

South Pad  
Chronology  
8/5/97

Preliminary Environmental Site Assessment by Woodward-Clyde  
Draft submitted to OSEA. No comment/criticism/response from  
OSEA. OSEA claimed draft status would shield NSB from  
Regulatory scrutiny. No final report. Contract closed.

8/17/97 Unsolicited Phase II ESA Woodward-Clyde  
No response from OSEA

8/13/99 RFP issued by OSEA  
Two page RFP, due on 9/24/99. Does not meet NSB Ordinance  
Requirements for RFP

8/25/99 Unsolicited Phase II ESA CH2M/Hill  
"Revised"

9/7/99 ATN submitted by OSEA with CH2M/Hill  
Stopped by CIPM

# DRAFT REPORT

## PRELIMINARY ENVIRONMENTAL SITE ASSESSMENT

### NSB SOUTH PAD

*Prepared for*

North Slope Borough  
Barrow, Alaska  
South Pad Staging Area

August 5, 1997

**Woodward-Clyde** 

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976023NA

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Appendix A. Field Checklists

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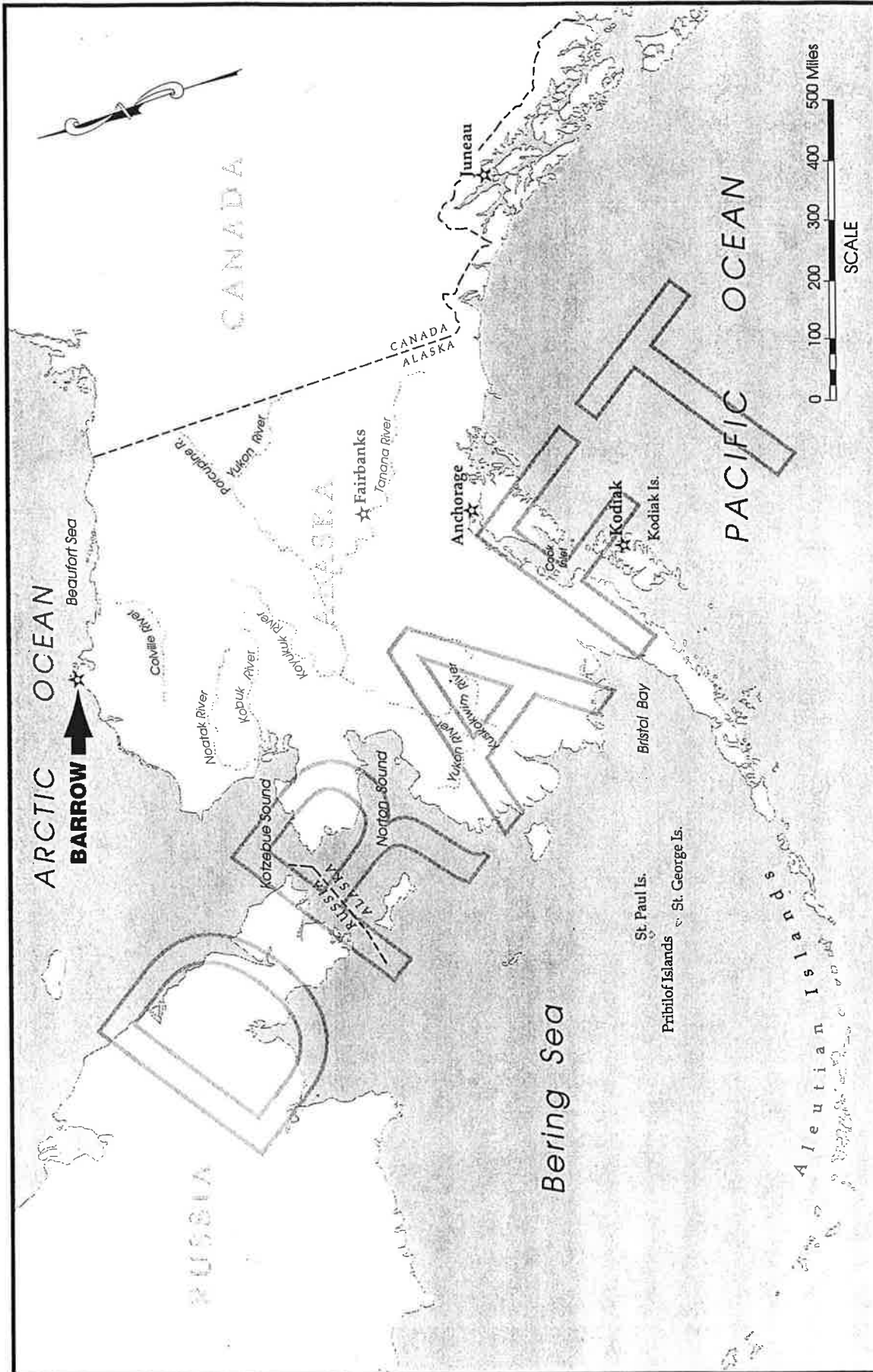
Appendix C. Resumes

## 1.1 PROJECT BACKGROUND

Woodward-Clyde International-Americas (Woodward-Clyde) was retained by the North Slope Borough (NSB) to conduct a Preliminary Environmental Site Assessment (PESA) of Lot 2 of Block B U.S. Survey #4615 within Sections 7, 12, and 13 of T22N, range R18W and R19W. The Property is located southwest of Barrow, Alaska (Figure 2).

