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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 6TH AVENUE
SEATTLE, WASHINGTON

RECORD OF DECISION

DECLARATION,
DECISION SUMMARY,
AND
RESPONSIVENESS SUMMARY

FOR

FINAL REMEDIAL ACTION
ARCTIC SURPLUS SUPERFUND SITE
FAIRBANKS, ALASKA

SEPTEMBER 1995

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RECORD OF DECISION
ARCTIC SURPLUS SUPERFUND SITE

THE DECLARATION

Site Name and Location

Arctic Surplus
Fairbanks, Fairbanks North Star Borough, Alaska

Statement of Basis and Purpose

This decision document presents the selected remedial actions for the Arctic Surplus Salvage Yard (Arctic Surplus or Site) located near the city of Fairbanks in the Fairbanks North Star Borough, Alaska. The remedy was developed in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. §9601 *et. seg.* (CERCLA) as amended by Superfund Amendments and Reauthorization Act of 1986 (SARA), and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Part 300. This decision is based on the administrative record for this site.

The State of Alaska concurs with the selected remedy.

Assessment of the Site

Arctic Surplus is a privately owned 24.5-acre salvage yard. Operations included storage of large quantities of materials intended for scrap and reclamation. Activities that contributed significantly to site contamination included battery processing and transformer scrapping.

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response actions selected in this Record of Decision (ROD), may present an imminent and substantial endangerment to public health, welfare, or the environment.

Description of the Selected Remedy

The selected remedy is a series of remedial actions which address the principal threats, lead and polychlorinated biphenyls (PCBs), and other contaminants at the site. These are considered to be the final actions needed to control the release of contaminants and reduce the risks to human health, welfare, and the environment from the Site.

The selected remedy combines source remediation, treatment of highly contaminated soils (hot spot), containment of hazardous substance residuals left onsite after treatment, and institutional controls to reduce the health risks posed by the contaminants in the soils at Arctic Surplus. Soil is the media which contain the elevated risks at Arctic Surplus. The selected remedial actions consist of the following:

- Relocation and processing, including decontamination, of salvage material and debris that must be moved to provide access to the contaminated site soil;

- Excavation of contaminated soil and stockpiling for treatment or disposal. Soils outside of the current fenced area with contaminant concentrations above 400 mg/kg lead or 1 mg/kg PCBs; and soils inside the fenced area with concentrations above 1000 mg/kg lead, 10 mg/kg PCBs, or chlorinated dioxin/furans above risk-based levels of concern will be excavated;

- Treatment of contaminated soil exceeding 50 mg/kg PCBs by solvent extraction, and solidification/stabilization of soils exceeding 1000 mg/kg lead. Pesticides will be transported to an off-site permitted disposal facility;

- Consolidation of both the contaminated and treated Hot Spot soils into a containment area over the old, closed landfill located in the southwestern part of the site;

- Capping of the soil in the containment area and the existing landfill with a TSCA chemical waste landfill cap; and,

- Institutional controls including long-term groundwater monitoring, operation and maintenance of the fences and cap; and restrictions to prevent use of groundwater, to maintain a current industrial use, and to prevent any unauthorized access or use of the capped area.

Declaration

The selected remedy is protective of human health and the environment, attains Federal and State requirements that are applicable or relevant and appropriate for this remedial action, and is cost effective. This remedy satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as principal elements and utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable.

Because this remedy will result in hazardous substances remaining onsite above health-base levels, a review will be conducted within five years after commencement of remedial actions to ensure that the remedy continues to provide adequate protection of human health and the environment.

Chuck Clarke 9/28/95

Chuck Clarke
Regional Administrator
U.S. Environmental Protection Agency
Region 10

Date

RECORD OF DECISION

FOR

FINAL REMEDIAL ACTION
ARCTIC SURPLUS SUPERFUND SITE
FAIRBANKS, ALASKA

DECISION SUMMARY

SEPTEMBER 1995

RECORD OF DECISION
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RECORD OF DECISION
ARCTIC SURPLUS SUPERFUND SITE

DECISION SUMMARY

1.0 SITE NAME, LOCATION, AND DESCRIPTION

Arctic Surplus
Fairbanks North Star Borough, Alaska

1.1 Site Location

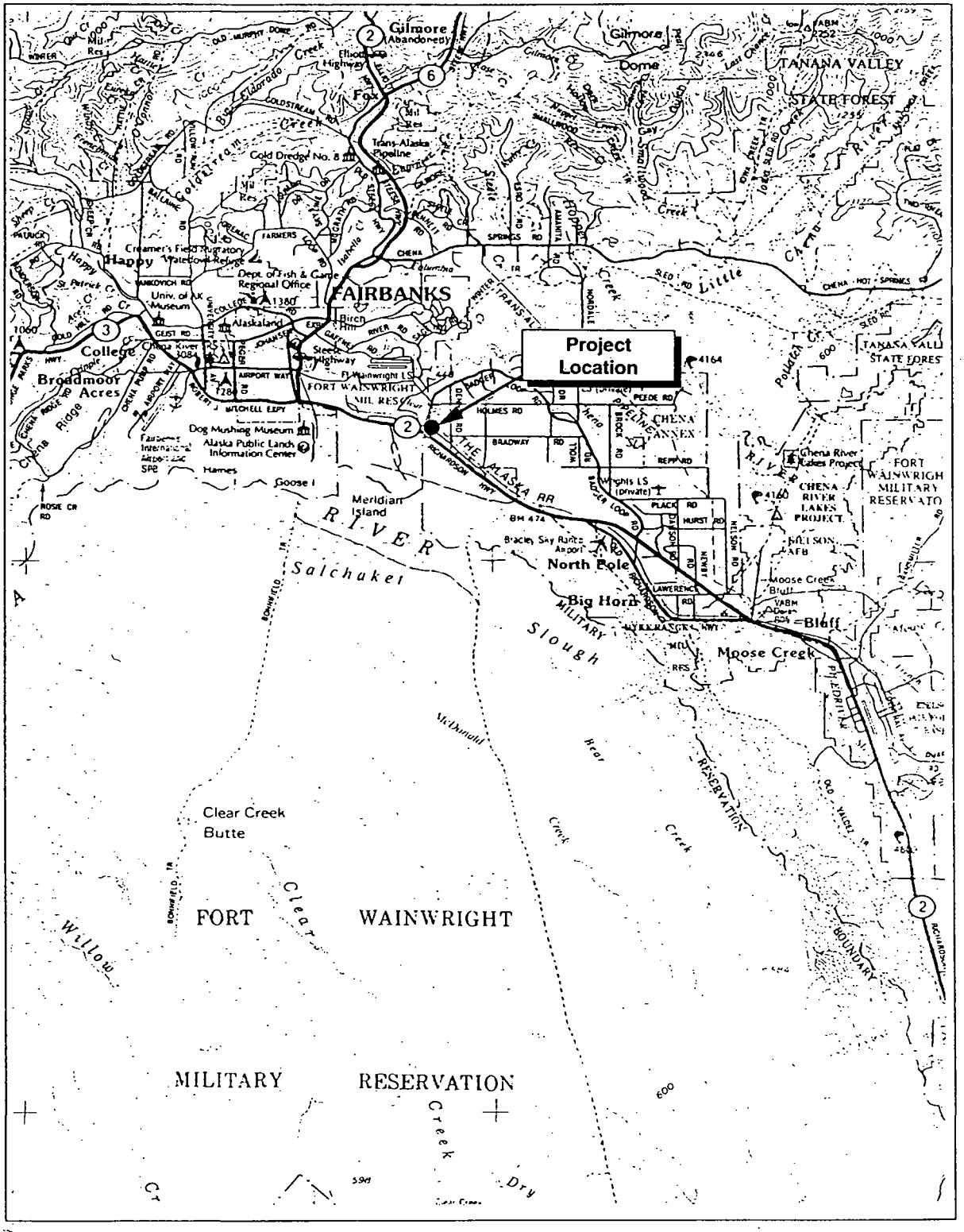
Arctic Surplus Salvage Yard (Arctic Surplus, site) is a privately owned salvage yard located about five miles southeast of Fairbanks, Alaska (Figure 1-1). It occupies approximately 24.5 acres on the northeast corner at the intersection of Badger Road and the Old Richardson Highway as illustrated in Figure 1-2. Private residences in the Clear Creek Estates subdivision and a salvage yard in Tract B bound the northern side of the property, and the Alaska Railroad and Old Richardson Highway separate the site from private residences to the south. Badger Road borders the Arctic Surplus property to the west, separating it from Fort Wainwright and the Defense Reutilization Marketing Office (DRMO); and McPeak Sand and Gravel Company adjoins the property to the east.

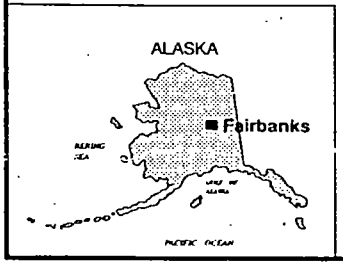
A site plan showing land ownership is presented in Figure 1-3.

1.2 Site Description

The Arctic Surplus site consists of the Arctic Surplus Salvage Yard facility which is currently fenced (onsite) and includes the surrounding adjacent properties (offsite) which have been impacted by the operations at the salvage yard. The entire site area has been used to store, salvage, reclaim, or dispose of material mainly from sale of surplus goods from local military bases. Tracked vehicles (armored personnel carriers, etc), trucks of all sizes, metal scrap from multiple sources are all found at Arctic Surplus. The amount of scrap metal is a factor in managing the site.

A private residential structure owned by Carl Pederson is located in the northwest corner of the property, and a collection of 81 office trailers (ATCO trailers) occupies an area along the northern property boundary. A small pond (Arctic Surplus Pond) occupies an



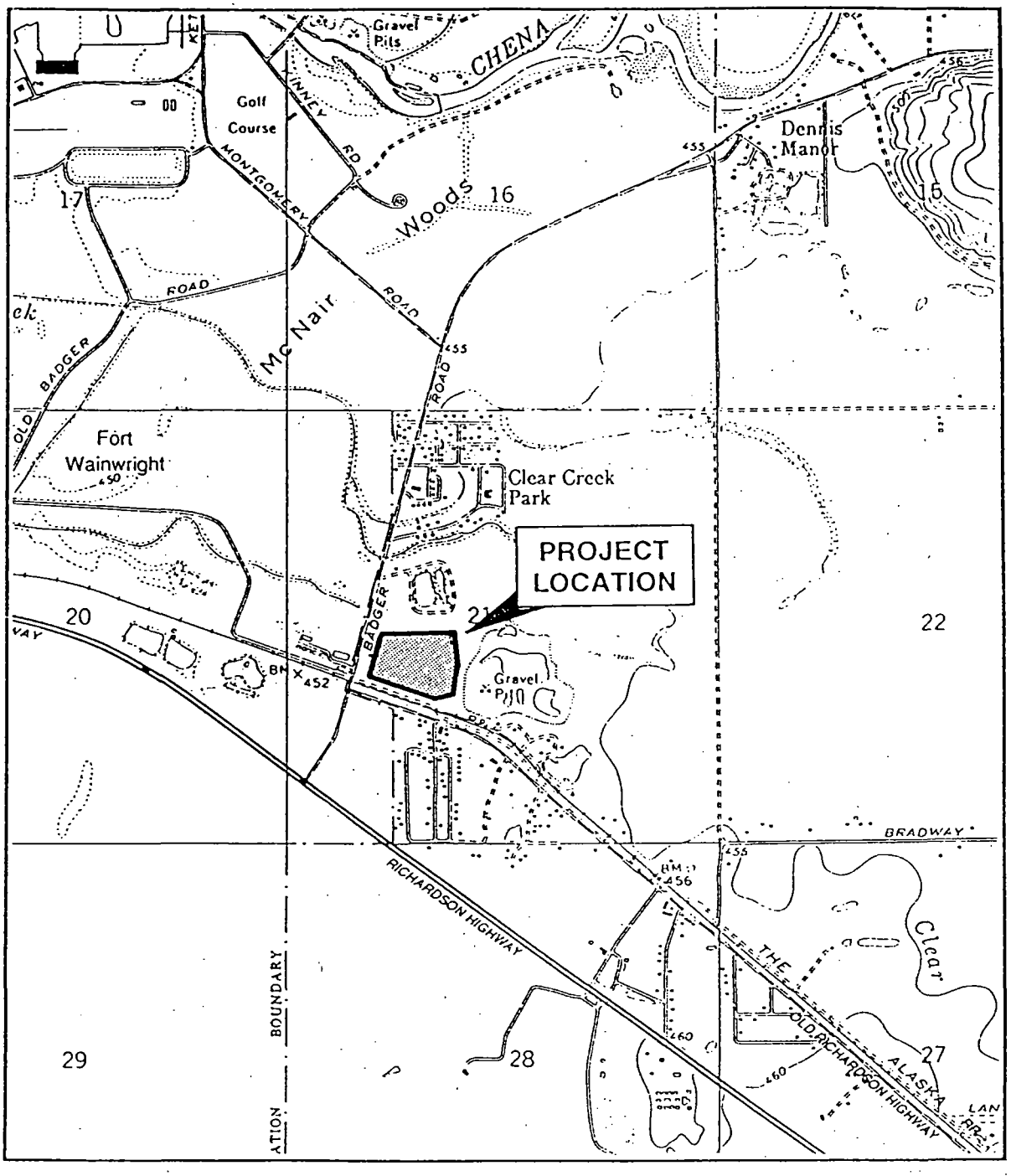


BASE MAP REFERENCE: Alaska Atlas and Gazetteer
DeLorme Mapping 1992
Scale: 1"= 4.8 miles

Arctic Surplus Salvage Yard
Fairbanks, Alaska

Figure 1-1

SITE LOCATION



0 1/4 1/2 1

Scale in Miles

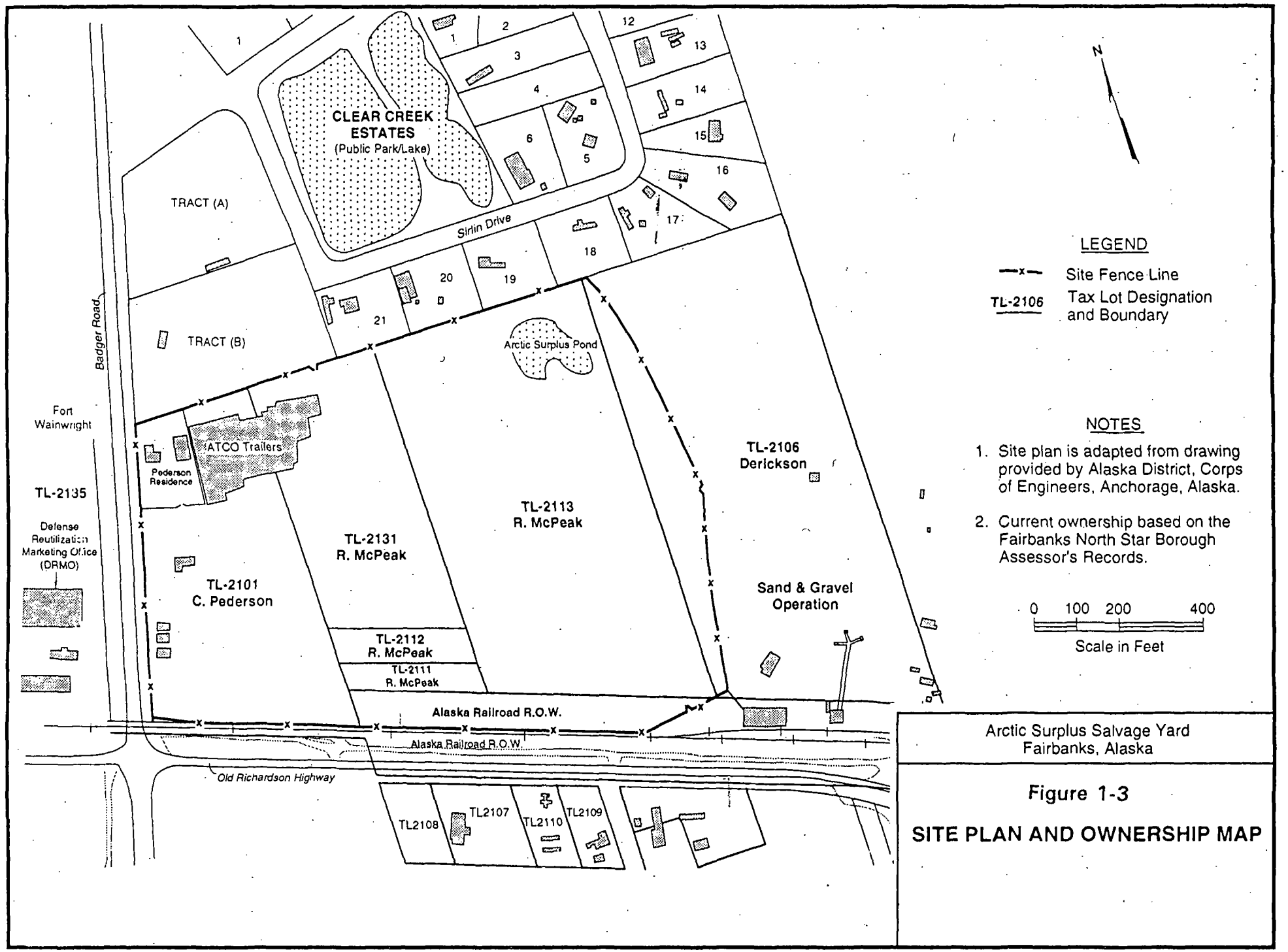
NOTE

Map adapted from USGS topographic map of Fairbanks D-2 SE, AK quadrangle, dated 1966.

