liner was pumped off into a module tank. The POL-contaminated sediments and sludge accumulated over the three-year operation period were removed from the liner and drummed for transportation and disposal off site. The line was then removed and properly packaged for disposal off site. Approximately eight cubic yards of oily debris (wood and liners) and three drums of sediments and sludge were recovered during decommissioning of the cleaning facility.

3.7.4 Drum Crushing Facility

A drum crushing facility was established during the 1994 work season to compact drums into a more manageable size for transport to the PSA landfill. Clean drums were transferred from the adjacent cleaning facility and staged on the PVC liner within the drum crushing facility. Once a sufficient quantity of drums was staged, the crushing action was initiated. The drum crushing facility consisted of two single hydraulic drum crushers placed on the concrete pad on the north side of the drum handling station. These drum crushers were capable of crushing standard gauge 55-gallon drums measuring 34” tall down to a compact 6 inches. Some of the heavier gauge drums could only be compacted down to 12inches. The crushed drums were then transported to the PSA landfill for disposal.

The drum crushing equipment was removed and transported to the warehouse for winter storage at the end of the 1994 work season. The drum crushers were not used during the 1995 work season due to the small quantity of drums handled. All drums were consolidated in the PSA landfill and crushed with a bulldozer.

The drums crushing facility was re-established during the 1996 work season at a new location. The drum crushing facility was constructed on an existing concrete pad approximately 150 northwest of the drum handling station. A PVC liner was placed over the pad and anchored with sandbags. Two single hydraulic drum-crushing units were placed on top of the liner. Clean drums were transferred from the cleaning facility for crushing. The compact crushed drums were then transported to the PVC landfill for disposal.

3.8 Product Drum Storage Areas

After the removal of the metal Quonset hut structure in the Western Area, the existing concrete slab was used as a product drum storage area during the 1994 work season. A PVC liner was placed over the concrete pad and extended beyond the one-foot high concrete footers. Product drums removed from Prison Site “A” were staged and hazcatted and contents were bulked for disposal. The empty drums were then transported to the drum handling facility for cleaning prior to crushing and disposal in the PSA landfill.

The concrete footers surrounding the product drum storage were removed during the 1995 work season. Approximately 12 cubic yards of concrete debris was transported to the PSA landfill.

During the 1995 work season, a product drum storage area was constructed west of the cleaning facility in the Support Area. This storage area, secured with fencing and encompassing approximately 2,500 square feet, was used to store all drummed waste material prior to disposal. All drums stored in this area were in overpacks or in new drums, so no liner or berm was required or installed.

Like waste materials were consolidated whenever possible. A connex box was used for the consolidation of all oily debris. This debris included investigation-derived waste (IDW) consisting of used personal protection equipment (PPE), sorbent pads, and liners; and contaminated wood (oil-stained) collected throughout all the Nome area sites. The connex box contained 9,250 pounds of oily debris and 20 55-gallon drums of diesel-contaminated carbon and clay. These waste materials were overpacked in 85-gallon drums or containerized in new 55-gallon drums, all of which met Department of Transportation (DOT) requirements.

At the end of the 1995 work season, all containerized materials were transported for disposal off site.

During the 1996 work season, a product drum storage area was constructed west of the cleaning facility. An HDPE liner was placed over the bermed area, and a PVC liner placed on top to prevent damage and provide better footing. The 1996 product drum storage area, measuring approximately 50’ x 30’, was secured with orange plastic fencing. This area was used to store containerized waste materials prior to transportation and disposal off site. The area was also used to consolidate compatible waste streams prior to transportation off site to designated disposal facilities.

Approximately, 9,020 gallons of hazardous waste were consolidated from the Nome area sites and bulked during the 1996 work season. At the end of the 1996 work season, all containerized materials were transported off site for disposal.

The PVC and HDPE liners, totaling approximately one cubic yard, were removed from the storage area and properly packaged for disposal off site. After removal of the liners, a visual inspection of the underlying soils was conducted to ensure that no contaminants had migrated to the subgrade. No visual evidence of soil staining was detected, and no sampling was performed in this area.

3.9 Revegetation

A total of 65,300 square feet were revegetated throughout the Prison Site “A” during the 1994 work season, and a total of 5,400 square feet were revegetated during the 1995 work season. Seed and fertilizer were applied to the disturbed areas to provide vegetation growth and to prevent wind and water erosion. A seed mixture of Arctared Fescue, Alyeska Polargrass, and Tundra Gaucous Bluegrass was applied at a ratio of 60-

20-20, respectively. The fertilizer was composed of nitrogen, phosphorus, and potassium, in a ratio of 20-20-10, respectively.

Revegetation performed during the 1996 work season at disturbed areas throughout the Prison Site “A” included the soil excavation area, the former drum washing station, the former location of the small biovent, and the PSA landfill.

4 Community Relations Activities

Remedial Design and RA at the Nome Area Defense Region were conducted in accordance with the National Environmental Policy Act (NEPA), the National Oil and Hazardous Substance Pollution Contingency Plan (NCP), and were consistent with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). As part of this process, Environmental Assessments (EA) and Finding of No Significant Impacts (FONSI) were prepared describing the proposed action. These documents were reviewed and commented on by State and Federal Agencies and the public. In addition, local labor was used wherever possible to staff the Nome Area Defense Region project. Interviews were conducted in Nome and craft laborers including laborers, operators and Teamsters were hired to support the project. Additional local hires were used to fill key office and support positions as demands warranted. Local vendors and equipment were used when possible. During remedial activities, several town meetings were held to discuss local concerns and to update personnel throughout the job sites. A summary of pertinent community relations and project actions is provided in Table 5. The Nome Area Defense Region Prison Site “A” Closeout Report will be made available for reviewed by State and Federal Agencies, and the public. Responses to all comments on this FUDS Site Closeout Report will be provided in a responsiveness summary.

5 Demonstration of QA/QC form Cleanup Activities

Performance Standards for the removal action for this project were defined in the project solicitation documents in the form of Special Contract Requirements, Contract Clauses, and Technical Specifications. Additionally, the Contract Delivery Order provided a scope of work, which defined specific tasks, and activities, which the contractor was required to accomplish at the site in conformance with the requirements in the solicitation documents.

ADEC and USACE-POA reviewed the project plans and submittals (Sampling and Analysis Plan, Work Plan, Quality Control Plan, etc.) for compliance with all ADEC and USACE quality control and quality assurance (QC/QA) procedures and protocols. Chemical quality control requirements were defined in the Delivery Order Scope of Work. Accordingly, only EPA or ADEC analytical methods were used. All procedures and protocols are documented in the Final Remedial Action Reports (IT 1996a, 1996b). All data quality objectives were achieved and the quality of the chemical data supports the decisions that were made at the site. Details can be found in the Final RA Reports. The QA/QC program utilized throughout the remedial action was sufficiently rigorous and was satisfactorily followed. All analytical results reported are accurate to the degree needed to assure satisfactory execution of the remedial action consistent with the RAO's.

Construction Quality Control is primarily governed by Technical Specification Section 01440, Contractor Quality Control. This specification section requires the contractor to establish and maintain an effective quality control system. The quality control system consists of plans, procedures, and organization necessary to produce a product that complies with the contract requirements. The system covers all construction activities, both on-site and off-site. The USACE-POA, through its quality assurance program, monitors the contractor’s quality control system and notifies the contractor of any noncompliance.

6 Cleanup Evaluation

6.1 Approach

As noted in the section on 'Establishment of Remedial Action Objectives', an agreement was made between the USACE-POA and ADEC to reevaluate the final levels of contaminants remaining on site upon project completion. Subsequent to that agreement, ADEC promulgated risk-based cleanup levels in 18 AAC 75. These promulgated values are now used to evaluate soil cleanup at the Prison Site “A.” The ADEC Water Quality Standards, 18 AAC 70, were used to evaluate surface water quality at the Prison Site ‘A.’

The 18 AAC 75 cleanup values are based on a residential scenario. In other words, they assume that an individual is living on site year-round. Another assumption is that the entire residential property is uniformly contaminated. EPA uses a half-acre (about 150-ft by 150-ft) ‘exposure area’ that is meant to represent a residential lot. The contamination found at the Nome Area Defense Region sites is much smaller in area (2-ft by 2-ft up to 40-ft by 50-ft) and no areas are currently residential. However, some residences are in the vicinity (1 to 2 miles) of the contaminated areas. Current exposure scenarios include the occasional visitor, trespasser, and potential worker (Alaska Gold employee). Consequently, the cleanup values are very conservative.

Another factor that lends conservatism to the sampling on site is the biased sampling procedure. As samples are collected from each site, the sampler intentionally looks for and samples from, the more heavily contaminated areas. An effort is made to sample where the highest level of contamination will be found. Since an individual on site is exposed to the average contamination levels, not limited to only those areas of higher contamination, the risk-based cleanup levels are generally conservative.

Risk-based cleanup level tables generally list soil contaminant concentrations that will produce no adverse effect to people on site from one particular pathway or route of exposure. The 18 AAC 75 tables list three cleanup levels for each contaminant. These cleanup levels address the three most common exposure pathways: incidental soil ingestion, inhalation of vapors from contaminants in soil, and migration to groundwater (and subsequent ingestion). First, it is necessary to determine which of these pathways are present at the site being investigated. The lowest applicable soil cleanup level is selected as the cleanup level for the site. If a particular pathway is not applicable, that contaminant concentration value is not used. For instance, in permafrost areas, the migration to groundwater pathway is usually not present. The human health pathways and receptors are shown on the Conceptual Site Model (Appendix A).

All chemical compounds detected above the screening levels (1/10-th of the Method 2 Cleanup Levels in 18 AAC 75.341 Tables B1 and B2) for soil and sediment and the water quality standards referenced in 18 AAC 70 for surface water) are discussed below. Tables 7, 9, and 11 show soil, sediment and water concentrations respectively. Gray shaded values are pre-remedial concentrations. Blue shaded values indicate the lower of a duplicate. The non-shaded values show the concentrations remaining on site.

The Method 2 cleanup levels for the under-40-inch zone, found in 18 AAC 75.341 Tables B1 and B2, are the appropriate cleanup levels for this site. Potential exposure to contaminants at this site would result from incidental ingestion of soil particles, dermal contact, or inhalation of contaminant vapors from the soil. Although the groundwater at the site is not used as a drinking water source this pathway is included as required by 18 AAC 75. The City of Nome requires new development to connect to the city water supply, which comes from Moonlight Springs. The petroleum contamination resulted from leaks from drums and operations at the site. These sources were *deminimis* in size, limited to surface contamination, and all visibly contaminated soil was excavated. Thus, exposure to potential receptors is limited. Evaluation of the dermal pathway using the direct contact cleanup levels in the proposed regulations (ADEC 2007) indicated dieldrin, heptachlor, heptachlor epoxide, and 2-methylnaphthalene required further examination. However, on comparing the site concentrations with the proposed direct contact cleanup levels, no potential dermal risk were found at the site. No other significant pathways of exposure are present at this site. Permafrost is discontinuous at the site. Disturbed areas from construction and mining are generally devoid of permafrost. Undisturbed areas contain permafrost. Appendix A shows the graphical Human Health Conceptual Site Model (HHCSM) patterned after the ADEC 21 March 2006 template. Following the HHCSM is a completed ADEC HHCSM Scoping Form. The scoping form was used to identify the complete and incomplete pathways of the site.

In addition to the ADEC 18 AAC 75 Method 2 cleanup values for each chemical, the cumulative risk from all contaminants must not exceed 1×10^{-5} for carcinogens and the non-carcinogens must not exceed a hazard index of 1. These calculated risks are very conservative as they assume that people are living full-time on the site.

6.2 Soil

A total of 131 soil samples were collected at the Prison Site A during the site characterization in 1989, during the remediation activities from 1994 to 1996, and follow-up monitoring in 2003 and 2005. These samples were obtained from areas on the site where potential contamination was possible. Some of these samples were pre-remedial action, some were interim sampling conducted during bioremediation and some were ‘bottom of hole’ or post-remedial action samples. See Tables 7 and 8.

The post-remedial action sampling has seventeen compounds above the screening level (1/10-th of the 18 AAC 75 Cleanup Levels). These compounds are shown in Table 1.

Table 1 – Soil Compounds Above Screening Levels

COMPOUND	CONCENTRATIONS (mg/kg)	SCREENING LEVEL (mg/kg)
Arsenic	**34; 32; 18; 13; 69; 9.3; 16.6; 60.7**;	0.2 (migration GW)
Barium	**160; 130**; 23; 16; 22; 43; 63;	110 (migration GW)
Benzene	**0.01 J; 0.0111 J**;	0.002 (migration GW)
Cadmium	**2.0; 4.2; 4.2; 3.0; 4.4**;	0.5 (migration GW)
Chromium	**47; 81; 17; 20; 20; 18; 36; 8.5**;	2.6 (migration GW)
1,1-Dichloroehtylene	**0.006**;	0.003 (migration GW)
Dieldrin	**0.0076**;	0.003 (migration GW)
DRO	**790; 26**; 11; **89.8; 1,340; 455; 1,910; 1,320; 57.3; 123; 79.7; 407; 1,210; 758; 540; 929; 140; 1,190; 219;** 16; 13; **72.6 B; 309 B; 331 B; 44.4 B; 83.9 B; 53.7 B**; ND (3.85); ND (3.85); ND (3.85); ND (3.85); ND (3.85); ND (3.85); ND (3.85); **30.1 B; 36,000**;	25 (migration GW)
Heptachlor	**0.14**;	0.08 (inhalation)
Lead	10.3; 34; **80**; 10; 7.4; 18; 21; 20; 2.5;	40 (ingestion)
Mercury	**0.89; 0.39; 0.24; 0.33**; 0.12;	0.14 (migration GW)
Methylene Chloride	**0.15 B; 0.76; 0.06 B; 0.006 B; 0.017 B; 0.013 B; 0.04 B; 0.014 B; 0.057 B; 0.050 B**;	0.0015 (migration GW)
2-Methylnaphthalene	**170**; ND (11); ND (8.7); ND (7.7); ND (2.2);	6.09 (migration GW)
Naphthalene	0.00568 J; 0.0102 J; 0.00332 J; 0.0153 J; **74**;	2.1 (migration GW)
RRO	598 B; **1,320 B**; **2,500 B**; 71 B; 133 B; 58.6 B; 216 B; 144 B; 55 B; 113 B; 146 B;	1,000 (ingestion) 2,200 (inhalation) 1,100 (migration GW)
Selenium	**3.5; 2.1; 1.6**;	0.35 (migration GW)
Silver	**17; 3.9; 13**;	2.1 (migration GW)
J = estimated value, B = compound found in blank. Concentrations that exceeded screening levels are in **bold** type.		

Arsenic showed concentrations as high as 69 mg/kg. All these concentrations exceed the ingestion cleanup level of 5.5 mg/kg and the migration to groundwater cleanup level of 2 mg/kg. Research indicates that arsenic was probably not anthropogenic at this site, that is, not introduced by past human activities. However, mining activities might have concentrated this naturally occurring metal.[1] Alaska has high natural concentrations of this element, which range from less than 10 to 750 mg/kg (USGS 1988). Background soil samples taken in the Nome area show arsenic concentrations ranging from 95 to 540 mg/kg (Appendix C). The concentrations of arsenic found at the Prison Site A, fall within this range and are assumed to represent the regional background value for this metal. Since arsenic is attributed to naturally occurring background levels in the soil, this compound is not considered further.

Barium showed concentrations as high as 160 mg/kg. All these concentrations are below the ingestion cleanup level of 7,100 mg/kg and the migration to groundwater cleanup level of 1,100 mg/kg. Research indicates that barium was probably not anthropogenic at this site, that is, not introduced by past human activities. Alaska has high natural concentrations of this element, which range from less than 39 to 3,100 mg/kg (USGS 1988). Background soil samples taken in the Nome area show barium concentrations ranging from 22.5 to 310 mg/kg (Appendix C). The concentrations of barium found at the Prison Site A, fall within this range and are assumed to represent the regional background value for this metal. Since barium is attributed to naturally occurring background levels in the soil, this compound is not considered further.

Benzene had two positive sample results at 0.01 mg/kg and 0.0111 mg/kg. Both of these values were "J" flagged indicating the analyte was identified below the analytical detection limits. These values are below the ingestion cleanup concentration of 150 mg/kg, the inhalation cleanup levels of 9 mg/kg, and the migration to groundwater cleanup value of 0.02 mg/kg. Although the 0.0111 mg/kg is higher than screening level (1/10-th of the migration to groundwater cleanup concentration) it is not included in the cumulative risk calculation since the groundwater is not a drinking water source.

Cadmium showed concentrations as high as 4.4 mg/kg. All these concentrations are below the ingestion cleanup level of 100 mg/kg and the migration to groundwater cleanup level of 5 mg/kg. Research indicates that cadmium was probably not anthropogenic at this site, that is, not introduced by past human activities. Background soil samples taken in the Nome area show cadmium concentrations ranging from 0.231 to 31 mg/kg (Appendix C). The concentrations of cadmium found at the Prison Site A, fall within background range and are assumed to represent the regional background value for this metal. Since cadmium is attributed to naturally occurring background levels in the soil, this compound is not considered further.

Chromium showed concentrations as high as 81 mg/kg. All these concentrations are below the ingestion cleanup level of 300 mg/kg and some are above the migration to groundwater cleanup level of 26 mg/kg. Research indicates that chromium was probably not anthropogenic at this site, that is, not introduced by past human activities. Alaska has high natural concentrations of this element, which range from 5 to 390 mg/kg (USGS 1988). Background soil samples taken in the Nome area show chromium concentrations ranging from 2.2 to 68 mg/kg (Appendix C). The concentrations of chromium found at the Prison Site A, fall within this range and are assumed to represent the regional

---

[1] ATSDR 1987 concludes that the high concentrations of arsenic and mercury in the Nome area are a result of the placer mining that has occurred over the years.

background value for this metal. Since chromium is attributed to naturally occurring background levels in the soil, this compound is not considered further.

1,1-Dichloroethylene had one positive sample results at 0.006 mg/kg. This value is below the ingestion cleanup concentration of 14 mg/kg, the inhalation cleanup levels of 0.9 mg/kg, and the migration to groundwater cleanup value of 0.03 mg/kg. Although the 0.006 mg/kg is higher than screening level (1/10-th of the migration to groundwater cleanup concentration) it is not included in the cumulative risk calculation since the groundwater is not a drinking water source.

Dieldrin had one positive sample results at 0.0076 mg/kg. This value is below the ingestion cleanup concentration of 0.5 mg/kg (and the proposed direct contact concentration of 0.32 mg/kg), the inhalation cleanup levels of 8 mg/kg, and the migration to groundwater cleanup value of 0.015 mg/kg. Although the 0.0076 mg/kg is higher than screening level (1/10-th of the migration to groundwater cleanup concentration) it is not included in the cumulative risk calculation since the groundwater is not a drinking water source.

All but one DRO sample result are below the ingestion cleanup level of 10,250 mg/kg and inhalation cleanup level of 12,500 mg/kg. Fourteen of the thirty-six DRO results exceeded the migration to groundwater cleanup level of 250 mg/kg. The highest sample result is from the 1989 sampling effort and was 36,000 mg/kg. The next highest DRO result is 1,340 mg/kg. The 95% upper confidence limit on all DRO samples is 5,130 mg/kg. The 95% UCL (nonparametric) on all samples except the 36,000 mg/kg is 500 mg/kg. ADEC procedure is not to include the petroleum fractions when calculating the cumulative risk for a site. The risk from the individual BTEX and PAH compounds are summed to account for petroleum risk. Only benzene, 2-methylnaphthalene, and naphthalene were detected above screening levels. The high concentration of 36,000 mg/kg is from the 1989 sample 3-S3 which was taken from Support Area 2 between the landfill and Pond 2. Sampling in Pond 2 yielded only very low detections of hydrocarbon constituents (see section on surface water below).

Heptachlor had one positive sample results at 0.14 mg/kg. This value is below the ingestion cleanup concentration of 2 mg/kg (and the proposed direct contact concentration of 1.3 mg/kg), the inhalation cleanup levels of 0.8 mg/kg, and the migration to groundwater cleanup value of 8 mg/kg. The 0.14 mg/kg is higher than screening level (1/10-th of the inhalation cleanup concentration) and must be included in the cumulative risk calculation. The heptachlor contribution to the cumulative risk can be calculated by dividing the on-site concentration by the cleanup value and multiplying by 10^{-5}. Therefore the risk from inhaling vapors from soil contaminated with heptachlor is, $(0.14 / 0.8) \times 10^{-5} = 2 \times 10^{-6}$. This is a conservative value since it assumes an entire half-acre lot is uniformly contaminated with heptachlor.

The concentrations of lead were from 2.5 to 80 mg/kg. All these concentrations are below the residential cleanup value of 400 mg/kg and the industrial cleanup value of 1,000 mg/kg. Background soil samples taken in the Nome area show lead concentrations ranging from 2 to 24 mg/kg (Appendix C). ADEC does not include lead in cumulative risk evaluations. Since lead was not detected above the residential cleanup level, no further evaluation is needed for risks associated with lead.

Mercury showed concentrations as high as 0.89 mg/kg. All concentrations are below the inhalation cleanup level of 18 mg/kg and the migration to groundwater cleanup level of 1.4 mg/kg. Mining activities in the area might have concentrated or contributed to the high mercury concentrations in Nome[2]. Since the groundwater is not a drinking water source, mercury is not included in the cumulative risk evaluation in this section.

Methylene chloride had detections as high as 0.76 mg/kg. This value is below the ingestion cleanup concentration of 1,100 mg/kg, and the inhalation cleanup levels of 180 mg/kg. However, it is above the migration to groundwater cleanup value of 0.015 mg/kg. Although the 0.76 mg/kg is higher than screening level (1/10-th of the migration to groundwater cleanup concentration) it is not included in the cumulative risk calculation since the groundwater is not a drinking water source. Methylene chloride is a common laboratory contamination. Many of the detections were 'B' flagged indicating potential laboratory contamination. Resampling of the area where the 0.76 mg/kg concentration was attempted in 2005. Due to effervescence of the soil with the sampling preservative, the laboratory results were rejected. Due to the difficulty of further soil sampling in this area, it was decided to install a monitoring well and directly sample the groundwater. This was decided because the old result of 0.76 mg/kg was below the ingestion and inhalation pathway cleanup levels, and only above the migration to groundwater pathway cleanup level. Sampling of the groundwater in 2007 showed non-detect for methylene chloride.

2-Methylnaphthalene had one positive sample result at 170 mg/kg and four non-detections. This high value is below the ingestion cleanup concentration of 2,030 mg/kg (and the proposed direct contact concentration of 280 mg/kg). However, it is above the migration to groundwater cleanup value of 60.9 mg/kg. Although the 170 mg/kg is higher than screening level (1/10-th of the migration to groundwater cleanup concentration) it is not included in the cumulative risk calculation since the groundwater is not a drinking water source. This high concentration of 2-methylnaphthalene came from the same location as the high DRO hit of 36,000 mg/kg. Sampling in the adjacent Pond 2 during the 2005 season resulted in a detection of 2-methylnaphthalene of 0.007 ug/L. This is a very low value when compared to the ADEC cleanup level of 780 ug/L (ADEC 2006).

Naphthalene had one high sample result at 74 mg/kg and four detections below 0.0153 mg/kg. This high value is below the ingestion cleanup concentration of 2,000 mg/kg and the inhalation cleanup value of 120 mg/kg. However, it is above the migration to groundwater cleanup value of 21 mg/kg. Although the 74 mg/kg is higher than screening level (1/10-th of the migration to groundwater cleanup concentration) it is not included in the cumulative risk calculation since the groundwater is not a drinking water source. This high concentration of naphthalene came from the same location as the high DRO hit of 36,000 mg/kg. Sampling in the adjacent Pond 2 during the 2005 season resulted in a detection of naphthalene of 0.117 ug/L. This is a very low value when compared to the ADEC cleanup level of 700 ug/L (ADEC 2006).

---

[2] ATSDR 1987 concludes that the high concentrations of arsenic and mercury in the Nome area are a result of the placer mining that has occurred over the years.

RRO had a high hit of 2,500 mg/kg. All results were below the ingestion cleanup value of 10,000 mg/kg, the inhalation cleanup value of 22,000 mg/kg, and the migration to groundwater cleanup level of 11,000 mg/kg. ADEC procedure is not to include the petroleum fractions when calculating the cumulative risk for a site. The risk from the individual BTEX and PAH compounds are summed to account for petroleum risk. Only benzene, 2-methylnaphthalene, and naphthalene were detected above screening levels.