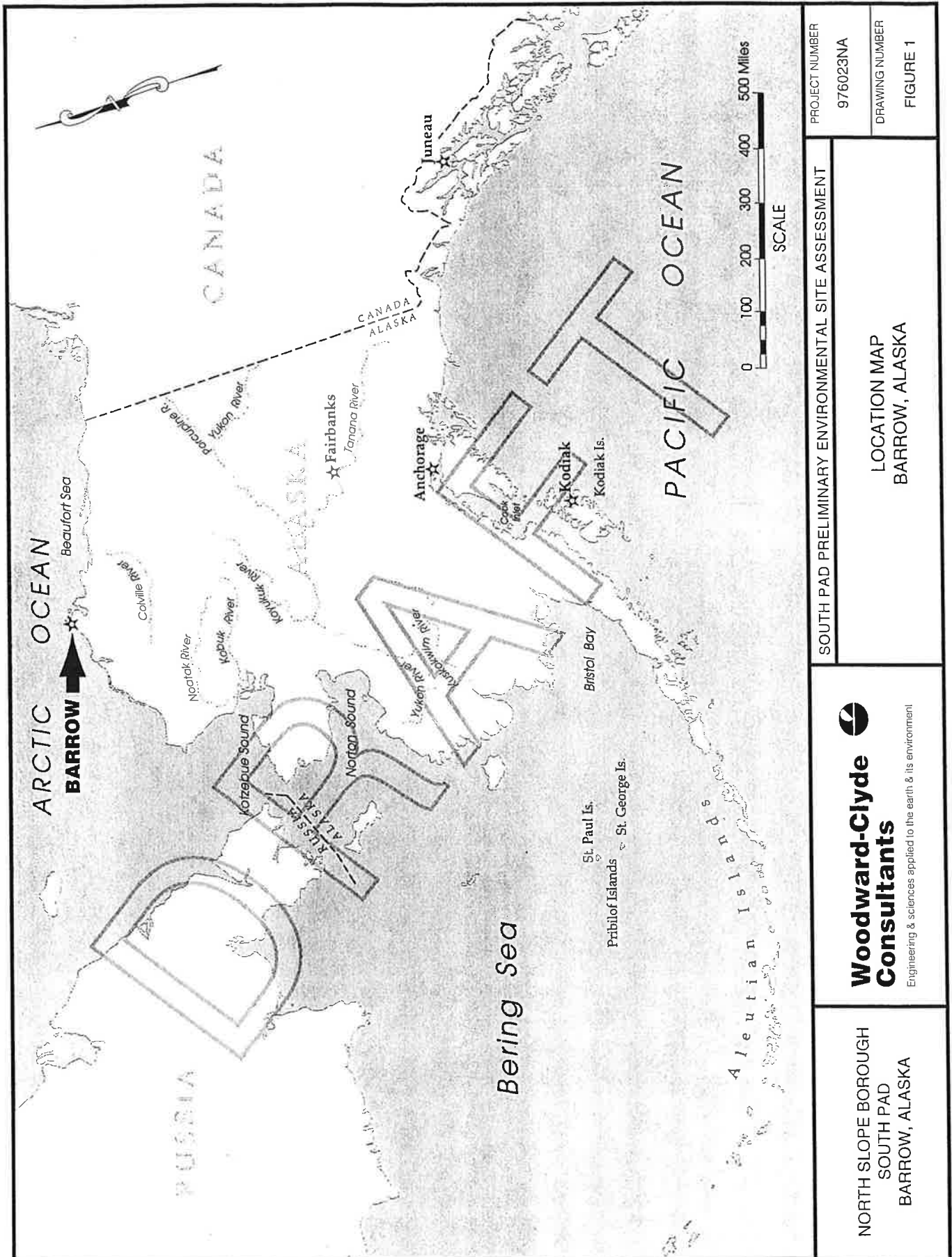
## 1.2 PROJECT OBJECTIVE

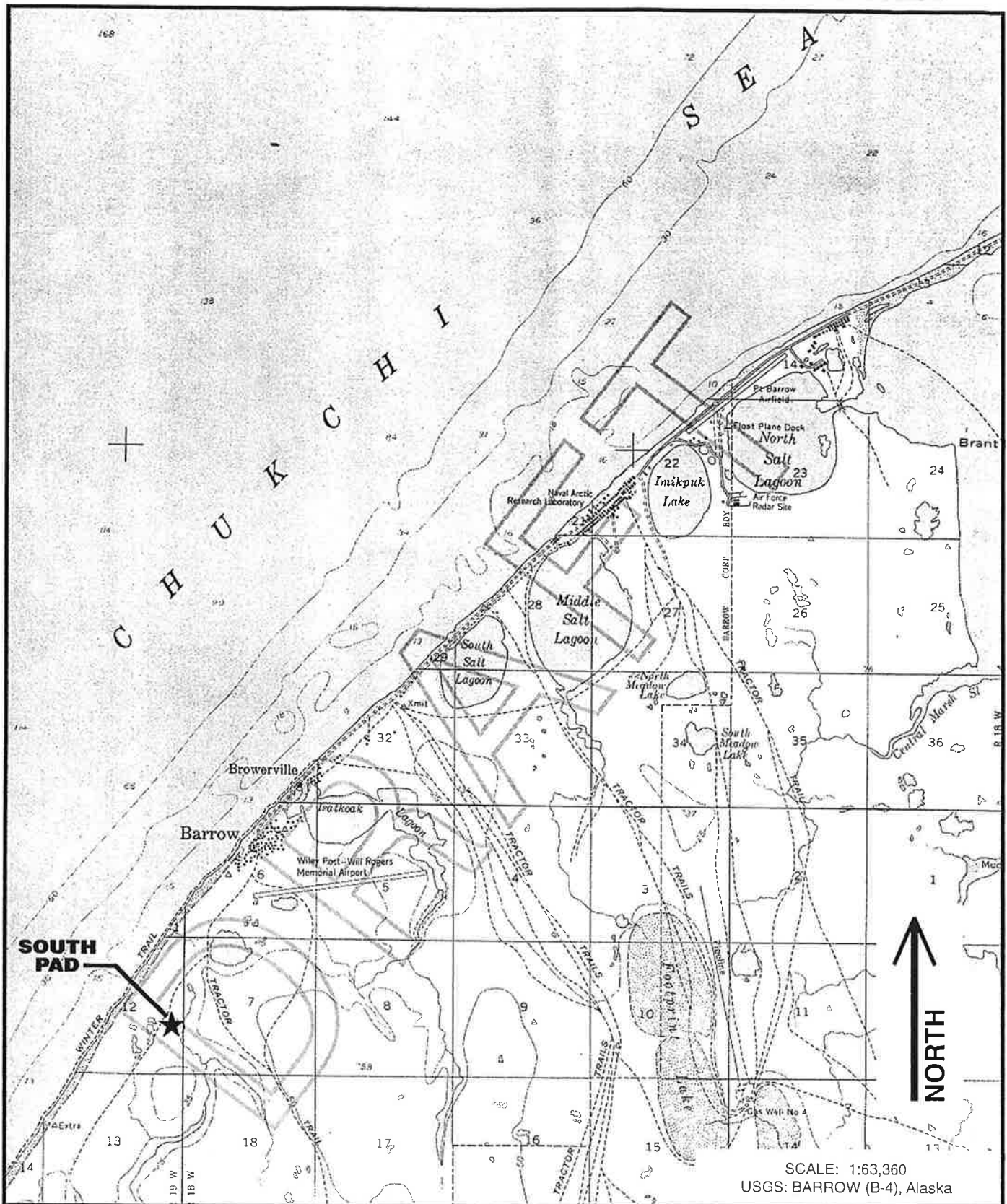
The objective of the PESA was to identify "recognized environmental conditions" that may exist on the Property. ASTM Practice E 1527, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, defines recognized environmental conditions as "the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property." The extent of research to identify recognized environmental conditions is limited by the scope of services, which is limited to the site reconnaissance and on site interviews. This project does not meet all of the ASTM requirements for a "Phase I" and shall be referred to as a "Preliminary" ESA.