Arctic Surplus Salvage Yard
Fairbanks, Alaska

Figure 1-2

VICINITY MAP



Arctic Surplus Salvage Yard
Fairbanks, Alaska

Figure 1-3

SITE PLAN AND OWNERSHIP MAP

abandoned gravel pit in the northeast corner of the site. There are numerous unpaved roads throughout the site, with piles of scrap and salvaged material covering much of the ground between the roads. Trees and shrubs have grown in and around the scrap and salvage materials. An 8-foot-high cyclone type fence was erected around the perimeter of the site in 1989 during a U.S. Environmental Protection Agency (EPA) removal action. The fence and locked gates are used to restrict unauthorized entry to the site.

1.2.1 Topography

The site lies in the center of the Tanana River Valley, a broad sweeping valley that extends through central Alaska. The Tanana River flows generally westerly through the Fairbanks area. The valley shows little relief around the site, with many wetland areas along the old meanders and floodways. The site is located within the 500 year flood, but because of flood control structures on the Tanana River, the site is no longer in the 100 year flood zone. The elevation of site is about 450 feet above sea level and is over 1000 river miles from the Bering Sea (Tanana River joins the Yukon River).

The regional aquifer, approximately 400 feet thick, underlies the valley in the Fairbanks area. This is a major aquifer and supplies many domestic wells. The groundwater flow beneath the site is in a north-northwesterly direction and is found between eight and fifteen feet below the land surface. The groundwater contains naturally high levels of iron, manganese, and arsenic which often exceed the Drinking Water Standards.

Due to the past human activities on the site, there are no defined wetlands. No endangered or threatened species of plants or animals were found to inhabit or forage the site. No historic or archaeological sites have been found.

1.2.2 Weather

The interior of Alaska has large temperature range from approximately -60°F to +95°F. The surface soils are frozen from about October through April each year. Permafrost conditions exist under the site. Rainfall is low, 15-20 inches, much of it as snow in the winter. The groundwater flows in a north-northwesterly direction beneath the site. Wind predominantly follows the valley, east to west, or west to east.

1.2.3 Land Use

The placer mining activities around Fairbanks during the Alaska Goldrush forever changed the land around the entire area including that of the site. The site area was entirely logged to provide firewood for the city. Part of the site became a municipal landfill site for

the U.S. Army Ft. Wainwright in the 1940's. The site itself was established as a storage, recycling, and salvage operation for excessed military material that was surplused by the Army. Over the years, the metal scrap and salvage operations impacted the surface of the site by establishing piles of scrap materials and roads throughout the site.

Recently, a residential subdivision was established along the northern side of the site. As a result, four homes were built on lots adjacent to the site.

Future land use has been projected to continue without much change. Two sides of the site are established rights-of-way, the adjacent residential area is fully constructed, and the gravel pit on the east will continue to exist whether or not it is operational.

2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

The first documented land use at the Arctic Surplus site was the operation of a municipal landfill in the southwest part of the site. The landfill was operated between 1944 and 1956 by the military. At closure, the landfill was capped with ash believed to have been hauled to the site from Ladd Field (now Fort Wainwright), where it was generated as spent fuel from a coal-fired power plant.

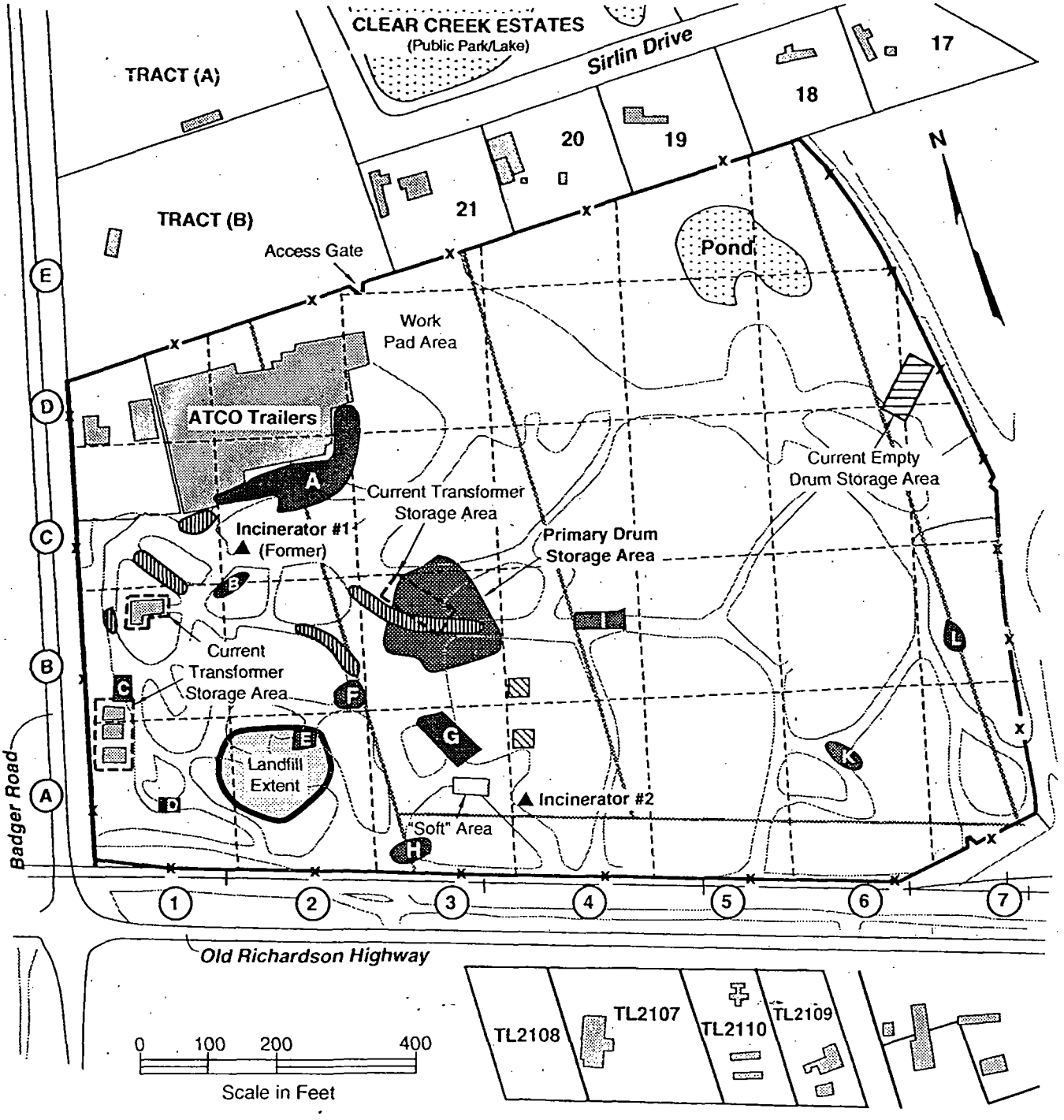
Between about 1959 and 1989, the site was operated as a privately owned salvage yard. Activities conducted as part of the salvage yard operation included storage of large quantities of materials intended for scrap and reclamation, including: drummed wastes, transformers, batteries, bulk asbestos and asbestos-clad vessels, gas cylinders, and containers of unknown wastes. Activities that contributed significantly to the present site contamination included battery processing for lead recovery, transformer (including PCB transformers) storage and reprocessing, storage of liquid wastes in drums and other containers, and operation of an incinerator fueled by waste oils, including transformer oil. Frequent site traffic and movement of materials contributed to the distribution of contaminants across wide areas of the site.

In 1986, two representatives from the Department of the Army conducted a site walk-through in response to a complaint about stored waste material with military markings. The Alaska Department of Environmental Conservation (ADEC) conducted a Preliminary Site Assessment in 1987 that recommended further site characterization. ADEC conducted a site-screening inspection in 1988 to determine whether the Arctic Surplus site should be considered for the EPA National Priorities List (NPL). In May and June 1989, EPA's Technical Assistance Team conducted an investigation under EPA's Superfund Response and Investigation Section. The site was proposed for the NPL in October 1989 and listed in August 1990.

Hazardous materials were removed by EPA from the site during the summer of 1989. Further removal actions were taken in 1990, and 1991 under an EPA Removal Order entered into with the Defense Logistics Agency (DLA). The site was fenced for the first time and over 22,200 pound of asbestos, 75 gallons of the pesticide, chlordane, 1700 drums of liquid waste, contaminated soil, an incinerator with dioxins, and PCBs were removed from the site during these summer work periods. These actions were taken to control access to the site and to remove potential source material and stabilize the conditions on the site until the site could be fully evaluated by the Remedial Investigation and Feasibility Studies (RI/FS) under the Superfund Remedial Action Program.

Notice letters were sent to the Potentially Responsible Parties (PRPs) on February 7, 1992, explaining their potential liability under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), requesting additional information, and seeking

their input into the Superfund remedial action process. On July 24, 1992, EPA and DLA entered into an Administrative Order on Consent in which DLA agreed to implement the RI/FS. On November 4, 1992, EPA entered into an Administrative Order on Consent with the Alaska Department of Transportation (ADOT) to clean up their Badger Road right-of-way adjacent to the site as part of the Badger Road improvement project. The other PRPs (land owners) chose not to participate in these actions. Both the RI/FS and the ADOT cleanup projects have been completed. The current status of the site is depicted in Figure 2-1.



LEGEND

Site Fence Line

Grid Designation

Approximate Location of Visually Stained Road Area Capped Prior to 1990 Removal Action

Approximate Location of PCB-Contaminated Area Excavated and Capped in 1990

Approximate Location and Designation of Previous Drum Storage Area

NOTE

Site plan is adapted from drawing provided by Alaska District, Corps of Engineers, Anchorage, AK.

Arctic Surplus Salvage Yard
Fairbanks, Alaska

Figure 2-1

CURRENT SITE STATUS

3.0 HIGHLIGHTS OF COMMUNITY PARTICIPATION

Since March 1990, twelve fact sheets have been distributed to the community providing information about EPA activities at the Arctic Surplus site. In addition, six meetings have been held in the community, both informational meetings and formal meetings to take comments on proposed cleanup plans for the site. Notice of the public meetings and comment periods were published in the *Fairbanks Daily News Miner* and mailed to approximately 300 addresses on the site mailing list.

The first fact sheet (March 1990) announced an open house to be held on April 12, 1990. People were also invited to talk with EPA representatives during the April visit and to provide information for a Community Relations Plan (June 1990) to guide community relations activities throughout the removal action.

Fact Sheets announced public information meetings in June and October of 1991 to discuss that summer's clean up activities.

A local information repository was established at the Defense Reutilization and Marketing Office on Badger Road. All documents pertaining to the site were made available for public review at this location. A copy of the Administrative Record is also located in this local repository as well as the EPA Regional office in Seattle. The selection of the remedy is based on the material contained in the Administrative Record.

A June 1992 fact sheet provided information about work to be done that summer season. In August 1992, individuals were again asked to meet with EPA representatives to discuss their concerns so that the Community Relations Plan could be updated. A September 1992 fact sheet updated the summer's activities. Another fact sheet, December 1992, was devoted to information about groundwater sampling and drinking water quality and provided detailed information in response to concerns raised by members of the community.

A fact sheet, June 9, 1993, described site study field work underway to complete the Remedial Investigation and Feasibility Study. Later, June 22, 1993, EPA invited comments on a range of cleanup alternatives for contaminated soil along Badger Road near the site.

In August 1994, a fact sheet announced the beginning of work to widen Badger Road and described how contaminated soil would be handled during the excavation of the road right-of-way. EPA also explained the investigations ongoing at the site to complete the study phase.

An open house held on June 6th was announced in a May 1995 fact sheet. It also announced the availability of the RI/FS reports and information about the alternatives being considered. The open house provided answers to many questions about the proposed cleanup

alternatives. On July 11, 1995, a fact sheet and the proposed plan were mailed announcing the public comment period (July 14 through August 14, 1995) and a public meeting to be held July 26, 1995. A notice of the public comment period and the public meeting was published in the *Fairbanks Daily News Miner* on July 19, 1995.

EPA has kept local, state, and federal officials whose constituents that could be affected by activities at the site informed through frequent updates and briefings.

EPA will continue to keep all interested parties informed about each significant step of the Superfund process through the final decision and clean up of the Arctic Surplus site.

4.0 SCOPE AND ROLE OF RESPONSE ACTION

The response action described in this Record of Decision (ROD) addresses all of the contamination identified during the investigations at the Arctic Surplus site. The remedy selected by EPA and documented in this ROD includes all of the remedial actions deemed necessary for the site to protect human health and the environment. All of the remedial actions are included in this decision, and no additional Operational Units or projects are proposed. Therefore, this ROD can be identified as the "Final" ROD since no other actions beyond those included are necessary to be protective.

The risk assessment determined that lead and polychlorinated biphenyls (PCBs) in the soils are the contaminants determined to be the principal threats to human health and the environment. The control of these threats, lead and PCBs, are a principal part of the remedial actions described in the selected remedy.

5.0 SUMMARY OF SITE CHARACTERISTICS

The nature and extent of contamination of the site is discussed in detail in the Arctic Surplus Remedial Investigation (RI) report which is included in the Administrative Record. The RI report also summarizes previous site characterization studies and documents a series of removal actions that were implemented to eliminate primary contaminant source areas and mitigate potential site risks to human health and the environment.

The removal actions taken by EPA and DLA stabilized the site so that sources of contamination were removed or controlled to prevent release to the environment. A fence surrounding the active site was erected to prevent unauthorized access. A large quantity of asbestos and liquid wastes were taken off site for proper disposal. The small burner/incinerator was dismantled and transported to a permitted disposal incinerator along with underlying dioxin containing soils. Small amounts of pesticides, PCBs, TCE, etc. were also removed from the site and taken to permitted disposal sites. Other hazardous substances, PCB transformers and over 3000 empty drums with residual materials inside, are staged for removal from the site as part of the ongoing removal actions. Tests done on the scrap metal indicate that it is not a source of contamination at the site. Therefore, no remedial actions are described for any of the scrap material found on site other than to insure that any soil, which is a source of contamination, is cleaned off any scrap that has to be relocated as part of any remedial actions.

Chemical data gathered during the RI and previous studies were evaluated to identify contaminants of potential concern (COPCs). The process for identifying the COPCs is discussed in Section 6.1.1. Based upon the results of this evaluation, the soil, and to a lesser extent, the groundwater were identified as the media of concern at the site. A number of organic and inorganic analytes were identified as COPCs for each of these two media. The identified COPCs for each medium are listed in Table 5-1 along with their range of contamination concentrations. COPCs were not identified in the surface water or sediments. The nature and extent of contamination at the site is summarized briefly below.

5.1 Contaminants of Potential Concern in Soil

The contamination in soil was evaluated by several soil sampling programs beginning in 1989 and culminating with the RI in 1993. Soil sampling included both grid sampling and subsequent biased sampling of areas most likely to be contaminated. These sampling programs, described in detail in the RI, included extensive sampling inside the fence, sampling around the perimeter outside the fence line, and background sampling. The majority of samples were collected from near-surface soil (upper 6-inches of soil), with subsurface sampling used to determine the vertical extent of contamination in hot spots and areas suspected of receiving contaminated fill materials.

Table 5-1

Contaminants of Potential Concern
Arctic Surplus Salvage Yard
Fairbanks, Alaska

Contaminants of Potential Concern in Soil			Contaminants of Potential Concern in Groundwater		
	Range (mg/kg)			Range (µg/L)	
Contaminant	Low	High	Contaminant	Low	High
Antimony	6.9	2,230	Antimony	31.3	45.7
Arsenic	1.7	189	Arsenic	1.3	41.8
Beryllium	0.15	4	Manganese	381	12,100
Cadmium	0.98	68.6	Tetrachloroethene	2	18
Lead	2	80,400	Trichlorethene	1	19
Manganese	106	5,740	1,2,4-Trichlorbenzene	1.3	24
	Range (µg/kg)		DDT	0.3	0.7
Benzo(a)anthracene	43	19,000	PCBs	0.06	0.08
Benzo(a)pyrene	40	18,000			
Benzo(b)fluoranthene	28	23,000			
Benzo(k)fluoranthene	47	7,500			
Dibenz(a,h)anthracene	110	7,500			
Indeno(1,2,3-ed)pyrene	39	9,500			
Chrysene	45	20,000			
alpha-Chlordane	181	161			
gamma-Chlordane	1.95	182			
DDD	2.45	1,740			
DDE	2	11,200			
DDT	2	146,000			
Aroclor 1248	76	200			
Aroclor 1254	21	9,300			
Aroclor 1260	13.67	26,100,100			
	Range (pg/g)				
Dioxins/Furans	5.7	29,000			

Note: Concentrations provided in this table were obtained from Appendix B of the Risk Assessment. These contaminants were selected as COPCs based on exceedence of background and risk-based screening concentrations.