Selenium showed concentrations as high as 3.5 mg/kg. No concentrations exceed the ingestion cleanup level of 510 mg/kg and the migration to groundwater cleanup level of 3.5 mg/kg. Research indicates that selenium was probably not anthropogenic at this site, that is, not introduced by past human activities. Background soil samples taken in the Nome area show selenium concentrations ranging from non-detect to 6.3 mg/kg (Appendix C). The concentrations of selenium found at the Prison Site A, fall within this range and are assumed to represent the regional background value for this metal. Since selenium is attributed to naturally occurring background levels in the soil, this compound is not considered further.

Silver showed concentrations as high as 17 mg/kg. All concentrations are below the ingestion cleanup level of 510 mg/kg and the migration to groundwater cleanup level of 21 mg/kg. Research indicates that silver was probably not anthropogenic at this site, that is, not introduced by past human activities. Background soil samples taken in the Nome area show silver concentrations ranging from non-detect to 101 mg/kg. The concentrations of silver found at the Prison Site A, fall below this concentration and are assumed to represent the regional background value for this metal. Since silver is attributed to naturally occurring background levels in the soil, this compound is not considered further.

The only compound contributing to the cumulative risk at the site is heptachlor (inhalation). Since groundwater is not used as a drinking water source, those compounds above the screening level (based on this pathway) are not included in the cumulative calculations. ADEC procedure is not to include DRO and RRO in the cumulative risk calculations. The site risk of 2×10^{-6} is below the Alaska risk management level of 1×10^{-5}. The actual risk is much lower as these calculations assume that someone is living full-time of the site (residential scenario). In addition, many of the contaminants were only found at one location, so the potential for exposure is limited.

6.3 Sediment

A total of 6 sediment samples were collected at the Prison Site A during the site characterization in 1989. These samples were obtained from areas collocated with the surface water samples. No sediment remediation occurred during 1994 – 1996. Therefore all samples represent concentrations remaining on site at the end of 1996. See Tables 9 and 10.

The sampling had nine compounds above the screening level (1/10-th of the 18 AAC 75 Soil Cleanup Levels). See Table 2.

Table 2 – Sediment Samples Above Screening Levels

COMPOUND	CONCENTRATIONS (mg/kg)	SCREENING LEVEL (mg/kg)
Arsenic	**77; 33; 21**;	0.2 (migration GW)
Barium	**170**; 24; 11;	110 (migration GW)
Delta-BHC	**0.127**	0.0003 (migration GW)
Gamma-BHC	**0.12**	0.0003 (migration GW)
Chromium	**51; 22; 18**;	2.6 (migration GW)
Heptachlor epoxide	**0.6; 0.46**	0.02 (migration GW)
Mercury	**0.17; 0.25**;	0.14 (migration GW)
Methylene chloride	**0.032 B; 0.021B; 0.029B;**	0.0015 (migration GW)
Selenium	**1.6**;	0.35 (migration GW)
B = compound found in blank. Concentrations that exceeded screening levels are in **bold** type.		

Sediment concentrations were compared to human health soil ingestion and inhalation criteria (18 AAC 75, Tables B1 and B2). Sediments sampled on site came from dredge pond sediments. Human health criteria instead of ecological criteria are used due to the low ecological risk. See discussion on Ecological Evaluation below.

Arsenic showed concentrations as high as 77 mg/kg. All these concentrations exceed the ingestion cleanup level of 5.5 mg/kg and the migration to groundwater cleanup value of 2 mg/kg. Research indicates that arsenic was probably not anthropogenic at this site, that is, not introduced by past human activities. Alaska has high natural concentrations of this element, which in sediments range from 5.0 to 1,796 mg/kg for sediments statewide (USGS 1988), and up to 20,000 mg/kg for sediments on the Seward Peninsula (USGS 1989a, b). The two background sediment samples taken in 1989 had concentrations of 21 mg/kg and 940 mg/kg. The action of water tends to concentrate the heavier metals and is one way that gold, in addition to arsenic, is concentrated. The Prison Site "A" is still an active gold mining area and is still owned by the Alaska Gold Company. Past mining activities might have further concentrated this naturally occurring metal[3]. The concentrations of arsenic found at the Prison Site "A" are assumed to represent the regional background value for this metal. Arsenic will not be further discussed.

Barium showed concentrations as high as 170 mg/kg. Nome of these concentrations exceeded the ingestion cleanup level of 7,100 mg/kg or the migration to groundwater cleanup value of 1,100 mg/kg. Research indicates that barium was probably not anthropogenic at this site, that is, not introduced by past human activities. Alaska has high natural concentrations of this element, which in sediments range from 3 to 65,000

---

[3] ATSDR 1987 concludes that the high concentrations of arsenic and mercury in the Nome area are a result of the placer mining that has occurred over the years.

mg/kg for sediments statewide (USGS 1988), and up to 10,000 mg/kg for sediments on the Seward Peninsula (USGS 1989a, b). The two background sediment samples taken in 1989 had concentrations of 136 mg/kg and 160 mg/kg. The action of water tends to concentrate the heavier metals and is one way that gold, in addition to barium, is concentrated. The Prison Site "A" is still an active gold mining area and is still owned by the Alaska Gold Company. The concentrations of barium found at the Prison Site "A" are assumed to represent the regional background value for this metal. Barium will not be further discussed.

Delta-BHC, a pesticide, had one positive sample result of 0.127 mg/kg. The other sample results were non-detect. This value is under the ingestion (6.4 mg/kg) cleanup level. However, it is over the migration to groundwater cleanup level of 0.003 mg/kg. Since the groundwater is not a drinking water source, it is not included in the cumulative risks. The concurrent 1989 surface water sample at the location of the 0.127 mg/kg sediment sample had a result of 1.8 ug/L. This pond was resampled in 2005 and gave a result of non-detect with a detection limit of 0.0009 ug/L. Delta-BHC is not considered further.

Gamma-BHC (Lindane), a pesticide, had one positive sample result of 0.12 mg/kg. The other sample results were non-detect. This value is under the ingestion (6.4 mg/kg) cleanup level. However, it is over the migration to groundwater cleanup level of 0.003 mg/kg. Since the groundwater is not a drinking water source, it is not included in the cumulative risks. The concurrent 1989 surface water sample at the location of the 0.12 mg/kg sediment sample was non-detect. Gamma-BHC is not considered further.

Chromium showed concentrations as high as 51 mg/kg. No concentrations exceed the ingestion cleanup level of 300 mg/kg. One out of four exceeded the migration to groundwater cleanup value of 26 mg/kg. Research indicates that chromium was probably not anthropogenic at this site, that is, not introduced by past human activities. Alaska has high natural concentrations of this element, which in sediments range from 1 to 15,000 mg/kg (USGS 1988). The two background sediment samples taken in 1989 had concentrations of 8.5 mg/kg and 47 mg/kg. The concentrations of chromium found at the Prison Site "A" are assumed to represent the regional background value for this metal. Chromium will not be further discussed.

Heptachlor epoxide was detected twice with concentrations of 0.6 mg/kg and 0.46 mg/kg. These values are below the ingestion cleanup concentration of 0.9 mg/kg, the inhalation cleanup levels of 33 mg/kg, and above the migration to groundwater cleanup value of 0.2 mg/kg. The 0.6 mg/kg is higher than screening level (1/10-th of the ingestion cleanup concentration) and must be included in the cumulative risk calculation. The heptachlor epoxide contribution to the cumulative risk can be calculated by dividing the on-site concentration by the cleanup value and multiplying by 10^{-5}. Therefore the risk from ingestion soil contaminated with heptachlor epoxide is, $(0.6 / 0.9) \times 10^{-5} = 7 \times 10^{-6}$. This is a conservative value since it assumes an entire half-acre lot is uniformly contaminated with heptachlor epoxide. The concurrent 1989 surface water samples at the location of the 0.6 mg/kg and 0.46 mg/kg sediment samples were non-detect. Heptachlor epoxide is not considered further.

Mercury showed concentrations of 0.17 and 0.25 mg/kg. All concentrations are below the inhalation cleanup level of 18 mg/kg and the migration to groundwater cleanup value of 1.4 mg/kg. The background sediment sample taken in 1989 had concentrations of 0.24 mg/kg. The action of water tends to concentrate the heavier metals and is one way that gold, in addition to arsenic, is concentrated. The Prison Site "A" is still an active gold mining area and is still owned by the Alaska Gold Company. Past mining activities might have contributed to higher mercury concentrations[4]. The concentrations of mercury found at the Prison Site "A" are assumed to represent the regional background value for this metal. Mercury will not be further discussed.

Methylene chloride had detections as high as 0.032 mg/kg. This value is below the ingestion cleanup concentration of 1,100 mg/kg, and the inhalation cleanup levels of 180 mg/kg. However, it is above the migration to groundwater cleanup value of 0.015 mg/kg. Methylene chloride is a common laboratory contamination. All of the detections were 'B' flagged indicating potential laboratory contamination. Methylene chloride will not be discussed further.

Selenium had a detection at 1.6 mg/kg. This concentration is below the ingestion cleanup level of 510 mg/kg and the migration to groundwater cleanup value of 3.5 mg/kg. Research indicates that selenium was probably not anthropogenic at this site, that is, not introduced by past human activities. Although there are no background sediment concentrations available for comparison, the sediment concentration is within the range of selenium background soil concentrations (Appendix C). The concentrations of selenium found at the Prison Site "A" are assumed to represent the regional background value for this metal. Selenium will not be further discussed.

The only compound contributing to the cumulative risk at the site is heptachlor epoxide (ingestion). Since groundwater is not used as a drinking water source, those compounds above the screening level (based on this pathway) are not included in the cumulative calculations. ADEC procedure is not to include DRO and RRO in the cumulative risk calculations. The site risk of 7 x 10^{-6}` is below the Alaska risk management level of 1 x 10^{-5}. The actual risk is much lower as these calculations assume that someone is living full-time of the site (residential scenario). In addition, many of the contaminants were only found at one location, so the potential for exposure is limited.

6.4 Surface Water

A total of 64 surface water samples were collected from the Prison Site 'A' in 1989, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2005 and 2007. Surface water is present in the form of dredge ponds and tundra ponds. Surface water is regulated under 18 AAC 70, which adopts by reference, the "Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances." See Tables 11 and 12. No active remediation of surface water occurred under the removal action. The only remediation was natural attenuation over the succeeding years.

No samples exceeded the total aromatic hydrocarbons (TAH) 10 ug/L criteria. No samples exceeded the total aqueous hydrocarbons (TAqH) 15 ug/L criteria.

---

[4] ATSDR 1987 concludes that the high concentrations of arsenic and mercury in the Nome area are a result of the placer mining that has occurred over the years.

Four compounds exceeded the surface water quality criteria (see Table 3).

Arsenic exceeded water quality standards six out of thirty samples. The one background value of 10 ug/L from the Moonlight Springs report is below the lowest water quality standard of 50 ug/L. Research indicates that arsenic was probably not anthropogenic at this site, that is, not introduced by past human activities. However, mining activities might have concentrated this naturally occurring metal.[5] Alaska has high natural concentrations of this element, which range from less than 10 to 750 mg/kg in soils (USGS 1988). Background soil samples taken in the Nome area show arsenic concentrations ranging from 95 to 540 mg/kg (Appendix C). Since there is high background soil concentrations of arsenic and the ATSDR conclusion that high arsenic is due to past mining activities, arsenic will not be considered further.

Heptachlor had one positive hit of 0.0118 ug/L. This is over the aquatic life chronic standard of 0.0038 ug/L by a factor of three. The sample taken in 1989 at the same location was 0.07 ug/L. Although two samples are not adequate to indicate a trend, it is indicative of natural attenuation of the chemical. Heptachlor may also be ubiquitous in the area, but further sampling would be needed to verify this assumption. Given the decreasing trend of heptachlor in the pond and the detected concentration being below both the drinking water standard and aquatic life freshwater acute criteria, heptachlor will not be addressed further.

The one detection of mercury (1.2 ug/L) was over the freshwater aquatic life chronic criteria of 0.77 ug/L and over the human health criteria of 0.050 ug/kg. It is probable this is from past mining activities[6]. Mercury will not be considered further.

---

[5] ATSDR 1987 concludes that the high concentrations of arsenic and mercury in the Nome area are a result of the placer mining that has occurred over the years.

[6] ATSDR 1987 concludes that the high concentrations of arsenic and mercury in the Nome area are a result of the placer mining that has occurred over the years.

Table 3 – Surface Water Samples Above Water Quality Levels

Compound of Potential Concern	Concentrations (ug/L)				Background Concentration (ug/L)	Aquatic Life Criteria (ug / L)			
						Drinking Water MCL	Stockwater / Irrigation	Aquatic Life, Freshwater, acute/chronic	Human Health, Non-carcinogen, water & aquatic organisms / aquatic organisms only
Arsenic (As)	12	24	**107**	**106**	10	50	50 / 100	340 / 150	
	34	**76**	35	16					
	38	15	17	7.6					
	12	8.3	8.2	ND (10) J					
	65	7	ND (1.5)	17 J					
	21.6	**77.4**	15.6 B	28					
	35	37	22	14					
	152	15 J							
Heptachlor	**0.0118**					0.4		0.52 / 0.0038	
Mercury	**1.2**					2		1.4 / 0.77	0.050 / 0.051
Values over the Water Quality Criteria are in **bold** type.									

6.5 Subsistence Use

Subsistence harvesting of plants and animals add an aspect to risk-based values that is not directly addressed in cleanup tables. Although the ingestion of water and soil is included in the cleanup tables, the ingestion of plants and animals is not. The amount of risk from ingestion of plants and animals from contaminated areas is generally proportional to the amount of plant material or animal meat ingested, the frequency of exposure (how often the particular plant or animal from the site in question is eaten), and the amount of contaminant in the plant or animal.

The most significant factors affecting the potential risk are the size of the contaminated area(s), the range of the animal(s)[7], the amount of plant harvesting in the area, and the amount the contaminants accumulate into the plant or animal. If the contaminated area is small, the proportion of total harvest from the contaminated area will be small. If the contaminated area is large, the proportion of total harvest from the contaminated area could be large. Animal ranges are important for a similar reason. If the contaminated area is small in relation to the animal's range, the proportion of the animals total food intake from the contaminated area is small. If the animals foraging range is totally within the contaminated area, all of the animals food intake would be from the contaminated area. To enter a subsistence food chain, contaminates have to move from the soil and waters into the animal or plant. Many chemicals are not absorbed up the food chain, some do to a minor amount, some to a great amount (they may actually concentrate into an animal that eats them), and some are absorbed but break down quickly in the animals' body without causing harm.

Both the aliphatic and aromatic fractions of petroleum tend to be absorbed by vegetation and animals. Evidence to date indicated that the actual bioconcentration in both plants and animals is none to minor. However, it is recommended that plants and animals from heavily (visible staining and odor) contaminated areas not be harvested. This is especially true for aquatic bivalves. Depending on the amount and concentration ingested the aromatics and aliphatics are purged from animals after several days to several months after the organism is returned to a non-contaminated environment. The heavier weight PAHs take longer to leave the organism, but are also absorbed to a lesser degree (ATSDR 1995).

Pesticides, by nature of design, tend to be both toxic and persistent. BHC and heptachlor are termed as moderately persistent. They do volatilize, photodegrade, and biodegrade to a small amount. Half-lives are on the order of a month to a year. All bioconcentrate moderately to extensively. Heptachlor epoxide is more persistent in the environment. It strongly adsorbs to soil and is extremely resistant to biodegradation but does break down from exposure to sunlight. It bioconcentrates extensively. Due to its stability, long-range dispersal occurs, resulting in the contamination of remote areas.

---

[7] Wildlife ranges vary widely depending on the species, time of year, and location. Range for mice (mouse gatherings) goes from a low of 2,050 square feet (SF) up to 14,000 SF. Muskrat: 5,100 SF to 18,000 SF; Snowshoe hare: 10 acres; Moose: 570 to 109,000 acres; and Caribou with ranges in the hundreds of thousands of square miles.

Chlorinated solvents are less persistent than pesticides but more so than petroleum compounds. They do volatilize, photodegrade, and biodegrade. Bioaccumulation is none to minor. Solvents were found in isolated cases and at low concentrations at the Nome Area Defense Region sites and do not pose a potential risk based on comparison with risk-based cleanup levels.

The type, concentration and extent of contamination does not impact the flora and fauna at the Prison Site 'A.' The remaining contamination poses no adverse effect on people conducting subsistence activities. The primary contaminant at the Prison Site 'A' is petroleum and is limited to a few small areas (2-ft by 2-ft up to 6-ft by 6-ft). Although the vegetation within the Prison site is harvestable, subsistence is not predominant in this area.

6.6 Ecological Evaluation

The ecological evaluation follows the 'Draft Ecological Scoping Evaluation Guidance,' (ADEC 2005b).

6.6.1 Direct Visual Impacts and Acute Toxicity

No direct impacts were observed during any of the site visits or remedial actions. Direct impacts include visibly stressed or dead biota and can be associated with acute toxicity.

Decision Point – Since no direct impacts were observed, evaluation continues with the remaining scoping factors, taking off-ramps as appropriate.

6.6.2 Receptor-Pathway Interactions

Receptor-pathway interactions describe the many ways that contaminants are transported to and can be taken up by plants or animals. Ecological receptors may be present at a contaminated site without there being receptor-pathway interactions.

6.6.2.1 Terrestrial Pathway

Potentially completed pathways include:

- Contaminants dissolved into moisture in the soil, making them available to plant roots. The majority of the contaminants in the site soils are slightly soluble to insoluble. Those with moderate to high solubility include acetone, benzene, 2-butanone, carbon disulfide, chloroform, 1,1-dichloroethylene, methylene chloride, naphthalene, toluene, and xylenes (solubility ranges from 31 mg/L to 1E+6 mg/L). The majority of these moderate to high solubility contaminants were detected infrequently in the site soils (all but acetone and methylene chloride had 5 or less detections) and at low concentrations (all but 2-methylnaphthalene are at 0.54 mg/kg or less). See Table 7 and Table 9.
- Incidental ingestion and/or exposure while animals grub for food, burrow or groom.

- Inhalation of fugitive dust or vapors disturbed by foraging or burrowing activities. While the Nome area is relatively dry with an annual precipitation of 18 inches, the contamination in the Prison ‘A’ site is generally covered with native vegetation. Many of the contaminants in site soils do not volatize easily. Those with moderate to high volatilization are acetone, benzene, 2-butanone, carbon disulfide, chloroform, 1,1-dichloroethylene, methylene chloride, 2-methylnaphthalene, naphthalene, toluene, and xylenes (vapor pressures range from 0.055 mmHg to 600 mmHg). The majority of these moderate to high volatilization contaminants were detected infrequently in site soils (all but acetone and methylene chloride had 5 or less detections) and at low concentrations (all but 2-methylnaphthalene are at 0.54 mg/kg or less). See Table 7 and Table 9.

6.6.2.2 Aquatic Pathway Interactions

There are no potentially complete aquatic pathways and exposure routes. The area does have some dredge and tundra ponds. Little Creek passes through a small portion of the site on the south but not near any contamination.

6.6.2.3 Contaminant Fate and Transport

As described above, many of the remaining contaminants are slightly soluble to insoluble and do not volatilize easily. Those with higher solubilities and volatization were detected infrequently and at low concentrations.

Those contaminants classified as bioaccumulative (log Kow > 3.5) included anthracene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, fluorene, 2-methylnaphthalene, phenanthrene, pyrene (all PAHs), alpha-BHC, delta-BHC, gamma-BHC, bis(2-ethylhexyl)phthalate, dieldrin, endosulfan sulfate, heptachlor, and heptachlor epoxide. The PAHs are polynuclear aromatic hydrocarbons and are a component of petroleum fuels. The heavier weight PAHs take longer to leave the organism, but are also absorbed to a lesser degree (ATSDR 1995). The concentrations of these chemicals are low (all under 1 mg/kg except for sample number 3-S3 from 1989. This location had a high result of 17 mg/kg of fluorene, 170 mg/kg of 2-methylmaphthalene, 9.5 mg/kg of phenanthrene, and 36,000 mg/kg of DRO. This sample location is currently under the closed Prison Site ‘A’ landfill.

6.6.2.4 Decision Point

Since there are potentially complete terrestrial pathways present, evaluation proceeds to the habitat determination scoping factor.

6.6.3 Habitat Determination

6.6.3.1 Valued Species

The Environmental Assessment (USACE 1993) indicated that no threatened or endangered species occur at the Nome Area Defense Region sites. Subsistence species that may pass through the Prison Site 'A' include hares, caribou, moose, and muskox. No species of ceremonial importance inhabit the Prison Site 'A.' Commercial species may pass through the Prison Site 'A' include wolf, fox, marmot, and weasel.

6.6.3.2 Critical Habitats and Anadromous Streams

The Prison Site 'A' is not in or near any state refuge, state critical habitat area, state sanctuary, or state range (ADF&G 2006a). The Fish Distribution Database Atlas, Nome C-1 shows no anadromous stream on the Prison Site 'A' (ADF&G 2006b).

6.6.3.3 Other Important Habitats

Significant aquatic or terrestrial habitats are not within the influence of site contaminants. The Prison Site 'A' is a small area within the larger tundra ecosystem of the Nome area. In addition, there is abundant, high quality habitat throughout the area. The localized remaining areas of contaminants are not in a critical or sensitive microcosm.

6.6.3.4 Parks, Preserves, and Wildlife Refuges

The Prison Site 'A' is not within any park, preserve, or wildlife refuge.

6.6.3.5 Decision Point

Contamination cannot impact habitats supporting valued species of wildlife, critical habitats or other habitats identified as important for the region. Scoping stops at this point.

6.6.4 Ecological Evaluation Conclusion

The remaining contamination at the Prison Site 'A' is limited in quantity, concentration, mobility, and toxicity. The probability of the remaining contaminants migrating off site is low. There are no other valued species or critical habitats near the site. The remaining contamination presents no adverse impacts to the environment.

7 Certification of Remedy

The primary objective of reducing risk to human health and the environment through implementation of effective, legally compliant, and cost-effective response actions has been met for the Prison Site 'A.' All eligible debris and containerized HTRW have been removed from the Prison Site 'A;' thus removing primary and secondary contaminant sources. Cumulative risks do not exceed the State's 1 x 10^{-5} criteria. A few small areas, which were formerly under 55-gallon drums, are still above ADEC 18 AAC 75 Method 2 cleanup levels for petroleum. The areal extent of the remaining contamination is a small percentage of the entire site and much less than the ADEC *deminimis* ½-acre criterion. Therefore, exposure potential is limited and no further action is recommended at this site. The Prison Site 'A' is being closed under section 4-7.1.3 of Engineering Regulation 200-3-1. This section states that a closeout decision is warranted “[w]hen the conclusion of a public health evaluation or baseline risk assessment states that there is no significant threat to public health, safety or the environment.”

ADEC has reviewed this Closeout Report and concurs with the closure decision.

8 References

8.1 Availability of References

A complete reference list of all reports relevant to the completion of this site is provided below. Those documents not in the public domain are available at the administrative record file in the Alaska District Corps of Engineers. Access to these documents can be obtained by calling the FUDs Project Management Section at 907 753-2862.

8.2 References

ADCED 2003, Alaska Department of Community and Economic Development, "Alaska Community Database," http://www.commerce.state.ak.us/dca/commdb/CF_BLOCK.cfm , accessed 2 September 2003, 24 October 2006, 21 August 2007

ADEC 1991a, Alaska Department of Environmental Conservation, "Interim Guidance for Non-UST Contaminated Soil Cleanup Levels," Guidance Number 001 - Revision 1, July 17, 1991.

ADEC 1991b, Alaska Department of Environmental Conservation, "Solid Waste Disposal Permit," Permit No. 9132-BA008 for PSA landfill, Fairbanks, AK, December 4, 1991.

ADEC 1996, Alaska Department of Environmental Conservation, "Petroleum Cleanup Guidance," Public Review Draft, December 1996.

ADEC 2001, Alaska Department of Environmental Conservation, "Cleanup Levels Guidance," August 17, 2001.

ADEC 2003, Alaska Department of Environmental Conservation, "Additional Cleanup Values," Technical Memorandum 01-007, November 24, 2003.

ADEC 2005a, Alaska Department of Environmental Conservation, "Draft Guidance on Developing Conceptual Site Models," http://www.dec.state.ak.us/spar/csp/guidance/csm05_draft.pdf, March 24, 2005.

ADEC 2005b, Alaska Department of Environmental Conservation, "Draft Ecological Scoping Evaluation Guidance," http://www.dec.state.ak.us/spar/csp/guidance/ecoscoping.pdf, September 2005

ADEC 2006, Alaska Department of Environmental Conservation, "18 AAC 75, Oil and Hazardous Substances Pollution Control," 130 December 2006.