NORTH SLOPE BOROUGH SOUTH PAD BARROW, ALASKA	SOUTH PAD PRELIMINARY ENVIRONMENTAL SITE ASSESSMENT		PROJECT NUMBER 976023NA
	LOCATION MAP BARROW, ALASKA		DRAWING NUMBER FIGURE 1

**Woodward-Clyde  
Consultants**  
Engineering & sciences applied to the earth & its environment





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Engineering & sciences applied to the earth & its environment

SOUTH PAD PRELIMINARY ENVIRONMENTAL SITE ASSESSMENT

VICINITY MAP  
BARROW, ALASKA

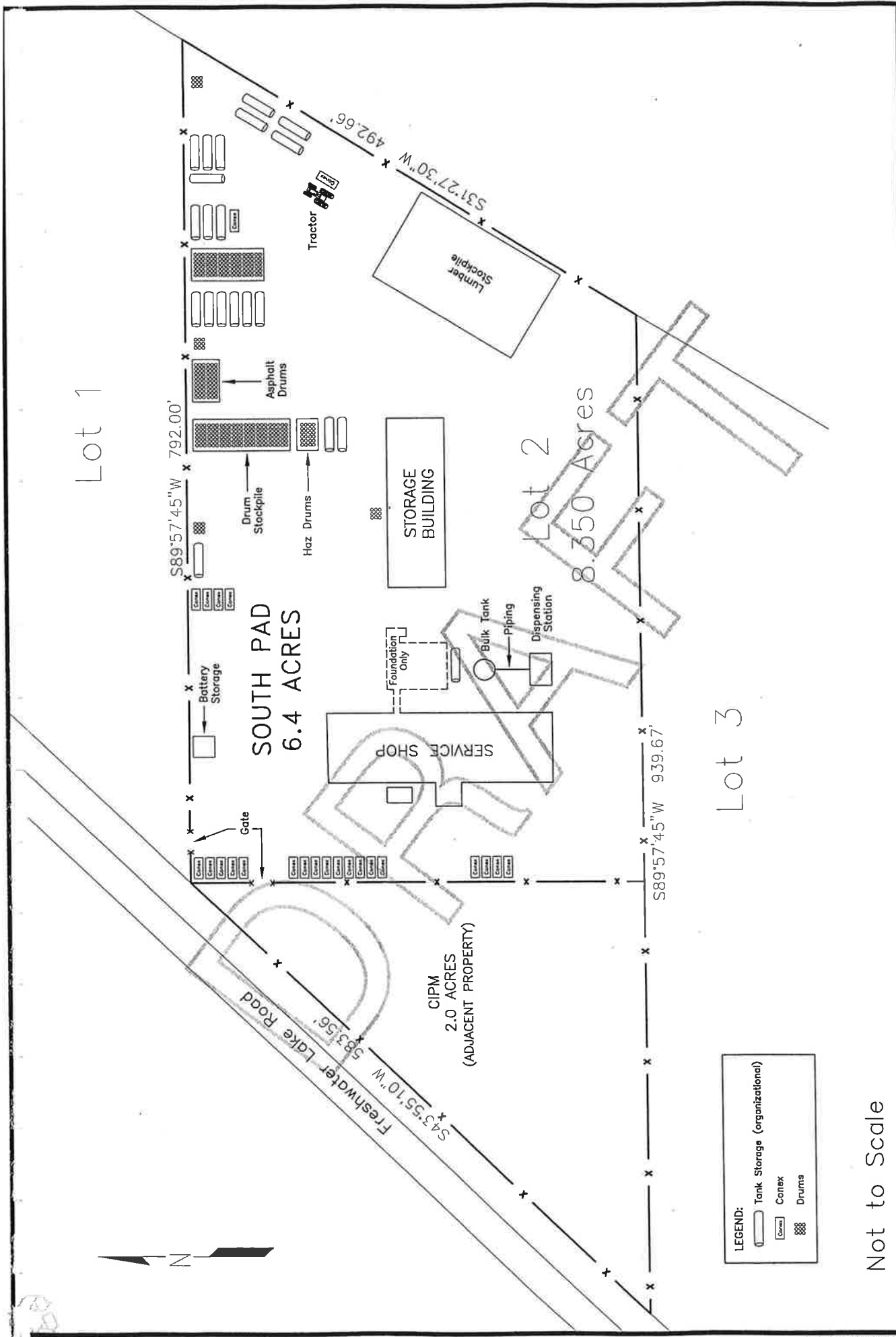
PROJECT NUMBER

976023NA

DRAWING NUMBER

FIGURE 2





**LEGEND:**

- Tank Storage (organizational)
- Conex
- Drums

Not to Scale

<b>NORTH SLOPE BOROUGH</b> <b>SOUTH PAD</b> <b>BARROW, ALASKA</b>	<b>Woodward-Clyde</b> <b>Consultants</b> <small>Engineering &amp; sciences applied to the earth &amp; its environment</small>		<b>SOUTH PAD PRELIMINARY ENVIRONMENTAL SITE ASSESSMENT</b>	PROJECT NUMBER <b>976023NA</b>
	<b>SITE MAP</b> <b>LOT 2 OF BLOCK B</b> <b>U.S. SURVEY NO. 4615</b>		DRAWING NUMBER <b>FIGURE 3</b>	

DESIGNED	DRAWN	CHECKED	PEER REVIEWER	PROJ. MANAGER	DATE
	AR	KN		TW	7/29/97



The scope of services conducted for this PESA consisted of the following tasks:

- **Site Reconnaissance** - A site reconnaissance was conducted by a Woodward-Clyde staff member experienced in hazardous materials surveys. Surface conditions and current activities on the Property and adjoining properties were observed. An inventory of potential contaminant sources on and adjoining the Property was completed on the basis of visual observations. No containers were opened or sampled. Private data sources included Woodward-Clyde's geologic, hydrogeologic, and hazardous waste project experience. No asbestos survey was conducted for this report. No hazardous or engineering assessment of the site's structure was conducted.
- **Evaluation, Analysis and Report** - Information collected during the above activities was evaluated and analyzed. This PESA report addresses our findings, and presents our conclusions and recommendations.

The PESA was performed in accordance with ASTM Practice E 1527 with several exceptions. As agreed in the Scope of Services, the historical records review portion of the PESA was deleted from the Practice. A records review would obtain and utilize information from public agencies to assess whether current and past property usage within the study area may have created a potential for contamination of the Property. Also deleted from the Practice is historical aerial photographs for characterization of past activities on and around the Property.

In addition to the above PESA scope, Woodward-Clyde was requested to perform the task described below. Although this task is beyond the scope of the ASTM Practice, results of this work have been included in the PESA report.

- **Environmental regulatory compliance issues** observed during the site reconnaissance. Since this was not the main focus of the site reconnaissance, our performance of this additional scope should not be interpreted as conducting an environmental compliance audit.

### **3.1 LOCATION AND TOPOGRAPHY**

The Property is located along Freshwater Lake Road, and is known as "South Pad;" Lot 2 of Block B U.S. Survey #4516 (Figure 3). It occupies approximately 8.35 acres and is bound by Lot 1, Lot 3, and Fresh Water Lake Road.

### **3.2 SITE IMPROVEMENTS**

South Pad is an 8.35 acre gravel pad constructed in the mid 1980s, to serve as a staging area for NSB Contractor activities. The gravel pad is 6 feet deep and rests directly on the tundra. NSB took control of South Pad in 1986. Since then South Pad has been used mainly as an outdoor storage area. Two abandoned buildings are on site. One is a vehicle service shop that was abandoned in 1992, the other is an unoccupied series of joined storage conexes.