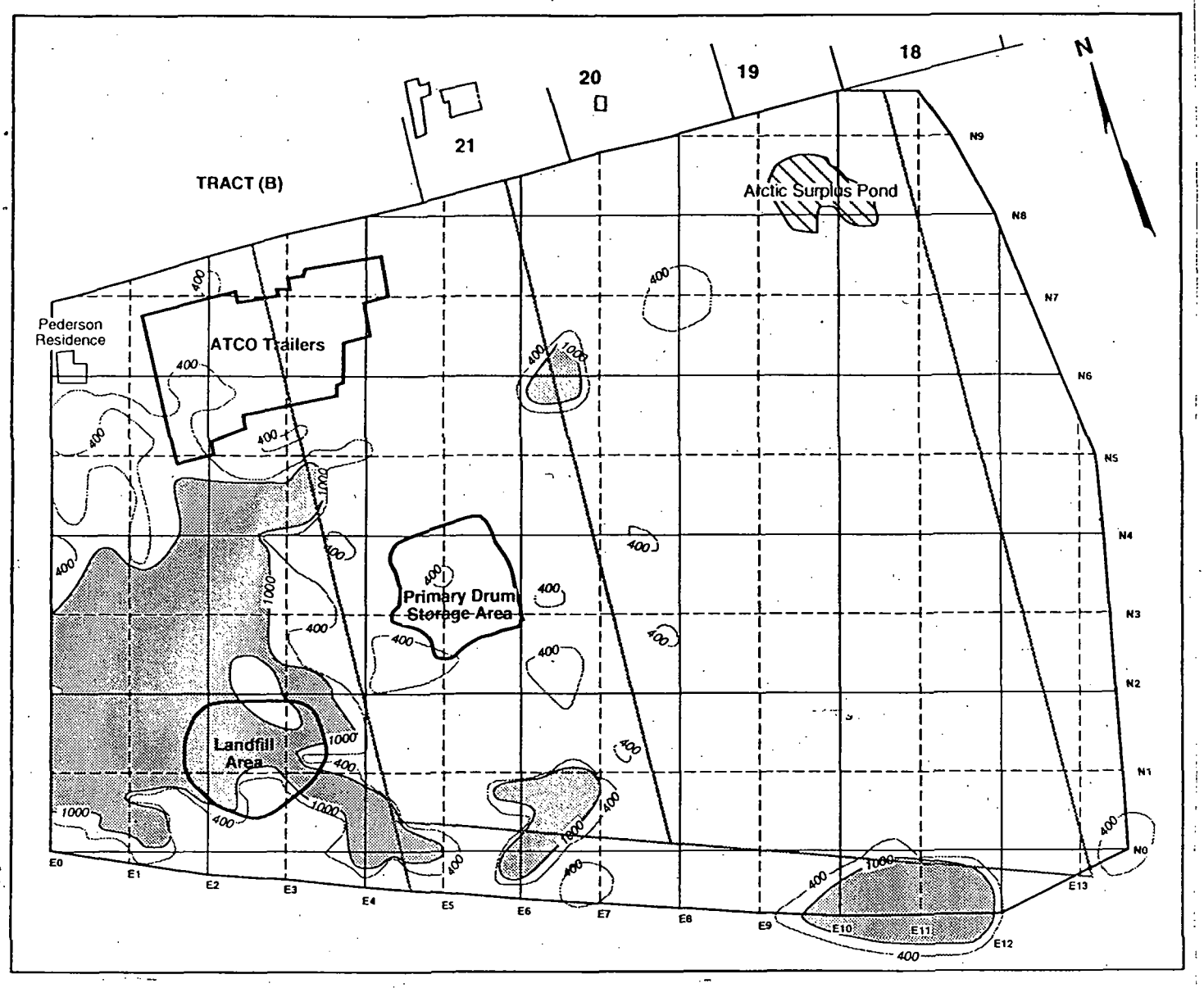
A variety of inorganic compounds (metals), as well as polycyclic aromatic hydrocarbons (PAHs), pesticides, PCBs, and dioxins/furans, have been identified as COPCs that occur in near-surface site soil. Lead and PCBs are by far the most widespread of the COPCs in site soil, and the only ones that have been detected in soil outside of the fence surrounding the salvage yard. As shown in Figures 5-1 and 5-2, soil containing lead and PCBs at concentrations above 1,000 mg/kg and 10 mg/kg, respectively are primarily confined to the western half of the site. The area impacted by PCBs for the most part encompasses that impacted by lead and other COPCs.

Organic COPCs other than PCBs in site soil are generally restricted to small hot spot areas. PAHs and pesticides in site soil generally are restricted to former drum storage areas. With two exceptions, these hot spots are in the western half of the site. The exceptions are in former Drum Storage Area K, where elevated concentrations of the pesticides DDD, DDE, and DDT were detected in soil samples; and in a small area south of the Arctic Surplus Pond, where chlordane has been detected. Dioxins/furans have been detected in the near-surface soil in the vicinity of former Incinerator No.1 and, at trace levels in the ash cap over the old military landfill in the southwestern part of the site.

Elevated levels of antimony and arsenic in near-surface soil are confined to a few areas where lead concentrations are also elevated, and cadmium has been detected in two former drum storage areas. Beryllium concentrations are fairly widespread, with no clear association to site use. Only in the northwestern corner of the site (MW-5625, see Figure 10-2) is there any apparent correlation between elevated inorganic constituents in groundwater and observed soil concentrations. The highest manganese concentration was detected in a subsurface soil sample collected from fill materials in the northwest corner of the site. That fill material may be a source of elevated manganese concentrations in one nearby downgradient monitoring well (MW-A).

Lead and PCBs are the only COPCs that have been identified in the soil outside of the fenced area. PCBs have been detected at concentrations exceeding 1 milligram per kilogram (mg/kg) in Tax Lot 20 (Figure 5-1) immediately north of the site. Lead has been detected above a residential land use screening level (400 mg/kg, see Section 6.1.3) in the soil between the Arctic Surplus Salvage Yard fence and the railroad tracks in the southeastern corner of the site. Lead and PCBs occurred at elevated concentrations in the soil immediately west of the site, along Badger Road. This contamination has been cleaned up by the Alaska Department of Transportation (ADOT), under an Administrative Order on Consent with EPA, in conjunction with a recent roadway widening and improvement project.

The clean up for the Badger Road soil involved removal and offsite disposal of TSCA-(PCB) and RCRA (lead) wastes greater than 10 mg/kg and 1000 mg/kg respectfully. An onsite (under the new widened road) containment cell was constructed for soil with PCB contamination between 1 mg/kg and 10 mg/kg and for lead contamination between 500



Lead Concentrations

0 200 400

Scale in Feet

LEGEND

Contour Line Indicating Approximate Concentration of PCBs in Surface Soil (mg/kg)

Approximate Extent of Concentrations Above 10 mg/kg

LEGEND

Contour Line Indicating Approximate Concentration of Lead in Surface Soil (mg/kg)

Approximate Extent of Concentrations Above 1,000 mg/kg

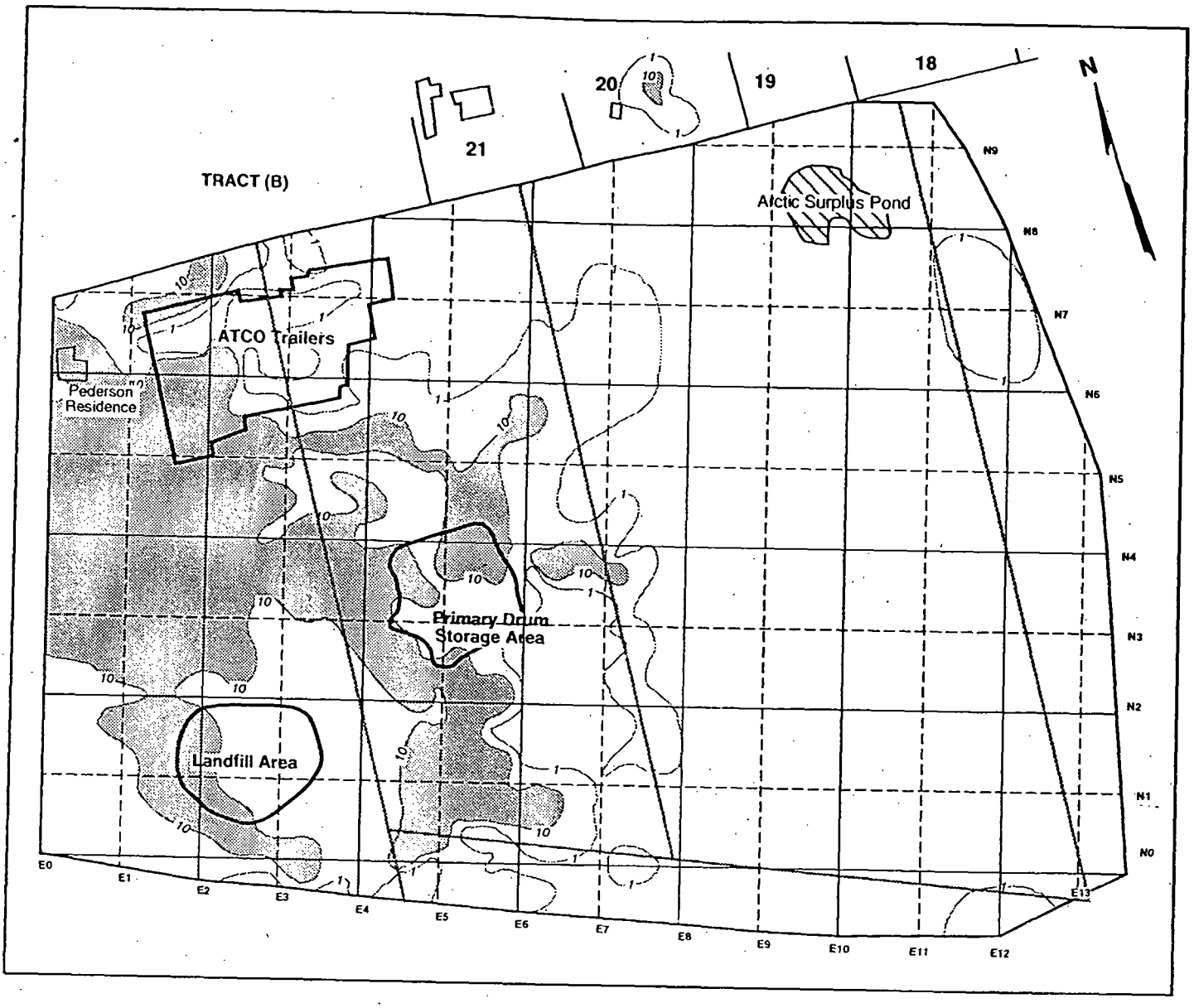
NOTES

1. Site plan is adapted from drawing provided by Alaska District, Corps of Engineers, Anchorage, Alaska.
2. Contour lines are based on concentrations detected in surface soil samples collected from 1989 through 1993.
3. In the case of duplicate samples or overlapping sample points, only the highest concentration was contoured.

Arctic Surplus Salvage Yard
Fairbanks, Alaska

Figure 5-1

LEAD CONCENTRATIONS IN SURFACE SOIL



PCB Concentrations

0 200 400

Scale in Feet

LEGEND

Contour Line Indicating Approximate Concentration of PCBs in Surface Soil (mg/kg)

Approximate Extent of Concentrations Above 10 mg/kg

LEGEND

Contour Line Indicating Approximate Concentration of Lead in Surface Soil (mg/kg)

Approximate Extent of Concentrations Above 1,000 mg/kg

NOTES

1. Site plan is adapted from drawing provided by Alaska District, Corps of Engineers, Anchorage, Alaska.
2. Contour lines are based on concentrations detected in surface soil samples collected from 1989 through 1993.
3. In the case of duplicate samples or overlapping sample points, only the highest concentration was contoured.

Arctic Surplus Salvage Yard
Fairbanks, Alaska

Figure 5-2

PCB CONCENTRATIONS IN SURFACE SOIL

mg/kg and 1000 mg/kg. Only those soils with PCBs concentrations less than 1 mg/kg PCB and lead concentration less than 500 mg/kg remain in the right-of-way without remediation.

5.2 Contaminants of Potential Concern in Groundwater

The nature and extent of contamination in groundwater has been evaluated by nine rounds of groundwater sampling (from July 1990 through July 1994) from up to 30 wells on or near the site. These include 22 monitoring wells, 6 private wells, and 2 wells on Ft. Wainwright. Six wells are located upgradient from the site; 23 are located inside the fence, typically near the downgradient boundary; and 7 are located downgradient of the site. Groundwater flow at the site is in the north-northwest direction.

Eight COPCs have been detected in the groundwater, as listed in Table 5-1. Of these COPCs, only trichloroethene (TCE), arsenic, and manganese have been detected with any consistency at elevated concentrations above drinking water standards in one or more wells. The other COPCs have been detected sporadically, both spatially and temporally, and do not appear to reflect site-wide groundwater conditions.

TCE is the only organic compound consistently found in site groundwater. It has been detected at concentrations ranging from 11 to 22 μg/L in MW-5627 (the well locations are illustrated on Figure 10-2), immediately downgradient from the former Primary Drum Storage Area near the center of the site. TCE concentrations have been routinely detected at concentrations of less than 2 μg/L in several site monitoring wells further downgradient from the drum storage area still inside the fenced site. The drinking water standard, Maximum Contaminant Level (MCL), for TCE is 5 μg/L.

Arsenic and manganese are natural constituents of the regional groundwater, generally occurring at elevated concentrations (above MCLs) in upgradient wells, wells inside the fence, and downgradient wells. Only in the northwestern corner of the site (MW-5625) is there any indication that these groundwater constituents could be derived from site contamination. This area has elevated concentrations of manganese in the soil, and the groundwater concentration is abnormally high, at about four times the background level. Similarly, arsenic concentrations detected in this same monitoring well have been consistently higher than elsewhere on site. These concentrations are not appreciably higher than arsenic levels detected in wells elsewhere in the aquifer, not associated with the site. The precise extent of contamination downgradient from the northwest corner of the site is not known, although lack of contamination in groundwater samples from MW-5623, less than 300 feet downgradient, indicates that the extent of contamination is very limited.

5.3 Chemical Fate and Transport

Over the course of about 40 years, contamination of site soil resulted from a variety of primary sources, including asbestos-containing materials; incineration fueled by waste oils; and releases from drums or containers, batteries, transformers, and materials deposited in the landfill and other filled areas. The primary sources of contamination were the focus of removal actions in 1989, 1990, and 1991. Although primary sources other than the old military landfill and filled areas have been eliminated, a variety of secondary sources remain. The most significant of these are the lead- and PCB-impacted near-surface soil that cover much of the western half of the site. Other secondary sources include near-surface soil associated with several former drum storage areas, fill materials, and former Incinerator #1. While many of the primary sources of contamination have been removed, the remaining contaminated soil has to be addressed as a major remaining source of contamination.

While most of the COPCs are relatively persistent, their chemical properties also tend to make them relatively immobile through the soil column. The physical properties of the site that favor contaminant migration, especially infiltration, generally have not overcome the chemical properties that retard it. Consequently, most COPCs are very limited in their vertical extent, top six inches of soil, and have had only a minimal impact on site groundwater. Conversely, horizontal transport of surface soil as particulate matter has occurred from the business operations, resulting in a widening distribution of surface soil contaminants inside the fence.

Contaminant transport to groundwater by infiltration appears to have been very limited. This minimal site impact on groundwater indicates that factors favoring contaminant migration through infiltration have thus far been outweighed by factors retarding it. Site factors that would enhance such transport include the permeable soil, low surface relief, shallow water table, low organic content in soil, competition for limited binding sites, and limited competing fate and transport processes for many COPCs. Factors that inhibit such transport include the low water solubility and strong soil affinity of most COPCs, the generally alkaline nature of soil, the low precipitation, and long periods (8-9 months each year) when the ground is frozen.

The contaminants that reach groundwater are likely to be transported by advection and dispersion. Some readsorption or chemical precipitation may occur as groundwater passes through uncontaminated soil. The high transmissivity of the aquifer is likely to rapidly dilute contaminant concentrations, which may explain why elevated concentrations of contaminants detected in MW-5625 in the northwest corner of the site have not also been detected in MW-5623, approximately 300 feet downgradient.

5.4 Endangered Species/Wetlands

The entire site has been disturbed by activities occurring on the property. The ecological review determined that there are no endangered species that are living on the site or would be impacted by changes in the site conditions. A wetland evaluation was conducted and it was determined that there are no defined wetlands on site. One surface pond does exist which was created from an old gravel borrow pit.

6.0 SUMMARY OF SITE RISKS

CERCLA response actions at the Arctic Surplus site as described in this ROD are intended to protect human health and the environment from current and potential future exposure to hazardous substances found at the site.

To assess the risks posed by site contamination, a "Baseline Human Health and Ecological Risk Assessment," (Risk Assessment) was prepared by Ecology and Environment, Inc., a contractor to EPA. The Risk Assessment assumes that there is no site cleanup.

6.1 Human Health Risks

The site is currently used as an industrial metal salvage and storage facility. The gravel mining operation is active adjacent to and east of the site. Four residences are located along the northern boundary and one person has a structure used as an office and summer residence in the northwest corner of the site. The residences use domestic wells for water, but water is brought to the onsite office/residential structure in containers (no supply well).

An assessment of the risks to human health involve a four-step process: identification of contaminants of potential concern (COPCs), an assessment of contaminant toxicity, an exposure assessment for the population at risk, and a quantitative characterization of the risk.

6.1.1 Contaminants of Potential Concern

An initial screening analysis was done to identify the chemicals of potential concern (COPCs). This screening involved two steps. In the first step, COPCs were selected based upon a very conservative estimate of potential health risk. Maximum concentrations of chemicals in media (*e.g.*, soil and groundwater) on the site were compared to conservative risk based concentrations. These risk based concentrations were derived assuming residential exposures; acceptable cancer risk levels of $1x10^{-7}$ for soil and $1x10^{-6}$ for water; and acceptable HQs of 0.1 (these terms are explained in more detail in Section 6.1.4). For lead, the risk based criteria selected were 500 ppm for soil and 15 ug/l for water. These values are recommended by Superfund guidance.

The second step in the selection of COPCs was a more refined screening which narrowed the list of COPCs by considering factors such as frequency of occurrence of each COPC, detection limits, and background concentrations for inorganics only.

The final list of COPCs for soil and groundwater are shown in Table 5-1. The potential for these COPCs to impact health was further evaluated using more realistic and more specific, site-specific exposure assumptions.

6.1.2 Risks Related to Compounds Other Than Lead

The methods used to assess exposure and toxicity and to characterize risk are different for lead than for other contaminants. Therefore, lead is discussed separately from the other contaminants. Sections 6.1.2.1 through 6.1.2.5 discuss the risk assessment methods and results for contaminants other than lead. Lead is discussed in Section 6.1.3.