ADEC 2007, Alaska Department of Environmental Conservation, "Cleanup levels Comparison spreadsheet," (Compares the proposed cleanup levels to existing ones), 29 October 2007.

ADF&G 2006a, Alaska Department of Fish and Game, "Refuges, Sanctuaries, and Critical Habitat Areas," http://www.wildlife.alaska.gov/index.cfm?adfg=refuge.main, accessed 4 October 2006.

ADF&G 2006b, Alaska Department of Fish and Game, “Fish Distribution Database Atlas, Nome C-1,” http://www.sf.adfg.state.ak.us/SARR/FishDistrib/GetPDF.cfm, 4 October 2006.

ATSDR 1987, U.S. Department of Health and Human Services, Agency for Toxic Substances and Disease Registry (ATSDR), “Public Health Assessment, City Of Nome/Alaska Gold Company Site, Nome, Alaska, http://www.atsdr.cdc.gov/HAC/PHA/alaskag/agc_p1.html, c. 1987.

ATSDR 1995, U.S. Department of Health and Human Services, Agency for Toxic Substances and Disease Registry, “Toxicological Profile for Fuel Oils,” Atlanta, June 1995.

ADGGS 1991, Alaska Division of Geological and Geophysical Surveys (Munter et al), in cooperation with the City of Nome, “ Preliminary Hydrogeological Evaluation of Moonlight Springs, Nome, Alaska,” Public-data File 91-28, June 1991. http://www.dggs.dnr.state.ak.us/scan2/pdf91/text/PDF91-28.PDF

Eisler, R. 1987, Polycyclic aromatic hydrocarbon hazards to fish, wildlife, and invertebrates: a synoptic review, U.S. Fish and Wildlife Service, Biological Report 85(1.11), May 1987.

EPA 1993, U.S. Environmental Protection Agency, "Wildlife Exposure Factors Handbook,” EPA/600/R-93/187a, December 1993.

EPA 1996a, U.S. Environmental Protection Agency, "Soil Screening Guidance: User's Guide", EPA/540/R-96/018, April 1996.

EPA 1996b, U.S. Environmental Protection Agency, "Soil Screening Guidance: Technical Background Document", EPA/540/R-95/128, May 1996.

EPA 1997, U.S. Environmental Protection Agency, Region 3, “Risk-Based Concentrations Table,” 1997.

IT 1996a, International Technology Corporation, “Remedial Action Report: Prison Site “A”” and “Supporting Documentation: Prison Site “A””, Anchorage, AK, July 1996.

IT 1996b, International Technology Corporation, “Remedial Action Report: Prison Site “A”, Addendum 1 – 1996 Work Season” and “Supporting Documentation, Prison Site “A”, Addendum 1 – 1996 Work Season”, Anchorage, AK, December 1996.

JMM 1990, James M. Montgomery Consulting Engineers Inc., "Chemical Contamination Report - Prison Site,” Chicago, IL, May 1990.

NTP 1997(6), “NTP Chemical Repository,” http//ntp-db.niehs.nih.gov/NTP_Reports/NTP_Chem_H&S/NTP_Chem8/.

Rogers 1996, Rogers, H.B. et al, “Selection of Cold-Tolerant Plants for Growth in Soils Contaminated With Organics,” Journal of Soil Contamination, Vol. 5, No. 2, April 1996, pp. 171-186.

USACE 1984, United States Army Corps of Engineers, facsimile, “Narrative Report of Alaska Construction, 1941-1944,” by LTC James D. Bush, Jr., original report date: November and December 1944, Anchorage, 1984.

USACE 1989, United States Army Corps of Engineers, Headquarters, Memorandum, “DERP for Formerly Used Defense Sites – Inventory Project Report for Project No. F10AK000052, Nome Area Defense Region, Seward Peninsula, Alaska,” Washington, D.C., 28 October 1989.

USACE 1991, United States Army Corps of Engineers, Alaska District, "Environmental Assessment and Finding of No Significant Impact: Seward Peninsula Sites, Alaska," Anchorage, AK, May 1991.

USACE 1993, United States Army Corps of Engineers, Alaska District, "Environmental Assessment and Finding of No Significant Impact: Seward Peninsula Sites, Alaska," Anchorage, AK, October 1993.

USACE 1995a, United States Army Corps of Engineers, Alaska District, "Environmental Assessment and Finding of No Significant Impact: Environmental Restoration and Debris Removal, Various Sites, Seward Peninsula, Alaska," Anchorage, AK, June 1995.

USACE 1995b, United States Army Corps of Engineers, Alaska District, "Environmental Assessment and Finding of No Significant Impact: Cleanup of Additional Military Site, Nome, Alaska," Anchorage, AK, November 1995.

USACE 1996, United States Army Corps of Engineers, “Solid Waste Disposal Permit #9532-BA003, Nome Prison Site,” letter to ADEC with analytical data from annual surface water samples, August 5, 1996.

USACE 1997, United States Army Corps of Engineers, “Chemical Data Report, Pond Sampling, Prison Site Landfill, Nome, Alaska,” memorandum for CEPOA-EN-EE-II, 19 November 1997.

USACE 1998, United States Army Corps of Engineers, “Chemical Data Report, 1998 Pond Sampling, Prison Site Landfill, Nome, Alaska,” memorandum for CEPOA-EN-EE-II, 29 December 1998.

USACE 2000a, United States Army Corps of Engineers, “Chemical Data Technical Memorandum, 1999 Pond Sampling, Prison Site Landfill, Nome, Alaska,” memorandum for CEPOA-EN-EE, 13 January 2000.

USACE 2000b, United States Army Corps of Engineers, “Chemical Data Report, Nome Area Defense Region, Long Term Monitoring [and] Alma Gulch Drum Site,” December 2000.

USACE 2001, United States Army Corps of Engineers, “Chemical Data Report, 2001 Sampling Event, Prison Site Landfill Long-Term Monitoring, Nome, Alaska,” November 2001.

USACE 2003, United States Army Corps of Engineers, “Chemical Data Report, Nome FUDS Soil Remediation Area Long-Term Monitoring, Nome, Alaska,” Anchorage, AK, September 2003.

USACE 2004, United States Army Corps of Engineers, Alaska District, telephone conversation between Robert A. Haviland (USACE-POA) and Gustave Olson (USACE-NWS), “Subject: Permafrost occurrences on the Nome Area Defense Region sites and UXO issue at the Field Site ‘R’,” 5 August 2004.

USACE 2006, United States Army Corps of Engineers, “Chemical Data Report, 2005 Site Sampling (05-012), Prison Site “A,” Nome Area Defense Region (ERP046), Nome, Alaska,” Anchorage, AK, February 2006.

USACE 2007, United States Army Corps of Engineers, “Chemical Data Report, 2007 Site Sampling (07-073), Prison Site ‘A,’ Nome Area Defense Region (ERP046), Nome, Alaska,” November 2007.

USGS 1950, United States Department of the Interior Geological Survey, “Nome (C-1), Alaska,” 1:63 360 series topographic map, (minor revisions 1970), 1950.

USGS 1984, United States Department of the Interior Geological Survey, "Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States," Professional Paper 1270, Washington, DC, 1984.

USGS 1988, United States Department of the Interior Geological Survey, "Element Concentrations in Soils and Other Surficial Materials of Alaska," Professional Paper 1458, Washington, DC, 1988.

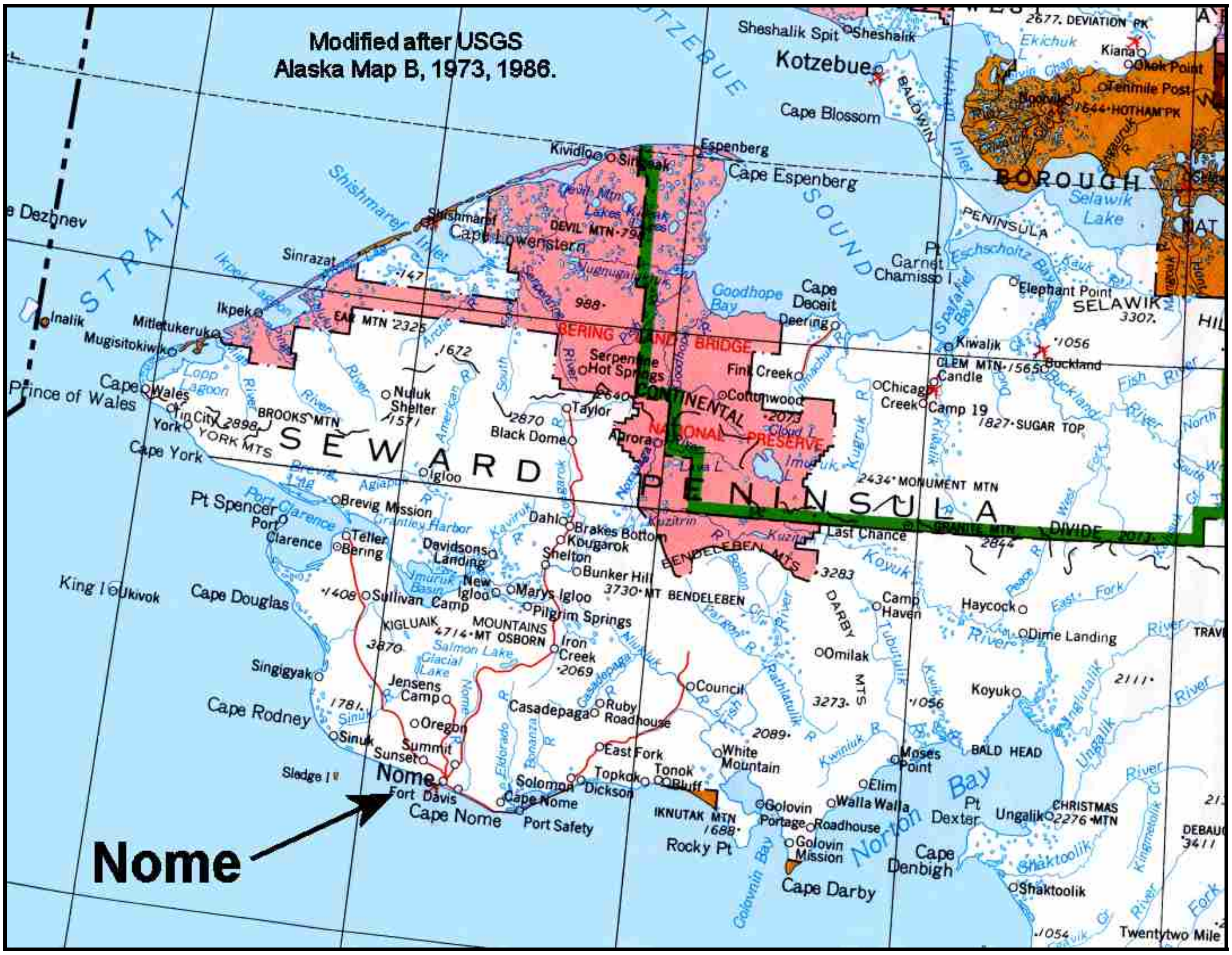
USGS 1989a, United States Department of the Interior Geological Survey, "Geochemical Maps Showing the Distribution and Abundance of Selected Elements in Stream-Sediment Samples, Solomon and Bendeleben 1º x 3º Quadrangles, Seward Peninsula, Alaska," Miscellaneous Field Studies Map MF-2071-A Pamphlet, Reston, Virginia, 1989.

USGS 1989b, United States Department of the Interior Geological Survey, "Geochemical Maps Showing the Distribution and Abundance of Selected Elements in Nonmagnetic Heavy-Mineral-Concentrate Samples from Stream Sediment, Solomon and Bendeleben 1º x 3º Quadrangles, Seward Peninsula, Alaska," Miscellaneous Field Studies Map MF-2071-B Pamphlet, Reston, Virginia, 1989.

Usher 1995, Peter J. Usher et al., “Communicating About Contaminants in Country Food: The Experience in Aboriginal Communities,” Inuit Tapirisat of Canada, Ottawa, May 1995.

WC 1985, Woodward-Clyde Consultants, “Field Investigation Report, Defense Environmental Restoration Act; Northwest Alaska Sites,” Anchorage, Alaska, October 1985.

Figure 1. Location Map



Modified after USGS Alaska Map B, 1973, 1986.

Figure 2. Vicinity Map

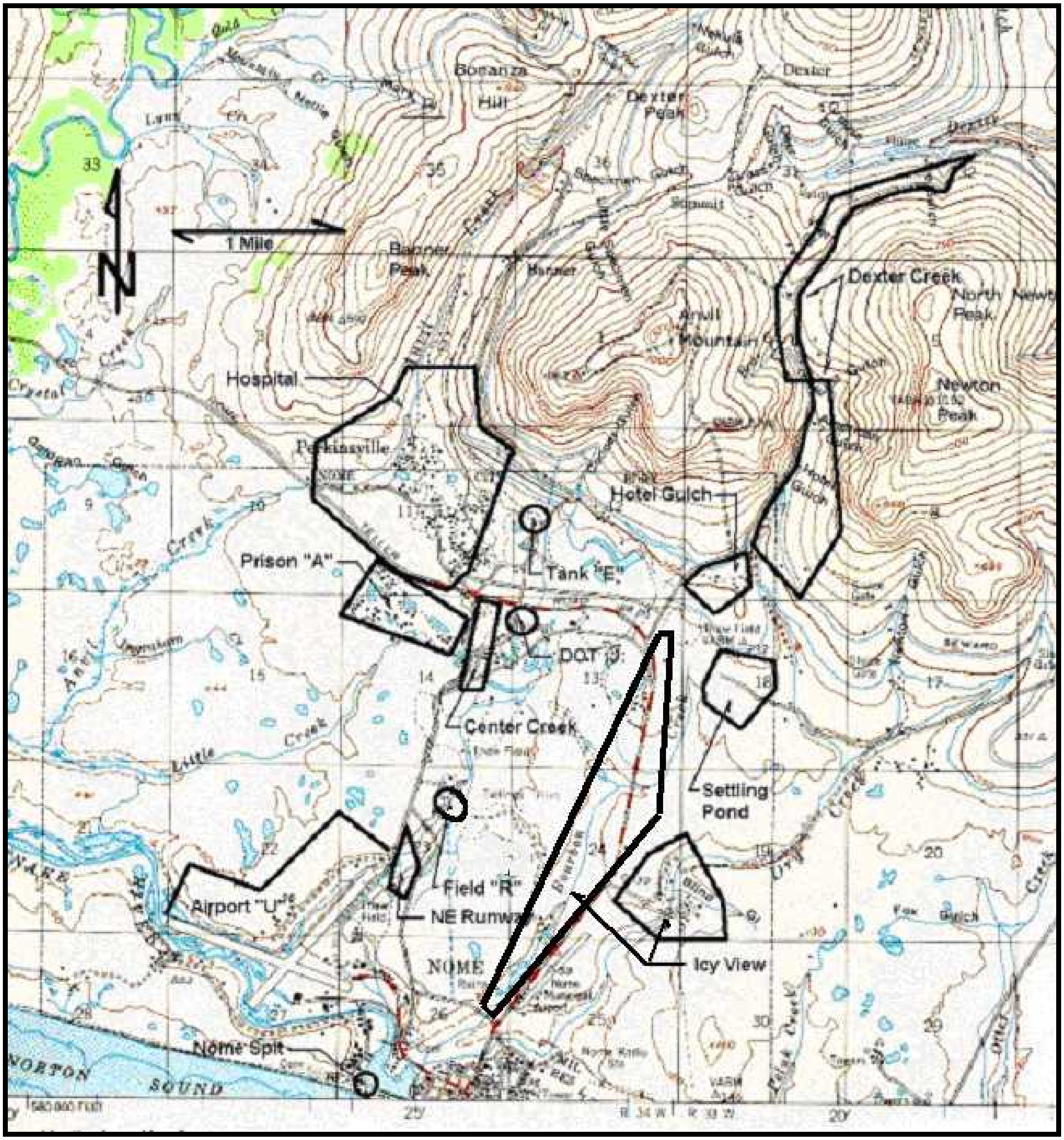


Figure 3. Site Map (USGS Nome C-1)

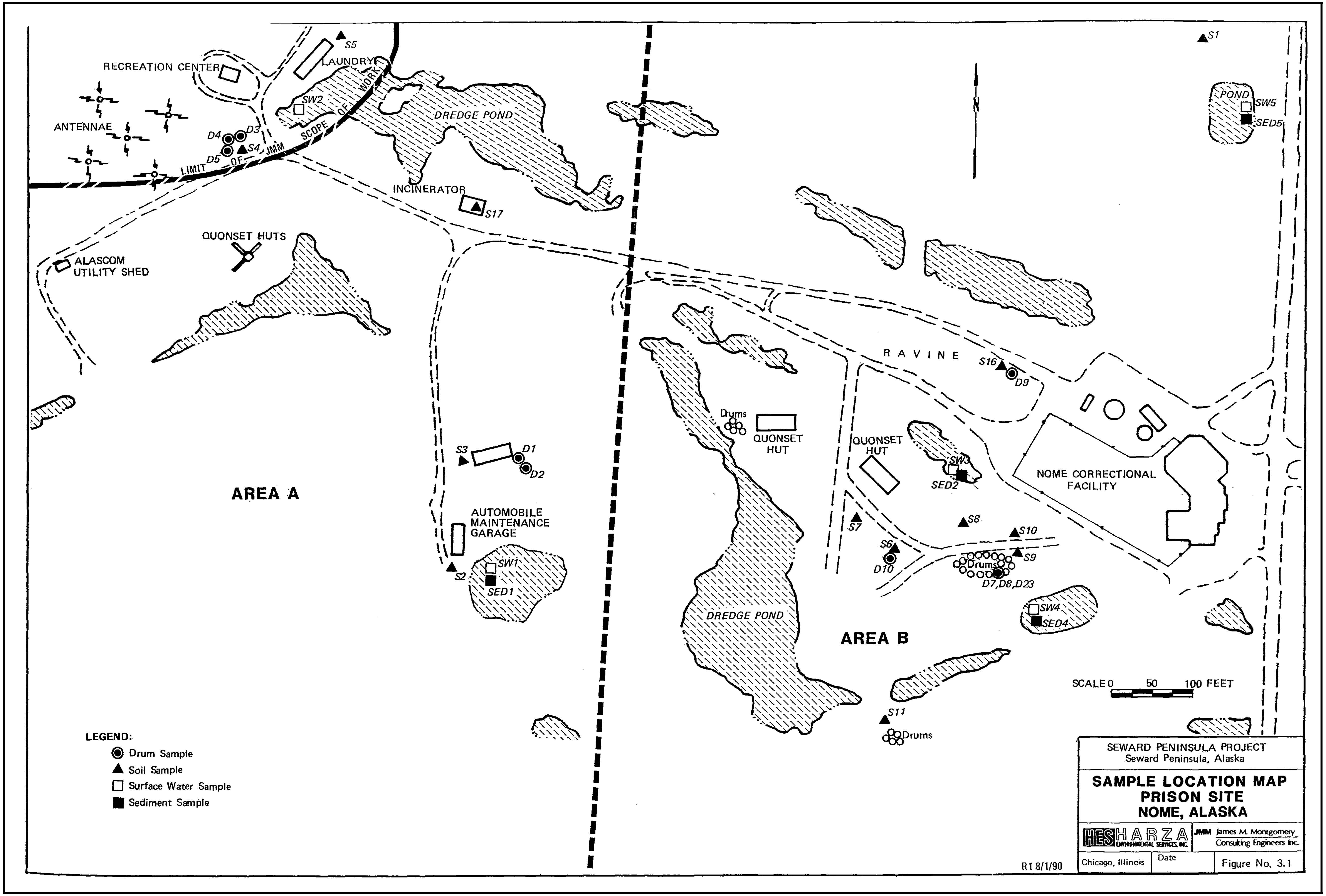
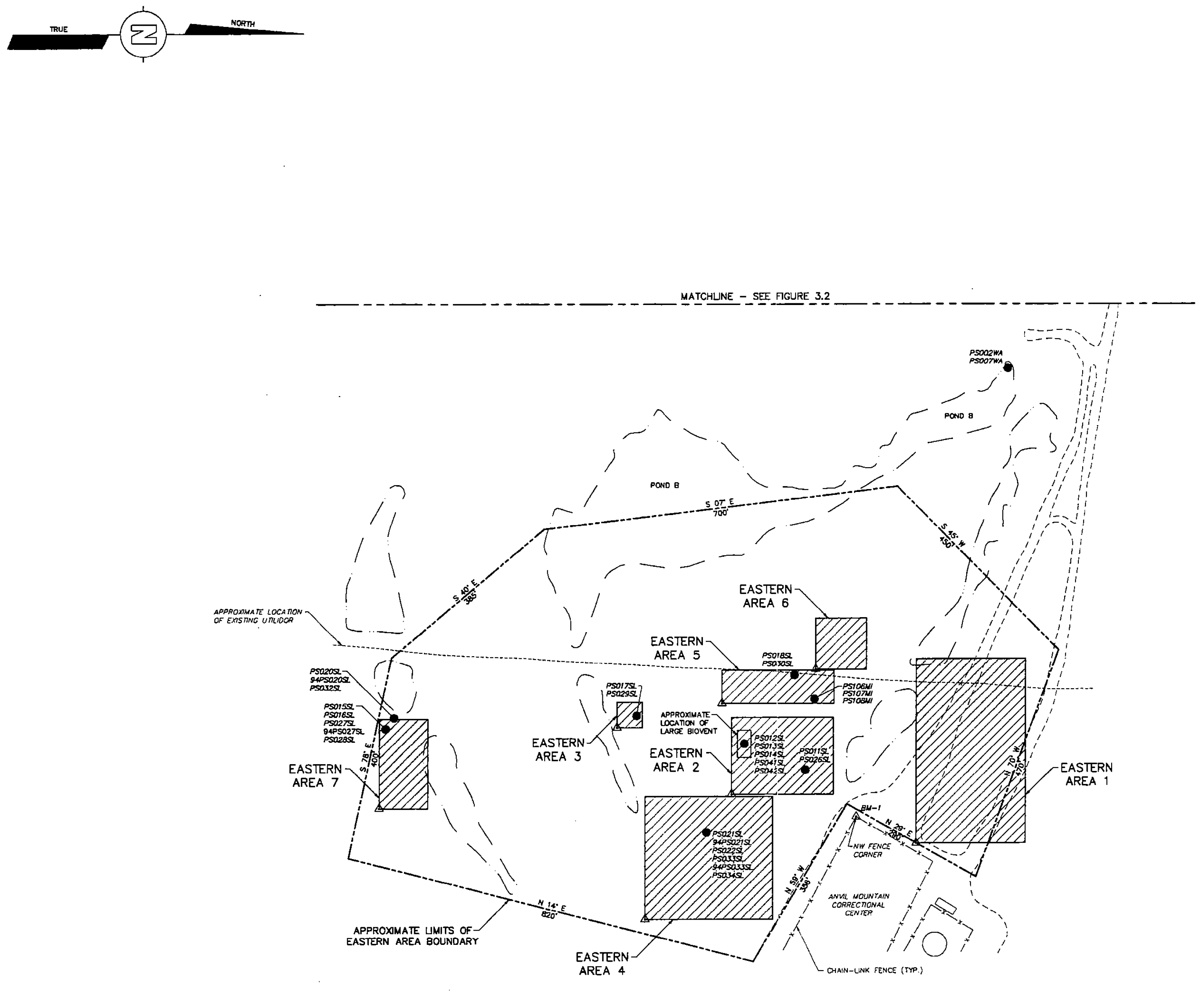
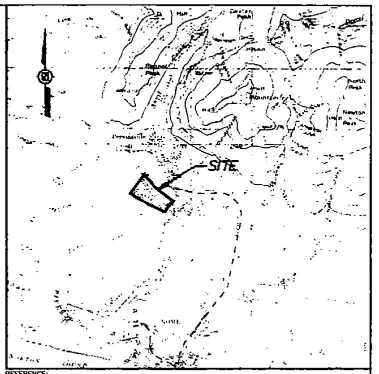


Figure 4 – Prison A Site Plan 1989

CORPS OF ENGINEERS

U. S. ARMY





REFERENCE:
USGS TOPOGRAPHIC MAP, 1:63 360 SERIES (TOPOGRAPHIC);
NOME (C-1), ALASKA QUADRANGLE, DATED 1950, MINOR
REVISIONS 1970; SCALE: 1"=1 MILE

SITE LOCATION MAP

SCALE
0 1 2 MILES

LEGEND:

● PS008SL	APPROXIMATE LOCATION OF ENVIRONMENTAL SAMPLE (1994)
△	SURVEY MONUMENT CONTROL POINT
△ BM-1	BENCHMARK
▨	DEBRIS REMOVED
□	BUILDING
=====	UNIMPROVED DIRT ROAD
— —	WATER BOUNDARY

NOTES:

1. PID AND IMMUNOASSAY TEST KITS WERE USED TO FIELD SCREEN SOILS AND DIRECT REMEDIAL ACTION ACTIVITIES. LABORATORY ANALYTICAL RESULTS WERE USED TO DETERMINE CONCENTRATIONS OF PETROLEUM, OIL, OR LUBRICANT (POL) CONTAMINATION.
2. SURFACE WATER SAMPLES WERE COLLECTED AS OUTLINED IN THE ADEC LANDFILL PERMIT AND SUBSEQUENT RENEWAL.
3. THERE ARE NO KNOWN WATER WELLS WITHIN 1,000 FEET OF THE SITE BOUNDARIES.
4. ALL QUANTITIES ARE BASED ON CONVERSION FACTORS USED IN IT CORPORATION'S 1993 PROPOSAL. ACTUAL QUANTITIES MAY VARY DUE TO MATERIAL TYPES AND DEGREE OF COMPACTION.
5. EXISTING FEATURES TAKEN FROM JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC. (JMM) DRAWINGS HAVE BEEN CORRECTED TO REFLECT ACTUAL FIELD CONDITIONS.