### **3.3 ENVIRONMENTAL SETTING**

Based on a USGS map of the area, it is believed that the South Pad is underlain by a geologic formation that was formed in the lower Cretaceous age, that period of geologic history near the end of the Mesozoic era. Wet tundra, sand deposits, and permafrost are prevalent in the region.

Regional land use is mostly undeveloped except for activities associated with the City of Barrow to the north. Areas directly adjacent to South Pad are undeveloped.

Based on the "Major Ecosystems of Alaska" map, the Property lies within the Arctic Hydrologic Region, West Arctic Hydrologic Subregion. It is estimated that the direction of regional groundwater flow is toward the northwest. The regional groundwater aquifer is isolated from a seasonally present perched groundwater horizon by permafrost. For this reason, groundwater is not used as a freshwater drinking source in this area. Drainage of the surface water in the vicinity of the Property flows to the north and northwest. The gravel pad is graded such that onsite surface drainage flows off of the pad in all directions.

The ground surface is typically snow covered from late September through late May or June.

## SECTION FOUR

## HISTORY OF SITE USE

Identification of historical uses of the Property and adjoining properties are based solely on interviews since the historical review was eliminated from the Scope of Services. Don Thornburg, Jack Azizeh, and Chris Cleveland were interviewed at the time of our site reconnaissance regarding past and present usage of the Property.

South Pad is an 8.35-acre gravel pad, first constructed in the mid 1980s to serve as a staging area for NSB Contractor activities.

NSB took control of South Pad in 1986. Since then South Pad has been used mainly for outdoor storage. Materials are stored for future NSB construction projects, excess materials from past projects, salvageable items, and waste materials awaiting proper disposal. Two abandoned buildings are on site: a condemned service shop and a series of storage conexas that have been joined with a wooden structure.

On-site photographs taken during the site reconnaissance were reviewed to identify current property usage and operations.

## SECTION FIVE

## SITE RECONNAISSANCE

Kimberly Nielsen and Marc Massengale of Woodward-Clyde conducted a site reconnaissance at South Pad on July 7 and 8, 1997 to identify current site uses and potential sources of hazardous substances onsite and nearby. Ms. Nielsen was accompanied by Jack Azizeh, and later Chris Cleveland of NSB OSEA accompanied both Nielsen and Massengale. Current usage information is included with our site reconnaissance observations below.

The reconnaissance of the portion of South Pad occupied by NSB began with an outdoor reconnaissance on foot beginning at the northwest corner of the property, just east of the entrance gate, progressing east around the perimeter of the gravel pad. Next, an indoor walk-through of the two buildings, located in the middle of the pad, and the outdoor areas surrounding them was completed. A brief drive through of the adjoining property the western portion of South Pad, occupied by CIPM, was also conducted.

Currently, South Pad is primarily an outdoor storage area. In addition to storage, South Pad is occupied by a storage building, an abandoned Service Shop, and an abandoned fuel storage and dispensing station. These facilities are described below:

- NSB's outdoor storage area consists of nearly 6.4 acres of open gravel pad storage. This area is used for various types of outdoor storage including vehicles, storage tanks, lumber, surplus materials, drums, and waste materials.
  - There is no defined area of vehicle storage but several heavy equipment vehicles and DMS trucks are stored on the pad. Some vehicles stored here, such as the tractor in the eastern portion of the pad near the lumber stockpile, are clearly junk vehicles which have leaked fluids onto the ground (Photo 1).
  - Twenty-two above ground fuel storage tanks (AST) are stored on site. It is unknown which, if any, of these tanks have been properly emptied and cleaned. At least one 10,000 gallon tank has seeped around the valve stem and stained the soil beneath it (Photo 2).
  - A stockpile of treated lumber is located on the east side of South Pad (Photo 3). The wood was purchased for the NSB's sewer/water utility construction project. Later direct bury pipe was chosen and the wood was never used. Some lumber was given away to residents, but a large portion of it, an estimated 192,000 cubic feet remains. This lumber is stockpiled on South Pad in an area approximately 100 feet wide by 150 feet long. Manufacturers commonly use chromated copper arsenate (CCA) to treat lumber. In the past a more toxic chemical, pentachlorophenol, was widely used. The chemical used to treat this lumber was not evident. Water located off the pad to the east of the lumber stockpile is discolored (Photo 4). Discolored water leading from the wood has also been reported several hundred yards downgradient of the wood pile.
  - Surplus materials stored outside include metal and synthetic piping, cable, and other construction items as well as chemical products such as asphalt, glycol, gasoline oil, kerosene, greases, and paint materials. There is an abundance of 55 gallon drums and

other sized containers of these products and unknown products in various locations on the pad. It is difficult to determine which are wastes and which are usable products.

- There is a platform located on the west side of the Storage Building that is used to store transformers. These transformers were newer models, but were unlabeled as to whether they contained PCBs. No leaking of dielectric fluid from the transformers was evident.
- There are about 150 drums of asphalt (Photo 5), of which at least four are leaking (Photo 6). About 50 rusted and dented drums of various product including glycol, kerosene, and oils are stored on a wooden platform (Photo 7) just west of the asphalt drums. Several of these drums have worn labels and many are leaking (Photos 8 and 9). Six crates, each containing ten 5-gallon rusted cans of flammable "Acrylic Enamel" are located south of these drums (Photo 10). Another platform located further to the east contains eight rusted, dented, and unlabeled drums (Photo 11) of which one has leaked (Photo 12). There are five 5-gallon cans and two 55-gallon drums located southeast of this platform. Some of these are open, some unlabeled, and some contain grease. Ten more rusted and dented drums are located in the northeast corner of the pad. Four of these contain either transmission fluid or lube oil, four are unlabeled, and two are empty. A pallet of small containers of flammable materials including chemical grout, automotive paint, carburetor cleaner, brake fluid, and lacquer primer as well as two cylinders of nitrogen gas are located on the north side of the Storage Building (Photo 13). A platform located on the west side of this building holds 5 transformers. Two pallets of compressed gas cylinders located west of the abandoned service shop (Photo 14) hold both acetylene and oxygen cylinders. The eighteen storage conexes on the west side of the property contain mostly surplus automotive parts.
- Besides the junk vehicles, ASTs, and unwanted products previously described, the waste materials onsite include used lead-acid batteries, seven overpack drums of uncharacterized waste, several empty drums, scrap metal, and empty compressed gas cylinders. Some batteries were stored on a pallet (Photo 15) just east of the entrance gate, although a few batteries were found on the ground near the buildings. Seven overpack drums with only plastic bags as covers are located south of the platform of unused product drums described above. Chris Cleveland reported the contents to be hazardous. Some of these drums had free product on top of the plastic and were leaking onto the ground (Photo 16). Just south of these drums is a half of a drum that is full, open, and unlabeled resting on top of a pallet of unlabeled and rusted 5-gallon cans (Photo 17).
- The Storage Building is located near the center of the pad and consists of a series of conexes that have been joined together with a wooden structure. About 10 conexes makeup the building which was used to store various materials including brake fluid, Chevron Ban Ice, automotive parts, and flammable materials. Most of these materials found in this building have been here for several years, although, according to Chris

Cleveland, newer items are placed here from time to time. At the time of the site reconnaissance, the floor of the building was covered with ice and water. The flammable storage room located in the southwest portion of the building (Photo 18) contains over fifty 5-gallon containers of various flammable materials as well as several smaller containers including Methyl Ethyl Ketone Oxide (97% active oxygen). This room does not meet federal regulations for flammable storage rooms inside of buildings. Some violations include an unclear aisle, incompatible substance storage, containers in poor condition, and the lack of a self closing fire resistant door.