6.1.2.1 Toxicity Assessment

Toxicity information was provided in the Risk Assessment for the chemicals of potential concern (COPCs). Generally cancer risks are calculated using toxicity factors known as slope factors (SFs), while noncancer risks are assessed using reference doses (RfDs).

EPA developed SFs for estimating excess lifetime cancer risks associated with exposure to potential carcinogens. SFs are expressed in units of $(mg/kg\text{-}day)^{-1}$ and are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to provide an upper-bound estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term "upper-bound" reflects the conservative estimate of the risks calculated from the SF. Use of this approach makes underestimates of the actual cancer risk highly unlikely. SFs are derived from the results of human epidemiological studies, or chronic animal bioassay data, to which mathematical interpolation from high to low doses, and from animal to human studies, have been applied.

EPA developed RfDs to indicate the potential for adverse health effects from exposure to chemicals exhibiting noncarcinogenic effects. RfDs, which are expressed in units of mg/kg-day, are estimates of lifetime daily exposure for humans, including sensitive subpopulations likely to be without risk of adverse effect. Estimated intakes of contaminants of concern from environmental media (*e.g.*, the amount of a contaminant of concern ingested from contaminated drinking water) can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied.

The Risk Assessment relied on oral and inhalation SFs and RfDs. For the two chemicals for which dermal exposures were able to be estimated (PCBs and chlorinated dioxins/furans), SFs were derived from oral SFs by adjusting for oral absorption. Toxicity factors were obtained from the Integrated Risk Information System (IRIS) or, if no IRIS

values were available, from the Health Effects Assessment Summary Table (HEAST). For the few chemicals which did not have toxicity values available at this time, sources other than IRIS and HEAST were used.

6.1.2.2 Exposure Assessment

The exposure assessment characterizes the exposure scenarios, identifies potentially exposed populations and their exposure pathways and routes of exposure, and quantifies exposure in terms of chronic daily dose (mg/kg/day or milligrams of contaminant taken into the body per kilogram of body weight per day).

A summary of the exposure scenarios and pathways are shown in Table 6-1. For current land use, exposures to onsite and offsite residents were evaluated. For future land-use, onsite exposures to workers as well as potential future residents were added for evaluation. For residential exposures, the following pathways were considered: (1) exposure to soil contaminants through soil ingestion and dermal contact, and inhalation of soil contaminants that have volatilized or have been resuspended on particles in the air; and (2) exposure to groundwater contaminants through ingestion of drinking water and inhalation of volatiles during showering. For industrial exposures, all of the same pathways were considered except inhalation during showering.

EPA Superfund guidance recommends that both RMEs (reasonable maximum exposures) and average exposures be calculated in site risk assessment. RME exposures are calculated using assumptions that result in higher than average exposures to ensure that the risk assessment results are protective of the reasonably maximally exposed individual. For this risk assessment, RME and average exposures were quantified by using Region 10 EPA default exposure factors (*e.g.*, body weight, contact rate, exposure frequency and duration) with site-specific exposure point concentrations. Both RME and average (more typical) exposures were calculated for residents. For workers, only RME exposures were calculated since default exposure factors were not available.

To estimate exposure point concentrations (EPCs) for soil for ingestion and dermal exposures, the 95 percent UCLs (upper confidence levels) on the mean were calculated separately for soils on the West and East sides of the facility and in offsite areas. If the 95 percent UCL exceeded the maximum detected concentration of a given COPC, or if less than 10 data points for a given COPC were available, then the maximum detected concentration of the COPC was used as the exposure point concentration. Because sampling for chlorinated dioxins and furans was limited to only a few areas on the western half of the site known to be contaminated with these compounds, data from the sampling points with the three highest concentrations of these contaminants were used to estimate exposures to these compounds. For drinking water, the average values of the COPCs in individual wells were used as the

Table 6-1

Summary of Exposure Pathways and Scenarios
Arctic Surplus Salvage Yard
Fairbanks, Alaska

Land Use	Exposure Scenario	Exposure Pathway	Medium
Current	Off-Site Residential	Incidental ingestion	Soil
		Dermal contact	Soil
		Ingestion	Groundwater
		Inhalation	Groundwater
		Inhalation of vapors and particulates	Air
	On-Site Residential	Same as On-Site Residential under future land use conditions	See below for On-Site Residential
Future	On-Site Residential	Incidental ingestion	Soil
		Dermal contact	Soil
		Ingestion	Groundwater
		Inhalation	Groundwater
		Inhalation of vapors and particulates	Air
	On-Site Industrial	Incidental ingestion	Soil
		Dermal contact	Soil
		Ingestion	Groundwater
		Inhalation of vapors and particulates	Air

EPCs. Models were used to calculate EPCs for particulates and vapors. [These models are discussed in detail in the risk assessment].

6.1.2.3 Risk Characterization

For carcinogens, risks are estimated as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to the specific carcinogen. Excess lifetime cancer risk is calculated by multiplying the SF (see toxicity assessment, section 6.1.2) by the quantitative estimate of exposure, the "chronic daily intake." These risks are probabilities generally expressed in scientific notation (*e.g.*, $1x10^{-6}$). An excess lifetime cancer of $1x10^{-6}$ indicates that an individual has a one in one million (1:1,000,000) chance of developing cancer as a result of site-related exposure to a carcinogen under the specific exposure conditions assumed.

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (lifetime) with a RfD (see toxicity assessment section above) derived for a similar exposure period. The ratio of exposure to toxicity is called a hazard quotient (HQ). Hazard quotients are calculated by dividing the exposure by the specific RfD. By adding the hazard quotients for all contaminants of concern that affect the same target organ (liver, nervous system, etc), the hazard index (HI) can be calculated.

The RME provides a conservative but realistic exposure scenario for considering remedial actions at a Superfund site. Based on the RME, when the excess lifetime cancer risk estimates are below $1x10^{-6}$, or when the noncancer HI is less than 1, EPA generally considers the potential human health risks to be below levels of concern. Remedial action may be warranted when excess lifetime cancer risks exceed $1x10^{-4}$ (one in ten thousand) and HIs exceed 1.0. Between $1x10^{-6}$ and $1x10^{-4}$, clean up may or may not be selected, depending on individual site conditions including human health and ecological concerns.

The following discussion summarizes the cancer and noncancer risk characterization results for the Arctic Surplus Superfund site.

6.1.2.4 Cancer Risk Estimates

Table 6-2 presents the upper bound estimates of cancer risk that could result from exposures to contaminants in site soils (other than chlorinated dioxins and furans) at existing concentrations. For RME assumptions, under a future residential scenario, the upper bound cancer risk from soil exposure was estimated to be $8x10^{-3}$ (8 in 1000) on the western half of the site and $4x10^{-4}$ (4 in 10,000) for the eastern half. The upper bound cancer risk for current offsite residents was estimated as $6x10^{-4}$ (6 in 10,000). Under a future industrial

Table 6-2

Summary of Cancer Risks and Hazard Indices for Soil
Arctic Surplus Salvage Yard
Fairbanks, Alaska

Exposure Scenario	Cancer Risks		Hazard Indices	
	RME	Average	RME	Average
Current Off-Site Resident	$6x10^{-4}$	$4x10^{-5}$	3	0.2
Future On-Site Resident Western Portion	$8x10^{-3}$	$7x10^{-4}$	4	0.0003
Future On-Site Resident Eastern Portion	$4x10^{-4}$	$3x10^{-5}$	5	0.4
Future On-Site Worker Western Portion	$1x10^{-3}$	--	0.07	--
Future On-Site Worker Eastern Portion	$5x10^{-5}$	--	0.08	--

Key:

RME = Reasonable maximum exposure.
-- = Cancer risk or hazard index was not calculated for this scenario.

scenario, upper bound cancer risk estimates were $1x10^{-3}$ for the western half of the site and $5x10^{-5}$ for the eastern half.

The chemicals responsible for these risks depend upon the area sampled (*i.e.*, offsite versus onsite, West or East side). PCBs are responsible for the majority of the onsite and offsite risks. As previously described for chlorinated dioxins and furans, risks were calculated for the three sampling locations with the highest contamination. Upper bound cancer risk estimates for soil ingestion and dermal contact with dioxins and furans at these three points ranged from $3x10^{-6}$ to $3x10^{-4}$. Site-wide risks from the chlorinated dioxins and furans are likely to be much lower since these numbers represent the three sampling points with the highest concentrations.

Estimated upper bound risks from groundwater exposure (ingestion and inhalation of volatiles) for each well are shown in Table 6-3. Assuming future residential use of the site and RME assumptions, the risk for the onsite wells range from $3x10^{-4}$ to $3x10^{-7}$. These risks range from $2x10^{-4}$ to $9x10^{-8}$ for future industrial use. For the offsite well, residential RME exposure assumptions result in an upper-bound risk of $5x10^{-6}$. The primary contributors to these risks are arsenic, PCBs, tetrachloroethene, and trichloroethene.

6.1.2.5. Noncancer Health Effects

Table 6-2 summarizes the evaluation of noncancer health impacts from exposures to soils using the HI. Assuming RME assumptions, three scenarios result in HIs above 1.0: current offsite (HI=3.0); future onsite resident, western portion (HI=4.0); and future onsite resident, eastern portion (HI=5.0). All other exposure scenarios were below a HI of 1.0. The majority of these noncancer impacts are attributable to manganese and antimony.

Noncancer impacts from groundwater exposure are shown in Table 6-3. For RMEs scenarios, contaminants in some wells exceeded a HI of 1.0, assuming residential and industrial land uses. HIs for offsite wells were not above 1.0. The primary contributors to risk were arsenic and manganese.

A portion of the estimated noncancer impacts (and cancer risks for arsenic) result from exposures to naturally occurring levels of arsenic and manganese in the soil and water. These differences are quantified and discussed in the Risk Assessment.

6.1.3 Risks Related to Lead Only

There is a large body of scientific literature on the toxicological effects of lead in humans. Children appear to be the segment of the population at greatest risk from the toxic effects of lead. Health impacts from lead are primarily assessed by using levels of lead in

Table 6-3

Summary of Cancer Risks and Hazard Indices for Groundwater
Arctic Surplus Salvage Yard
Fairbanks, Alaska

Exposure Scenario	Well	Cancer Risks		Hazard Indices	
		RME	Average	RME	Average
Future Residential Use of On-Site Groundwater	MW-5624	$2x10^{-5}$	$3x10^{-6}$	0.05	0.02
	MW-5625	$7x10^{-4}$	$1x10^{-4}$	60	30
	MW-5627	$4x10^{-6}$	$7x10^{-7}$	20	0.1
	MW-5807	$3x10^{-7}$	$5x10^{-8}$	2	0.9
	MW-H	$3x10^{-4}$	$5x10^{-5}$	20	9
Future Industrial Use of On-Site Groundwater	MW-5624	$6x10^{-6}$	--	0.02	--
	MW-5625	$2x10^{-4}$	--	20	--
	MW-5627	$1x10^{-6}$	--	8	--
	MW-5807	$9x10^{-8}$	--	0.6	--
	MW-H	$9x10^{-5}$	--	6	--
Current Residential Use of Off-Site Groundwater	TL-19	$5x10^{-6}$	$8x10^{-7}$	0.02	0.01

Key:

RME = Reasonable maximum exposure.
-- = Cancer risk or hazard index was not calculated for this scenario.

blood. At blood lead levels of 40 to 100 micrograms per deciliter (ug/dL), children have exhibited nerve damage, permanent mental retardation, colic, anemia, brain damage, and death. Blood lead levels as low as 10 ug/dL (or lower) have been associated with neurological and developmental defects in children. Blood lead levels of concern for adults are generally higher than for children. However, studies examining the relationship between lead exposure and blood pressure suggest that blood lead levels from as low as 7 ug/dL upward to approximately 30 or 40 ug/dL may increase blood pressure. In addition, studies suggest that low levels of exposure for pregnant women may increase the risk for developmental effects in the unborn child.

Lead was not included in the quantitative risk estimates described above for the other site contaminants because: (1) EPA-approved RfDs and SFs are unavailable, and (2) for the residential exposure, EPA guidelines specify the use of the EPA IEUBK model for estimating acceptable lead levels in soil for children.

The IEUBK model estimates the blood lead concentrations expected to result from exposure to lead concentrations in soil and other media (*e.g.*, air, water, diet, dust, and paint) for children. EPA recommends a benchmark of either 95 percent of the sensitive population of children having blood lead levels below 10 ug/dL or a 95 percent probability of an individual child having a blood lead level below 10 ug/dL. When the IEUBK model is run using this benchmark and all the model's default parameters, an acceptable soil screening level of about 400 ppm is predicted for lead. [Note: When the Risk Assessment was done for Arctic Surplus, the IEUBK model in use by EPA predicted an acceptable soil screening level of about 500 ppm. The newer version of the model predicts a level closer to 400 ppm.]

The IEUBK model does not address lead exposure to older children or adults. Therefore, potential risks associated with exposures of adult residents and workers could not be quantitatively evaluated using the IEUBK model. However, the exposure potential and sensitivity of older receptors are generally lower than those of young children. To assess the impacts of lead on workers, a 1,000 ppm soil lead level was chosen as protective. This level has been used in the past for sites when the expected future land use is industrial.

Health impacts for lead were characterized by comparing the exposure point concentrations calculated for lead in soil at the site, using the methods discussed in the exposure assessment for other site contaminants, to 400 ppm (for residential exposures); and to 1,000 ppm (for industrial exposures). In both cases, risks associated with either residential or industrial exposures to the elevated concentrations of lead in site soil were determined to present significant risks to human health. Therefore, a clean up action to address the lead-contaminated soil at the site is considered warranted.

6.1.4 Uncertainty in the Human Health Risk Assessment

The accuracy of the risk characterization depends in large part on the accuracy and representativeness of the sampling, exposure, and toxicological data. Most assumptions are intentionally conservative so the risk assessment will be more likely to overestimate the risk than to underestimate it.

Calculations of risk for exposure to soil are likely to be overestimations. Soil sampling focused on "hot spot" locations of suspected contamination, therefore, calculation of EPCs are likely biased high. Also due to the cold weather conditions in the winter, exposures are over estimated because of snow cover and frozen soil.

Uncertainty in the toxicity evaluation may over-estimate risks by relying on slope factors that describe the upper confidence limit on cancer risk from carcinogens. Also, evidence for carcinogenicity of the contaminants of potential concern are based on animal studies and limited human data. Some under-estimation of risk may occur due to lack of quantitative toxicity information for some contaminants detected at the site.

6.2 Ecological Risks

A qualitative ecological Risk Assessment was done to assess the ecological effects of the contaminants present at the Arctic Surplus site. Chemicals identified as potential stressors of ecological concern include: several inorganic compounds in surface water and sediment in the Arctic Surplus Pond; and lead, PCBs, several volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs), and pesticides in near-surface soil.

Threats to terrestrial species were found to be negligible, based on an evaluation of potential risks to the American Kestrel (a type of raptor) through ingestion of small mammals that could contain elevated lead and PCBs in their tissues. A small mammal study was conducted to help determine risks to the animal and subsequent food chain.

Potential risks to aquatic communities from chemicals in surface water and sediment were also evaluated. Of the naturally occurring contaminants, only iron was elevated above a level that could produce significant adverse affects in some benthic biological resources. Based on supplemental information such as the presence of diverse aquatic insect communities and lush vegetation, it was concluded that stressor concentrations in the Arctic Surplus Pond sediment and surface water do not pose significant risks to the aquatic biota in the pond.

Based on the water quality analysis and the terrestrial study, it did not appear that there was a measurable impact on the ecology of the site or near-site areas. The ecological

risk assessment indicated that the levels of contamination present at the site were not likely to cause adverse effects to plants and animals in the site vicinity.

6.3 Risk Conclusions

The Baseline Risk Assessment supports the conclusion that hazardous substances are found on the site and that the actual or threatened release of these substances from this site, if a response action is not taken, may present an imminent and substantial endangerment to public health, welfare, or the environment.

7.0 REMEDIAL ACTION OBJECTIVES AND CLEANUP STANDARDS

The overall objective of the remedial actions for the Arctic Surplus site is to provide an effective mechanism for protecting human health and the environment from contaminated site soils and groundwater while allowing future access to areas containing salvageable and recyclable material. The remedial action objectives (RAOs) have been develop to describe what site remedial actions will need to be accomplished.

7.1 Remedial Action Objectives

The RAOs identified for site soils are to:

- Prevent exposure by ingestion, inhalation, and dermal contact with contaminated soils and dust that would result in an excess lifetime carcinogenic risk above 10^{-5}.

- Prevent exposure by ingestion, inhalation, and dermal contact with contaminated soils and dust that would result in a noncarcinogenic health effects as indicated by an HI greater than 1.0.

- Prevent offsite migration of contaminants caused by mechanical transport, runoff, or wind erosion.

- Prevent infiltration/migration of contaminants that would result in groundwater contamination in excess of regulatory standards.

The RAOs identified for site groundwater are to:

- Prevent inhalation of volatiles released from, or ingestion of, groundwater containing contaminants at levels above regulatory standards (MCLs and non-zero MCLGs).

  If there are no regulatory standards:

- Prevent inhalation of volatiles released from, or ingestion of, groundwater contaminants that could result in an excess lifetime carcinogenic risk above the 10^{-5} level.

- Prevent ingestion of groundwater containing contaminants that could result in noncarcinogenic health effects as indicated by an HI in excess of 1.0.

7.2 Cleanup Standards

Using the RAOs, cleanup standards are developed for each of the contaminants of concern. Once these standards are determined, cleanup technologies can be evaluated so that the cleanup standards can be achieved.