SUMMARY OF MATERIALS REMOVED

DEBRIS TYPE	SCHEDULED	ACTUAL
DRUMS	269 EA.	492 EA.
DRUMS WITH PRODUCT	35 EA.	86 EA.
WOOD	49 TONS	906 TONS
MISCELLANEOUS	8 TONS	681 TONS
METAL	99 TONS	986 TONS

SCALE
0 100 200 300 FEET

REV.	DATE	C.O.	ACTION	DESCRIPTION	BY	APP'D.

CONTRACT NO. DACW41-89-D-0133 DELIVERY ORDER #15
CONTRACTOR INTERNATIONAL TECHNOLOGY CORPORATION
CITY ANCHORAGE STATE ALASKA

RECOMMENDED:
APPROVED: USACE
DATE: ● CONTRACT CLOSE

INTERNATIONAL TECHNOLOGY CORPORATION
... Creating a Safer Tomorrow

ALASKA DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

DESIGNED:
DRAWN: B. A. KUMPF
TRACED: B. A. KUMPF
CHECKED: RGW 8/5/96
SUBMITTED:
CH. SECT.

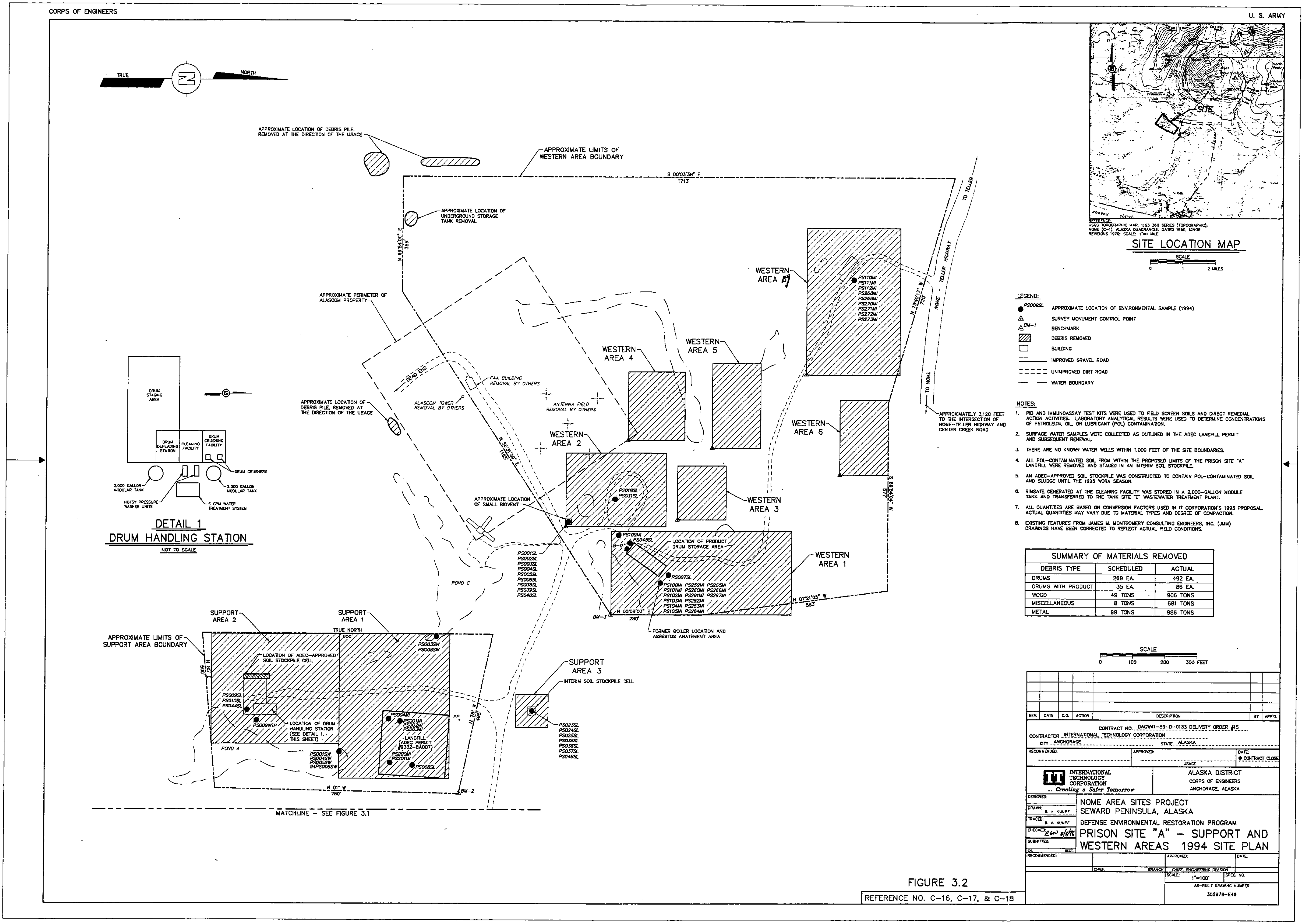
NOME AREA SITES PROJECT
SEWARD PENINSULA, ALASKA
DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
PRISON SITE "A" – EASTERN AREA
1994 SITE PLAN

RECOMMENDED:
CHIEF, BRANCH
APPROVED:
CHIEF, ENGINEERING DIVISION
DATE:
SCALE: 1"=100'
SPEC. NO.
AS-BUILT DRAWING NUMBER
305978-E47

FIGURE 3.1

REFERENCE NO. C-16, C-17, & C-18

Figure 5 –Prison Site 'A' Eastern Area 1994 Site Plan



REFERENCE:
USGS TOPOGRAPHIC MAP, 1:63 360 SERIES (TOPOGRAPHIC); NOME (C–1), ALASKA QUADRANGLE, DATED 1950, MINOR REVISIONS 1970; SCALE: 1"=1 MILE

SITE LOCATION MAP

SCALE 0 1 2 MILES

LEGEND:

● PS008SL	APPROXIMATE LOCATION OF ENVIRONMENTAL SAMPLE (1994)
△	SURVEY MONUMENT CONTROL POINT
△ BM-1	BENCHMARK
▨	DEBRIS REMOVED
☐	BUILDING
═	IMPROVED GRAVEL ROAD
╌	UNIMPROVED DIRT ROAD
— —	WATER BOUNDARY

NOTES:

1. PID AND IMMUNOASSAY TEST KITS WERE USED TO FIELD SCREEN SOILS AND DIRECT REMEDIAL ACTION ACTIVITIES. LABORATORY ANALYTICAL RESULTS WERE USED TO DETERMINE CONCENTRATIONS OF PETROLEUM, OIL, OR LUBRICANT (POL) CONTAMINATION.
2. SURFACE WATER SAMPLES WERE COLLECTED AS OUTLINED IN THE ADEC LANDFILL PERMIT AND SUBSEQUENT RENEWAL.
3. THERE ARE NO KNOWN WATER WELLS WITHIN 1,000 FEET OF THE SITE BOUNDARIES.
4. ALL POL–CONTAMINATED SOIL FROM WITHIN THE PROPOSED LIMITS OF THE PRISON SITE "A" LANDFILL WERE REMOVED AND STAGED IN AN INTERIM SOIL STOCKPILE.
5. AN ADEC–APPROVED SOIL STOCKPILE WAS CONSTRUCTED TO CONTAIN POL–CONTAMINATED SOIL AND SLUDGE UNTIL THE 1995 WORK SEASON.
6. RINSATE GENERATED AT THE CLEANING FACILITY WAS STORED IN A 2,000–GALLON MODULE TANK AND TRANSFERRED TO THE TANK SITE "E" WASTEWATER TREATMENT PLANT.
7. ALL QUANTITIES ARE BASED ON CONVERSION FACTORS USED IN IT CORPORATION'S 1993 PROPOSAL. ACTUAL QUANTITIES MAY VARY DUE TO MATERIAL TYPES AND DEGREE OF COMPACTION.
8. EXISTING FEATURES FROM JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC. (JMM) DRAWINGS HAVE BEEN CORRECTED TO REFLECT ACTUAL FIELD CONDITIONS.

SUMMARY OF MATERIALS REMOVED

DEBRIS TYPE	SCHEDULED	ACTUAL
DRUMS	269 EA.	492 EA.
DRUMS WITH PRODUCT	35 EA.	86 EA.
WOOD	49 TONS	906 TONS
MISCELLANEOUS	8 TONS	681 TONS
METAL	99 TONS	986 TONS

REV.	DATE	C.O.	ACTION	DESCRIPTION	BY	APP'D.

CONTRACT NO. DACW41–89–D–0133 DELIVERY ORDER #15
CONTRACTOR INTERNATIONAL TECHNOLOGY CORPORATION
CITY ANCHORAGE STATE ALASKA
RECOMMENDED:
APPROVED: USACE
DATE: @ CONTRACT CLOSE

INTERNATIONAL TECHNOLOGY CORPORATION
... Creating a Safer Tomorrow

ALASKA DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

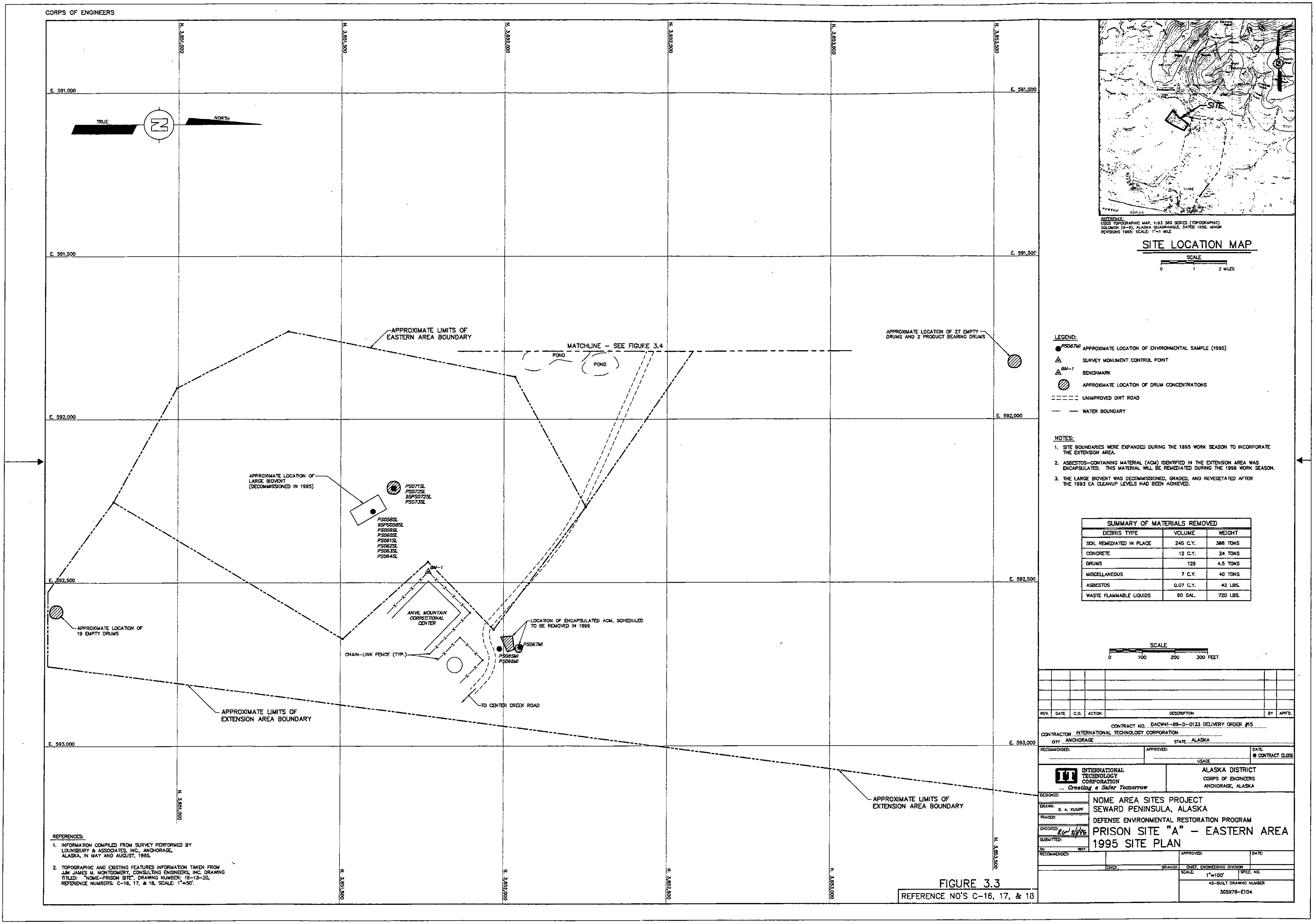
DESIGNED:
DRAWN: B. A. KUMPF
TRACED: B. A. KUMPF
CHECKED: RGW 8/5/96
SUBMITTED:
CH. SECT.

NOME AREA SITES PROJECT
SEWARD PENINSULA, ALASKA
DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
PRISON SITE "A" – SUPPORT AND WESTERN AREAS 1994 SITE PLAN

RECOMMENDED:
CHIEF, BRANCH
APPROVED: CHIEF, ENGINEERING DIVISION
DATE:
SCALE: 1"=100'
SPEC. NO.
AS–BUILT DRAWING NUMBER 305978–E46

FIGURE 3.2
REFERENCE NO. C–16, C–17, & C–18

Figure 6 – Prison Site 'A' Support and Western Areas 1994 Site Plan



REFERENCE:
USGS TOPOGRAPHIC MAP, 1:63 360 SERIES (TOPOGRAPHIC) SOLOMON (B-6), ALASKA QUADRANGLE, DATED 1950, MINOR REVISIONS 1965; SCALE: 1"=1 MILE

LEGEND:

● PS067MI APPROXIMATE LOCATION OF ENVIRONMENTAL SAMPLE (1995)

△ SURVEY MONUMENT CONTROL POINT

△ BM-1 BENCHMARK

▨ APPROXIMATE LOCATION OF DRUM CONCENTRATIONS

= = = = UNIMPROVED DIRT ROAD

— — WATER BOUNDARY

NOTES:

1. SITE BOUNDARIES WERE EXPANDED DURING THE 1995 WORK SEASON TO INCORPORATE THE EXTENSION AREA.
2. ASBESTOS-CONTAINING MATERIAL (ACM) IDENTIFIED IN THE EXTENSION AREA WAS ENCAPSULATED. THIS MATERIAL WILL BE REMEDIATED DURING THE 1998 WORK SEASON.
3. THE LARGE BIOVENT WAS DECOMMISSIONED, GRADED, AND REVEGETATED AFTER THE 1993 EA CLEANUP LEVELS HAD BEEN ACHIEVED.

SUMMARY OF MATERIALS REMOVED

DEBRIS TYPE	VOLUME	WEIGHT
SOIL REMEDIATED IN PLACE	245 C.Y.	368 TONS
CONCRETE	12 C.Y.	24 TONS
DRUMS	129	4.5 TONS
MISCELLANEOUS	7 C.Y.	40 TONS
ASBESTOS	0.07 C.Y.	42 LBS.
WASTE FLAMMABLE LIQUIDS	90 GAL.	720 LBS.

REFERENCES:

1. INFORMATION COMPILED FROM SURVEY PERFORMED BY LOUNSBURY & ASSOCIATES, INC., ANCHORAGE, ALASKA, IN MAY AND AUGUST, 1995.
2. TOPOGRAPHIC AND EXISTING FEATURES INFORMATION TAKEN FROM JJM JAMES M. MONTGOMERY, CONSULTING ENGINEERS, INC. DRAWING TITLED: "NOME-PRISON SITE", DRAWING NUMBER: 16-13-20, REFERENCE NUMBERS: C-16, 17, & 18, SCALE: 1"=50'.

REV.	DATE	C.O.	ACTION	DESCRIPTION	BY	APP'D.

CONTRACT NO. DACW41-89-D-0133 DELIVERY ORDER #15
CONTRACTOR INTERNATIONAL TECHNOLOGY CORPORATION
CITY ANCHORAGE STATE ALASKA
RECOMMENDED:
APPROVED: USACE
DATE: ● CONTRACT CLOSE

INTERNATIONAL TECHNOLOGY CORPORATION
... Creating a Safer Tomorrow

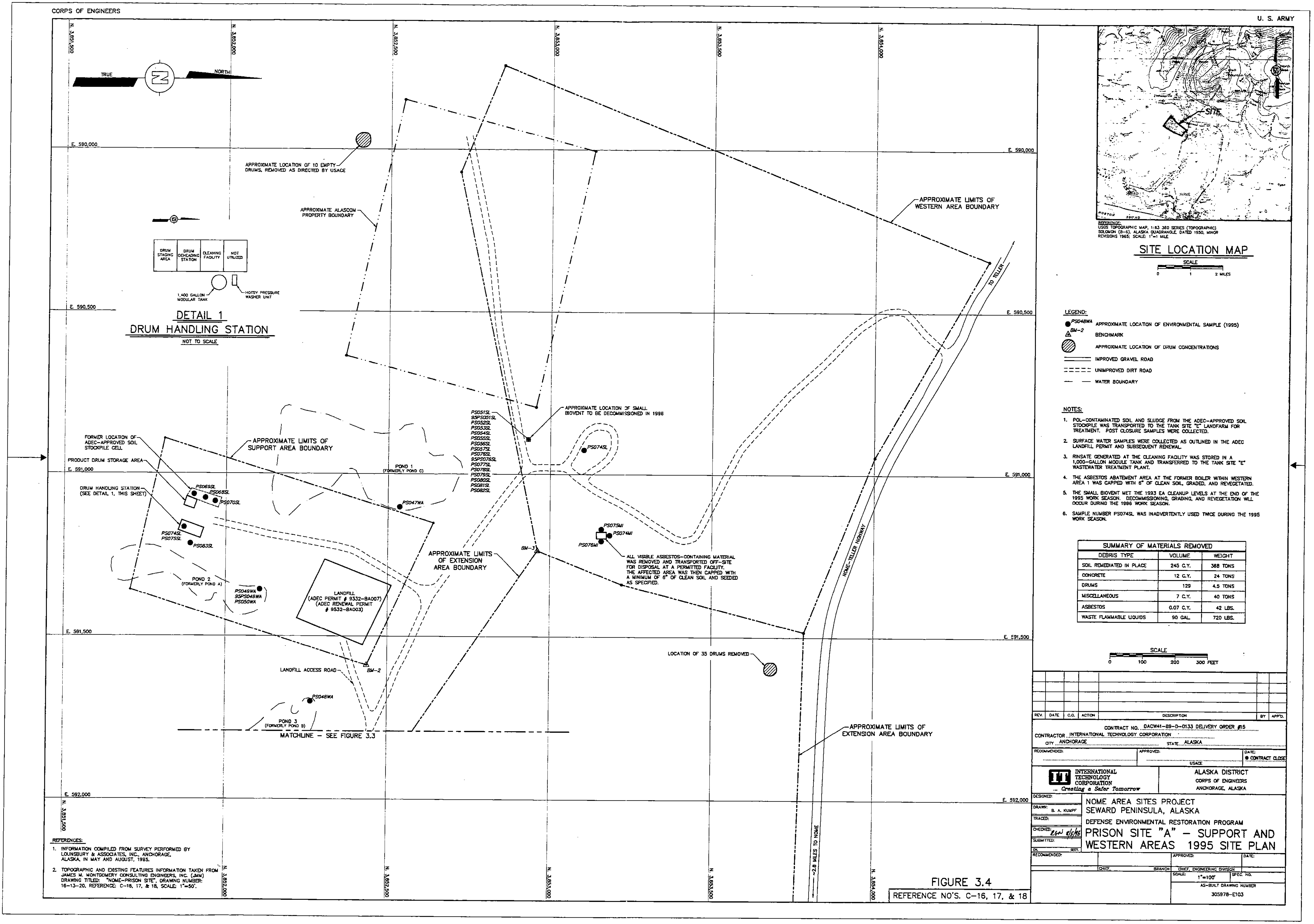
ALASKA DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

DESIGNED:
DRAWN: B. A. KUMPF
TRACED:
CHECKED: RG 8/9/96
SUBMITTED:
CH. SECT.

NOME AREA SITES PROJECT
SEWARD PENINSULA, ALASKA
DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
PRISON SITE "A" – EASTERN AREA
1995 SITE PLAN

RECOMMENDED:
CHIEF, BRANCH
APPROVED: CHIEF, ENGINEERING DIVISION
DATE:
SCALE: 1"=100'
SPEC. NO.
AS-BUILT DRAWING NUMBER 305978-E104

Figure 7 – Prison Site 'A' Eastern Area 1995 Site Plan



REFERENCE:
USGS TOPOGRAPHIC MAP, 1:63 360 SERIES (TOPOGRAPHIC) SOLOMON (B-6), ALASKA QUADRANGLE, DATED 1950, MINOR REVISIONS 1965; SCALE: 1"=1 MILE

SITE LOCATION MAP

SCALE 0 1 2 MILES

LEGEND:

- ● PS048WA APPROXIMATE LOCATION OF ENVIRONMENTAL SAMPLE (1995)
- △ BM-2 BENCHMARK
- ▨ APPROXIMATE LOCATION OF DRUM CONCENTRATIONS
- ═ IMPROVED GRAVEL ROAD
- ╌ UNIMPROVED DIRT ROAD
- — — WATER BOUNDARY

NOTES:

1. POL-CONTAMINATED SOIL AND SLUDGE FROM THE ADEC-APPROVED SOIL STOCKPILE WAS TRANSPORTED TO THE TANK SITE "E" LANDFARM FOR TREATMENT. POST CLOSURE SAMPLES WERE COLLECTED.
2. SURFACE WATER SAMPLES WERE COLLECTED AS OUTLINED IN THE ADEC LANDFILL PERMIT AND SUBSEQUENT RENEWAL.
3. RINSATE GENERATED AT THE CLEANING FACILITY WAS STORED IN A 1,000-GALLON MODULE TANK AND TRANSFERRED TO THE TANK SITE "E" WASTEWATER TREATMENT PLANT.
4. THE ASBESTOS ABATEMENT AREA AT THE FORMER BOILER WITHIN WESTERN AREA 1 WAS CAPPED WITH 6" OF CLEAN SOIL, GRADED, AND REVEGETATED.
5. THE SMALL BIOVENT MET THE 1993 EA CLEANUP LEVELS AT THE END OF THE 1995 WORK SEASON. DECOMMISSIONING, GRADING, AND REVEGETATION WILL OCCUR DURING THE 1996 WORK SEASON.
6. SAMPLE NUMBER PS074SL WAS INADVERTENTLY USED TWICE DURING THE 1995 WORK SEASON.

SUMMARY OF MATERIALS REMOVED

DEBRIS TYPE	VOLUME	WEIGHT
SOIL REMEDIATED IN PLACE	245 C.Y.	368 TONS
CONCRETE	12 C.Y.	24 TONS
DRUMS	129	4.5 TONS
MISCELLANEOUS	7 C.Y.	40 TONS
ASBESTOS	0.07 C.Y.	42 LBS.
WASTE FLAMMABLE LIQUIDS	90 GAL.	720 LBS.

SCALE 0 100 200 300 FEET

REFERENCES:

1. INFORMATION COMPILED FROM SURVEY PERFORMED BY LOUNSBURY & ASSOCIATES, INC., ANCHORAGE, ALASKA, IN MAY AND AUGUST, 1995.
2. TOPOGRAPHIC AND EXISTING FEATURES INFORMATION TAKEN FROM JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC. (JMM) DRAWING TITLED: "NOME-PRISON SITE", DRAWING NUMBER: 16-13-20, REFERENCE: C-16, 17, & 18, SCALE: 1"=50'.