- The abandoned Service Shop building is located south of the entrance gate, west of the Storage Building. According to Jack Azizeh, it was built in the 1980s and used as a vehicle maintenance shop until it was condemned in 1992. The pre-fabricated metal building has concrete floors and is still served by electricity. The building has been emptied except for scattered parts and debris, some drums of unused antifreeze and gear oil, a half empty drum of "Excel" solvent, four empty overpack drums, two ASTs, and four overpack drums of contaminated soil dated May 14, 1993 (Photo 19).
- An abandoned fuel storage and dispensing station is located adjacent to the Service Shop building to the east (Photo 20). It was constructed in the 1980s and used in conjunction with the Service Shop. The 45,000 gallon AST is connected to the pump station by an above ground pipe. The AST sets in a lined dike that is full of water. The dispensing station also rests in water. According to Jack Azizeh, it was taken out of service/abandoned along with the Service Shop building in 1992, but it is doubtful that this tank has been properly decommissioned. Immediately north of this AST is a smaller AST that rests on a raised area just south of a second depression in the ground that is full of water. According to a plat map, this depression was a foundation for an extension to the Service Shop that has since been demolished.

The adjacent property was constructed as a part of South Pad in the 1980s. South Pad has been divided by a fence and this west portion of the pad is presently occupied by Capital Improvements Project Management (CIPM). A brief drive through of this property, accessible by the same entrance gate as South Pad, revealed some environmental conditions.

- CIPM occupies approximately 2 acres of South Pad for outdoor storage area. Most storage is contained in locked conexes (one of which is marked "HAZARDOUS"), although some open storage exists on the west side of the pad. There are about 15 empty fuel and sewage storage tanks on the west side of the pad. In the southwest corner there are about 30 crates of various sizes reported to contain unused ethylene glycol as well as sixteen 55-gallon drums stored on pallets (Photo 21). Eleven of these drums are unlabeled and five are labeled as containing "Isocyanate Compound HAZARDOUS". All of the drums are in poor condition; they are rusted and dented, one is bulging, and one has a hole in its side (Photo 22). Another drum reported to contain an acid has almost completely corroded except for the inner plastic liner which is torn. This drum,

stored on top of the other drums, has leaked onto a drum containing hazardous material (Photo 23).

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# SITE RECONNAISSANCE PHOTOGRAPHS

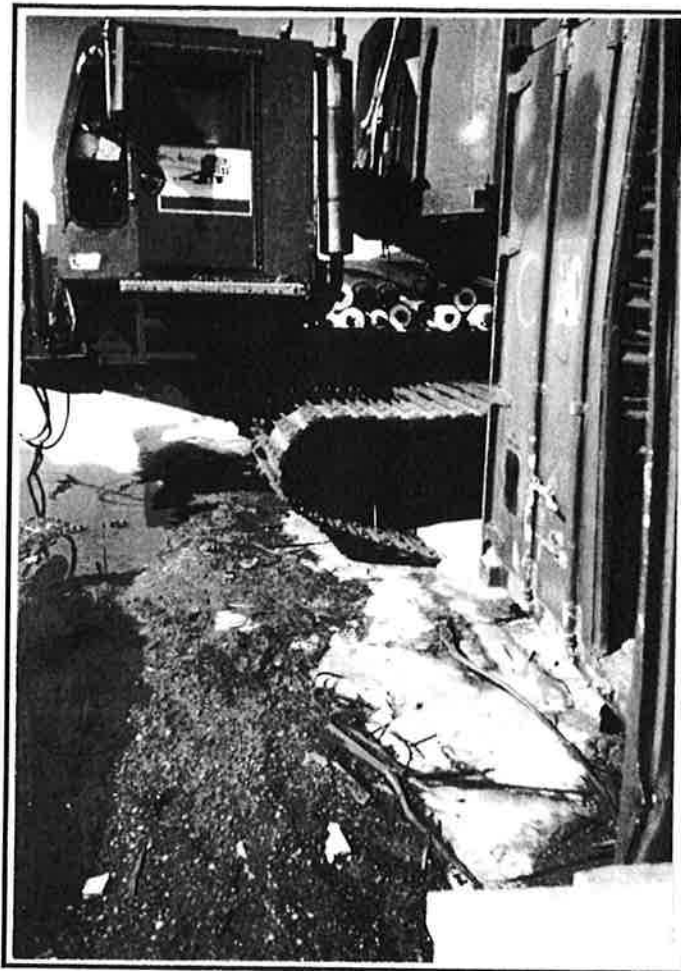
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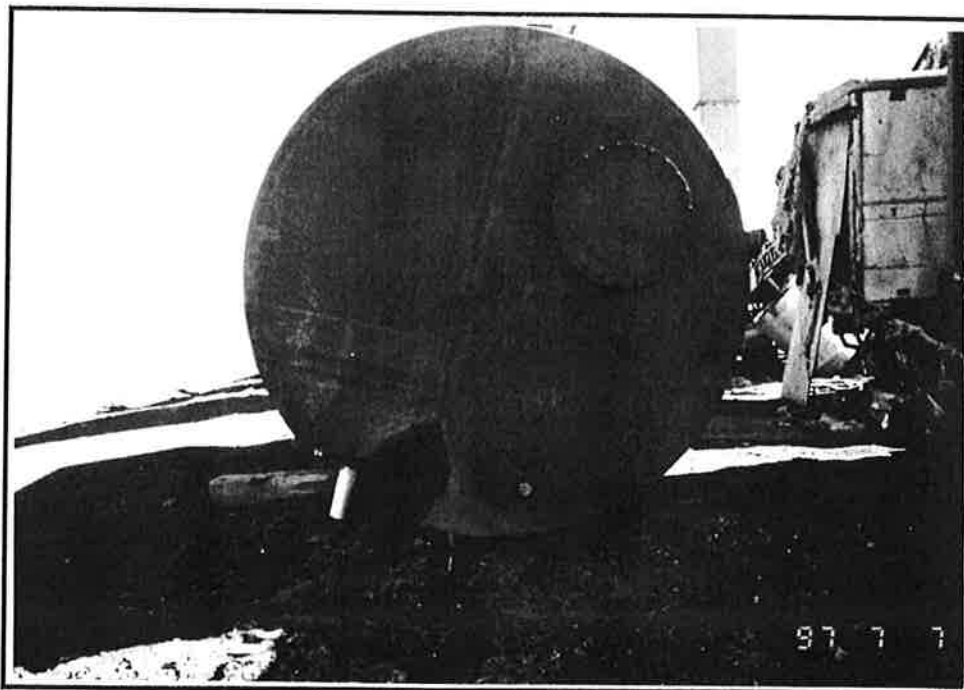
## PHOTOGRAPH LOG