7.2.1 Soil Cleanup Standards

Based upon future industrial land use inside the fence line, cleanup standards for the soil on site are required for 3 contaminants/contaminant classes: PCBs, lead, and chlorinated dioxins and furans. The estimated upper-bound cancer risks exceeded levels of concern ($1x10^{-4}$) for PCBs and chlorinated dioxins and furans. Lead levels above 1000 ppm were found. Based upon a residential scenario, cleanup standards are required for PCBs and lead offsite. PCBs have been detected at levels above an estimated upper-bound cancer risk of $1x10^{-4}$ in one property north of the facility. Lead has been detected above the residential land use risk screening level of 400 ppm outside of the fence near the southeast corner of the property and along the Badger Road right-of-way at the western boundary of the site.

There are no regulatory cleanup standards for soil contaminants found at the site in federal or Alaska laws/regulations. The cleanup standards for the site soil are derived from two main sources:

- EPA and State of Alaska guidance on soil cleanup levels (for PCBs and lead);
- Risk-based concentrations when guidance is not available (for chlorinated dioxins/furans).

Soil cleanup standards for the Arctic Surplus site are summarized in Table 7-1. The industrial standards are for the areas inside the fence and the residential use standards are for the areas outside the existing site fence. Only two small areas outside of the fence were identified as having contaminants of concern. Only lead and PCBs were identified as COCs in the area outside the fence.

7.2.1.1 PCB Cleanup Standards

For PCBs in soil, EPA established a nationwide spill cleanup policy under the Toxic Substance Control Act (TSCA) (TSCA 15 U.S.C. 2601 *et. seq.*). The requirements specified under 40 CFR 761, subpart G, particularly with respect to the clean up of PCB-contaminated soil, are considered as a potential to be considered (TBC) guidance under CERCLA actions. The TSCA cleanup policy applies to spills containing PCBs at concentrations greater than 50

Table 7-1

Soil Cleanup Standards
Arctic Surplus Salvage Yard
Fairbanks, Alaska

Contaminant of Concern	Soil Cleanup Standards[a]	
	Industrial Scenario	Residential Scenario
Lead	1,000[b]	400[c]
PCBs	10[d]	1[d]
Dioxins/Furans	0.44[e,f]	NA[g]

Notes:

a Concentrations are in mg/kg, unless otherwise noted.

b Lead cleanup goal for industrial land use; consistent with cleanup standards for other similar Region 10 CERCLA sites.

c Residential soil screening value for lead using the IEUBK Model (EPA Revised Interim Soil Lead Guidance for CERCLA Site and RCRA Corrective Action Facilities, OSWER Directive No. 9355.4.12, Office of Solid Waste and Emergency Response, Washington, D.C.)

d Cleanup standard for PCBs from 40 CFR 761.25(c)(4)(v).

e Cleanup standard is based upon a cancer risk of 1×10^{-5}.

f Units: µg/kg

g Not applicable. Dioxins/furans were not detected off-site; therefore, only the industrial soil cleanup standard is provided.

mg/kg. The cleanup standard for spills in restricted access areas is 10 mg/kg and for nonrestricted access (residential) areas is 1.0 mg/kg.

Less stringent cleanup standards may be approved by EPA on a site-specific basis, as defined in 40 CFR 761.120(9)(4), if factors associated with the spill "may mitigate expected exposures and risks or make clean up to these requirements impracticable." Alternatively, more stringent levels may be required by EPA based on site-specific factors (e.g., depth to groundwater or presence of drinking water wells) as outlined in 40 CFR 761.120(b).

PCBs are present in the site soil and landfilling involks design criteria and long-term management controls consistent with TSCA chemical waste landfill requirements (40 CFR 761.75). Certain chemical waste landfill requirements may be waived using the TSCA waiver provisions, depending on the concentration of PCB remaining and other site-specific factors.

Based on the above guidances, EPA has selected 10 mg/kg PCB as the cleanup level for soil within the fenced area (industrial use) and 1 mg/kg PCB for outside of the fenced (residential) soil areas. The soil above these levels will have to be excavated.

7.2.1.2 Lead Cleanup Standards

For lead in soil, EPA's Office of Solid Waste and Emergency Response (OSWER) has issued Interim Soil Lead Guidance for CERCLA Sites. In this guidance, a 400 mg/kg screening level for lead in soil under residential land use is recommended. This level was derived using the Integrated Exposure Uptake/Biokinetic (IEUBK) Model to estimate a soil concentration that will not result, under default residential exposure assumptions, in an unacceptable blood lead level in children. Exceeding this level does not necessarily indicate that a remedial action is necessary, but does indicate that a site-specific study of risks is warranted. Residential cleanup standards for CERCLA remedial actions can be developed using the IEUBK Model on a site-specific basis where site data support modification of model default parameters. EPA considers this model to be the most appropriate and widely applicable tool available for evaluating residential risks from lead.

Within the fenced area, an industrial land-use scenario is considered most appropriate. However, the IEUBK Model is applicable only to children, and no model is currently available for developing an adult industrial screening level for lead.

At the Arctic Surplus site soil lead concentrations exceed 1000 mg/kg over much of the western half of the site. When a cost analysis was done to help determine site-specific cleanup standards, it was found that there was not much difference in soil cleanup costs if the cleanup standards were set at 1000 or 2000 mg/kg. When cleanup levels were set below 1000 mg/kg, the amount of soil requiring excavation increased greatly and the associated cost

for the cleanup increase sharply. Cleanup levels established for lead at other industrial sites in the region were considered before establishing an industrial cleanup standard at Arctic Surplus.

Lead in soil is a RCRA hazardous waste when the results of the Toxicity Characteristic Leaching Procedure (TCLP) test exceeds 5 mg/kg. When a soil fails the TCLP test for lead it is known as a "characteristic" hazardous waste. Concentrations of 1,000 mg/kg for lead in Arctic Surplus soil typically does not fail the TCLP test, and therefore, are not considered hazardous waste. Based on the RCRA characteristic waste criteria, the soil cleanup standard for lead at 1000 mg/kg was selected for industrial use areas inside the site fence line.

7.2.1.3 Other Contaminants of Concern in Soil

Chlorinated Dioxins and Furans

For dioxins and furans, the soil concentrations corresponding to a cancer risk-based level of $1x10^{-5}$ was selected as the soil cleanup standard (Table 7-1).

None of the other COCs found in the soils presented a risk great enough to change the overall site risk when added to the risks from PCBs and lead.

7.2.2 Groundwater Cleanup Standards

Based upon industrial land use exposure assumptions, concentrations of arsenic and manganese were present in a limited number of wells at levels above their RfDs (*i.e.*, HQ > 1); estimated cancer risks for arsenic was slightly above $1x10^{-4}$ in one well. Levels of arsenic, manganese, and TCE above the MCLs have been found occasionally in several onsite monitoring wells. Sources of TCE were removed by EPA removal actions and TCE is not found in the soil. Groundwater monitoring will continue as part of the remedy. The remedy will include institutional controls that prevent the use of onsite drinking water.

Levels of arsenic or manganese above the regional aquifer background levels have not been detected in any offsite wells. However, the onsite well with the highest consistently elevated levels of arsenic and manganese is in the downgradient northwest corner of the site (TCE is still detected but has consistently been below the MCL in this well). The nearest downgradient well to this onsite area is 300 feet from the fence boundary. It is likely that elevated levels of arsenic and manganese exceeding both health- and risk-based levels and background levels continue for some limited distance off site. Both of the two downgradient properties which may be affected are currently used for industrial purposes (another salvage yard north, and Ft. Wainwright west of the site), so there is no immediate likelihood that

domestic water wells would be installed (the area between this northern salvage yard and Ft. Wainwright is in the Badger Road Right-of-Way). If monitoring at additional downgradient well(s) indicates site-derived contaminants above the cleanup standards (Table 7-2) on either adjacent property, restrictions on groundwater use may need to be extended in the event that land use changes.

7.3 Cleanup Standards Conclusions

Based on the information gathered and evaluated in the RI/FS, EPA concludes that contaminated soil presents an unacceptable risk to human health, welfare, and the environment. Even after the EPA removal of large quantities of hazardous wastes, PCBs, lead, and dioxins/furans pose a future risk. The large amount of scrap metal on the site presents a problem for getting to the soil, but does not contribute to the contamination and the scrap can be decontaminated by physically removing any soil that may be on it. In order to meet the cleanup objectives, the soil requires remediation.

The groundwater contains some elevated concentrations of a few naturally occurring contaminants and intermittent detections of potentially site related contaminants. These can be monitored to determine if source controls related to the soils can prevent contaminants from entering the groundwater and causing a problem that would require future controls.

Therefore, EPA has established soil cleanup standards for residential areas as 400 mg/kg lead and 1 mg/kg PCB, and industrial cleanup standards as 1000 mg/kg lead and 10 mg/kg PCB. EPA has determined the these standards will be sufficiently protective of offsite residents and onsite workers based on target levels defined by the NCP for additive or combined risk effects.

Table 7-2

Groundwater Cleanup Standards
Arctic Surplus Salvage Yard
Fairbanks, Alaska

Contaminant of Concern	Groundwater Cleanup Standards[a,b]	
	Highest Concentration at Downgradient Property Boundary	Residential Scenario
Antimony	41.8	25
Manganese	18,400	2,900

Notes:

[a] Concentrations are in µg/kg, unless otherwise noted.

[b] Cleanup standards are based upon regional aquifer background levels, which exceed risk-based levels.

8.0 DESCRIPTION OF ALTERNATIVES

Each of the remediation alternatives in this section was developed as a way to mitigate the risks from contamination on the site. The different alternatives provide a range of actions to provide different levels of protectivness. A general discussion of each of the alternatives follows.

8.1 Alternative 1: No action.

Under this alternative, no further remedial activities would be conducted at the site. There would be no provisions for continuing to restrict site access and the current groundwater monitoring program would be discontinued upon issuance of the ROD.

8.2 Alternative 2: Institutional Controls, Monitoring, and Removal of Offsite Soil.

Under this alternative, remedial activities would be limited to excavation of soil outside of the fence that is contaminated above the residential cleanup standards for either lead or PCBs. The cleanup standards are described in Section 7.2. The areas of concern include a part of Tax Lot 20, an area along the outside of the southeastern fence line, and possibly localized areas near the site fence line in Tract B. The extent of contamination above the cleanup standards in these areas would be established with onsite screening tests and confirmatory testing by an offsite laboratory of a representative percentage of the onsite screening samples. The excavated soil would be transported to a permitted facility for treatment and/or disposal, and the excavations would be backfilled with clean (i.e., soil that does not exceed site-specific cleanup standards) soil and graded. No remediation inside the fence would be performed as part of this alternative. Instead, only institutional and access controls would be implemented, along with groundwater monitoring, to limit risks of exposure to site contaminants through direct contact, inhalation, or ingestion of soil or groundwater.

Alternative 2 would involve the following key elements:

- Excavation of soil outside of the fence contaminated with PCBs and lead above residential cleanup standards and transportation of these soils to a permitted facility treatment and/or disposal. Backfilling with clean soil and grading.
- Institutional controls to limit future land and groundwater use.
- Improvements to and maintenance of site perimeter fencing to restrict site access.

- Long-term groundwater monitoring using the existing groundwater monitoring network, with the possible addition of one or more new wells, to monitor potential contaminant migration.

- Periodic site performance reviews.

8.3 Alternative 3: Capping

The primary elements of Alternative 3 include on-site relocation of salvage materials and debris, localized excavation of contaminated soil inside and outside of the fence, consolidation of excavated soil in the western part of the site, and construction of a low-permeability soil cap over much of the western part of the site. The purpose of the cap would be to prevent exposure to site contaminants and to reduce the potential for leaching of contaminants from site soil to the underlying aquifer. This site cap would also serve as a cover for the old military landfill, and would be designed and constructed in compliance with state and federal requirements for municipal waste landfill closure.

This alternative focuses on capping site soil impacted by lead and PCBs; it also provides for consolidation under the capped area of all other soil both inside and outside of the site fence containing contaminants above the appropriate cleanup standards with the exception of two areas of hazardous waste. These areas are Drum Storage Area K, which contains an estimated 50 cubic yards (cy) of pesticide-contaminated soil, and a chlordane-contaminated area immediately east of the Primary Drum Storage Area, which contains an estimated 25 cy of contaminated soil. This soil would be excavated and transported to an off-site RCRA-permitted facility for proper treatment and disposal.

The key elements of remediation incorporated in this capping alternative are as follows:

- Staged relocation and decontamination of on-site salvage material to provide access to the contaminated soil (surface clean up of about 10 acres). This would involve the construction of a decontamination pad for equipment and debris, clean staging and storage areas, and a support services area.

- Excavation of small amounts of soil in the northern and eastern parts of the site containing COCs at concentrations above the industrial cleanup standards (with the exception of pesticide-contaminated soil in Drum Storage Area K and a small area adjacent to the Primary Drum Storage Area) and consolidation of these soils in the western part of the site in the area to be capped. Most of the contaminated soils would be capped in place.

- Excavation of fill soil in a septic tank drain field area in the northwestern corner of the site which contains COCs at concentrations above the industrial cleanup standards, and consolidation of these soils in the western part of the site in the area to be capped.

- Excavation of soil outside of the fence contaminated with PCBs and lead above residential cleanup standards (Tax Lot 20 and southeastern fence line), and consolidation of these soils in the western part of the site in the area to be capped.

- Excavation of pesticide-contaminated soil above industrial cleanup standards in Drum Storage Area K and chlordane contaminated soil immediately east of the Primary Drum Storage Area, and transport of these soils to a RCRA-permitted facility for treatment and incineration.

- Confirmatory sampling for identified COCs to define the limits of excavated areas to comply with cleanup standards, and to determine the extent of capping.

- Backfilling and regrading of excavated areas with clean soil.

- Abandonment of existing monitoring wells located within the area to be capped, and installation of new wells beyond the capped area for use in groundwater monitoring.

- Construction of a low-permeability (permeability less than 1×10^{-5} cm/sec) cap over contaminated soil in the western part of the site, including the old military landfill.

- Construction of an infiltration trench around the perimeter of the cap to receive stormwater runoff from the cap.

- Implementation of institutional controls to limit future land and groundwater use.

- Construction and maintenance of fencing around the perimeter of the capped area to restrict access to the containment unit.

- Inspection and maintenance of the cap, stormwater drainage/infiltration system, and monitoring wells to preserve their integrity and effectiveness.

- Long-term groundwater monitoring for the site and landfill closure.

- Periodic site performance reviews.

8.4 Alternative 4: Consolidation and Capping

Alternative 4, was developed as a remediation approach that would provide the protective benefits of both consolidation and containment of the contaminated soil. The primary elements of Alternative 4 include on-site relocation of salvage materials and debris, excavation and consolidation of most of the contaminated soil, both inside and outside of the site fence, then placing the soil over the old military landfill, and construction of a low-permeability soil cap over the consolidated soil and landfill. The cap would be designed to prevent a risk of exposure to site contaminants and to reduce the potential for leaching of contaminants from site soil to the underlying aquifer. The consolidated contaminated soil would contain RCRA hazardous waste and TSCA hazardous substances in the consolidated disposal area. However, its closure would not be in compliance with state and federal requirements for a TSCA chemical waste landfill without landfill waiver, but this alternative would comply with a solid waste landfill closure. Pesticide-contaminated soil would not be consolidated after excavation, but would be segregated for transport to an offsite RCRA-permitted facility for treatment and incineration.

The key elements of remediation that would be required as part of the capping alternative are as follows:

- Staged relocation and decontamination of onsite debris covering the contaminated soil. This would involve the construction of a decontamination pad for equipment, clean staging and storage areas, and a support services area.

- Geophysical exploration to delineate the lateral extent of the old military landfill.

- Excavation of soil inside the fence containing COCs at concentrations above the industrial cleanup standards (excluding the pesticide-contaminated soil); the septic tank drain field area soil in the northwest corner of the site; and consolidation of these soils above the old military landfill which will be capped.

- Excavation of soil from outside the fence containing PCB or lead at concentrations above the residential cleanup standards, and consolidation of these soil above the old military landfill prior to capping.

- Excavation of pesticide-contaminated soil above industrial cleanup standards and transport to a RCRA-permitted facility for treatment and disposal.
- Excavation of dioxin/furan-contaminated soil above the cleanup standard and transported off site to a permitted treatment and disposal facility.
- Confirmatory sampling and analysis of identified COCs to define the limits of excavated areas to comply with cleanup standards.
- Backfilling of all excavated areas and regrading of the areas inside and outside of the fence with clean soil.
- Abandonment of existing monitoring wells located within the area to be capped, and installation of new wells beyond the capped area for use in groundwater monitoring.
- Construction of a low-permeability RCRA hazardous waste cap over the consolidated soil and the old military landfill.
- Construction of a perimeter drain and stormwater infiltration basin to contain runoff from a maximum storm event.
- Construction and maintenance of fencing to restrict access to the capped area.
- Implementation of institutional controls to limit future land and water use.
- Inspection and maintenance of the cap and existing perimeter fencing to preserve their integrity and effectiveness.
- Long-term groundwater monitoring for the site and closed landfill.
- Periodic site performance reviews.

8.5 Alternative 5: Soil Treatment, Consolidation, and Capping

This alternative, involves excavation, solvent extraction, and solidification/stabilization of all soil from both inside and outside of the site fence that contain COCs above the cleanup standards (estimated to be 17,400 tons). Following treatment, this soil would be consolidated and capped in the south-western corner of the site over the old military landfill.

On-site treatment by solvent extraction would be used to remove organic contaminants, primarily PCBs and TCE, from the soil to concentrations below the cleanup standards. The residual soil would then be mixed with additives that bind the lead and other inorganic COCs to the soil matrix, and the stabilized product would be placed in a series of lifts on the ground surface over and adjoining the area underlain by the old military landfill. A clean soil fill would be imported, placed, and graded as needed to achieve the design slopes for placement of the overlying cap materials. This fill and treated soil would then be covered with a low-permeability TSCA chemical waste landfill cap to prevent exposure to remaining site contaminants and to reduce the potential for leaching of residual contaminants from the treated soil to groundwater. The TSCA cap would be designed to cover and protect both the treated soil and the underlying landfill, and would comply with Alaska and federal requirements for closure of municipal landfills.