FIGURE 3.4
REFERENCE NO'S. C-16, 17, & 18

REV.	DATE	C.O.	ACTION	DESCRIPTION	BY	APP'D.

CONTRACT NO. DACW41-89-D-0133 DELIVERY ORDER #15
CONTRACTOR INTERNATIONAL TECHNOLOGY CORPORATION
CITY ANCHORAGE STATE ALASKA
RECOMMENDED:
APPROVED: USACE
DATE: ● CONTRACT CLOSE

INTERNATIONAL TECHNOLOGY CORPORATION
... Creating a Safer Tomorrow

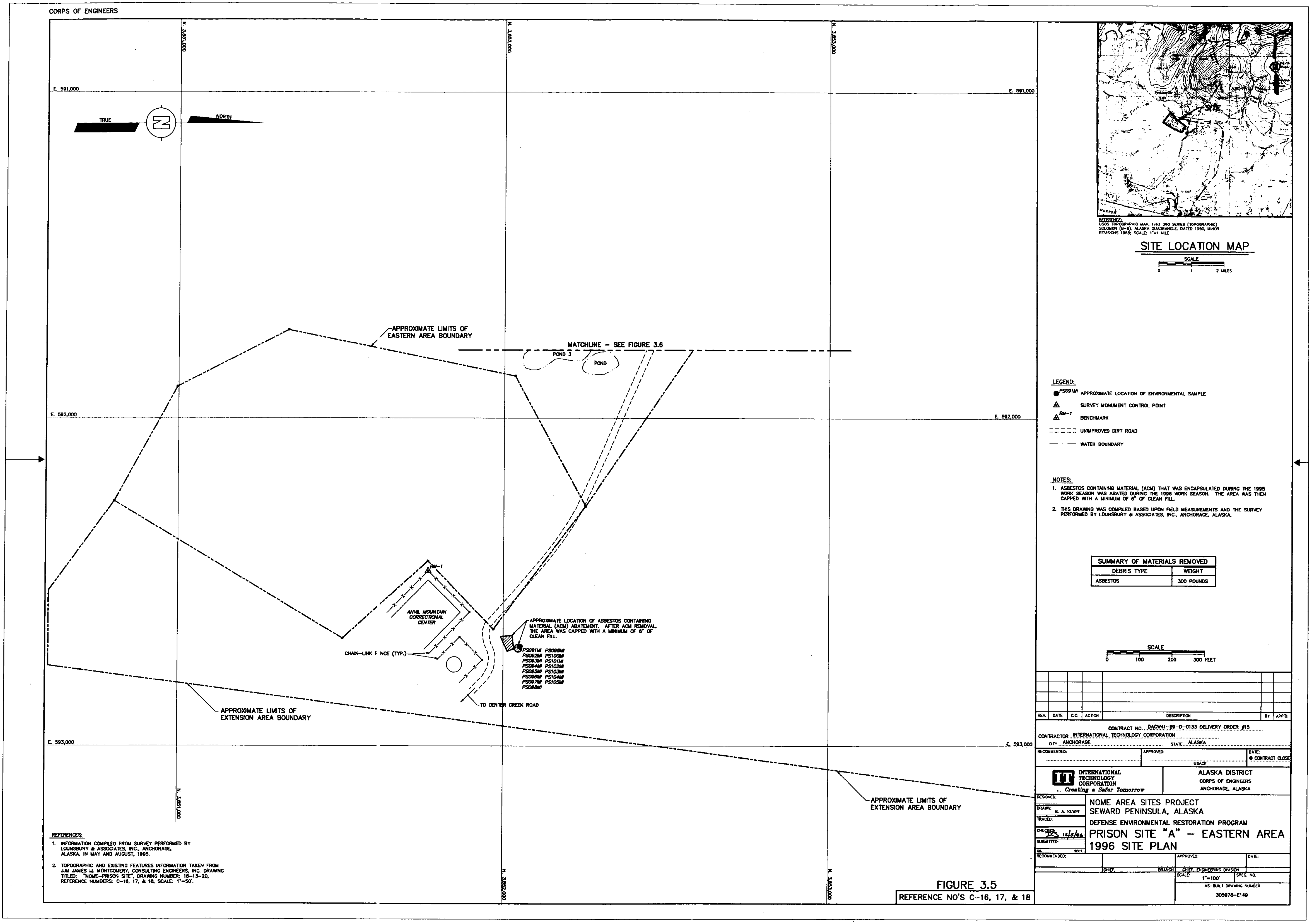
ALASKA DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

DESIGNED:
DRAWN: B. A. KUMPF
TRACED:
CHECKED: ZGN 8/5/96
SUBMITTED:
CH. SECT.

NOME AREA SITES PROJECT
SEWARD PENINSULA, ALASKA
DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
PRISON SITE "A" – SUPPORT AND WESTERN AREAS 1995 SITE PLAN

RECOMMENDED:
CHIEF, BRANCH
APPROVED:
CHIEF, ENGINEERING DIVISION
DATE:
SCALE: 1"=100'
SPEC. NO.
AS-BUILT DRAWING NUMBER
305978-E103

Figure 8 – Prison Site 'A' Support and Western Areas 1995 Site Plan



NOTES:

1. ASBESTOS CONTAINING MATERIAL (ACM) THAT WAS ENCAPSULATED DURING THE 1995 WORK SEASON WAS ABATED DURING THE 1996 WORK SEASON. THE AREA WAS THEN CAPPED WITH A MINIMUM OF 6" OF CLEAN FILL.
2. THIS DRAWING WAS COMPILED BASED UPON FIELD MEASUREMENTS AND THE SURVEY PERFORMED BY LOUNSBURY & ASSOCIATES, INC., ANCHORAGE, ALASKA.

SUMMARY OF MATERIALS REMOVED	
DEBRIS TYPE	WEIGHT
ASBESTOS	300 POUNDS

REFERENCES:

1. INFORMATION COMPILED FROM SURVEY PERFORMED BY LOUNSBURY & ASSOCIATES, INC., ANCHORAGE, ALASKA, IN MAY AND AUGUST, 1995.
2. TOPOGRAPHIC AND EXISTING FEATURES INFORMATION TAKEN FROM JJM JAMES M. MONTGOMERY, CONSULTING ENGINEERS, INC. DRAWING TITLED: "NOME-PRISON SITE", DRAWING NUMBER: 18-13-20, REFERENCE NUMBERS: C-16, 17, & 18, SCALE: 1"=50'.

REV.	DATE	C.O.	ACTION	DESCRIPTION	BY	APP'D.

CONTRACT NO. DACW41-89-D-0133 DELIVERY ORDER #15
CONTRACTOR INTERNATIONAL TECHNOLOGY CORPORATION
CITY ANCHORAGE STATE ALASKA
RECOMMENDED:
APPROVED: USACE
DATE: ● CONTRACT CLOSE

INTERNATIONAL TECHNOLOGY CORPORATION
... Creating a Safer Tomorrow

ALASKA DISTRICT
CORPS OF ENGINEERS
ANCHORAGE, ALASKA

DESIGNED:
DRAWN: B. A. KUMPF
TRACED:
CHECKED: 12/5/96
SUBMITTED:
CH. SECT.

NOME AREA SITES PROJECT
SEWARD PENINSULA, ALASKA
DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
PRISON SITE "A" – EASTERN AREA
1996 SITE PLAN

RECOMMENDED:
CHIEF, BRANCH
APPROVED:
CHIEF, ENGINEERING DIVISION
DATE:
SCALE: 1"=100'
SPEC. NO.
AS-BUILT DRAWING NUMBER
305978-E149

Figure 9 – Prison Site ‘A’ Eastern Area 1996 Site Plan

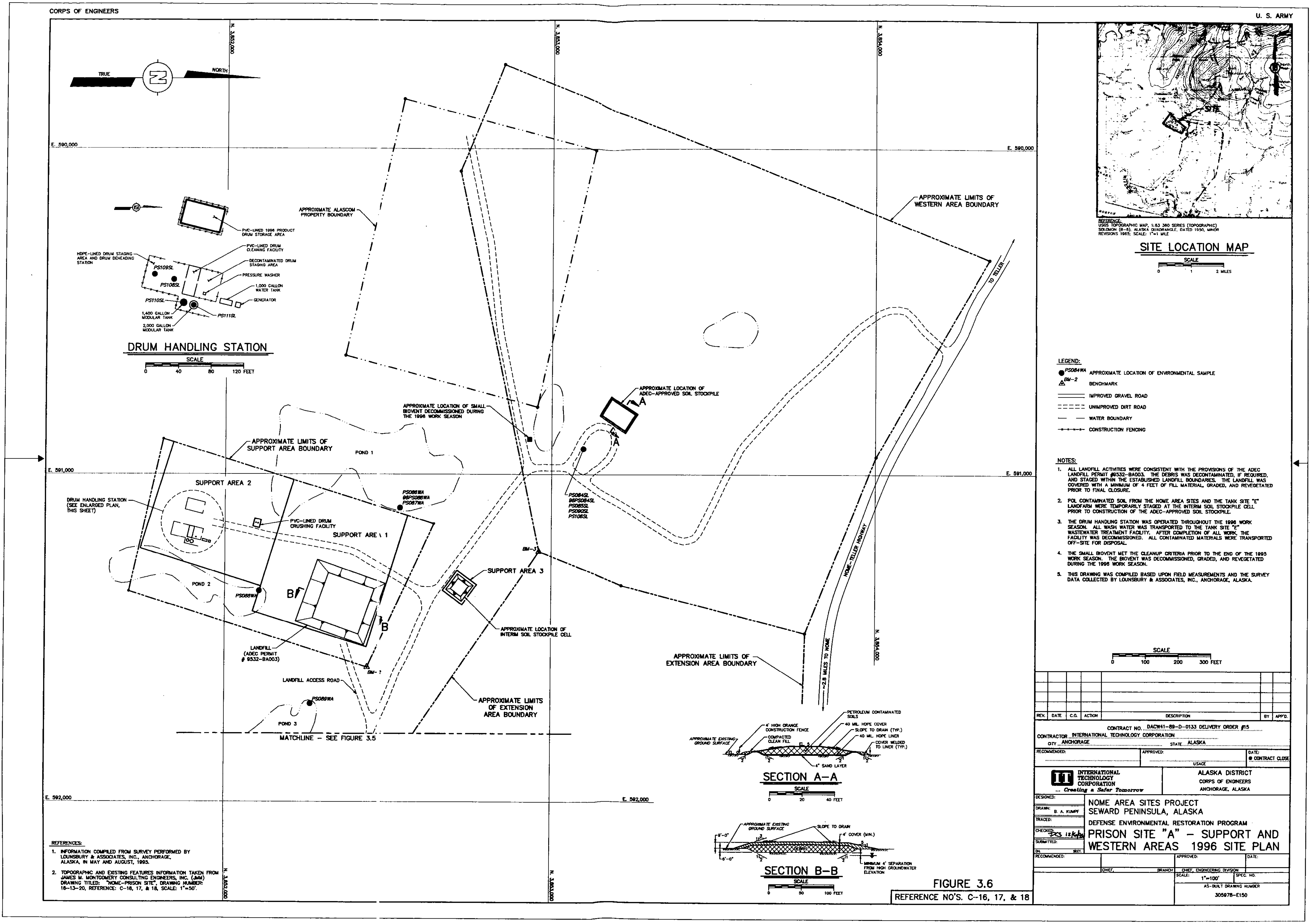


Figure 10 – Prison Site ‘A’ Support and Western Areas 1996 Site Plan

Prison Site "A"
1994 Work Season - May 29, 1994

Nome Area Sites Project
Contract DACW41-89-D0133

Eastern Area, Quonset hut demolition

Photograph 1 – Quonset Hut Demolition 1994

Prison Site "A"
1994 Work Season - June 9, 1994

Nome Area Sites Project
Contract DACW41-89-D0133

Eastern Area, landfill operations, view looking west

Photograph 2 – Landfill Operations 1994

Prison Site "A"
1994 Work Season - August 31,1994

Nome Area Sites Project
Contract DACW41-89-D0133

Eastern Area, revegetation adjacent to large biovent cell

Photograph 3 – Revegetation 1994

Prison Site "A"
1995 Work Season - June 29, 1995

Nome Area Sites Project
Contract DACW41-89-D0133

Support Area, aerial view of drum handling station and product drum staging area

Photograph 4 – Drum Handling and Product Staging Area 1994

Photograph 5 - View of east side of landfill cap, looking west (20 Sep 2001)

Photograph 6 - View of south side of landfill cap, looking north (20 Sep 2001)

Photograph 7 – Prison Site ‘A’ Soil Pile Composite Photo 2004

Photograph 8 – Panoramic View of FUDS Sites from Anvil Mountain, Looking South

Table 4 - Chronology of Significant Events

Event	Dates	Remarks
Nome Area Defense Region established	December 31, 1941	Established by the U.S. Army.
Land transfer to US Army.	1940’s	Acquisition Authorization: for partial transfer of property within the Nome Area Defense Region. Some property used without formal acquisition procedures.
Site Inspection of the Nome Area Defense Region sites by Woodward-Clyde Consultants.	September 1985	Site inspection on September 3, 1995 by Woodward-Clyde Consultants (WCC) under contract to USACE-POA. The contract with WCC was to inspect and inventory 42 sites in northern Alaska. The Nome Area Defense Region was one of these sites. Final report published March 1986 (WCC 1986). Report provided debris inventory, POL inventory, HTW, disposal alternatives, cost estimate, and conclusions.
Remedial Investigation	August 1989	Remedial Investigation by Harza Engineering under subcontract to JMM. The objective of the RI was to provide information for the debris cleanup and site restoration design. Final reports were published May 1990 (JMM 1990). The reports provided sampling results on drums, water, sediment, and soil; site restoration considerations, remedial action alternative development, and recommendations. Sites included were: Nome Spit, Underground Tank, Airport, Prison, DOT/PF Yard, and Field.
INPR Completed	October 1989	Final Inventory Project Report (USACE 1989) was approved by the USACE, Headquarters. IPR defines Project Eligibility.
Remedial Design	1989-1991	Plans and specifications were prepared for the cleanup of the Nome Area sites. The project was designed as a firm fixed price contract.
EA and FONSI	May 1991	The USACE-POA prepared and issued the Environmental Assessment and Finding of No Significant Impact (USACE 1991). The EA and FNSI were distributed to other state and federal agencies, as well as to the public, for review and comment.
Project put “on the shelf.”	1991-1993	Due to funding shortfalls, project was postponed.
Revised Remedial Action Design	1993	When funding became available, the project’s RAO’s were updated.
EA and FONSI	October 1993	The USACE-POA prepared and issued the Environmental Assessment and Finding of No Significant Impact (USACE 1993). The EA and FNSI were distributed to other state and federal agencies, as well as to the public, for review and comment.
Remedial Action Contract Award.	December 13, 1993	Project was awarded to IT on December 13, 1993 as a cost-plus-fixed-fee delivery order on the Kansas City District’s preplaced contract. Sites included in the original award were: Nome Airport “U,” Nome DOT “J,” Nome Field “R,” Nome Prison “A,” Nome Tank “E,” and Nome Spit.
Remedial Action – Initial Site Visit	July 7, 1994	USACE-POA and IT conducted initial site visit prior to mobilization.
EA and FONSI	November 1995	The USACE-POA prepared and issued the Environmental Assessment and Finding of No Significant Impact (USACE 1995) for the Additional Nome sites. The EA and FNSI were distributed to other state and federal agencies, as well as to the public, for review and comment. The Additional Nome sites included: Icy View, Nome Airport NE Runway, Hospital, Hotel Gulch, Center Creed Road, Settling Pond, and Dexter Creek.

Event	Dates	Remarks
Prison Site "A"		
Remedial Action – Remediation for 1st year	May 10 – October 14, 1994	IT mobilized to the site, conducted remedial activities, and demobilized for the winter. The final inspection was held on October 13, 1994 with representatives from USACE-POA present. The Final Remedial Action Report: Airport Site "A" (IT 1996g) documents activities on site.
Remedial Action- Remediation for 2nd year	May 19 – September 15, 1995	IT mobilized to the site, conducted remedial activities, and demobilized for the winter. Representatives from USACE-POA completed the final inspection on September 15, 1995. The Final Remedial Action Report: Prison Site "A" (IT 1996g) documents activities during this time.
Remedial Action – Remediation for 3rd year	April 26 – September 14, 1996	IT mobilized to the site, conducted remedial activities, and conducted a final inspection on September 17, 1996. Representatives from USACE-POA were present. Long-term stockpile constructed for 750 CYs of petroleum contaminated soil that did not reach cleanup levels by end of IT contract. The Final Remedial Action Report: Prison Site "A" – Addendum 1 – 1996 Work Season (IT 1996h) documents activities during this time.
Soil Pile Remediation	1997 - 1998	Contract awarded to SBS / AEI Pacific, Inc. to thermally remediate 750 CYs of stockpiled petroleum contaminated soil. Work was conducted in 1997 and 1998. Contractor went bankrupt without completing the final remedial action report.
Soil Pile Sampling	2003	USACE-POA conducted sampling at the soil pile and footprint areas to verify cleanup levels were attained. All cleanup levels were met.
Soil and Surface Water Sampling	2005	USACE-POA conducted follow-up sampling of soil and surface water.
Groundwater and Surface Water Sampling	2007	USACE-POA conducted follow-up sampling of groundwater and surface water.

Table 5 - Pertinent Community Relations and Project Coordination Activities

Activity	Description	Reviewers
Environmental Assessments	Environmental Assessments prepared by the USACE-POA to determine the potential impacts of the proposed action. Resulted in Finding of No Significant Impact.	State Agencies including ADEC and ADNR, Federal Agencies including BLM, and the public.
Contractor Work Plan	Describes methods, material, and personnel that the contractor intends to use to implement the proposed action.	USACE-POA, ADEC
Contractor Sampling and Analysis Plan	Describes the contractor's proposed sampling methodology including sampling locations, test methods, and quality control/quality assurance procedures.	USACE-POA, ADEC
Coastal Zone Consistency review and determination.	Review and determination by the ADNR and other state agencies to insure that the proposed action is consistent with work requirements in Coastal Zones. Determination completed prior to EA (October 1993).	USACE-POA, ADNR
Landfill Permit for PSA	Permit from ADEC that provides stipulations for the construction, operation, and closure of the landfill at PSA. Permit issued 1991 (ADEC 1991)	USACE-POA, ADEC
Labor Agreement Meeting	April 12, 1994: IT conducted a meeting with the International Union of Operating Engineers and Laborers International Union of North America to review a Labor Agreement, establish communications, and organize an employee interview process.	USACE-POA, IT, IUOE, LIUNA
Community Relations Plan	Prepared by IT for USACE-POA. Dated April 19, 1994.	USACE-POA
Public Meeting	April 19, 1994: IT held a preseason public meeting in Nome to provide information and answer questions.	USACE-POA, IT, public
Reindeer Herder's Association Meeting	April 25, 1994: IT met with the Reindeer Herder's Association to coordinate site activities with the regional reindeer herding activities.	USACE-POA, IT, Reindeer Herder's Association
Public Meeting	October 21, 1994: IT held a post-season public meeting to provide information and answer questions.	USACE-POA, IT, public, local unions, Nome city officials
Newspaper Articles	The Nome Nugget: May 5, 1994; May 12, 1994; June 2, 1994; June 16, 1994; October 27, 1994; June 15, 1995; June 6, 1996; October 3, 1996.	
Public Meeting	May 11, 1995: IT held a preseason public meeting in Nome to provide information and answer questions.	USACE-POA, IT, local union officials, Nome city officials, public
Public Meeting	Sept. 12, 1995: IT held a post-season public meeting in Teller, AK to provide information and answer questions.	USACE-POA, IT, several local native corporations, public.
Public Meeting	Sept. 21, 1995: IT held a post-season public meeting to provide information and answer questions.	USACE-POA, IT, local union officials, public, local newspaper.
Public Meeting	May 7, 1996: IT held a pre-season public meeting to provide information and answer questions.	USACE-POA, IT, ADEC, Bering Straits Native Corp., Nome city officials, public, local newspaper
Public Meeting	Sept. 18, 1996: IT held a post-season public meeting to provide information and answer questions.	USACE-POA, IT, ADEC, local union officials, local native corps., public, local newspaper

Table 6 - Chemical Descriptions

CHEMICAL	DESCRIPTION
Arsenic	CAS 7440-38-2; Element, classified as a metal; used in metallurgy for hardening copper, lead, nonferrous alloys, automotive body solder, as wood preservative, herbicide, and pesticide; Naturally occurring in Alaskan soils from < 10 ppm up to 750 ppm.
Barium	CAS 7440-39-3; Element, Alkaline earth metal; Yellowish-white, slightly lustrous lumps. Flammable solid. Small amounts of barium are used in paints and glasses. Naturally occurring in Alaskan soils from 39 ppm up to 3,100 ppm.
Benzene	CAS 71-43-2; Benzene is produced naturally by volcanoes and forest fires, and is present in many plants and animals, but is also a major industrial chemical made from coal and oil. As a pure chemical, benzene is a clear, colorless liquid. It is used to make other intermediate chemicals and some types of plastics, liquid detergents, synthetic rubbers and fibers, and pesticides. It is used in plastic containers, adhesives, radios, toys, sporting goods, appliances, automobiles, tires, and textiles. Benzene has been used in the rotogravure printing industry, in shoe manufacturing, and chemical laboratories. It is also a component of motor vehicle gasoline. Emissions can be detected from carpet glue, textured carpet, and furniture wax. (National Safety Counsel, http://www.nsc.org/)
Alpha-BHC	CAS 319-84-6; Insecticide, one of the isomers of BHC (Hexachlorocyclohexane); Still used in many developing countries. In 2002 the EPA prohibited the use of BHC on food related uses.
Gamma-BHC	CAS 58-89-9; Lindane, an insecticide, one of the isomers of BHC (Hexachlorocyclohexane); Still used in many developing countries. In 2002 the EPA prohibited the use of BHC on food related uses.
Cadmium	CAS 7440-43-9; Element; used in batteries, coating and electroplating steel and cast iron, pigments, plastic stabilizers; Naturally occurring in North American soils from 0.01 ppm up to 22 ppm.
Chromium	CAS 7440-47-3; Element; used in manufacturer of chrome-steel or chrome-nickel-steel alloys (stainless steel), leather tanning, pigment and mordant, wood preservative; Naturally occurring in Alaskan soils from 5 ppm up to 390 ppm.
1,1- Dichloroethylene	CAS 75-35-4; Vinylidene Chloride; Used as comonomer, primarily with vinyl chloride. In adhesives; component of synthetic fibers. In the synthesis of the refrigerant 142b, 1-chloro-1,1-difluoroethane, is synthesized from 1,1-difluoroethane, vinylidene chloride & 1,1,1-trichloroethane. A monomeric intermediate in the production of plastics, particularly the saran types. Comonomer, esp for food packaging & coating resins. Comonomer for modacrylic fibers; unisolated chemical intermediate for 1,1,1-trichloroethane. Chemical intermediate in production of chloracetyl chloride. (Spectrum Laboratories Inc., http://www.speclab.com/compound/c75354.htm)

CHEMICAL	DESCRIPTION
Dieldrin	CAS 60-57-1; Aldrin and dieldrin are the common names of two structurally similar compounds that were once used as insecticides. They are chemicals that are made in the laboratory and do not occur naturally in the environment.
DRO	Diesel range organics; the major component of diesel #2 and fuel oil; contains aromatic and aliphatic chemicals with 10 carbon atoms up to 24 carbon atoms.
Endosulfan sulfate	CAS 1031-07-8; A metabolite of endosulfan that shows similar toxicity. Endosulfan is a chlorinated hydrocarbon insecticide of the cyclodiene subgroup which acts as a contact poison in a wide variety of insects and mites. It can also be used as a wood preservative. It is used primarily on food crops like tea, fruits, vegetables and on grains.
Heptachlor	CAS 76-44-8; Heptachlor is a synthetic chemical that was used in the past for killing insects in homes, buildings, and on food crops. It has not been used for these purposes since 1988. There are no natural sources of heptachlor or heptachlor epoxide.
Heptachlor epoxide	CAS 1024-57-3; Heptachlor epoxide is an oxidation product of heptachlor formed by many plants and animals, including people, after exposure to heptachlor. Heptachlor is present as an impurity in the pesticide chlordane. (National Safety Counsel, http://www.nsc.org/)
Lead	CAS ; Element, metallic; construction material for tank linings, piping, pigments for paint, storage batteries, in ceramics, plastics, and lead alloys; Naturally occurring in Alaskan soils from < 4 ppm up to 310 ppm.
Mercury	CAS 7439-97-6; Mercury is an element that occurs naturally in the environment. [It occurs in North American soils from about <0.01 ppm to 4.6 ppm.] It is a silver-white, heavy metal that is liquid at room temperature; as a solid, it is tin-white and can be cut with a knife. It can also be found in compounds with other chemicals such as chlorine in the same way that sodium is found in table salt. Mercury is used in pure form in thermometers, barometers, and other consumer products. Batteries containing mercury are used in devices ranging from guided missiles and space craft to hearing aids, cameras, toys, portable radios, calculators, measuring devices, smoke alarms, self-winding watches, and radio microphones. Electric or mercury lamps are used for outdoor lighting, including floodlights and street lights, motion picture projection, health treatment, and photography. Mercury is also used as a catalyst in the production of vinyl chloride monomer, urethane foam, and anthraquinone. It is used in diuretics, antiseptics, and skin preparations. Prior to August 20, 1990, mercury was added to paints as an anti-mildew agent, antibacterial agent, and fungicide; about one-third of all interior latex paint contained varying levels of mercury. (Oil-based paint does not contain mercury.) Mercury is also used in pigments, refining, lubrication oils, and dental amalgams. (National Safety Counsel, http://www.nsc.org/)

CHEMICAL	DESCRIPTION
Methylene chloride	CAS 75-09-2; Dichloromethane; Methylene Chloride is a colorless liquid with a pleasant Chloroform-like odor. It is used in food, furniture and plastics processing, and as a paint remover. (The New Jersey Department of Health and Senior Services; http://www.state.nj.us/health/eoh/rtkweb/1255.pdf)
2-Methylnaphthalene	CAS 91-57-6; 2-Methylnaphthalene is a component of crude oil and a product of combustion which is produced and released to the environment during natural fires. Emissions from petroleum refining, coal tar distillation, and gasoline and diesel fueled engines are major contributors of 2-methylnaphthalene to the environment. Pure 2-methylnaphthalene is primarily used in vitamin K production and as a chemical intermediate. Consequently, 2-methylnaphthalene may be released to the environment via manufacturing effluents and the disposal of waste byproducts. Because of the widespread use of 2-methylnaphthalene in a variety products, 2-methylnaphthalene is also released to the environment through landfills, municipal waste water treatment facilities and waste incinerators. 2-Methylnaphthalene should biodegrade rapidly in the environment where micro-organisms have acclimated to polycyclic aromatic hydrocarbons and at a moderate rate in unacclimated soils and aquatic systems. Hydrolysis and bioconcentration of 2-methylnaphthalene should not be an important fate processes in the environment. (Spectrum Laboratories Inc., http://www.speclab.com/compound/c91576.htm)
Naphthalene	CAS 91-20-3; Naphthalene is a white solid with a strong smell; is also called mothballs, moth flakes, white tar, and tar camphor. Naphthalene is a natural component of fossil fuels such as petroleum and coal; it is also formed when natural products such as wood or tobacco are burned. The principal use for naphthalene is as an intermediate in the production of phthalic anhydride, which is used as an intermediate in the production of phthalate plasticizers, resins, phthaleins, dyes, pharmaceuticals, insect repellents, and other materials; other products made from naphthalene are moth repellents, in the form of mothballs or crystals, and toilet and diaper pail deodorant blocks. Naphthalene is also used for making leather tanning agents, and the insecticide carbaryl. (National Safety Counsel, http://www.nsc.org/)
Pentachlorophenol	CAS 87-86-5; Pentachlorophenol was once one of the most widely used biocides in the United States, but it is now a restricted use pesticide and is no longer available to the general public. It was primarily used as a wood preservative.
RRO	Residual range organics; the major component of bunker C oil and fuel oil #6; contains aromatic and aliphatic chemicals with 25 carbon atoms up to 36 carbon atoms. Also present in diesel #2 to a small degree.