### South Pad

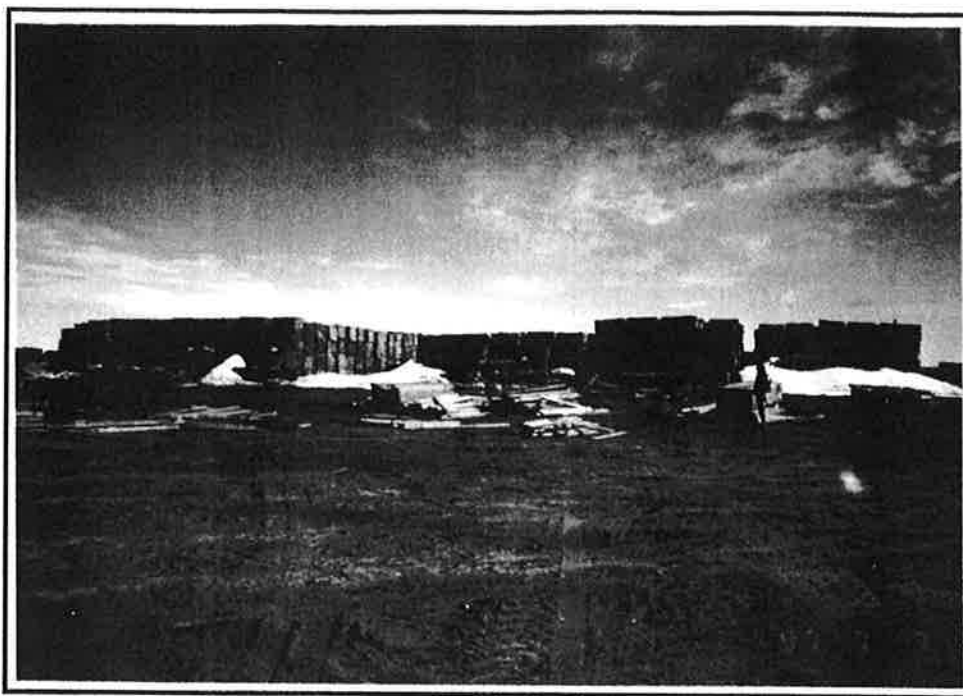
Photo ID	Roll #	Frame #	Date	Direction	Notes
1	3	0	07July97		POL product spill from tractor vehicle on east side of pad.
2	2	14	07July97	East	10,000 gal AST. Note: seeping around valve -- spill on ground.
3	3	2	07July97	East	Lumber stockpile.
4	3	1	07July97	East	Water to the east of the lumber stockpile
5	2	20	07July97	North	About 150 drums of asphalt material. Drums stacked 4 high plus 13 more stored haphazardly just right of the stacked drums.
6	2	21	07July97		Spilling drum of asphalt -- typical of at least 4 drums in the pile
7	2	15	07July97	Southeast	View of half of the unused product drum stockpile
8	2	16	07July97		Unlabeled leaking drum is typical of several drums in stockpile
9	4	3	08July97		Drum storage area -- degraded spilling drum
10	2	17	07July97	East	Six crates of 5-gal rusted cans of flammable "Acrylic Enamel"
11	2	22	07July97	Northeast	Eight drums -- rusted, dented, and unlabeled.
12	2	23	07July97	West	One of the 8 drums described above is leaking.
13	3	3	07July97	South	Pallet of flammable solvents and two nitrogen cylinders located on the north side of the Storage Building.
14	3	8	07July97	Southeast	Two pallets of compressed gas (acetylene and oxygen) cylinders on west side of Service Shop. Not labeled empty or full.
15	2	11	07July97	East	Used lead-acid batteries stored on pallet east of entrance gate
16	2	18	07July97		Four of the 7 overpack drums reportedly containing hazardous waste. The drums are unlabeled and have product on top.
17	2	19	07July97		The other drums described above, plus a cut drum that is full, unlabeled, open, and resting on top of a pallet of unlabeled cans.
18	3	4	07July97	West	Inside Storage Building, southwestern most connex is a flammables storage room.
19	3	6	07July97	East	Inside Service Shop -- 4 drums of contam. soil dated 5/14/93
20	3	5	07July97	West	Bulk fuel AST and dispensing station--two dikes full of water.
21	4	0	08July97	South	Adjacent (CIPM) property--SW corner--28 crates of ethylene glycol plus 16 drums, 5 are hazardous "Isocyanate compound".
22	4	1	08July97	South	Adjacent (CIPM) property--close up of above drums. Note: All are rusted, a hole in the side of one and two are bulging.
23	4	2	08July97	South	Adjacent (CIPM) property--close up of drum pile. Note: degraded leaking drum of acid on top of hazardous drums.



**PHOTO 1:**  
POL product spill from tractor  
vehicle on east side of pad.



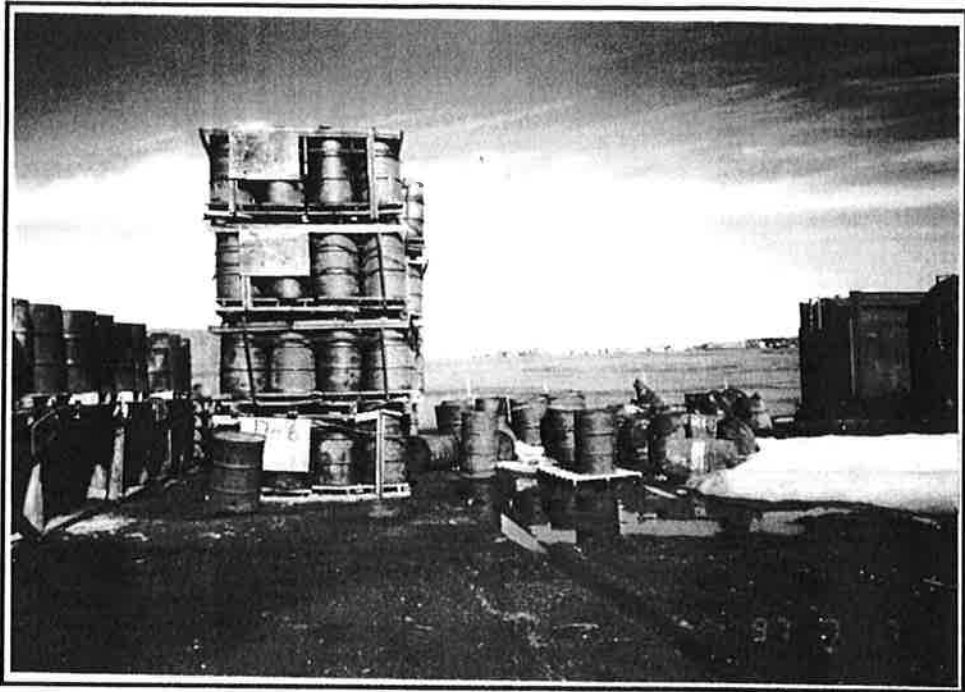
**PHOTO 2:** 10,000-gallon AST. Note: seeping around valve & spill on  
ground.