The key elements of this treatment alternative include those listed for Alternative 4 and add the following:

- Confirmation sampling and analysis to establish the limit of excavation and to demonstrate compliance with cleanup standards.
- Solvent extraction of excavated soil exceeding the cleanup standards followed by solidification/stabilization and placement over and adjacent to the area underlain by the old military landfill.
- Incineration of solvent extracted "waste oil" treatment residuals at an offsite permitted incineration facility.
- Construction of a low-permeability cap over the consolidated soil and the old military landfill. The design of the cap would have to meet TSCA chemical waste and solid waste landfill cap requirements.

8.6 Alternative 6: Hot Spot Soil Treatment, Consolidation, Capping

This alternative has been developed for consideration as a potentially cost-effective variation of Alternative 5. It differs from Alternative 5 in that the on-site treatment and solidification/stabilization process would be used on a smaller volume of soil (11,000 tons), however, the remaining untreated soil with contamination above the cleanup standards would be consolidated and capped on site. The size of the capped are could be smaller that either Alternative 4 or 5, but the actual size of the capped area will be dependent on the final amount of consolidated material and the height of the pile. All of the capping options will totally cover the old closed landfill.

For Alternative 6, soil containing PCBs above 50 mg/kg and other COCs above the respective industrial cleanup standards would be treated and stabilized on site. Soil with PCB concentrations between 10 and 50 mg/kg (or between 1 and 50 mg/kg for soil outside of the fence) would be consolidated and capped on site. This soil may require solidification/stabilization prior to consolidation depending on the lead concentration. Soil with lead concentrations above 1000 mg/kg would be treated by solidification/stabilization before placement in the containment unit. Like Alternative 5, pesticide- and dioxin/furan-contaminated soil would be transported to an off-site RCRA-permitted facility for treatment and disposal. This approach, of only treating soil containing higher concentrations of COCs, is estimated to result in a 38 percent reduction in the volume of soil that would be treated on site.

The key element of this alternative are similar to Alternative 5 but use a slightly different soil treatment criteria as follows:

- Solvent extraction of soil containing PCB concentrations greater than 50 mg/kg, followed by solidification/stabilization and placement over and adjacent to the area underlain by the old military landfill. Excavated soil that does not exceed 50 mg/kg PCBs or that does not require stabilization, will placed directly over and adjacent to the area underlain by the old military landfill.

8.7 Alternative 7: Onsite Treatment (Soil Washing/Solvent Extraction), and Alternative 8: Onsite Treatment (Solvent Extraction/Acid Leaching).

These two alternatives were determined not to be technically feasible after a treatability study. The separation of the lead from the soil proved to be ineffective. Based on the technical difficulties with these alternatives, they were not evaluated further. The solvent extraction process still worked to reduce the PCB concentrations, however, neither the soil washing nor acid extraction worked effectively for lead separation.

8.8 Alternative 9: OffSite Treatment/Disposal

Alternative 9 would consist of excavation and offsite treatment and disposal of all soil containing COCs at concentrations exceeding the cleanup standards. All excavated soil would be transported to an offsite, RCRA/TSCA-permitted facility for treatment and disposal.

The key elements of remedial action required to accomplish this alternative are as follows:

- Staged relocation and decontamination of onsite debris. This would include the construction of a decontamination pad for equipment and debris, and a support services area.
- Construction of a railroad spur and loading ramp for loading contaminated soil into railcars.
- Excavation of soil containing COCs at concentrations above the cleanup standards and transport to a RCRA/TSCA-permitted facility for treatment and disposal.
- Confirmatory screening and laboratory analysis for appropriate COCs to determine the limit of excavation and ensure compliance with cleanup standards.
- Backfilling excavated areas with clean fill and grading.
- Geophysical exploration to delineate the lateral extent of the old military landfill.
- Abandonment of existing monitoring wells within the area to be capped, and installation of new wells to be used in groundwater monitoring program.
- Construction of a low-permeability solid waste landfill cap over the old military landfill.
- Construction of a drain around the perimeter of the cap and an infiltration basin to receive stormwater runoff from the cap.
- Implementation of institutional controls to limit future land and groundwater use.

- Construction, inspection, and maintenance of perimeter fencing around the landfill cap to restrict access.

- Inspection and maintenance of the landfill cap, stormwater drainage/infiltration system, and monitoring wells to preserve their integrity and effectiveness.

- Long-term groundwater monitoring of the old military landfill and the site.

- Periodic site performance reviews.

8.9 Alternative 10: Hot Spot Soil Offsite Treatment/Disposal with Capping of Contaminated Residual Soil

Alternative 10 has been developed for consideration as a potentially cost-effective variation of Alternative 9. It differs from Alternative 9 in that a smaller volume of soil with contamination above the cleanup standards would be excavated and treated/disposed off site. For this alternative, it is assumed that soil inside the fence containing PCBs above 50 mg/kg, lead above 1000 mg/kg, or other COCs above industrial cleanup standards, would be transported to an off-site facility, whereas soil with PCB concentrations between 10 and 50 mg/kg (or between 1 and 50 mg/kg for soil outside of the fence) would be consolidated and capped on site. In comparison with Alternative 9, this approach is estimated to result in a 38 percent reduction in the volume of soil that would be disposed off site.

The key elements of remediation required as part of this alternative are similar to Alternative except for the following:

- Transport excavated soil with PCBs above 50 mg/kg and lead above 1000 mg/kg to an off-site RCRA/TSCA-permitted facility for treatment and disposal. Consolidate and place other contaminated soil over the old military landfill and cap.

- Construction of a low-permeability TSCA cap over the old military landfill and consolidated PCB-contaminated soil at concentrations of 10 to 50 mg/kg. This would include construction of a trench drain around the perimeter of the cap and an infiltration basin to receive stormwater runoff from the cap.

- Implementation of institutional controls to limit future land and groundwater use.

- Construction, inspection, and maintenance of perimeter fencing around the landfill cap to restrict access.

- Inspection and maintenance of the landfill cap, stormwater drainage/infiltration system, and monitoring wells to preserve their integrity and effectiveness.
- Long-term groundwater monitoring of the old military landfill and the site.
- Periodic site performance reviews.

9.0 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

The NCP requires that each remedial alternative analyzed in detail in the FS be evaluated according to specific criteria. The purpose of this evaluation is to promote consistent identification of the relative advantages and disadvantages of each alternative, thereby guiding selection of remedies offering the most effective and efficient means of achieving site cleanup goals. There are nine criteria by which feasible remedial alternatives are evaluated. While all nine criteria are important, they are weighed differently in the decision-making process depending on whether they describe a consideration of technical or socioeconomic merits (primary balancing criteria), or involve the evaluation of non-EPA reviewers that may influence an EPA decision (modifying criteria).

9.1 Threshold Criteria

The remedial alternatives were first evaluated by comparison with the threshold criteria: overall protection of human health and the environment and compliance with ARARs. The threshold criteria must be fully satisfied by candidate alternatives before the alternatives can be given further consideration in the remedy selection process.

9.1.1 Overall Protectiveness of Human Health and the Environment

Evaluation of this criterion focused on how exposure pathways are eliminated, reduced, or controlled through engineering or institutional controls.

Alternatives 1 and 2 would not mitigate any site contamination or limit exposure pathways and are not protective of human health and the environment. Controlling access would reduce risks only to offsite residents in Alternative 2, therefore, not protective. All the other alternatives are protective of human health and the environment. A soil cap over the contaminated soils in Alternatives 3 and 4 would control exposure from ingestion and dermal contact. Alternatives 5 and 6 are the only alternatives that would result in the decontamination of a significant volume of soil. These two alternatives (5 and 6) are effective in reducing and controlling exposure pathways both on site and off site by treatment and capping. Alternatives 9 and 10 remove most of the contamination from the site, thereby reducing and controlling exposures at the site.

9.1.2 Compliance with ARARs

This criterion addressed whether each alternative meets the chemical-specific, location-specific, and action-specific ARARs identified for the site.

Alternatives 1, 2, 3 and 4 do not comply with ARARs. These alternatives do not comply with the TSCA disposal requirements for soil containing greater than 50 ppm PCBs. The onsite disposal area in Alternatives 3 and 4 will not meet the TSCA chemical waste landfill requirements and would not qualify for a TSCA landfill waiver. PCB concentrations above 50 ppm in soil consolidated into a waste containment area would also invoke relevant and appropriate Alaska chemical waste landfill requirements.

All remaining alternatives (Alternatives 5, 6, 9, and 10) comply with ARARs. Some of these alternatives, 5 and 6, would comply with RCRA Land Disposal Restrictions with a Treatability Variance for the soil contaminated with a California list waste (PCB). Alternatives 5, 6, 9, and 10 would comply with the TSCA chemical waste landfill requirements with a TSCA landfill waiver. These alternatives would qualify for a waiver because treatment or offsite treatment and disposal would reduce the maximum concentration of PCBs so that the remaining soil would not pose an unacceptable threat under the selected long term controls. None of these alternatives would require a SARA ARAR waiver.

Because Alternatives 1, 2, 3, and 4 do not meet the Threshold Criteria for protection of health and the environment these alternatives will not be considered further.

9.2 Primary Balancing Criteria

For those alternatives satisfying the threshold criteria, five primary balancing criteria are used to evaluate other aspects of the potential remedies. Not single alternative will necessarily receive the highest evaluation for every balancing criterion. This phase of the comparative analysis is useful in refining the relative merits of candidate alternatives for site clean up. The five primary balancing criteria are: long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost.

9.2.1 Long-Term Effectiveness and Permanence

This criterion addressed the results of each alternative with respect to the risk remaining at the site after the conclusion of the remedial action. Evaluation of this criterion includes an assessment of the magnitude of the residual risk from untreated waste or treatment residuals. It also includes an assessment of the adequacy, reliability, and useful life of any controls that are to be used to manage hazardous substances that remain on site after the remediation.

The action alternatives are all adequate with respect to long-term effectiveness and permanence. Treatment and removal alternatives have the best long-term permanence with

Alternatives 5 and 9 being preferable to Alternatives 6 and 10 because less contamination remains after the remedial actions are completed.

The treatment alternatives, 5 and 6, are the most protective since the concentration of PCBs in the residual soil after treatment is reduced. Lead and the PCB residual soils undergo a further protective step by a solidification/stabilization process. Both of these treatment steps help to control the long-term release of contaminants to the environment and reduce exposure. Consolidation and capping the treated soils increases long-term effectiveness by reducing potential leaching of contaminants into groundwater which improves the long-term management of the contained residuals for permanence.

9.2.2 Reduction of Toxicity, Mobility, or Volume through Treatment

Evaluation of this criterion included: an assessment of the treatment processes to be employed by each remedial action and the types of wastes they would treat; the amount of waste that would be destroyed or treated; the projected amount of reduction in toxicity, mobility, or volume; the degree to which the treatment is irreversible; and the types and quantities of residuals that would remain after treatment. Also considered in this assessment is whether the alternative would satisfy the expressed preference of the Superfund Amendments and Reauthorization Act (SARA), Section 121, for remedial actions that reduce toxicity, mobility, or volume of hazardous waste.

Onsite treatment (Alternatives 5 and 6) ranks highest with respect to the criterion for reduction in toxicity, mobility, and volume. These are the only alternatives that use treatment processes to reduce the toxicity and mobility of contaminated soil. Alternative 5 is the preferred alternative of the treatment options with respect to this criterion because it would result in a greater reduction in toxicity, and mobility of contaminated soil.

9.2.3 Short-term Effectiveness

The potential health effects and environmental impacts of each alternative action during construction and implementation were evaluated by this criterion. The factors assessed in this evaluation include the protection of the community and site workers during implementation and construction, environmental impacts during implementation, and the estimated time required to meet cleanup standards.

All remaining alternatives (5 through 10) would have short-term impacts resulting from the excavation and handling of contaminated soils. All require similar amounts of excavation, onsite soil handling, and time to implement. Alternatives 5 and 6 have the most soil handling because of the onsite treatment processes. Impacts from excavation and

handling can be mitigated by air monitoring, dust suppression, and worker safety clothing and equipment.

Transportation risks are the greatest for Alternatives 9 and 10 because nearly all of the contaminated soil is removed from the site and transported to a disposal facility.

9.2.4 Implementability

This criterion evaluated the terms of technical and administrative feasibility and the availability of services and materials to accomplish the remediation. Technical feasibility includes relative ease of installation or constructability; the ease of additional remediation, if necessary; and the ease of monitoring the effectiveness of the remediation. Administrative feasibility addresses the degree of procedural difficulty anticipated for each alternative in permitting and institutional requirements.

Alternative 9 would be the easiest to implement, followed by Alternative 10, with Alternative 9 being the more reliable. The implementability of Alternatives 5 and 6 is difficult to assess without the results of a pilot study, although this process has proven feasible at a variety of other hazardous waste sites. Nevertheless, the complexities involved in onsite treatment would make implementation of Alternatives 5 and 6 more involved than the other alternatives.

9.2.5 Estimated Costs

Consistent with EPA guidance, the cost analysis for each alternative consisted of an order-of-magnitude estimation (accurate to a range from +50% to -30%) of capital, O&M and present worth costs determined for 30 years at a 7 percent discount rate. Table 9-1 summarizes the estimated costs and time required to implement for the range of alternatives. The estimates are based onquotes from vendors and contractors, conventional cost estimating guides, generic unit prices, and prior experience in the area. They are intended as a guide in evaluating the alternatives based on information available at the time of the estimate. Actual costs would depend on true labor and material costs, final scope, schedule, and actual site conditions.

Table 9-1

Estimated Costs of Remedial Alternatives
Arctic Surplus Salvage Yard
Fairbanks, Alaska

	Alternative	Estimated Costs (Millions of Dollars)			Implementation Time Frame
		Cost to Build	Operation & Maintenance	30-Year Present Worth Cost[a]	
1	No Remedial Action	$ 0	$ 0	$ 0	0
2	Institutional Controls, Monitoring, and Off-Site Soil Removal	$ 0.3	$ 2.9	$ 1.5	1 month
3	Capping and Off-Site Soil Removal	$ 8.5	$ 2.6	$ 9.6	8 months of operations over a 16 month period
4	Consolidation and Capping	$ 8.8	$ 2.7	$ 10.0	9 months of operations over a 25 month period
5	Solvent Extraction and On-Site Solidification/Stabilization	$ 16.8	$ 2.7	$17.9	11 months of operations over a 25 month period
6	Solvent Extraction and On-Site Solidification/Stabilization of Hot-Spot Soils, with Consolidation and Capping of Remaining Soils	$ 14.0	$ 2.7	$ 15.1	12 months of operations over a 28 month period
7	(Eliminated From Consideration)	--	--	--	--
8	(Eliminated From Consideration)	--	--	--	--
9	Off-Site Treatment and Disposal	$ 17.6	$ 2.0	$ 18.6	11 months of operations over a 27 month period
10	Off-Site Treatment and Disposal of Hot-Spot Soils, with Consolidation and Capping of Remaining Soils	$ 15.4	$ 2.5	$ 16.4	11 months of operations over a 27 month period

[a]The 30-year present worth is the total cost over 30 years in terms of today's dollars.

The costs for the various alternatives range from $1.5 million for Alternative 2 (institutional controls and monitoring and off-site soil removal) to $18.6 million for Alternative 9 (complete off-site disposal). The least expensive of the alternatives that are responsive to the cleanup standards is Alternative 3 (capping), which is estimated to cost $9.6 million. Alternatives 5 and 6 (onsite treatment) are estimated to cost $17.9 million and $15.1 million, respectively, and Alternative 10 (partial off-site disposal) is estimated to cost $16.4 million. Alternative 6 is the least expensive alternative over a projected 30 years of operation.

9.3 Modifying Criteria

The modifying criteria are used in the final analysis of remedial alternatives and are generally considered in altering an otherwise viable alternative rather than deciding between very different alternatives. The two modifying criteria are state acceptance and community acceptance.

9.3.1 State Acceptance

The State of Alaska, Department of Environmental Conservation, has been involved with the review of the Remedial Investigation, Feasibility Study, and Proposed Plan for the site. The State concurs with the treatment options of Alternatives 5 and 6 because they provide for more permanence and a preference for treatment than simply capping the contaminated soil. The treatment alternatives provide nearly the same protection to health and the environment as disposal of contaminated soil off site (Alternatives 9 and 10). A concurrance letter from the state is included in Appendix B.

9.3.2 Community Acceptance

EPA carefully considered the comment submitted during the public comment period. The EPA response to the comment is included in the attached Responsiveness Summary. The single comment was from one of the PRPs. The local community has been kept informed throughout the process by fact sheets and meetings.