CHEMICAL	DESCRIPTION
Selenium	Selenium (CAS 7782-49-2) is a naturally occurring element widely but unevenly distributed in the earth's crust and commonly found in sedimentary rock formations. [Selenium is found in North American soils from about <0.1 ppm to 4.3 ppm.] It is also manufactured for industrial uses. Humans are exposed to selenium daily in their food, particularly in grains, cereals, meat, seafood and drinking water. Industry uses selenium as a black, gray or red odorless solid to manufacture "electric eyes," photographic exposure meters, rectifiers for home entertainment equipment, xerography, red or black glass, anti-dandruff shampoos, and pigments in plastics, paints, enamels, inks and rubber. It is also used in veterinary medicine and as a fungicide and insecticide. (National Safety Counsel, http://www.nsc.org/)
Silver	CAS 7440-22-4; Silver is one of the basic elements that make up our planet. [Silver is found in North American soils from about 0.13 ppm to 0.77 ppm.] Silver is rare, but occurs naturally in the environment as a soft, "silver" colored metal. Because silver is an element, there are no man-made sources of silver. People make jewelry, silverware, electronic equipment, and dental fillings with silver in its metallic form. It also occurs in powdery white (silver nitrate and silver chloride) or dark-gray to black compounds (silver sulfide and silver oxide). Silver could be found at hazardous waste sites in the form of these compounds mixed with soil and/or water. Therefore, these silver compounds will be the main topic of this profile. Throughout the profile the various silver compounds will at times be referred to simply as silver. Photographers use silver compounds to make photographs. Photographic materials are the major source of the silver that is released into the environment. Another source is mines that produce silver and other metals. The natural wearing down of silver-bearing rocks and soil by the wind and rain also releases large amounts of silver into the environment. (ATSDR Toxicological Profile for Silver, 1990)

Table 7 – Soil Concentrations

1	2						3	4
Compound of Potential Concern	**Concentrations (mg/kg)**						**Cleanup Level (carcinogen) (mg/kg) Ingestion, Inhalation, Migration GW**	**Cleanup Level (non-carcinogen) (mg/kg) Ingestion, Inhalation, Migration GW**
	result	**sample #**	**result**	**sample #**	**result**	**sample #**		
Acetone	0.070 B	3-S3	0.11 B	3-S11	0.54 B	3-S12RE		10,000
	0.013	3-S2	0.035 B	3-S5	0.031	3-S7		---
	0.029	3-S9	0.032 B	3-S9RE	0.009 J	3-S10		10
	0.01 J	3-S14 (QC OF S10)	0.071	3-S16	0.059	3-S17		
	0.025	3-S15 (QA of S10)						
Anthracene	0.00162 J	03NFSL15SO						30,000 --- 4,300
Arsenic	42	3-S2	34	3-S3	97	3-S4	5.5	
	32	3-S5	20	3-S6	18	3-S7	---	
	13	3-S8	25	3-S9	18	3-S10	2	
	25	3-S14 (QC of S10)	6.5	3-S11	3.7	3-S12 (QC of S11)		
	69	3-S16	9.3	3-S17	16.6	3-S13 (QA of S11)		
	60.7	3-S15 (QA of S10)						
Barium	64	3-S2	160	3-S3	71	3-S4		7,100
	130	3-S5	23	3-S6	23	3-S7		---
	16	3-S8	35	3-S9	18	3-S10		1,100
	22	3-S14 (QC of S10)	43	3-S11	23	3-S12 (QC of S11)		
	63	3-S16	28.6	3-S13 (QA of S11)				
Benzene	0.01 J	03NFSL10SO	0.0109 J	03NFSL13SO	0.0111 J	03NFSL14SO	150 9 0.02	

1	2						3	4
Compound of Potential Concern	**Concentrations (mg/kg)**						**Cleanup Level (carcinogen) (mg/kg) Ingestion, Inhalation, Migration GW**	**Cleanup Level (non-carcinogen) (mg/kg) Ingestion, Inhalation, Migration GW**
	result	**sample #**	**result**	**sample #**	**result**	**sample #**		
Benzo(a)anthracene	0.00423 J	03NFSL15SO					11 --- 6	
Benzo(b)fluoranthene	0.00179 J	03NFSL09SO					11 --- 20	
Benzo(g,h,i)perylene	0.00171 J	03NFSL15SO						3000 *2 --- 1500 *2
Benzoic acid	0.250 J	3-S2						410,000 --- 390
BHC, alpha-	0.0065	3-S10	nd (0.001)	-51SL	nd (0.001)	-52SL (QC of -51SL)	1.3	
	nd (0.000899)	-53SL (QA of -51SL)	nd (0.001)	-54SL	nd (0.001)	-55SL	5.5	
	nd (0.001)	-56SL	nd (0.001)	-57SL	nd (0.001)	-58SL	0.0026	
	nd (0.001)	-59SL	nd (0.001)	-60SL	nd (0.001)	-61SL		
BHC, gamma- (Lindane)	0.061	3-S14 (QC OF S10)	nd (0.001)	-51SL	nd (0.001)	-52SL (QC of -51SL)	6.4	
	nd (0.000899)	-53SL (QA of -51SL)	nd (0.001)	-54SL	nd (0.001)	-55SL	---	
	nd (0.001)	-56SL	nd (0.001)	-57SL	nd (0.001)	-58SL	0.003	
	nd (0.001)	-59SL	nd (0.001)	-60SL	nd (0.001)	-61SL		
bis(2-Ethylhexyl)phthalate	0.079	3-S4	0.079 JB	3-S5	0.21 JB	3-S6	590	
	0.36	3-S7	0.29 JB	3-S8	0.2 JB	3-S10	---	
	0.21 JB	3-S14 (QC OF S10)	0.47	3-S11	0.40 JB	3-S12 (QC OF S11)	1200	
	0.16 JB	3-S16						

1	2						3	4
Compound of Potential Concern	**Concentrations (mg/kg)**						**Cleanup Level (carcinogen) (mg/kg) Ingestion, Inhalation, Migration GW**	**Cleanup Level (non-carcinogen) (mg/kg) Ingestion, Inhalation, Migration GW**
	result	**sample #**	**result**	**sample #**	**result**	**sample #**		
Butanone, 2- (Methyl ethyl ketone)	0.009 J	3-S2	0.045	3-S3RE	0.019	3-S4RE		60800 *2
	0.042	3-S5	0.018 B	3-S6	0.005 JB	3-S8		28100 *2
	0.037 B	3-S9	0.025 B	3-S10	0.028 B	3-S14 (QC OF S10)		60 *2
	0.40	3-S12RE						
Cadmium	2.2	3-S2	2.0	3-S3	8.9	3-S6		100
	4.2	3-S7	1.8	3-S9	2.4	3-S10		---
	2.0	3-S14 (QC of S10)	4.2	3-S11	3.0	3-S16		5
	4.4	3-S15 (QA of S10)						
Carbon Disulfide	0.012	3-S5						10,000 453 (Csat) 17
Chloroform	0.005 J	3-S5					1,000 3.4 0.34	
Chromium	35	3-S2	47	3-S3	31	3-S4		300
	81	3-S5	27	3-S6	17	3-S7		---
	20	3-S8	23	3-S9	16	3-S10		26
	20	3-S14 (QC of S10)	18	3-S11	9.7	3-S12 (QC of S11)		
	36	3-S16	8.5	3-S17	2.4	3-S13 (QA of S11)		
	13.1	3-S15 (QA of S10)						
Chrysene	0.0058 J	03NFSL08SO	0.00636 J	03NFSL09SO	0.00164 J	03NFSL13SO	1,100	
	0.0213 J	03NFSL15SO					--- 620	

1	2						3	4
Compound of Potential Concern	**Concentrations (mg/kg)**						**Cleanup Level (carcinogen) (mg/kg) Ingestion, Inhalation, Migration GW**	**Cleanup Level (non-carcinogen) (mg/kg) Ingestion, Inhalation, Migration GW**
	result	**sample #**	**result**	**sample #**	**result**	**sample #**		
Dichloroethylene, 1,1-	0.006	3-S5					14 0.9 0.03	
Dieldrin	0.0076	3-S7					0.5 8 0.015	
Di-n-butylphthalate	0.017 J	3-S4						10000 --- 1700
DRO	12,100	PS001SL	10,500	PS002SL	3500	3-S9		10250
	5,960	PS003SL	4,100	PS012SL	2,800	PS013SL		12500 Csat
	8,000	PS014SL	15,000	PS019SL	22,000	PS020SL		250
	790	PS021SL	330	PS022SL	8,400	PS038SL		
	7,500	PS039SL	4,500	PS040SL	26	PS045SL		
	11	PS046SL	2,530	PS051SL	2,950	PS052SL		
	2,680	PS053SL	2,410	PS054SL	2,070	PS055SL		
	2,550	PS056SL	2,890	PS057SL	133	PS058SL		
	64.5	PS059SL	89.8	PS060SL	1,340	PS061SL		
	455	PS062SL	1,910	PS063SL	1,320	PS064SL		
	57.3	PS071SL	123	PS072SL	3,290	PS074SL		
	79.7	PS075SL	714	PS076SL	676	PS077SL		
	407	PS078SL	1,210	PS079SL	758	PS080SL		
	540	PS081SL	929	PS082SL	1,230	94PS020SL		
	3,900	95PS051SL	140	95PS058SL	84	95PS072SL		
	1,190	95PS076SL	5,000	PS084SL	5,510	PS085SL		
	3,410	PS090SL	219	PS106SL	16	PS108SL		
	13	PS109SL	1,790	96PS084SL	65.5 B	03NFSL01SO		
	72.6 B	03NFSL02SO	309 B	03NFSL03SO	331 B	03NFSL04SO		
	44.4 B	03NFSL06SO	83.9 B	03NFSL07SO	53.7 B	03NFSL08SO		
	ND (3.85)	03NFSL05SO	ND (3.85)	03NFSL09SO	ND (3.85)	03NFSL10SO		
	ND (3.85)	03NFSL11SO	ND (3.85)	03NFSL12SO	ND (3.85)	03NFSL13SO		

1	2						3	4
Compound of Potential Concern	**Concentrations (mg/kg)**						**Cleanup Level (carcinogen) (mg/kg) Ingestion, Inhalation, Migration GW**	**Cleanup Level (non-carcinogen) (mg/kg) Ingestion, Inhalation, Migration GW**
	result	**sample #**	**result**	**sample #**	**result**	**sample #**		
	ND (3.85)	03NFSL14SO	ND (3.85)	03NFSL15SO	30.1 B	03NFSL16SO		
	36,000	3-S3						
Fluoranthene	0.0028 J	03NFSL08SO	0.00374 J	03NFSL09SO	0.00875 J	03NFSL15SO		4,100
	0.036 J	3-S2	0.026 J	3-S6				---
								2,100
Fluorene	17 J	3-S3						4,100 --- 270
GRO	11	3-S5	12	3-S6	19	3-S7		1,400
	12	3-S8	11	3-S10	15			1,400
								300
Heptachlor	0.14	3-S8					2 0.8 8	
Heptachlor epoxide	0.34	3-S14 (QC OF S10)	nd (0.001)	-51SL	nd (0.001)	-52SL (QC of -51SL)	0.9	
	nd (0.000899)	-53SL (QA of -51SL)	nd (0.001)	-54SL	nd (0.001)	-55SL	33	
	nd (0.001)	-56SL	nd (0.001)	-57SL	nd (0.001)	-58SL	0.2	
	nd (0.001)	-59SL	nd (0.001)	-60SL	nd (0.001)	-61SL		
Hexanone, 2- (methyl isobutyl ketone)	0.026	3-S9RE	0.026	3-S9RE				8,110
								1,990
								8
Lead (Pb)	10.3	PS008SL	149	PS019SL	15.5	PS020SL		400 (residential) 1000 (industrial)
	13	94PS020SL	250	3-S2	34	3-S3		
	23	3-S4	80	3-S5	19	3-S6		
	10	3-S7	7.4	3-S8	20	3-S9		
	17	3-S10	18	3-S14 (QC of S10)	2	3-S11		

1	2						3	4
Compound of Potential Concern	**Concentrations (mg/kg)**						**Cleanup Level (carcinogen) (mg/kg) Ingestion, Inhalation, Migration GW**	**Cleanup Level (non-carcinogen) (mg/kg) Ingestion, Inhalation, Migration GW**
	result	**sample #**	**result**	**sample #**	**result**	**sample #**		
	21	3-S16	20	3-S17	2.5	3-S13 (QA of S11)		
	14.4	3-S15 (QA of S10)						
Mercury	1.2	3-S6	0.89	3-S7	0.39	3-S8		---
	0.67	3-S9	0.24	3-S10	0.33	3-S11		18
	0.12	3-S17						1.4
Methylene Chloride	0.15 B	3-S3RE	0.065	3-S11	0.76	3-S12RE (QC of S11)	1,100	
	0.046 B	3-S2	0.024 B	3-S4RE	0.06 B	3-S5	180	
	0.006 B	3-S6	0.017 B	3-S7	0.013 B	3-S8	0.015	
	0.04 B	3-S9RE	0.012 B	3-S10	0.014 B	3-S14 (QC OF S10)		
	0.057 B	3-S16	0.050 B	3-S17	0.011 B	3-S13 (QA OF S11)		
Methylnaphthalene, 2-	170	3-S3	ND (11)	PS008SL	ND (8.7)	PS019SL		2030 *2
	ND (7.7)	PS020SL	ND (5.2)	PS021SL	ND (2.2)	PS022SL (QC of 21SL)		--- 60.9 *2
Naphthalene	0.00568 J	03NFSL08SO	0.0102 J	03NFSL09SO	0.00332 J	03NFSL13SO		2,000
	0.0153 J	03NFSL15SO	0.024 J	3-S2	74	3-S3		120 21
Phenanthrene	0.0107 J	03NFSL08SO	0.015 J	03NFSL09SO	0.00858 J	03NFSL13SO		30000 *2
	0.0355 J	03NFSL15SO	9.5 J	3-S3	0.054 J	3-S2		--- 4,300 *2
Pyrene	0.00341 J	03NFSL08SO	0.0031 J	03NFSL09SO	0.0089 J	03NFSL15SO		3,000
	0.054 J	3-S2	0.083 J	3-S6				--- 1,500

1	2						3	4
Compound of Potential Concern	**Concentrations (mg/kg)**						**Cleanup Level (carcinogen) (mg/kg) Ingestion, Inhalation, Migration GW**	**Cleanup Level (non-carcinogen) (mg/kg) Ingestion, Inhalation, Migration GW**
	result	**sample #**	**result**	**sample #**	**result**	**sample #**		
RRO	417 B	03NFSL01SO	598 B	03NFSL02SO	1320 B	03NFSL03SO		10,000
	2,500 B	03NFSL04SO	71 B	03NFSL05SO	133 B	03NFSL06SO		22,000 Csat
	58.6 B	03NFSL07SO	216 B	03NFSL08SO	144 B	03NFSL11SO		11,000
	55 B	03NFSL12SO	113 B	03NFSL15SO	146 B	03NFSL16SO		
Selenium	3.6	3-S6	3.5	3-S7	1.6	3-S10		510
	2.1	3-S14 (QC of S10)	1.6	3-S16	1.7	3-S15 (QA of S10)		--- 3.5
Silver	21	3-S6	17	3-S7	3.9	3-S8		510
	5	3-S9	13	3-S11	5	3-S12 (QC of S11)		--- 21
Toluene	0.0299 J	03NFSL12SO	0.01	3-S6	0.003 J	3-S15 (QC of S10)		20,300 180 Csat 5.4
TPH (RRO surrogate)	41,000	PS019SL	310	PS021SL	65	PS022SL		10000 22000 Csat 11000
Xylenes, Total	0.330	3-S3	0.116	3-S12RE				203,000 81 (Csat) 78

1) Sampling and Analysis Sources:
IT 1996a, International Technology Corporation, “Remedial Action Report: Prison Site “A”, Anchorage, AK, July 1996.
IT 1996b, International Technology Corporation, “Remedial Action Report: Prison Site “A”, Addendum 1 – 1996 Work Season,” Addendum 1 – 1996 Work Season”, Anchorage, AK, December 1996.
JMM 1990, James M. Montgomery Consulting Engineers Inc., "Chemical Contamination Report - Prison Site,” Chicago, IL, May 1990.
USACE 1997, United States Army Corps of Engineers, “Chemical Data Report, Pond Sampling, Prison Site Landfill, Nome, Alaska,” memorandum for CEPOA-EN-EE-II, 19 November 1997.
USACE 1998, United States Army Corps of Engineers, “Chemical Data Report, 1998 Pond Sampling, Prison Site Landfill, Nome, Alaska,” memorandum for CEPOA-EN-EE-II, 29 December 1998.
USACE 2000a, United States Army Corps of Engineers, “Chemical Data Technical Memorandum, 1999 Pond Sampling, Prison Site Landfill, Nome, Alaska,” memorandum for CEPOA-EN-EE, 13 January 2000.

1	2						3	4
Compound of Potential Concern	**Concentrations (mg/kg)**						**Cleanup Level (carcinogen) (mg/kg) Ingestion, Inhalation, Migration GW**	**Cleanup Level (non-carcinogen) (mg/kg) Ingestion, Inhalation, Migration GW**
	result	**sample #**	**result**	**sample #**	**result**	**sample #**		

USACE 12000b, United States Army Corps of Engineers, “Chemical Data Report, Nome Area Defense Region, Long Term Monitoring [and] Alma Gulch Drum Site,” December 2000.

USACE 2001, United States Army Corps of Engineers, “Chemical Data Report, 2001 Sampling Event, Prison Site Landfill Long-Term Monitoring, Nome, Alaska,” November 2001.

USACE 2003, United States Army Corps of Engineers, “Chemical Data Report, Nome FUDS Soil Remediation Area Long-Term Monitoring, Nome, Alaska,” Anchorage, AK, September 2003.

USACE 2006, United States Army Corps of Engineers, “Chemical Data Report, 2005 Site Sampling (05-012), Prison Site “A,” Nome Area Defense Region (ERP046), Nome, Alaska,” Anchorage, AK, February 2006.

2) Cleanup values from ADEC 18 AAC 75 unless indicated otherwise.
*2 = Values from ADEC Tech Memo 01-007.
3) Note: all non-detects not shown.
4) Yellow shaded analytes indicate that the highest result is over screening value. Screening value is 1/10-th of the lowest cleanup value.
5) Gray shaded cells indicated interim (soil was remediated) values.
6) Blue shaded cells indicate a value not included in analysis as it is the lower of a duplicate.
7) J Qualifier: USEPA flag - Estimated Value.
8) B Qualifier: USEPA flag - Analyte present in the blank and the sample.
9) Total petroleum hydrocarbons for 1989 data for kerosene, diesel and fuel oil #2 listed as DRO.
10) Total petroleum hydrocarbons for 1989 data for 'unidentified low boiling fuel' listed as GRO.

Table 8 – Soil Samples

Date	Sample ID	QC/QA	Analytes	Pre- (during), Post-, or no-remediation	Notes
1989	3-S1		VOC, SVOC, Pest/PCB. Fuels, 8 metals	no	Background sample. About 500-feet north of prison.
	(S1)	QA of 3-S1		no	
1989	3-S2		VOC, SVOC, Pest/PCB. Fuels, 8 metals	pre	Support Area 2; Surface soil near old auto batteries S of old automobile maint. bldg.
1989	3-S3RE		VOC, SVOC, Pest/PCB. Fuels, 8 metals	no	Support Area 2; original reanalyzed
1989	3-S4		VOC, SVOC, Pest/PCB. Fuels, 8 metals	pre	Western Area 2. Surface soil near 4 full motor oil drums in antennae filed.
1989	3-S5		VOC, SVOC, Pest/PCB. Fuels, 8 metals	no	Western Area 1. Surface soil 10 feet north of old laundry.
1989	3-S6		VOC, SVOC, Pest/PCB. Fuels, 8 metals	pre	soil among 16 drums of solid black tar
1989	3-S7		VOC, SVOC, Pest/PCB. Fuels, 8 metals	no	Eastern Area 5. Low spot where 5 empty drums were paritally buried.
1989	3-S8		VOC, SVOC, Pest/PCB. Fuels, 8 metals	no	Eastern Area 2. 30-ft from group of 30 full drums next to old gravel road.
1989	3-S9RE		VOC, SVOC, Pest/PCB. Fuels, 8 metals	pre	Eastern Area 2. Heavily stained soil next to the group of 30 drums. Original reanalyzed, heavily stained soil next to 30 drums, large biovent Eastern Area 2
1989	3-S10		VOC, SVOC, Pest/PCB. Fuels, 8 metals	pre	Eastern Area 2. Soil in an area of wood building debris.
1989	3-S11		VOC, SVOC, Pest/PCB. Fuels, 8 metals	no	Aobut 150 feet NW of Eastern Area 3. Stained soil and stressed begetation downslope of the single overturned, empty drum in a group of 16 empty drums.
1989	3-S12	QC of S11	VOC, SVOC, Pest/PCB. Fuels, 8 metals	no	reanalyzed for VOC.
1989	3-S13	QA of S11	VOC, SVOC, Pest/PCB. Fuels, 8 metals	no	
1989	3-S14	QC of S10	VOC, SVOC, Pest/PCB. Fuels, 8 metals	no	
1989	3-S15	QA of S10	VOC, SVOC, Pest/PCB. Fuels, 8 metals	no	
1989	3-S16		VOC, SVOC, Pest/PCB. Fuels, 8 metals	no	Eastern Area 1. In a ravine near the prison at the base of the slope strewn with metal debris.
1989	3-S17		VOC, SVOC, Pest/PCB. Fuels, 8 metals	no	Support Area 3. Sand near the bottom of the incinerator.
1994	PS011SL		GRO	no	Eastern Area 2
1994	PS026SL		GRO	no	Eastern Area 2
1995	PS071SL		DRO	post	Eastern Area 2. tar-contaminated soil
1995	PS072SL		DRO	post	Eastern Area 2. Tar-contaminated soil.