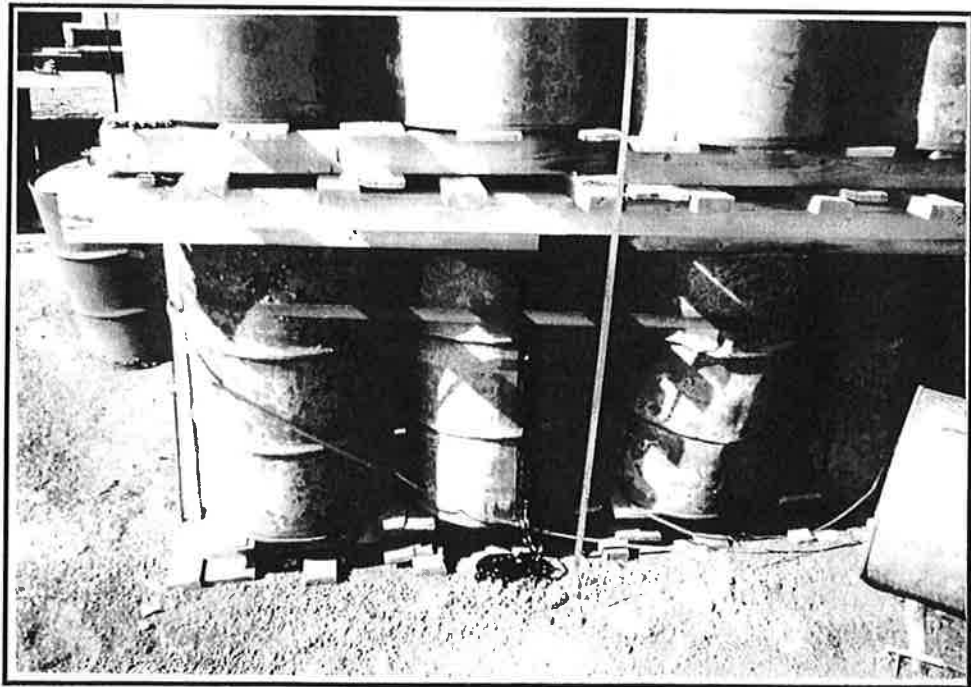
**PHOTO 3:** Lumber stockpile.



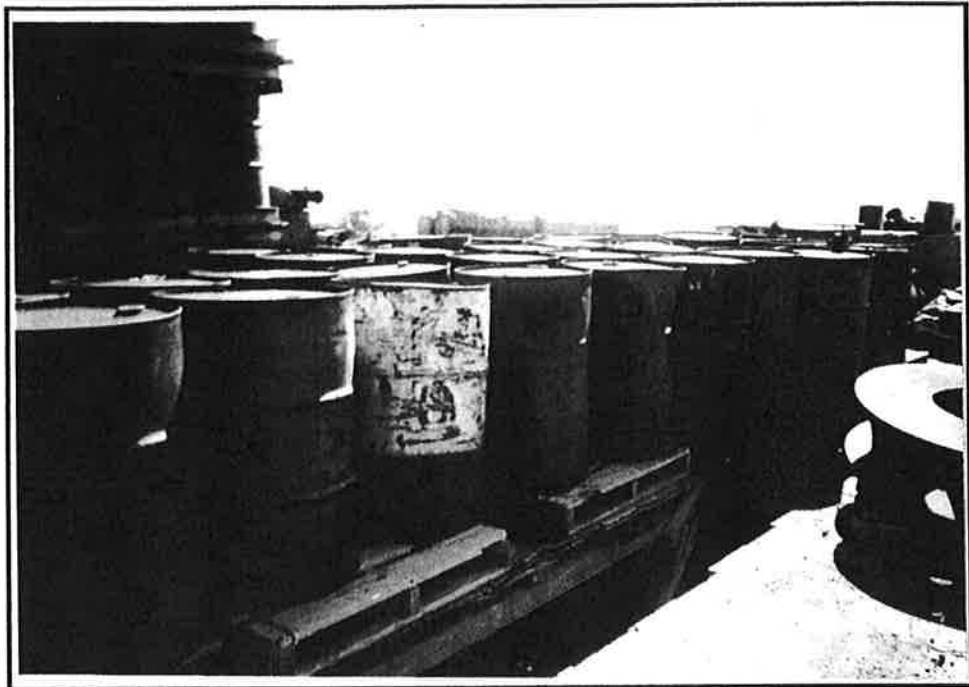
**PHOTO 4:** Water to the east of the lumber stockpile.



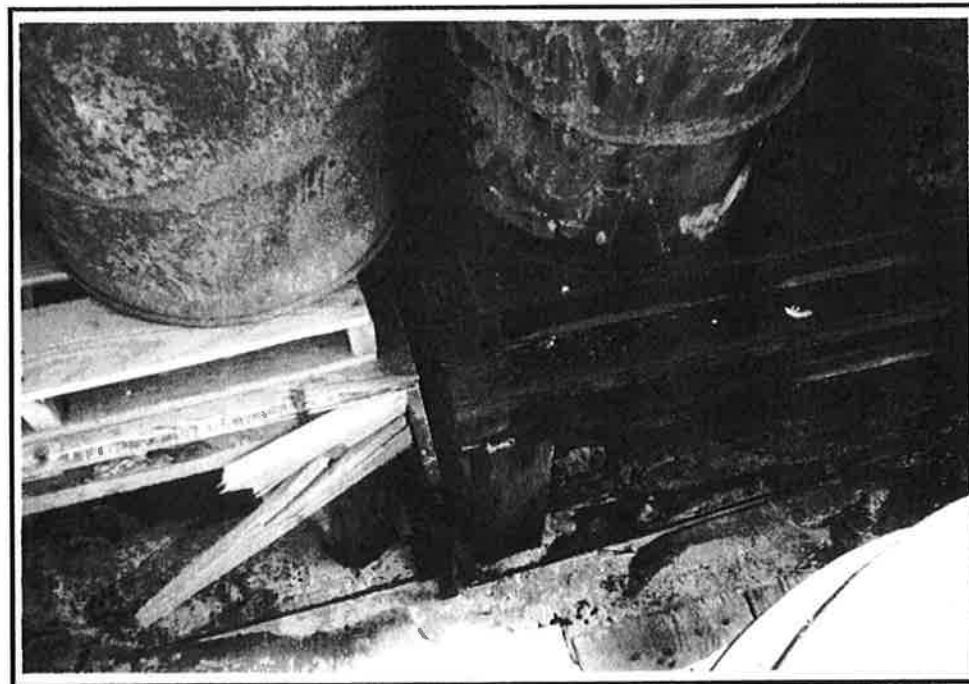
**PHOTO 5:** About 150 drums of asphalt material. Drums stacked 4 high plus 13 more stored haphazardly just right of the stacked drums.