10.0 THE SELECTED REMEDY

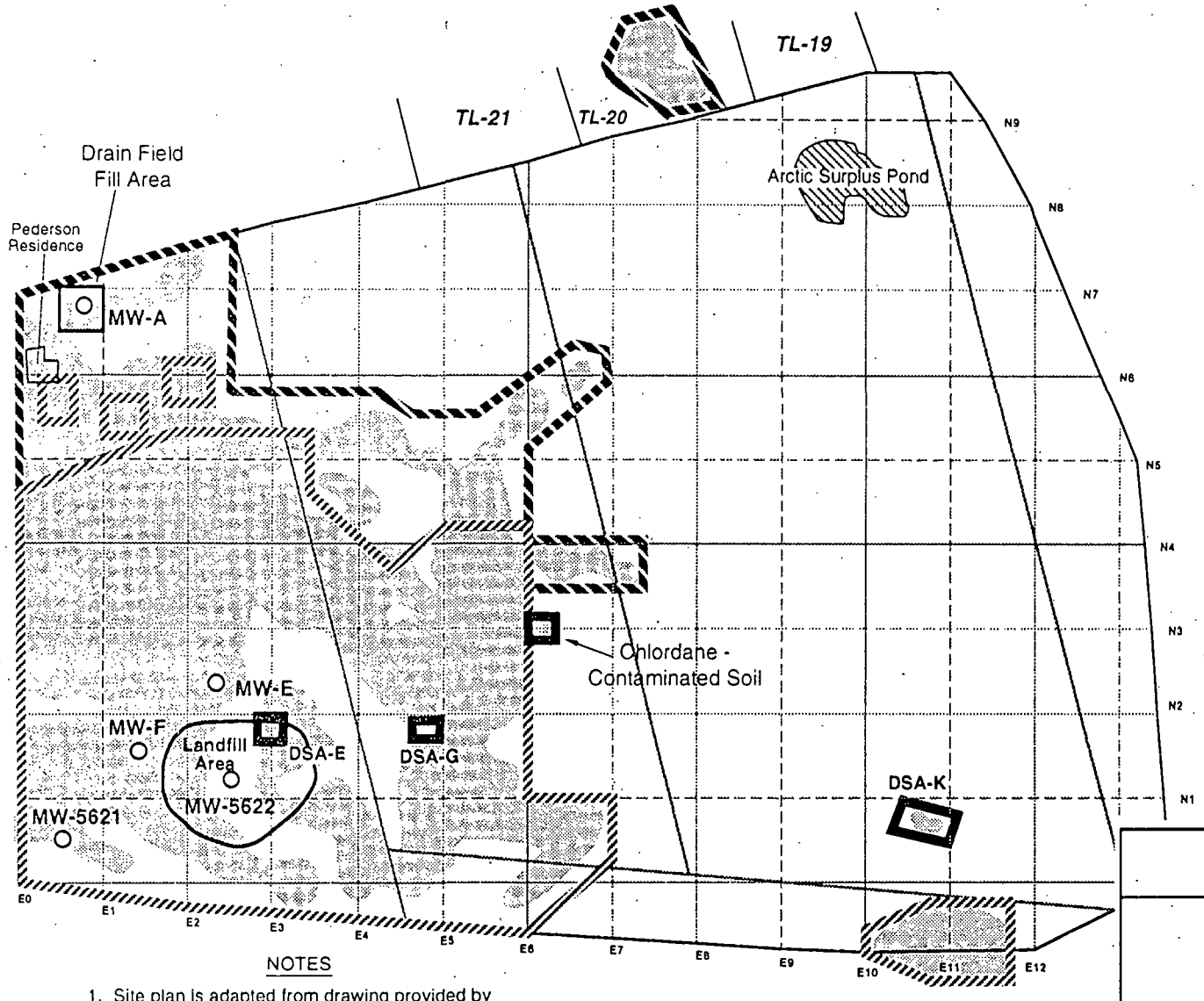
EPA has selected Alternative 6, Hot Spot Soil Treatment, Consolidation, and Capping, as the Selected Remedy for the Arctic Surplus Site as a result of the alternative evaluation in Section 9.0. This alternative protects human health and the environment and is one of only two alternatives that results in the decontamination of a significant volume of soil. Furthermore, it is the most cost effective when compared to other alternatives that involve treating or excavating soil with the same or greater contaminant levels.

Excavating contaminated soil and treating for the PCBs (TSCA waste) and lead (RCRA waste) allows for the treated soils to be consolidated on site. Treatment of the PCB soil by a solvent extraction process will reduce the concentration of PCBs below the TSCA and state regulated control of 50 mg/kg. The lead will be treated by solidification/stabilization to keep it from failing the RCRA characteristic test (TCLP) for lead. By treating the contaminated soils, the consolidated soils that will be placed under the protective low-permeability cap will not be subject to RCRA hazardous wastes disposal requirements, nor State of Alaska Hazardous and Chemical Wastes disposal regulations. The design of the capped area will meet RCRA and state standards for solid and chemical waste landfills. The exposed soil remaining after the clean up will meet the cleanup standards for residential use outside of the current fence and industrial use for the area inside the current fence. The soil on the surface of the cap will be clean and access to the containment area will be restricted by new fencing to prevent breaching of the cap and exposing the treated and consolidated soils which could represent a source for recontamination of the site.

None of the alternatives included removal of the scrap metal or other useable/recyclable material that is currently on the site, since this material was not a source of the contaminants. The only way to allow for the continued use of this material was to make it accessible in an area which will not interfere with completed remedial actions. Therefore, the decontamination of the scrap by soil removal and moving it to "clean" soil areas was a consideration in the selection of this remedy and other alternatives. The industrial use classification of the site will allow operational access to the salvageable material. The consolidated and capped area will occupy only small section of the site.

10.1 Description of the Selected Remedy

For the Selected Remedy, (illustrated in Figures 10-1 and 10-2), soil containing PCBs above 50 mg/kg (Hot Spot) will be treated by solvent extraction, solidified/stabilized if necessary for lead contamination, consolidated and placed over the old military landfill and capped. The PCB contaminated soil that is treated will have to be treated to below 50 mg/kg to be considered treated. Soil with PCB concentrations between 10 and 50 mg/kg (or between 1 and 50 mg/kg for soil outside of the fence) will not require treatment by solvent



LEGEND

- Area Containing COPCs in Soil Above the PRGs
- Area Containing COPCs at Levels Requiring Treatment
- Approximate Extent of Soils to be Excavated and Treated On Site
- Approximate Extent of Soils to be Excavated and Transported Off Site for Treatment/Disposal
- Approximate Extent of Soil to be Excavated and Consolidated On Site
- MW-E Existing Monitoring Well to be Abandoned

NOTES

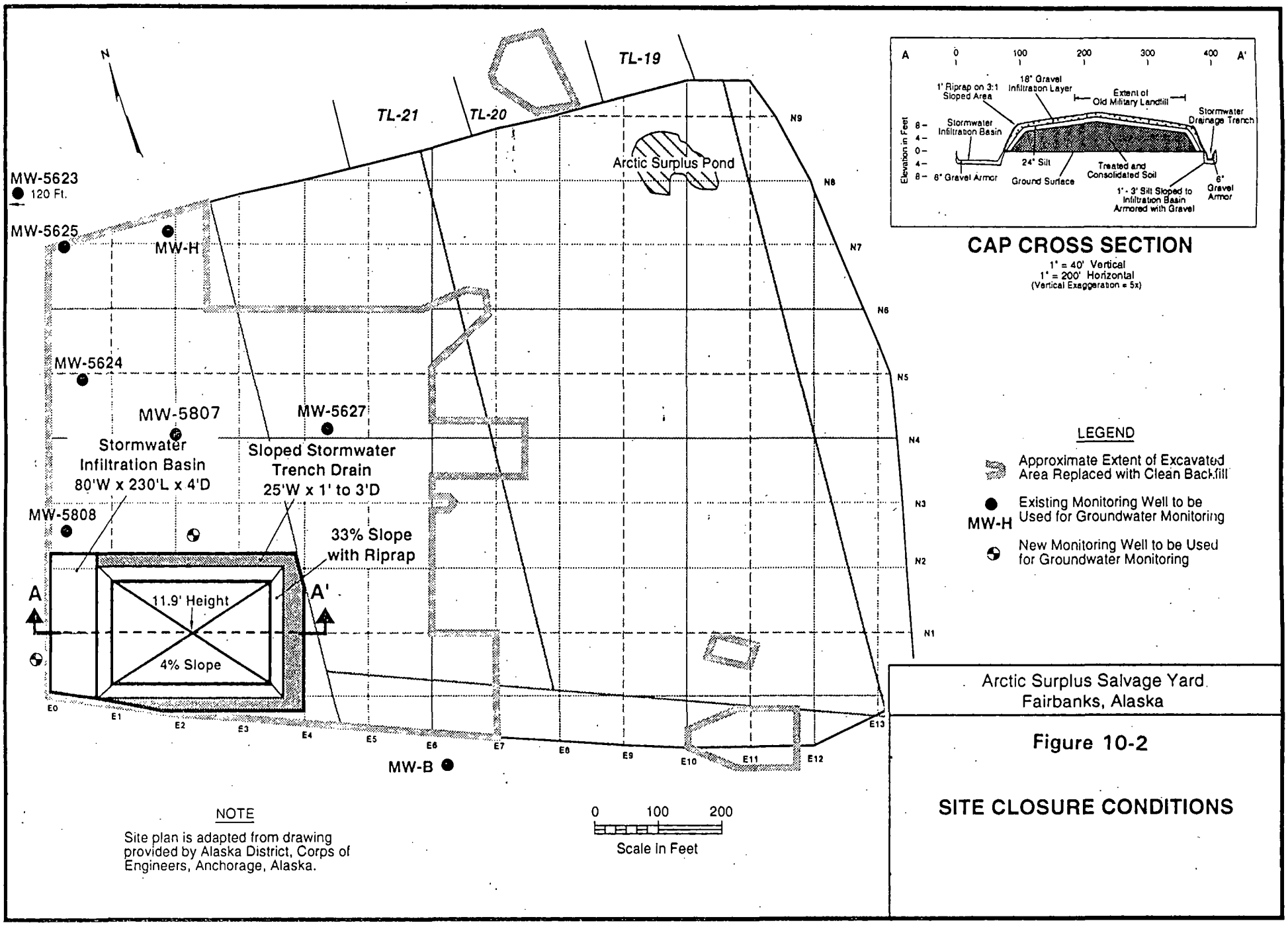
1. Site plan is adapted from drawing provided by Alaska District, Corps of Engineers, Anchorage, Alaska.
2. Extent of contamination is based on concentrations detected in soil samples collected from 1989 through 1993.
3. See Figure 4-4 and Section 4.2.6 for debris relocation approach.

0 100 200
Scale in Feet

Arctic Surplus Salvage Yard
Fairbanks, Alaska

Figure 10-1

REMEDIAL ACTION REQUIREMENTS



Arctic Surplus Salvage Yard
Fairbanks, Alaska

Figure 10-2

SITE CLOSURE CONDITIONS

extraction, but may require stabilization for other contaminants prior to consolidation and capping.

Lead in soil within the fenced area greater than 1000 mg/kg (Hot Spot) will be treated by solidification/stabilization. Lead in soil outside the fenced area greater than 400 mg/kg will be excavated and consolidated in the onsite containment unit. Small amounts (concentrations below cleanup standards) of other soil contaminants that are commingled with the Hot Spot soil will be treated in the same processes. The organics will be treated by solvent extraction, and the other inorganics will be stabilized/solidified, prior to consolidation and capping. The soil that is left on the surface after the excavation of the contaminated soil will be tested for all COCs before any backfilling, *etc.* can be done. Pesticide- (part of Primary Drum Storage areas and area K, Figure 2-1) and dioxin/furan-contaminated (at location of removed Incinerator #1, Figure 2-1) soil that was identified in several small areas will be transported off site to a RCRA-permitted facility for treatment and disposal by incineration. For more detail on the cleanup standards, see Section 7.2.

The main components of the Selected Remedy are listed and then are described below:

- Relocation and processing, including decontamination, of salvage material and debris that must be moved to provide access to the contaminated site soil;

- Excavation of contaminated soil and stockpiling for treatment or disposal. Soils outside of the current fenced area with contaminant concentrations above 400 mg/kg lead or 1 mg/kg PCBs; and soils inside the fenced area with concentrations above 1000 mg/kg lead, 10 mg/kg PCBs, or chlorinated dioxin/furans above risk-based levels of concern will be excavated;

- Treatment of contaminated soil exceeding 50 mg/kg PCBs by solvent extraction, and solidification/stabilization of soils exceeding 1000 mg/kg lead. Pesticides and dioxin/furans will be transported to an offsite permitted disposal facility;

- Consolidation of both the contaminated and treated Hot Spot soils into a containment area over the old, closed landfill located in the southwestern part of the site;

- Capping of the soil in the containment area and the existing landfill with a TSCA chemical waste landfill cap; and,

- Institutional controls including long-term groundwater monitoring, operation and maintenance of the fences and cap; and restrictions to prevent use of groundwater, to maintain a current industrial use, and to prevent any unauthorized access or use of the capped area.

10.1.1 Debris Relocation and Material Processing

Debris and salvage material relocation is part of the remedy. Since much of the contaminated soil lies beneath piles of scrap metal and recyclable/useable material, the scrap must be moved, and decontaminated if necessary, to allow access to the contaminated soils. Metal and debris relocation areas will have to be defined on the work plans. All relocations must be to areas that are not contaminated above cleanup standards.

10.1.2 Soil Excavation

After surface debris relocation, excavation of contaminated soil with concentrations above the cleanup standards will be accomplished in stages in any given area. Initially, the first six inches of soil and any remaining debris will be removed from areas found to be contaminated by previous sampling or additional soil testing. Field contaminant screening of the excavated area will be performed to determine whether the remaining soil is below the cleanup standards. Both field screening and confirmation laboratory analyses will be performed to demonstrate attainment of cleanup standards. The excavated soil will be screened to remove oversize material, and then stockpiled for on-site treatment and/or disposal. Oversized material will have to be decontaminated or consolidated in the containment area to be left on site. Pesticide- and dioxin/furan-contaminated soil will be disposed off site.

10.1.3 Onsite Treatment, Containment, and Disposal

It is anticipated that treatment of the contaminated soil will not begin until the second field season, and will continue in the third field season of the remedial action. The contaminated soil exceeding 50 mg/kg PCBs will be treated on site. The contaminated soil that does not exceed 50 mg/kg PCBs may be consolidated on site, but potentially will require stabilization for the commingled lead contamination.

The soil treatment will consist of a two-step process; solvent extraction and solidification/stabilization. A small scale treatability study was done to verify the effectiveness of solvent extraction process on the site soils. The solvent extraction process uses a solvent to separate contaminated soil into contaminated PCB oil, water, and solid fractions. The solvent is recycled in the process, and the oil with PCBs and organics will be shipped off site to be incinerated at a permitted facility. Recovered water is of a distilled quality and can be discharged or used to adjust the moisture content of the treated soil, as necessary, for solidification/stabilization. The solid fraction would be consolidated as a RCRA treated waste (for PCBs) in the onsite containment area.

The second step in the treatment process involves mixing a standard construction binder and water with the dry soil derived from the solvent extraction step and lead contaminated soils that were not treated by the solvent extraction process. This mixing process is to stabilize and/or solidify the lead (and other inorganics) contaminated soils. The purpose is to reduce the leachability of the lead so that it does not fail the TCLP test. The treated, stabilized/solidified soil will be analyzed to confirm that it is no longer a RCRA "characteristic waste". Clean water will be added to the treatment process only to enhance the hydration and compactability of the soil. Once treated, the stabilized soil will be placed over the old military landfill and adjoining area to solidify. Clean fill will be placed over it and sloped to drain in preparation for construction of the soil cap.

Stabilization has been most widely successful when applied to inorganic waste streams. The waste slurry or sludge may be pretreated to adjust pH and insolubilize heavy metals, thereby reducing their mobility. The high alkalinity of most cements and setting agents will serve to neutralize acidic leachate, keeping heavy metals in their insoluble, less mobile form.

Critical parameters in stabilization treatment include selection of stabilizing agents and other additives, the waste-to-additive ratio, mixing, and curing conditions. All of these parameters depend on the chemical and physical characteristics of the waste, and will be adjusted to suit site soil conditions during full-scale testing.

10.1.3.1 RCRA Land Disposal Restrictions Treatability Variance

PCBs alone are not considered hazardous under RCRA, however the RCRA Land Disposal Restrictions (LDRs) do address PCBs under the California List provisions in cases where PCBs are mixed with a waste that is hazardous under RCRA. Under the RCRA LDR regulations, non-liquid hazardous wastes containing halogenated organic carbon (HOC) total concentrations greater than 1000 parts per million (ppm) must be incinerated, or obtain a Treatability Variance (40 CFR 268.44), prior to land disposal. PCBs are on the list that defines HOCs subject to the California List requirements. Consequently, soils at Arctic Surplus contaminated with PCB concentrations equal to or above 1000 ppm, that are also RCRA characteristic wastes for lead (RCRA waste code D008), are banned from land disposal unless the soil is first incinerated or qualifies for a treatability variance.

The NCP and EPA guidance state that a Treatability Variance is available to comply with the LDRs when a Superfund waste differs significantly from the waste used to set the LDR treatment standard such that the best demonstrated available technology used to set the standard is inappropriate for the waste. The LDRs for the California list wastes are based on treating less complex matrices of industrial process wastes, not soil. In addition, incinerating large qualities of soil with high levels of lead and PCBs is inappropriate because such treatment can result in unacceptably high levels of lead emissions.

The Selected Remedy will comply with the LDRs for HOCs (PCBs) through a Treatability Variance for the contaminated soil. The selected PCB treatment process will treat all PCB contaminated soil so that the soil will contain less than 50 mg/kg PCBs after treatment. This level of treatment will ensure at least a 95% reduction of the PCBs for soil subject to the California List requirements. This percentage reduction in PCB concentrations is consistent with the percentage reduction range listed in Highlight 2 of EPA guidance document *Superfund LDR Guide #6A (2nd Edition): Obtaining a Soil and Debris Treatability Variance for Remedial Actions*, OSWER Number 9347.3-06FS, September 1990. No Treatability Variance is being granted for characteristic lead LDR standard, nor for the non-soil solvent extracted treatment residual.