Date	Sample ID	QC/QA	Analytes	Pre- (during), Post-, or no-remediation	Notes
1995	PS073SL	QC OF 72SL	DRO	post	Eastern Area 2. Tar-contaminated soil.
1995	95PS072SL	QA OF 72SL	DRO	post	Eastern Area 2
1994	PS012SL		DRO	pre	Eastern Area 2 - Large Biovent
1994	PS013SL		DRO	pre	Eastern Area 2 - Large Biovent
1994	PS014SL		DRO	pre	Eastern Area 2 - Large Biovent
1994	PS041SL			during	Eastern Area 2 - Large Biovent - Bioassay Testing
1994	PS042SL			during	Eastern Area 2 - Large Biovent - Bioassay Testing
1995	PS058SL		DRO	post	Eastern Area 2 - Large Biovent
1995	PS059SL	QC OF 58SL	DRO	post	Eastern Area 2 - Large Biovent
1995	95PS058SL	QA OF 58SL	DRO	post	Eastern Area 2 - Large Biovent
1995	PS060SL		DRO	post	Eastern Area 2 - Large Biovent
1995	PS061SL		DRO	post	Eastern Area 2 - Large Biovent
1995	PS062SL		DRO	post	Eastern Area 2 - Large Biovent
1995	PS063SL		DRO	post	Eastern Area 2 - Large Biovent
1995	PS064SL		DRO	post	Eastern Area 2 - Large Biovent
1994	PS017SL		GRO	no	Eastern Area 3
1994	PS029SL		GRO	no	Eastern Area 3
1994	PS021SL		DRO, GRO, TPH, PNA, TCLP Pb, xylenes	no	Eastern Area 4
1994	PS022SL	QC OF 21SL	DRO, GRO, TPH, PNA, Total Pb	no	Eastern Area 4
1994	94PS021SL	QA OF 21SL		no	Eastern Area 4
1994	PS033SL		GRO, xylenes	no	Eastern Area 4
1994	PS034SL	QC OF 33SL	GRO	no	Eastern Area 4
1994	94PS033SL	QA OF 33SL		no	Eastern Area 4
1994	PS018SL		GRO	no	Eastern Area 5
1994	PS030SL		GRO	no	Eastern Area 5
1994	PS020SL		DRO, GRO, PNA, Total PB	pre	Eastern Area 7
1994	PS032SL		GRO	post	Eastern Area 7
1994	PS015SL		Total xylenes	no	Eastern Area 7
1994	PS016SL	QC OF	Total xylenes	no	Eastern Area 7

Date	Sample ID	QC/QA	Analytes	Pre- (during), Post-, or no-remediation	Notes
		15SL			
1994	PS027SL		Total xylenes	no	Eastern Area 7
1994	PS028SL	QC OF 27SL	Total xylenes	no	Eastern Area 7
1994	94PS027SL	QA OF 27SL	Total xylenes	no	Eastern Area 7
1994	PS008SL		PNA, Total Pb	no	Support Area 1, pre-landfill sample
1994	PS009SL		TCLP Pb	pre	Support Area 2
1994	PS010SL		TCLP Pb	pre	Support Area 2
1994	PS044SL		TCLP Pb	post	Support Area 2
1995	PS074SL		DRO	no	Support Area 2, Drum Staging Area sand bed. (NOTE: a post-excavation sample was collected from Western Area 2 during the 1995 work season and was inadvertently also identified with sample number PS074SL.
1995	PS075SL		DRO	no	Support Area 2, Drum Staging Area sand bed
1995	PS083SL		DRO	no	Support Area, former location of 1,400-gal module tank at claning facility.
1995	PS068SL		DRO	no	Support Area 2, under former ADEC-approved soil stockpile cell.
1995	PS069SL		DRO	no	Support Area 2, under former ADEC-approved soil stockpile cell.
1995	PS070SL		DRO	no	Support Area 2, under former ADEC-approved soil stockpile cell.
1994	PS046SL		DRO	no	Support Area 3, under former interim soil stockpile cell. composite sample
1994	PS007SL		GRO	no	Western Area 1
1994	PS045SL		DRO	no	Western Area 1, adjacent to former 1994 product drum storage area.
1994	PS019SL		DRO, GRO, TPH, PNA, Total Pb	pre	Western Area 2
1994	PS031SL			pre	Western Area 2, repeat of 19SL due to holding time problem.
1994	PS001SL		DRO	pre	Western Area 2, small biovent area
1994	PS002SL		DRO	pre	Western Area 2, small biovent area
1994	PS003SL		DRO	pre	Western Area 2, small biovent area

Date	Sample ID	QC/QA	Analytes	Pre- (during), Post-, or no-remediation	Notes
1995	PS074SL			during	Western Area 2 (19SL and 31SL location) (NOTE: a second sample, also identified as PS074SL, was collected from the sand at the drum staging area and inadvertently identified with the same sample number).
1994	PS004SL		bioassessment analysis	during	Western Area 2, small biovent area
1994	PS005SL		bioassessment analysis	during	Western Area 2, small biovent area
1994	PS006SL		bioassessment analysis	during	Western Area 2, small biovent area
1994	PS038SL		DRO, bioassessment	during	Western Area 2, small biovent area
1994	PS039SL		DRO, bioassessment	during	Western Area 2, small biovent area
1994	PS040SL		DRO, bioassessment	during	Western Area 2, small biovent area
1995	PS051SL		DRO	during	Western Area 2, small biovent area
1995	PS052SL	QC OF 51SL	DRO	during	Western Area 2, small biovent area
1995	95PS051SL	QA OF 51SL	DRO	during	Western Area 2, small biovent area
1995	PS053SL		DRO	during	Western Area 2, small biovent area
1995	PS054SL		DRO	during	Western Area 2, small biovent area
1995	PS055SL		DRO	during	Western Area 2, small biovent area
1995	PS056SL		DRO	during	Western Area 2, small biovent area
1995	PS057SL		DRO	during	Western Area 2, small biovent area
1995	PS076SL		DRO	post	Western Area 2, small biovent area
1995	PS077SL	QC OF 76SL	DRO	post	Western Area 2, small biovent area
1995	95PS076SL	QA OF 76SL	DRO	post	Western Area 2, small biovent area
1995	PS078SL		DRO	post	Western Area 2, small biovent area
1995	PS079SL		DRO	post	Western Area 2, small biovent area
1995	PS080SL		DRO	post	Western Area 2, small biovent area
1995	PS081SL		DRO	post	Western Area 2, small biovent area
1995	PS082SL		DRO	post	Western Area 2, small biovent area
1996	PS108SL		DRO	post	Support Area 2, drum staging area
1996	PS109SL		DRO	post	Support Area 2, drum staging area
1996	PS110SL		DRO	post	Support Area 2, drum cleaning facility
1996	PS111SL		DRO	post	Support Area 2, drum cleaning facility
1996	PS084SL		DRO	during	Western Area 2 (1995 sample PS074SL location
1996	PS085SL	QC OF 84SL	DRO	during	Western Area 2 (1995 sample PS074SL location

Date	Sample ID	QC/QA	Analytes	Pre- (during), Post-, or no-remediation	Notes
1996	96PS084SL	QA OF 84SL	DRO	during	Western Area 2 (1995 sample PS074SL location
1996	PS090SL		DRO	during	Western Area 2 (1995 sample PS074SL location
1996	PS106SL		DRO	post	Western Area 2 (1995 sample PS074SL location
2003	03NFSL01SO		GRO, DRO, RRO, BTEX, PAH	post	Western Area 2, Soil Remediation Area, Footprint
2003	03NFSL02SO	QC OF 01SO	GRO, DRO, RRO, BTEX, PAH	post	Western Area 2, Soil Remediation Area, Footprint
2003	03NFSL03SO		GRO, DRO, RRO, BTEX, PAH	post	Western Area 2, Soil Remediation Area, Footprint
2003	03NFSL04SO		GRO, DRO, RRO, BTEX	post	Western Area 2, Soil Remediation Area, Footprint
2003	03NFSL05SO		GRO, DRO, RRO, BTEX, PAH	post	Western Area 2, Soil Remediation Area, Footprint
2003	03NFSL06SO		GRO, DRO, RRO, BTEX	post	Western Area 2, Soil Remediation Area, Footprint
2003	03NFSL07SO		GRO, DRO, RRO, BTEX	post	Western Area 2, Soil Remediation Area, Footprint
2003	03NFSL08SO		GRO, DRO, RRO, BTEX, PAH	post	Western Area 2, Soil Remediation Area, Footprint
2003	03NFSL09SO		GRO, DRO, RRO, BTEX, PAH	post	Western Area 2, Soil Remediation Area, South Soil Pile
2003	03NFSL10SO		GRO, DRO, RRO, BTEX	post	Western Area 2, Soil Remediation Area, South Soil Pile
2003	03NFSL11SO		GRO, DRO, RRO, BTEX	post	Western Area 2, Soil Remediation Area, South Soil Pile
2003	03NFSL12SO		GRO, DRO, RRO, BTEX	post	Western Area 2, Soil Remediation Area, South Soil Pile
2003	03NFSL13SO		GRO, DRO, RRO, BTEX, PAH	post	Western Area 2, Soil Remediation Area, South Soil Pile
2003	03NFSL14SO	QC OF 13SO	GRO, DRO, RRO, BTEX	post	Western Area 2, Soil Remediation Area, South Soil Pile
2003	03NFSL15SO		GRO, DRO, RRO, BTEX, PAH	post	Western Area 2, Soil Remediation Area, North Soil Pile
2003	03NFSL16SO		GRO, DRO, RRO, BTEX	post	Western Area 2, Soil Remediation Area, North Soil Pile
2005	05NADRA51SL		Heptachlor epoxide, a-BHC, g-BHC	post	S10 Grid “A”
2005	05NADRA52SL	QC of -51SL	Heptachlor epoxide, a-BHC, g-BHC	post	S10 Grid “A”
2005	05NADRA53SL	QA of -51SL	Heptachlor epoxide, a-BHC, g-BHC	post	S10 Grid “A”
2005	05NADRA54SL		Heptachlor epoxide, a-BHC, g-BHC	post	S10 Grid “B”
2005	05NADRA55SL		Heptachlor epoxide, a-BHC, g-BHC	post	S10 Grid “C”
2005	05NADRA56SL		Heptachlor epoxide, a-BHC, g-BHC	post	S10 Grid “D”
2005	05NADRA57SL		Heptachlor epoxide, a-BHC, g-BHC	post	S10 Grid “E”
2005	05NADRA58SL		Heptachlor epoxide, a-BHC, g-BHC	post	S10 Grid “F”

Date	Sample ID	QC/QA	Analytes	Pre- (during), Post-, or no-remediation	Notes
2005	05NADRA59SL		Heptachlor epoxide, a-BHC, g-BHC	post	S10 Grid “G”
2005	05NADRA60SL		Heptachlor epoxide, a-BHC, g-BHC	post	S10 Grid “H”
2005	05NADRA61SL		Heptachlor epoxide, a-BHC, g-BHC	post	S10 Grid “I”

Table 9 – Sediment Concentrations

1 **Compound of Potential Concern**	**2** **Concentrations (mg/kg)**						**3** **Cleanup Level (carcinogen) (mg/kg) Ingestion, Inhalation, Migration GW**	**4** **Cleanup Level (non-carcinogen) (mg/kg) Ingestion, Inhalation, Migration GW**
	result	**sample #**	**result**	**sample #**	**result**	**sample #**		
Acetone (2-Propanone)	0.08	3-SED1	0.029	3-SED2	0.014	3-SED4		10000 --- 10
	0.017	3-SED6 (QC OF SED4)						
Arsenic (As)	77	3-SED1	33	3-SED2	16	3-SED4	5.5 --- 2	
	21	3-SED6 (QC of SED4)						
Barium (Ba)	170	3-SED1	24	3-SED2	11	3-SED6 (QC of SED4)		7100 --- 1100
BHC, delta- (gamma-BHC surrogate)	0.127	3-SED4	0.099	3-SED6 (QC OF SED4)			6.4 --- 0.003	
BHC, gamma- (Lindane)	0.12	3-SED1					6.4 --- 0.003	
bis(2-Ethylhexyl)phthalate	0.13 J	3-SED1	0.69 J	3-SED2	0.42 J	3-SED4	590 --- 1200	
	0.51 B	3-SED6 (QC OF SED4)						
Butanone, 2-	0.073 B	3-SED2	0.007 J	3-SED4	0.036	3-SED6 (QC OF SED4)		60800 *2 28100 *2 60 *2

1 Compound of Potential Concern	2 Concentrations (mg/kg)						3 Cleanup Level (carcinogen) (mg/kg) Ingestion, Inhalation, Migration GW	4 Cleanup Level (non-carcinogen) (mg/kg) Ingestion, Inhalation, Migration GW
	result	sample #	result	sample #	result	sample #		
Chromium (Cr)	51	3-SED1	22	3-SED2	6.3	3-SED4		300 --- 26
	18	3-SED6 (QC of SED4)						
GRO	15	3-SED4	16	3-SED6 (QC of SED4)				1,400 1,400 300
Heptachlor epoxide	0.6	3-SED1	0.46	3-SED4	0.45	3-SED6 (QC OF SED4)	0.9 33 0.2	
Lead (Pb)	32	3-SED1	15	3-SED2	5.5	3-SED4		400 (residential) 1000 (industrial)
	20	3-SED6 (QC of SED4)						
Mercury (Hg)	0.17	3-SED2	0.25	3-SED4	0.10	3-SED6 (QC of SED4)		--- 18 1.4
Methylene Chloride	0.032 B	3-SED1	0.021 B	3-SED2	0.029 B	3-SED4	1,100 180 0.015	
	0.016 B	3-SED6 (QC OF SED4)						
Selenium	1.6	3-SED6 (QC of SED4)						510 --- 3.5

1) Sampling and Analysis Sources:
JMM 1990, James M. Montgomery Consulting Engineers Inc., "Chemical Contamination Report - Prison Site," Chicago, IL, May 1990.
2) Cleanup values from ADEC 18 AAC 75 unless indicated otherwise.

1 Compound of Potential Concern	2 Concentrations (mg/kg)						3 Cleanup Level (carcinogen) (mg/kg) Ingestion, Inhalation, Migration GW	4 Cleanup Level (non-carcinogen) (mg/kg) Ingestion, Inhalation, Migration GW
	result	sample #	result	sample #	result	sample #		

3) Note: all non-detects not shown.
4) Yellow shaded analytes indicate that the highest result is over screening value. Screening value is 1/10-th of the lowest cleanup value.
5) Gray shaded cells indicated interim (soil was remediated) values.
6) Blue shaded cells indicate a value not included in analysis as it is the lower of a duplicate.
7) J Qualifier: USEPA flag - Estimated Value.
8) B Qualifier: USEPA flag - Analyte present in the blank and the sample.
9) Total petroleum hydrocarbons for 1989 data for 'unidentified low boiling fuel' listed as GRO.

Table 10 – Sediment Samples

Date	Sample ID	QC/QA	Analytes	Notes
1989	SED1		VOC, SVOC, Pest/PCB, Fuels, 8 metals	Support Area, Pond A, large wetlands
1989	SED2		VOC, SVOC, Pest/PCB, Fuels, 8 metals	Between Eastern Area 1 and Area 2, small dredge pond.
1989	SED4		VOC, SVOC, Pest/PCB, Fuels, 8 metals	Eastern Area 4, small wetland
1989	SED5		VOC, SVOC, Pest/PCB, Fuels, 8 metals	About 500 feet north of prison. Background.
1989	SED6	QC of SED4	VOC, SVOC, Pest/PCB, Fuels, 8 metals	
1989	SED 7	QA of SED5		

Table 11 –Water Concentrations (surface and ground)

1	2				3	4	5	6	7
						Alaska Water Quality Criteria (ug/L)			
Compound of Potential Concern	**Concentrations (ug/L)**				**Background Concentration (ug/L)**	**Drinking Water MCL**	**Stockwater / Irrigation**	**Aquatic Life, Freshwater, acute/chronic**	**Human Health, Non-carcinogen, water & aquatic organisms / aquatic organisms only**
	result	sample #	result	sample #					
Acenaphthylene	0.0031 J	05NADRA67WA (QA of -65WA)							
Acetone	0.61	01POND-01WA	0.683 J	01POND-02WA					
	0.957 J	01POND-03WA (QC of 02WA)	ND (2)	01POND-05WA					
	4	3-SW1							
Arsenic (As)	12	PS047WA	24	PS048WA	10 (sample ADGGS 1991)	50	50 / 100	340 / 150	
	107	PS049WA	106	PS050WA					
	34	94PS006SW	76	95PS049WA					
	35	PS086WA	16	PS087WA					
	38	PS088WA	15	PS089WA					
	17	96PS086WA	7.6	3-SW1					
	12	3-SW2	8.3	3-SW3					
	8.2	01POND-01WA	63	01POND-02WA					
	65	01POND-03WA (QC of 02WA)	62	01POND-04WA (QA of 02WA)					
	ND (1.5)	01POND-05WA	19.1	98NOMP01WA					
	21.6	98NOMP02WA (QC of 01WA)	77.4	98NOMP03WA					

1	2				3	4	5	6	7
						Alaska Water Quality Criteria (ug/L)			
Compound of Potential Concern	**Concentrations (ug/L)**				**Background Concentration (ug/L)**	**Drinking Water MCL**	**Stockwater / Irrigation**	**Aquatic Life, Freshwater, acute/chronic**	**Human Health, Non-carcinogen, water & aquatic organisms / aquatic organisms only**
	result	sample #	result	sample #					
	15.6 B	98NOMP04WA	28	97PSLN01WA					
	35	97PSLN02WA (QC of 01WA)	37	97PSLN03WA					
	22	97PSLN04WA	14	99POND-01WA					
	152	99POND-02WA	139	99POND-03WA (QC of 02WA)					
	7	99POND-04WA	15 J	00NAFS11WA					
	17 J	00NAFS12WA	16 J	00NAFS13WA (QC of 12WA)					
	ND (10) J	00NAFS14WA							
Barium (Ba)	41	PS047WA	41	PS048WA	29 (sample ADGGS 1991)	2000			
	76	PS049WA	76	PS050WA					
	60	94PS006SW	76	95PS049WA					
	35	PS086WA	34	PS087WA					
	49	PS088WA	36	PS089WA					
	36	96PS086WA	28	01POND-01WA					
	54	01POND-02WA	55	01POND-03WA (QC of 02WA)					

1	2				3	4	5	6	7
						Alaska Water Quality Criteria (ug/L)			
Compound of Potential Concern	**Concentrations (ug/L)**				**Background Concentration (ug/L)**	**Drinking Water MCL**	**Stockwater / Irrigation**	**Aquatic Life, Freshwater, acute/chronic**	**Human Health, Non-carcinogen, water & aquatic organisms / aquatic organisms only**
	result	sample #	result	sample #					
	54.5	01POND-04WA (QA of 02WA)	30	01POND-05WA					
	28	98NOMP01WA	28.1	98NOMP02WA (QC of 01WA)					
	44.5	98NOMP03WA	27.2	98NOMP04WA					
	33	97PSLN01WA	33	97PSLN02WA (QC of 01WA)					
	44	97PSLN03WA	30	97PSLN04WA					
	35	99POND-01WA	75	99POND-02WA					
	73	99POND-03WA (QC of 2WA)	33	99POND-04WA					
	30	00NAFS11WA	30	00NAFS12WA					
	43	00NAFS13WA (QC of 2WA)	29	00NAFS14WA					
Benzene	0.5	PS001SW	0.5	PS002SW		5			
	0.5	PS003SW	nd (0.5)	05NADRA62WA					
	nd (0.5)	05NADRA64WA	nd (0.5)	05NADRA63WA					
	nd (0.5)	05NADRA65WA	nd (0.5)	05NADRA66WA (QC of -65WA)					
	nd (1)	05NADRA67WA (QA of -65WA)	nd (0.5)	05NADRA68WA					
	nd (0.5)	05NADRA69WA							
Benzo(a)anthracene	0.0016 J	05NADRA67WA (QA of -65WA)							

1	2				3	4	5	6	7
						Alaska Water Quality Criteria (ug/L)			
Compound of Potential Concern	**Concentrations (ug/L)**				**Background Concentration (ug/L)**	**Drinking Water MCL**	**Stockwater / Irrigation**	**Aquatic Life, Freshwater, acute/chronic**	**Human Health, Non-carcinogen, water & aquatic organisms / aquatic organisms only**
	result	sample #	result	sample #					
Benzo(b)fluoranthene	0.0018 J	05NADRA67WA (QA of -65WA)							
BHC, gamma (Lindane)	0.04	3-SW6 (QC OF SW4)				0.2		0.95 / ---	
bis(2-Ethylhexyl)phthalate	9 JB	3-SW1	2 JB	3-SW2	1 JB (sample 3-SW5)				
	2 JB	3-SW4							
Bromoform	0.17 B	00NAFS13WA				80 (TTHM)			
Butanone, 2-	5 J	3-SW2	15	3-SW6 (QC OF SW4)	15 (Sample 3-SW5)				
Butylbenzylphthalate	2 J	3-SW1							
Cadmium	1.8 J	00NAFS11WA	1.4 J	00NAFS12WA (QC of 11WA)		5	10 / 10	2.3 / 0.24	
	1.9 J	00NAFS13WA	1.3 J	00NAFS14WA					
	nd (1)	05NADRA62WA	nd (1)	05NADRA70WA					
	nd (1)	05NADRA75WA	nd (0.16)	07NADRA01WG					
	nd (0.16)	07NADRA01WG (QC of 01WG)	nd (2)	07NADRA03WS (QA of 01WG)					
Carbon Tetrachloride	10	3-SW3	nd (0.5) J	05NADRA71WA		5			
	1.17	05NADRA72WA	1.1	05NADRA73WA (QC of -72WA)					
Chloro-3-methylphenol, 4-	58	3-SW3							
Chlorophenol, 2-	73	3-SW3							120 / 400

1	2				3	4	5	6	7
							Alaska Water Quality Criteria (ug/L)		
Compound of Potential Concern	**Concentrations (ug/L)**				**Background Concentration (ug/L)**	**Drinking Water MCL**	**Stockwater / Irrigation**	**Aquatic Life, Freshwater, acute/chronic**	**Human Health, Non-carcinogen, water & aquatic organisms / aquatic organisms only**
	result	sample #	result	sample #					
Chromium	17	3-SW3	14	3-SW6 (QC of SW4)	12 (Sample 3-SW5) 2.8 (Sample ADGGS 1991)	100	50 CrVI / 100 Total	CrIII: 1920 / 91.8 CrVI: 16 / 11	
	1.6	01POND-01WA	1.9	01POND-02WA					
	2.7	01POND-03WA (QC of 02WA)	ND (6)	01POND-04WA (QA of 02WA)					
	3.2	01POND-05WA	ND (11.4)	98NOMP01WA					
	ND (11.4)	98NOMP01WA	ND (11.4)	98NOMP03WA					
	ND (11.4)	98NOMP04WA	3 J	97PSLN01WA					
	ND (10)	97PSLN02WA (QC of 01WA)	ND (10)	97PSLN03WA					
	ND (10)	97PSLN04WA	0.2 J	05NADRA71cWA					
	8.3 J	05NADRA72cWA (QC of -71cWA)	3.3 J	05NADRA73cWA (QA of -72cWA)					
	nd (1)	05NADRA74WA							
Copper (Cu)	10	PS047WA	0.5 J	01POND-01WA			--- / 200	15.1 / 2.16	1300 / ---
	0.5 J	01POND-03WA (QC of 02WA)	0.5 J	01POND-02WA					
	ND (6)	01POND-04WA (QA of 02WA)	0.9 J	01POND-05WA					
	ND (10)	97PSLN04WA	1	05NADRA62WA					

1	2				3	4	5	6	7
Compound of Potential Concern	**Concentrations (ug/L)**				**Background Concentration (ug/L)**	**Alaska Water Quality Criteria (ug/L)**			
						Drinking Water MCL	**Stockwater / Irrigation**	**Aquatic Life, Freshwater, acute/chronic**	**Human Health, Non-carcinogen, water & aquatic organisms / aquatic organisms only**
	result	sample #	result	sample #					
Dibenzo(a,h)anthracene	0.0014 J	05NADRA67WA (QA of -65WA)							
Di-n-butylphthalate	4 J	3-SW2	1 J	3-SW3	2 (Sample 3-SW5)				2700 / 12000
	1 J	3-SW3	3 J	3-SW6 (QC of SW4)					
Endosulfan sulfate	1.3	3-SW6 (QC OF SW4)			1.4 (Sample 3-SW5)				110 / 240
Ethylbenzene	0.5	PS001SW	0.5	PS002SW		700			3100 / 29000
	0.5	PS003SW	1.7	98NOMP04WA					
	nd (1)	05NADRA62WA	nd (1)	05NADRA64WA					
	nd (1)	05NADRA63WA	nd (1)	05NADRA65WA					
	nd (1)	05NADRA66WA (QC of -65WA)	nd (1)	05NADRA67WA (QA of -65WA)					
	nd (1)	05NADRA68WA	nd (1)	05NADRA69WA					
Fluoranthene	0.0102 B	05NADRA67WA (QA of -65WA)							300 / 370
Fluorene	0.0044 JB	05NADRA67WA (QA of -65WA)							1,300 / 14,000
Heptachlor	0.07	3-SW6 (QC OF SW4)	nd (0.08)	05NADRA74WA		0.4		0.52 / 0.0038	
	nd (0.08)	05NADRA77WA (QC of -74WA)	0.0118 J	05NADRA78WA (QA of -74WA)					
Heptachlor epoxide	1.8	3-SW6 (QC OF SW4)	nd (0.04)	05NADRA74WA		0.2		0.52 / 0.0038	
	nd (0.04)	05NADRA77WA (QC of -74WA)	nd (0.0009)	05NADRA78WA (QA of -74WA)					
Indeno(1,2,3-cd)pyrene	0.0018 JB	05NADRA67WA (QA of -65WA)							

1	2				3	4	5	6	7
							Alaska Water Quality Criteria (ug/L)		
Compound of Potential Concern	**Concentrations (ug/L)**				**Background Concentration (ug/L)**	**Drinking Water MCL**	**Stockwater / Irrigation**	**Aquatic Life, Freshwater, acute/chronic**	**Human Health, Non-carcinogen, water & aquatic organisms / aquatic organisms only**
	result	sample #	result	sample #					
Lead (Pb)	4	PS048WA	1	96PS086WA			50 / 5,000	90.0 / 3.51	
	0.1 JB	01POND-01WA	0.3 JB	01POND-02WA					
	0.2 JB	01POND-03WA (QC OF 02WA)	ND (2)	01POND-04WA (QA OF 02WA)					
	0.1 JB	01POND-05WA	ND (5.7)	98NOMP01WA					
	ND (5.7)	98NOMP02WA (QC of 01WA)	ND (5.7)	98NOMP03WA					
	ND (5.7)	98NOMP04WA	ND (1)	PS089WA					
	ND (2)	97PSLN01WA	ND (2)	97PSLN02WA (QC of 01WA)					
	0.34 J	00NAFS11WA	ND (0.5)	00NAFS12WA					
	0.14 J	00NAFS13WA (QC of 12WA)	0.048 J	00NAFS14WA					
	2.1	3-SW1	2.7	3-SW2					
	8	3-SW6 (QC OF SW4)	nd (1)	05NADRA70WA					
	nd (1)	05NADRA75WA	nd (1)	05NADRA74WA					
Mercury	1.2	3-SW3				2		1.4 / 0.77	0.050 / 0.051
Methylene Chloride	20 B	3-SW1	15 B	3-SW2	5 JB (Sample 3-SW5)				
	5 JB	3-SW3	4 JB	3-SW4					
	4 JB	3-SW6 (QC OF SW4)	nd (0.090)	07NADRA01WG					

1	2				3	4	5	6	7
						Alaska Water Quality Criteria (ug/L)			
Compound of Potential Concern	Concentrations (ug/L)				Background Concentration (ug/L)	Drinking Water MCL	Stockwater / Irrigation	Aquatic Life, Freshwater, acute/chronic	Human Health, Non-carcinogen, water & aquatic organisms / aquatic organisms only
	result	sample #	result	sample #					
	nd (0.090)	07NADRA01WG (QC of 01WG)	nd (5)	07NADRA03WS (QA of 01WG)					
Methylnaphthalene, 1-	0.0044 J	05NADRA67WA (QA of -65WA)							
Methylnaphthalene, 2-	0.007 J	05NADRA67WA (QA of -65WA)							
Naphthalene	0.117	05NADRA66WA (QC of -65WA)	0.0146 B	05NADRA67WA (QA of -65WA)					
Nitrophenol, 4-	17 J	3-SW3							
Pentachlorophenol	71	3-SW3	nd (0.5)	05NADRA71cWA		1		3.19 / 2.45	
	nd (0.5)	05NADRA72cWA (QC of -71cWA)							
Phenanthrene	0.0155 B	05NADRA67WA (QA of -65WA)							
Phenol	32	3-SW3							21000 / 4600000
Pyrene	0.0045 J	05NADRA67WA (QA of -65WA)							960 / 11,000
Silver (Ag)	0.3	PS047WA	0.1	PS048WA				4.63 / ---	
	0.1	PS049WA	0.1	PS050WA					
	0.098 J	01POND-01WA	0.058 J	01POND-02WA					
	0.061 J	01POND-03WA (QC OF 02WA)	ND (2)	01POND-04WA (QA OF 02WA)					
	0.06 J	01POND-05WA	4 J	97PSLN01WA					
	ND (5)	97PSLN02WA (QC of 01WA)							
Toluene	0.5	PS001SW	0.5	PS002SW		1000			6,800 / 200,000
	0.5	PS003SW	10	3-SW1					
	1 B	98NOMP04WA							
	nd (1)	05NADRA62WA	nd (1)	05NADRA64WA					

1	2				3	4	5	6	7
						Alaska Water Quality Criteria (ug/L)			
Compound of Potential Concern	Concentrations (ug/L)				Background Concentration (ug/L)	Drinking Water MCL	Stockwater / Irrigation	Aquatic Life, Freshwater, acute/chronic	Human Health, Non-carcinogen, water & aquatic organisms / aquatic organisms only
	result	sample #	result	sample #					
	nd (1)	05NADRA63WA	nd (1)	05NADRA65WA					
	nd (1)	05NADRA66WA (QC of -65WA)	nd (1)	05NADRA67WA (QA of -65WA)					
	nd (1)	05NADRA68WA	nd (1)	05NADRA69WA					
Xylenes (Total)	1	PS001SW	1	PS002SW					
	11.8	98NOMP04WA	1	PS003SW					
	1.2 B	98NOMP01WA							
	nd (2)	05NADRA62WA	nd (2)	05NADRA64WA					
	nd (2)	05NADRA63WA	nd (2)	05NADRA65WA					
	nd (2)	05NADRA66WA (QC of -65WA)	nd (3)	05NADRA67WA (QA of -65WA)					
	nd (2)	05NADRA68WA	nd (2)	05NADRA69WA					
Zinc (Zn)	12	PS047WA	8	PS048WA	6.4 (Sample ADGGS 1991)		--- / 2,000	128 / 128	9100 / 69000
	36	PS049WA	17	PS050WA					
	2 J	95PS049WA	10	PS087WA					
	10	PS088WA	5.7	01POND-01WA					
	7.4	01POND-02WA	7	01POND-03WA (QC OF 02WA)					
	ND (25)	01POND-04WA (QA OF 02WA)	5.5	01POND-05WA					
	8 J	99POND-01WA	4 J	99POND-02WA					
	4 J	99POND-03WA (QC of 2WA)	ND (10)	99POND-03WA (QC of 2WA)					
	5.9 J	00NAFS12WA	37	00NAFS13WA (QC of 12WA)					

1	2				3	4	5	6	7
						Alaska Water Quality Criteria (ug/L)			
Compound of Potential Concern	Concentrations (ug/L)				Background Concentration (ug/L)	Drinking Water MCL	Stockwater / Irrigation	Aquatic Life, Freshwater, acute/chronic	Human Health, Non-carcinogen, water & aquatic organisms / aquatic organisms only
	result	sample #	result	sample #					
	0.9 J	00NAFS14WA							

1) Sampling and Analysis Sources:
IT 1996a, International Technology Corporation, “Remedial Action Report: Prison Site “A”, Anchorage, AK, July 1996.
IT 1996b, International Technology Corporation, “Remedial Action Report: Prison Site “A”, Addendum 1 – 1996 Work Season,” Addendum 1 – 1996 Work Season”, Anchorage, AK, December 1996.
JMM 1990, James M. Montgomery Consulting Engineers Inc., "Chemical Contamination Report - Prison Site,” Chicago, IL, May 1990.
USACE 1997, United States Army Corps of Engineers, “Chemical Data Report, Pond Sampling, Prison Site Landfill, Nome, Alaska,” memorandum for CEPOA-EN-EE-II, 19 November 1997.
USACE 1998, United States Army Corps of Engineers, “Chemical Data Report, 1998 Pond Sampling, Prison Site Landfill, Nome, Alaska,” memorandum for CEPOA-EN-EE-II, 29 December 1998.
USACE 2000a, United States Army Corps of Engineers, “Chemical Data Technical Memorandum, 1999 Pond Sampling, Prison Site Landfill, Nome, Alaska,” memorandum for CEPOA-EN-EE, 13 January 2000.
USACE 2001, United States Army Corps of Engineers, “Chemical Data Report, 2001 Sampling Event, Prison Site Landfill Long-Term Monitoring, Nome, Alaska,” November 2001.
USACE 2003, United States Army Corps of Engineers, “Chemical Data Report, Nome FUDS Soil Remediation Area Long-Term Monitoring, Nome, Alaska,” Anchorage, AK, September 2003.
USACE 2006, United States Army Corps of Engineers, “Chemical Data Report, 2005 Site Sampling (05-012), Prison Site “A,” Nome Area Defense Region (ERP046), Nome, Alaska,” Anchorage, AK, February 2006.
USACE 2007, United States Army Corps of Engineers, “Chemical Data Report
2) WQC from 18 AAC 70.
3) Note: all non-detects not shown.
4) Yellow shaded analytes indicate that the highest result is over WQC value.
5) Blue shaded cells indicate a value not included in analysis as it is the lower of a duplicate.
6) Gray shaded value indicates sample taken before remediation (natural attenuation).
7) J Qualifier: USEPA flag - Estimated Value.
8) B Qualifier: USEPA flag - Analyte present in the blank and the sample.
9) Surface water background values from ADGGS 1991, "Preliminary Hydrogeological Evaluation of Moonlight Springs, Nome, Alaska," James A. Munter, et al, Alaska Division of Geological and Geophysical Surveys in cooperation with the City of Nome, June 1991 (surface water and seep concentrations averaged.)
10) Hardness dependent water quality criteria calculated with a hardness of 108 mg/L $CaCO_3$ (see derivation in closeout report for Field Site R. (1989 sampling used total (non-filtered) values.
11) pH dependent water quality criteria calculated with a pH of 6 based on 1989 sampling.

Table 12 –Water Samples

Date	Sample ID	QC/QA	Methods	Analytes	Pre-(during), Post-, or no-remediation	Notes
1989	3-SW1			VOC, SVOC, Pesticides, PCB, fuels, 8 metals	no	Support Area, Pond A, large wetlands
1989	3-SW2			VOC, SVOC, Pesticides, PCB, fuels, 8 metals	no	Western Area 1, large dredge pond.
1989	3-SW3			VOC, SVOC, Pesticides, PCB, fuels, 8 metals	pre	Between Eastern Area 1 and Area 2, small dredge pond.
1989	3-SW4			VOC, SVOC, Pesticides, PCB, fuels, 8 metals	pre	Eastern Area 4, small wetland
1989	3-SW5			VOC, SVOC, Pesticides, PCB, fuels, 8 metals	no	About 500 feet north of prison. Background.
1989	3-SW6	QC of SW4		VOC, SVOC, Pesticides, PCB, fuels, 8 metals	no	
1989	3-SW7	QA of SW5			no	
1994	PS001SW			T, pH, Cond., TDS, metals, COD, BTEX	pre	Support Area, Pond A
1994	PS004SW			T, pH, Cond., TDS, metals, COD, BTEX	pre	Support Area, Pond A *CANCELED*
1994	PS005SW			T, pH, Cond., TDS, metals, COD, BTEX	pre	Support Area, Pond A *CANCELED*
1994	PS006SW			T, pH, Cond., TDS, metals, COD, BTEX	pre	Support Area, Pond A *CANCELED*
1994	94PS006SW	QA OF 6SW			pre	Support Area, Pond A
1994	PS002SW			T, pH, Cond., TDS, metals, COD, BTEX	pre	Eastern Area 1, Pond B
1994	PS007SW			T, pH, Cond., TDS, metals, COD, BTEX	pre	Eastern Area 1, Pond B *CANCELED*
1994	PS003SW			T, pH, Cond., TDS, metals, COD, BTEX	pre	Support Area, Pond C
1994	PS008SW			T, pH, Cond., TDS, metals, COD, BTEX	pre	Support Area, Pond C *CANCELED*
1995	PS047WA			T, pH, Cond., TDS, metals, COD, BTEX	pre	Support Area, Pond 1 (formerly Pond C)
1995	PS048WA			T, pH, Cond., TDS, metals, COD, BTEX	pre	Support Area, Pond 3 (formerly Pond B)
1995	PS049WA			T, pH, Cond., TDS, metals, COD, BTEX	pre	Support Area, Pond 2 (formerly Pond A)
1995	PS050WA	QC OF 49WA		T, pH, Cond., TDS, metals, COD, BTEX	pre	Support Area, Pond 2 (formerly Pond A)

Date	Sample ID	QC/QA	Methods	Analytes	Pre- (during), Post-, or no-remedi-ation	Notes
1995	95PS049WA	QA OF 49WA			pre	Support Area, Pond 2 (formerly Pond A)
1996	PS086WA			T, pH, Cond., TDS, metals, COD, BTEX	pre	Support Area, Pond 1 (formerly Pond C)
1996	PS087WA	QC OF 86WA		T, pH, Cond., TDS, metals, COD, BTEX	pre	Support Area, Pond 1 (formerly Pond C)
1996	96PS086WA	QA OF 86WA			pre	Support Area, Pond 1 (formerly Pond C)
1996	PS088WA			T, pH, Cond., TDS, metals, COD, BTEX	pre	Support Area, Pond 2 (formerly Pond A)
1996	PS089WA			T, pH, Cond., TDS, metals, COD, BTEX	pre	Support Area, Pond 3 (formerly Pond B)
1997	97PSLN01WA			T, pH, Cond., TDS, metals, COD, BTEX	pre	Support Area, Pond 3
1997	97PSLN02WA	QC of 01WA		T, pH, Cond., TDS, metals, COD, BTEX	pre	Support Area, Pond 3
1997	97PSLN03WA			T, pH, Cond., TDS, metals, COD, BTEX	pre	Support Area, Pond 2
1997	97PSLN04WA			T, pH, Cond., TDS, metals, COD, BTEX	pre	Support Area, Pond 1
1998	98NOMP01WA			T, pH, Cond., TDS, metals, COD, BTEX	pre	Support Area, Pond 3
1998	98NOMP02WA	QC of 01WA		T, pH, Cond., TDS, metals, COD, BTEX	pre	Support Area, Pond 3
1998	98NOMP03WA			T, pH, Cond., TDS, metals, COD, BTEX	pre	Support Area, Pond 2
1998	98NOMP04WA			T, pH, Cond., TDS, metals, COD, BTEX	pre	Support Area, Pond 1
1999	99POND-01WA			T, pH, Cond., TDS, metals, COD, BTEX	pre	Support Area, Pond 3
1999	99POND-02WA	QC of 01WA		T, pH, Cond., TDS, metals, COD, BTEX	pre	Support Area, Pond 2
1999	99POND-03WA			T, pH, Cond., TDS, metals, COD, BTEX	pre	Support Area, Pond 2
1999	99POND-04WA			T, pH, Cond., TDS, metals, COD, BTEX	pre	Support Area, Pond 1
2000	00NAFS11WA			VOC, PCP, Metals, TDS, COD	pre	Support Area, Pond 3
2000	00NAFS12WA	QC of 11WA		VOC, PCP, Metals, TDS, COD	pre	Support Area, Pond 3
2000	00NAFS13WA			VOC, PCP, Metals, TDS, COD	pre	Support Area, Pond 2
2000	00NAFS14WA			VOC, PCP, Metals, TDS, COD	pre	Support Area, Pond 1
2001	01POND-01WA			T, pH, Cond., TDS, metals, COD, VOC	pre	Support Area, Pond 3
2001	01POND-02WA			T, pH, Cond., TDS, metals, COD, VOC	pre	Support Area, Pond 2
2001	01POND-03WA	QC of 02WA		T, pH, Cond., TDS, metals, COD, VOC	pre	Support Area, Pond 2
2001	01POND-04WA	QA of 02WA		T, pH, Cond., TDS, metals, COD, VOC	pre	Support Area, Pond 2

Date	Sample ID	QC/QA	Methods	Analytes	Pre- (during), Post-, or no-remedi-ation	Notes
2001	01POND-05WA			T, pH, Cond., TDS, metals, COD, VOC	pre	Support Area, Pond 1
2005	05NADRA62WA			Metals, BTEX	post	Pond 1 – ‘A’
2005	05NADRA64WA			BTEX	post	Pond 1 – ‘B’
2005	05NADRA63WA			BTEX	post	Pond 1 – ‘C’
2005	05NADRA65WA			BTEX, SVOCs,	post	Pond 2 – ‘A’
2005	05NADRA66WA	QC of -65WA		BTEX, SVOCs,	post	Pond 2 – ‘A’
2005	05NADRA67WA	QA of -65WA		BTEX, SVOCs,	post	Pond 2 – ‘A’
2005	05NADRA68WA			BTEX	post	Pond 2 – ‘B’
2005	05NADRA69WA			BTEX	post	Pond 2 – ‘C’
2005	05NADRA70WA			Metals	post	Pond 3 Small
2005	05NADRA75WA			Metals	post	Pond 3 Large
2005	05NADRA71WA			Carbon tetrachloride	post	SW3 Pond ‘A’
2005	05NADRA72WA			Carbon tetrachloride	post	SW3 Pond ‘C’
2005	05NADRA73WA	QC of -72WA		Carbon tetrachloride	post	SW3 Pond ‘C’
2005	05NADRA71cWA			Metals, pentachlorophenol	post	SW3 Pond (composite)
2005	05NADRA72cWA	QC of -71cWA		Metals, pentachlorophenol	post	SW3 Pond (composite)
2005	05NADRA73cWA	QA of -72cWA		Metals, pentachlorophenol	post	SW3 Pond (composite)
2005	05NADRA74WA			Metals, pesticides	post	SW4 Pond (composite)
2005	05NADRA77WA	QC of -74WA		pesticides	post	SW4 Pond (composite)
2005	05NADRA78WA	QA of -74WA		pesticides	post	SW4 Pond (composite)
2007	07NADRA01WG			cadmium	post	Pond 2 – ‘A’
2007	07NADRA01WG	QC of –01WG		cadmium	post	Pond 2 – ‘A’
2007	07NADRA03WS	QA of -01WG		cadmium	post	Pond 2 – ‘A’
2007	07NADRA01WG			methylene chloride	no	MW at S-11 grid
2007	07NADRA02WG	QC of –01WG		methylene chloride	no	MW at S-11 grid
2007	07NADRA03WG	QA of -01WG		methylene chloride	no	MW at S-11 grid

Table 13 – Surface Water Hardness

Excerpt of surface water and seep sources (i.e. wells excluded) (ADGGS 1991). Hardness values used to calculate CrIII and Lead aquatic life water criteria in Table 10 above.

SITE	DATE	ALKALINITY
		(mg/L $CaCO_3$)
Moonlight Springs	06/06/90	116
Anvil Creek	06/06/90	64
Anvil Peak	06/07/90	15
Lindblom Spring	06/07/90	175
Little Creek	06/08/90	146
Specimen Gulch Seep	06/08/90	112
Moonlight Springs	09/26/90	132
Moonlight Springs(at pumphouse)	04/02/91	105
AVERAGE		108

APPENDIX A: HUMAN HEALTH CONCEPTUAL SITE MODEL

The Human Health Conceptual Site Model is patterned after the ADEC Human Health Conceptual Site Model dated 21 March 2006. The supporting pages are from the ADEC Human Health Conceptual Site Model Scoping Form dated 16 March 2006.

HUMAN HEALTH CONCEPTUAL SITE MODEL

Site: Prison Site "A"

Completed By: USACE
Date Completed: 13 November 2006

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

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

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

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

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

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

Media / Transport Mechanisms

☑ Surface Soil (0-2 ft bgs)
- Direct release to surface soil — check soil
- ☑ Migration or leaching to subsurface — check soil
- ☑ Migration or leaching to groundwater — check groundwater
- ☑ Volatilization — check air
- ☐ Runoff or erosion — check surface water
- ☑ Uptake by plants or animals — check biota
- ☐ Other (*list*): ______

☑ Subsurface Soil (2-15 ft bgs)
- Direct release to subsurface soil — check soil
- ☑ *Migration to groundwater* — check groundwater
- ☑ *Volatilization* — check air
- ☐ *Other (list):* ______

☐ Ground-water
- Direct release to groundwater — check groundwater
- ☐ *Volatilization* — check air
- ☐ *Flow to surface water body* — check surface water
- ☐ *Flow to sediment* — check sediment
- ☐ *Uptake by plants or animals* — check biota
- ☐ *Other (list):* ______

☐ Surface Water
- Direct release to surface water — check surface water
- ☐ *Volatilization* — check air
- ☐ *Sedimentation* — check sediment
- ☐ *Uptake by plants or animals* — check biota
- ☐ *Other (list):* ______

☐ Sediment
- Direct release to sediment — check sediment
- ☐ *Resuspension, runoff, or erosion* — check surface water
- ☐ *Uptake by plants or animals* — check biota
- ☐ *Other (list):* ______

Exposure Media / Exposure Pathways / Current & Future Receptors

Exposure Media	Exposure Pathways	Residents (adults or children)	Commercial or industrial workers	Site visitors, trespassers, or recreational users	Construction workers	Farmers or subsistence harvesters	Subsistence consumers	Other
☑ soil	☑ Incidental Soil Ingestion		FC	FC				
	☑ Dermal Absorption of Contaminants from Soil		FC	FC				
☑ groundwater	☐ Ingestion of Groundwater							
	☐ Dermal Absorption of Contaminants in Groundwater							
	☐ Inhalation of Volatile Compounds in Tap Water							
☑ air	☑ Inhalation of Outdoor Air		FC	FC				
	☐ Inhalation of Indoor Air							
	☐ Inhalation of Fugitive Dust							
☐ surface water	☐ Ingestion of Surface Water							
	☐ Dermal Absorption of Contaminants in Surface Water							
	☐ Inhalation of Volatile Compounds in Tap Water							
☐ sediment	☐ Direct Contact with Sediment							
☑ biota	☐ Ingestion of Wild Foods							

Human Health Conceptual Site Model
Scoping Form

Site Name: Prison Site "A"

File Number: F10AK005209

Completed by: USACE

Introduction

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

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

1. *General Information:*

Sources *(check potential sources at the site)*

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

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

☑ Spills
☑ Leaks
☐ Direct discharge
☐ Burning
☐ Other: ________

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

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

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

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

* bgs – below ground surface

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

a) Direct Contact –

1 Incidental Soil Ingestion

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

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

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

2 Dermal Absorption of Contaminants from Soil

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

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

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

Arsenic
Cadmium
Chlordane
2,4-dichlorophenoxyacetic acid
Dioxins
DDT

Lindane
PAHs
Pentachlorophenol
PCBs
SVOCs

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

b) Ingestion –

1 Ingestion of Groundwater

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

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

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

2 Ingestion of Surface Water

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

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

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

3 Ingestion of Wild Foods

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

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

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

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

c) Inhalation

1 Inhalation of Outdoor Air

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

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

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

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

2 Inhalation of Indoor Air

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

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

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

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

Dermal Exposure to Contaminants in Groundwater and Surface Water

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

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

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

Comments:

Inhalation of Volatile Compounds in Household Water

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

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

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

Comments:

Inhalation of Fugitive Dust

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

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

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

Comments:

Direct Contact with Sediment

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

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

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

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

Comments:

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