10.1.3.2 TSCA ARARs and TSCA Waiver of Chemical Waste Landfill Requirements

The applicable TSCA requirements for the soils at the Arctic Surplus site require that any non-liquid PCBs at concentrations of 50 ppm or greater be disposed of in a TSCA-approved incinerator, or in a TSCA approved chemical waste landfill (40 CFR 761.60(a)(4)), or by a TSCA approved alternative disposal method (40 CFR 761.60(e)). The alternative disposal methods can be used without long-term management of treatment residuals if the alternative disposal method can be shown to achieve a level of performance equivalent to incineration. EPA's guidance states that an equivalent level of performance requires that the solid treatment residuals contain less than or equal to 2 ppm PCBs, using a total waste analysis. Because the treated soil at this site will achieve a level of 50 ppm or less of PCBs, long-term management of the treated soil will be required. Such long term management of the treated soil needs to be considered, under the TSCA regulatory framework, as closure of an existing unit consistent with TSCA chemical landfill requirements.

The TSCA chemical waste landfill requirements (40 CFR 761.75(c)(4)) allow a waiver of any of the requirements as long as operation of the landfill will not present an unreasonable risk of injury to health or the environment. This selected remedy will be complying with following TSCA landfill requirements through a TSCA waiver: the requirement for a bottom liner, depth to groundwater, leachate collection system; and surface water monitoring. Such a waiver is appropriate at this site because only soils with relatively low concentrations (less than 50 ppm PCBs) will require long-term management. In addition, the selected remedy includes: solidification/stabilization of the treated soil; implementation of a groundwater monitoring program; design, installation and maintenance of a protective cover system; restricted access; fencing; and land use and institutional controls. This remedy is protective of human health and the environment; complies with EPA's guidance on long-term management controls of PCBs at Superfund sites; and will not present an unreasonable risk of injury to health or the environment.

10.1.4 Capping

The consolidated excavated soil and cap will be configured to occupy the southwest corner of the site, leaving the remainder of the site available for industrial use (Figure 10-2). The low-permeability cap will be constructed to cover all of the consolidated soil and the underlying old military landfill. It will be constructed in accordance with state and federal chemical waste landfill disposal regulations. A schematic cross section of a soil cap is shown in Figure 10-2. A 2-foot-thick silt layer (low permeability layer) will be placed directly over the stabilized soil. The silt (with possible soil amendments) will be compacted to provide a permeability of 10^{-7} cm/sec or less. (The low permeability layer may also be accomplished by a geomembrane material with the same permeability criteria. A geomembrane may have specific layers of select soils on either side of the membrane to protect it from puncture.) An 18-inch-thick armoring and erosion control layer of pit run gravel will be placed over the low permeability layers. The outermost part of the cap will be sloped at 33 percent to reduce the overall footprint and to make the cap less useable (less likely to be used for storage of salvage materials). This slope will be covered with a one-foot thick layer of riprap for erosion protection. The cap will be designed for the extreme freeze-thaw cycles that can exist in this area.

Runoff water (noncontact with the stabilized, consolidated soils) from the cap will be directed through the gravel to a lined perimeter drain. This drain will be sloped to an infiltration basin designed to contain the typical maximum runoff event. The basin will be located downgradient from the old military landfill to prevent the cap runoff from recharging to the aquifer directly upgradient of the landfill.

By placing the containment area over the old landfill, the cap will be just as effective for the old landfill as it will be for the consolidated, stabilized soil.

10.1.5 Institutional Controls, Operations, and Maintenance

Institutional controls limiting future land use will be part of this remedy. Deed restrictions, covenants, local ordinances, or other methods may be used to prohibit future residential use of the entire site within the current fence. Institutional controls may also be used to prohibit any future use of the capped area without proper state environmental agency (ADEC) approval. Also, a restriction may be necessary to prohibit groundwater use in parts of the aquifer that contain site-derived contaminants at concentrations above the health-based or MCL standards. The conceptual design of this remedy utilizes excavation of contaminated soils, treatment, and consolidation of treated residual soils to reduce any unacceptable health-based exposure and allows for access to most of the site. Having the treated soils in a compact, consolidated area allows for easier inspection and maintenance of the capped area.

The existing site fence will provide sufficient access control for those parts of the site where industrial use will be permitted. However, new fencing will be installed to control access to the capped area. These fences will be periodically inspected and maintained to restrict access. The landfill cap and stormwater drainage/infiltration system will also require periodic inspection and maintenance to preserve their effectiveness in preventing direct exposure to treated soil and in reducing the amount of infiltration through the treated soil and landfill.

10.2 Groundwater Monitoring

Approximately eight wells, as shown in Figure 10-2, will be monitored regularly on an EPA approved schedule, with the possible addition of new monitoring wells (not shown) in the area downgradient from the northwest corner of the site and downgradient from the landfill. A Long-Term Groundwater Monitoring Plan will have to be developed as part of the Operations and Maintenance Plan to provide details of the groundwater monitoring schedule, who will be implementing the monitoring, and how modifications, including new monitoring wells, to the program can be made. If contaminants are detected in groundwater outside of the fence at concentrations greater than Federal Drinking Water Standards, EPA will be notified and the effectiveness of the remedial action will be evaluated.

It is assumed that groundwater monitoring will be continued for 30 years. This period could be shortened or lengthened depending on the groundwater monitoring results or the general condition of the site based on site performance reviews.

Site performance reviews will be required no less than every five years because hazardous materials will remain on site. These reviews will evaluate the effectiveness of the remedy and will include a review of the cap maintenance records and performance, changes in land use near the site, and the groundwater monitoring results. The purpose of the these

reviews will be to evaluate the adequacy of the site to protect human health and the environment, in accordance with CERCLA 121 (c).

11.0 STATUTORY DETERMINATIONS

The selected remedy satisfies the requirements under Section 121 of CERCLA and the NCP. The following sections discuss how the selected remedy meets these requirements.

11.1 Protective of Human Health and the Environment

The selected remedy is protective of human health and the environment. The current points of exposure include residential use through ingestion and inhalation of contaminated soil off-site and industrial exposures through ingestion and inhalation of contaminated soil inside the existing fence. Through treatment and containment, the selected remedy will reduce the concentrations of soil contamination to levels acceptable under federal and state guidelines.

The groundwater from outside the facility currently does not pose a risk to human health or the environment. Monitoring will be performed to ensure that the site does not pose a risk to offsite groundwater from migrating contaminants.

11.2 Applicable or Relevant and Appropriate Requirements

The action-specific, chemical-specific, and location-specific applicable or relevant and appropriate requirements (ARARs) for the selected remedy are:

- 40 CFR 261, RCRA Subtitle C Hazardous Waste Determination is applicable for identifying soil that must managed as hazardous waste.

- 40 CFR 264, Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities is applicable to the treatment of RCRA characteristic waste (*i.e.*, lead).

- 40 CFR 268, RCRA Land Disposal Restrictions is applicable and establishes the treatment levels that must be achieved prior to land disposal of:

  - RCRA characteristic waste (i.e., lead); and,
  - California List waste (i.e., nonliquid hazardous waste containing halogenated organic compounds [HOCs] in total concentrations greater than or equal to 1,000 mg/kg). The LDRs for the California List Wastes will be met through the RCRA Land Disposal Restriction Treatability Variance (see Section 10.1.3)

- 40 CFR 258 Subpart F, Criteria for Municipal Solid Waste Landfills is applicable for onsite landfill closure and post-closure care.

- 40 CFR 761.60 and 761.75, TSCA PCB Disposal Requirements and Chemical Waste Landfill Requirements is applicable to onsite disposal of PCB-contaminated soil.

- 40 CFR 141, Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs) is relevant and appropriate for establishing protective groundwater criteria.

- 40 CFR 300.440, Procedures for Planning and Implementing Offsite Response Actions is applicable to the offsite management of CERCLA waste.

- 18 AAC 60.410, Alaska Solid Waste Management Regulations is applicable for landfill closure.

The To-Be-Considered requirements for the selected remedy are:

- 40 CFR 761.120(c)(4)(v), TSCA PCB Spill Cleanup Policy is a to-be-considered criteria for cleanup of PCB-contaminated soil.

- EPA's Revised Interim Soil Lead Guidance for CERCLA Sites presents to-be-considered criteria for selection of cleanup standards of lead-contaminated soil.

- Alaska Interim Guidance for Non-UST Soil Cleanup Levels present to-be-considered criteria for selection of cleanup standards of contaminated soil.

- EPA's Superfund LDR Guide #6A *Obtaining a Soil and Debris Treatability Variance for Remedial Actions,* present to-be-considered criteria for selection of alternative LDR treatment levels for land disposal of California List waste (i.e., nonliquid hazardous waste containing halogenated organic compounds [HOCs] (PCBs at Arctic Surplus) in total concentrations greater than or equal to 1,000 mg/kg).

11.3 Cost Effectiveness

The selected remedy represents the most cost-effective of the alternatives in comparison to their overall effectiveness proportional to their costs. The selected remedy is not the least expensive, but does provide the best long-term permanence and risk protection by reduction of toxicity by use of treatment. This is considered the most effective solution given the costs of removal for offsite disposal.

11.4 Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

The United States Environmental Protection Agency, and the State of Alaska determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be used cost-effectively at the Arctic Surplus Site. Of those alternatives that are protective of human health and the environment and comply with ARARs, EPA and ADEC have determined that the selected remedy provides the best balance of trade-offs in terms of long-term effectiveness and permanence; reduction in toxicity, mobility, or volume achieved through treatment; short-term effectiveness; implementability; cost; and the statutory preference for treatment as a principle element and considering state and community acceptance.

11.5 Preference for Treatment as a Principal Element

The selected remedy satisfies the statutory preference for treatment by utilizing treatment as a main method to permanently reduce the toxicity, mobility, and volume of contaminated soil. Solvent extraction will reduce PCB toxicity and volume of the contaminated soil. Solidification/stabilization of the lead contaminated soil will reduce the motility of lead in the environment.

11.6 Modifying Criteria

There were no changes between the Preferred Alternative that was submitted for public comment in the Proposed Plan and the Selected Remedy.

RECORD OF DECISION

FOR

FINAL REMEDIAL ACTION
ARCTIC SURPLUS SUPERFUND SITE
FAIRBANKS, ALASKA

APPENDIX A

RESPONSIVENESS SUMMARY

SEPTEMBER 1995

RECORD OF DECISION
ARCTIC SURPLUS SUPERFUND SITE

APPENDIX A

RESPONSIVENESS SUMMARY

The purpose of this responsiveness summary is to summarize and respond to public comments submitted regarding the Proposed Plan for the remedy at the Arctic Surplus Superfund site located near Fairbanks, Alaska. The public comment period for the Proposed Plan was held from July 14 through August 14, 1995.

This responsiveness summary meets the requirements of Section 117 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA).

The Proposed Plan, issued July 11, 1995, by the U.S. Environmental Protection Agency (EPA) described the various cleanup alternatives that were considered for the clean up of the Arctic Surplus site. These cleanup alternatives were based on information collected during the EPA Removal actions and during the Remedial Investigation and Feasibility Study (RI/FS) actions conducted at the site. The purpose of the various actions was to develop knowledge about the site so that problems could be identified, stabilized, controlled, and mitigated using the Superfund processes. The RI/FS documents and Proposed Plan were available in two official information repositories; at the EPA Region 10 office in Seattle, and at the Defense Reutilization Marketing Office (DRMO) at Ft. Wainwright, across Badger Road from the site. A copy of the Proposed Plan, or a Fact Sheet describing the availability of the Proposed Plan both with the announcement of the public meeting was mailed to the list of interested parties developed as part of the Community Relations Plan.

A public meeting to discuss the range of alternatives and EPA's preferred alternative for the clean up of the Arctic Surplus site was held at the North Pole High School on July 26, 1995. Notice of the public comment period and meeting were published in the *Fairbanks Daily News Miner* on July 19, 1995. No comments on the Proposed Plan were received at the meeting. Written comments from the Defense Logistics Agency, a Potentially Responsible Party (PRP), were received during the public comment period. The EPA response to these comments follows.

Comment on Proposed Plan's Preferred Alternative

The Defense Logistics Agency (DLA) commented on EPA's proposed Alternative 6 as the preferred alternative in the Proposed Plan. DLA is asking that EPA reconsider Alternative 4 because they suggest that it would provide the same benefits to the community as Alternative 6 at a cost savings. The comment goes on to identify five ways that Alternative 4 would provide similar benefits as the EPA's Preferred Alternative. The primary difference between Alternative 4 and Alternative 6 is the treatment process that would be applied to the contaminated site soil. The comment suggests that the treatment process would increase costs, increase time to implement with an increase in potential short-term exposures during construction, and increase complexity because of the treatment technology and associated uncertainty involved with its implementation.

EPA Response to Comment

Federal regulations specify that a less effective cleanup action cannot be chosen simply because it is cheaper. However, if several alternatives are considered to be equally effective, EPA may select the least costly one.

EPA considers Alternate 4 less effective in protecting human health, welfare, and the environment than the preferred alternative, Alternative 6, as described in the Feasibility Study (FS) and Proposed Plan. EPA selected Alternative 6 because the solvent extraction treatment process would permanently reduce the toxicity and volume of PCBs left in the environment, and the stabilization/solidification treatment of the lead contaminated site soil would significantly reduce the mobility of the lead contained onsite. Stabilization and solidification processes generally increase the volume of the soil being treated, but this has been accounted for in the estimated size of the containment area. Both of these treatment processes would enhance the long-term permanence of the remedial actions. The remedial actions in Alternative 6 also satisfy the statutory preference for remedies that employ treatment that reduce toxicity, mobility, or volume as a principal element and utilize permanent solutions and alternative technologies to the maximum extent practicable. Both of these treatment processed would be employed on contaminated soil that exceed health-based and regulatory contaminant concentrations.

Alternative 4 does not appear to satisfy ARARs. Excavation of soils containing PCBs involks TSCA disposal requirements (40 CFR 761.60(a)) which requires disposal in a chemical waste landfill. Consolidation does not qualify as treatment for a TSCA landfill waiver. If the PCB concentration in the soil is greater than 50 ppm then the Alaska chemical waste landfill regulation may become relevant and appropriate.

The removal of toxicity and reduction of mobility of contaminants is preferable to simply consolidating and capping the contaminated soils. Although the consolidation and

capping actions are similar for both Alternatives 4 and 6, the treated soils would be less harmful to human health or the environment than the untreated soils. The treated soils would present less impact over the long-term from leaching and any direct exposure if the cap were breached. The treatment processes destroys PCBs and almost irreversibly reduces the mobility of lead, thereby permanently reducing the principal threats at the site.

The soil treatment processes do raise the cost of the site clean up, but EPA, in consultation with other agencies, has determined that Alternative 4 does not provide the same level of protectiveness as the preferred alternative, Alternative 6. EPA has also determined that the increased cost of treatment will allow for some reduced operations and maintenance costs since neither Resource, Conservation, and Recovery Act (RCRA) characteristically listed hazardous wastes, nor wastes containing Toxic Substances Control Act (TSCA) regulated concentrations of PCBs would be contained in the consolidated containment unit. Alternative 4 would not reveive a TSCA landfill waiver nor comply with the Alaska chemical waste landfill regulations which would translate into higher design and construction costs than estimated in the FS because RCRA and TSCA regulated wastes would be contained onsite.

The preferred alternative will require more time to implement and increase the potential short-term exposures during construction. Treatment processes are more complex than simply excavating and consolidating contaminated soil; however, solvent extraction and stabilization/solidification are proven technologies that have been successfully implemented at Superfund sites. A bench scale treatability study was done on contaminated site soils to evaluate the effectiveness of the solvent extraction process.

EPA believes that the increase in cost of Alternative 6 when compared with Alternative 4 is easily justified by the increased long-term permanence and reduction of toxicity and mobility of the site contaminants mitigated in the preferred alternative.

The primary reason that Alternative 4 cannot be selected is that it does not comply with ARARs and is therefore not sufficiently protective to human health or the environment as those remedies which comply with ARARs.

RECORD OF DECISION

FOR

FINAL REMEDIAL ACTION
ARCTIC SURPLUS SUPERFUND SITE
FAIRBANKS, ALASKA

APPENDIX B

STATE OF ALASKA CONCURRENCE WITH REMEDY

SEPTEMBER 1995

STATE OF ALASKA

TONY KNOWLES, GOVERNOR

RECEIVED
DEC 04 1995
SUPERFUND

DEPT. OF ENVIRONMENTAL CONSERVATION

OFFICE OF THE COMMISSIONER
410 Willoughby Ave., Suite 105
Juneau, AK 99801-1795

Telephone: 465-5066
Fax: 465-5070

November 28, 1995

Mr. Chuck Clarke
Regional Administrator, Region 10
U.S. Environmental Protection Agency
1200 Sixth Avenue
Seattle, Washington 98101

Re: Record of Decision, Arctic Surplus Salvage Yard

Dear Mr. Clarke:

The Alaska Department of Environmental Conservation has reviewed the Record of Decision for the Arctic Surplus Salvage Yard located on Badger Road in Fairbanks, Alaska. We have been involved with the development of the cleanup solutions for the site during our review of the removal actions, remedial investigations, and feasibility study. We concur with the selected remedy which was presented to the public for review and comment. Concurrence by the Alaska Department of Environmental Conservation does not in any way constitute acceptance of responsibility, financial or otherwise, for achieving the remedial design/remedial action goals.

We recognize that contaminants will remain on the site, because removal is not cost effective. However, the treatment processes that will be employed during the cleanup phase will provide for long term protection of human health and the environment.

We are looking forward to the cleanup activities at this site.

Sincerely,

for Gene Burden
Commissioner

KK\LK\ha(G:\csites\sites\arctic.rod)

cc: Neil Thompson, EPA Seattle
Kalu A. Kalu, ADEC
Jennifer Roberts, ADEC

RECORD OF DECISION

FOR

FINAL REMEDIAL ACTION
ARCTIC SURPLUS SUPERFUND SITE
FAIRBANKS, ALASKA

APPENDIX C

INDEX TO THE ADMINISTRATIVE RECORD

SEPTEMBER 1995