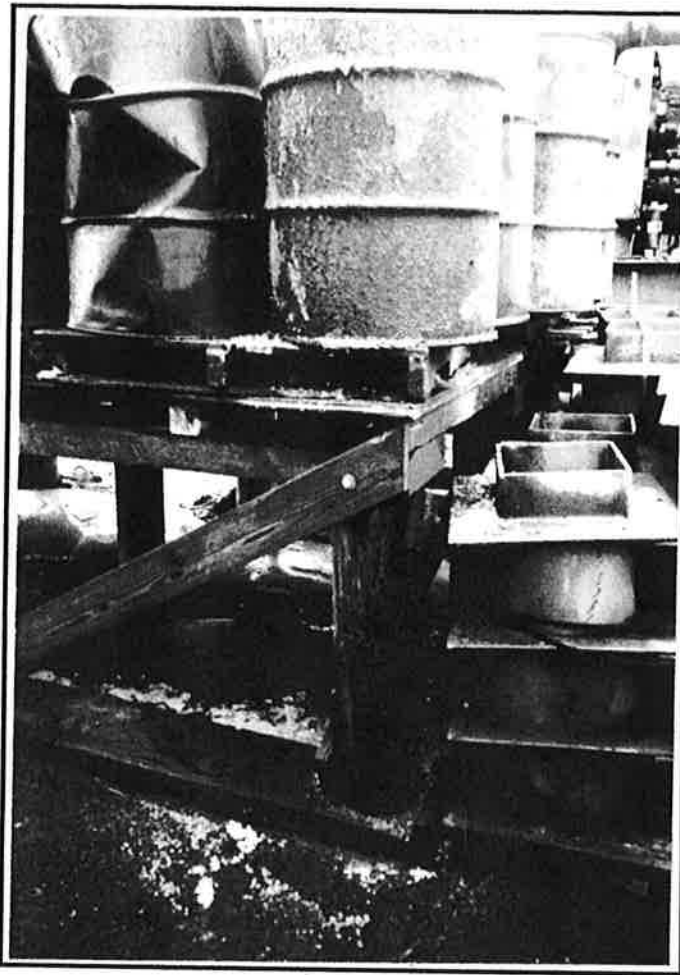
**PHOTO 6:** Spilling drum of asphalt - typical of at least 4 drums in the pile.



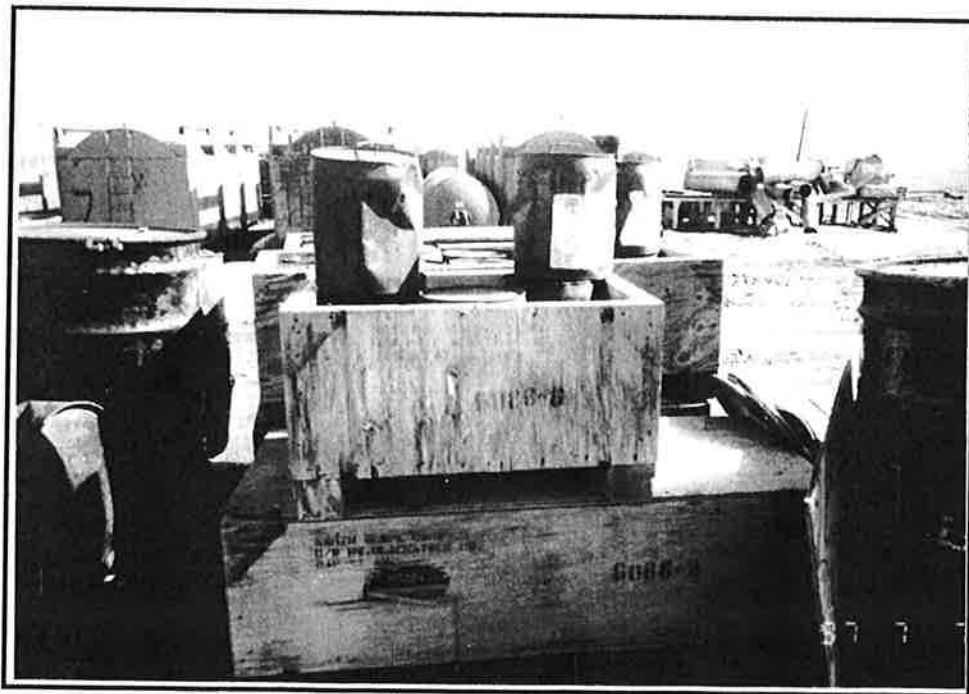
**PHOTO 7:** View of half of the unused product drum stockpile.



**PHOTO 8:** Unlabeled leaking drum is typical of several drums in stockpile.

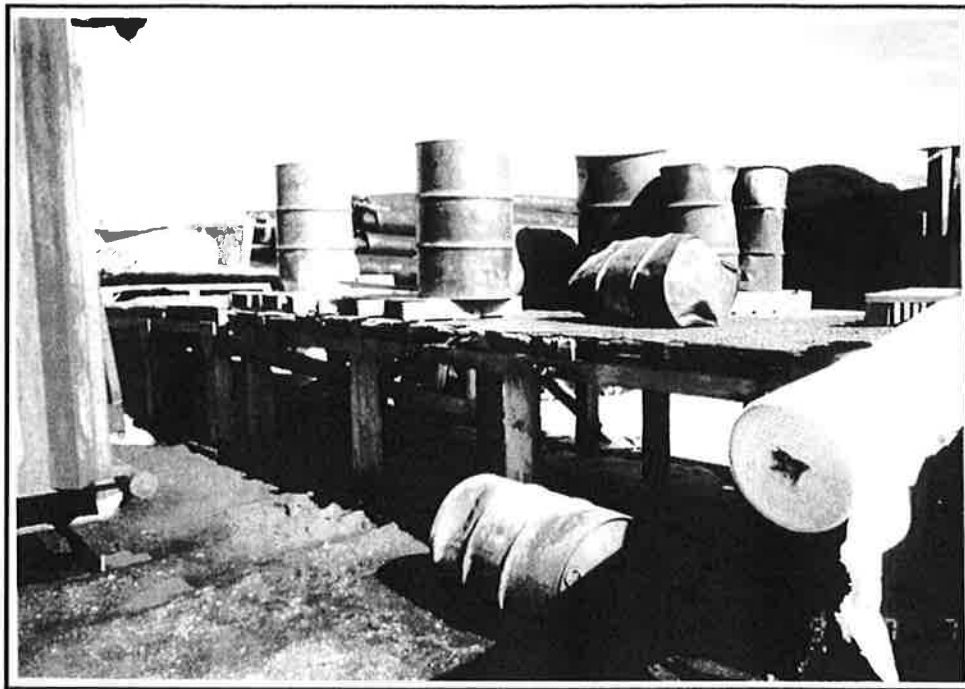


**PHOTO 9:**  
Drum storage area -  
degraded spilling drum.

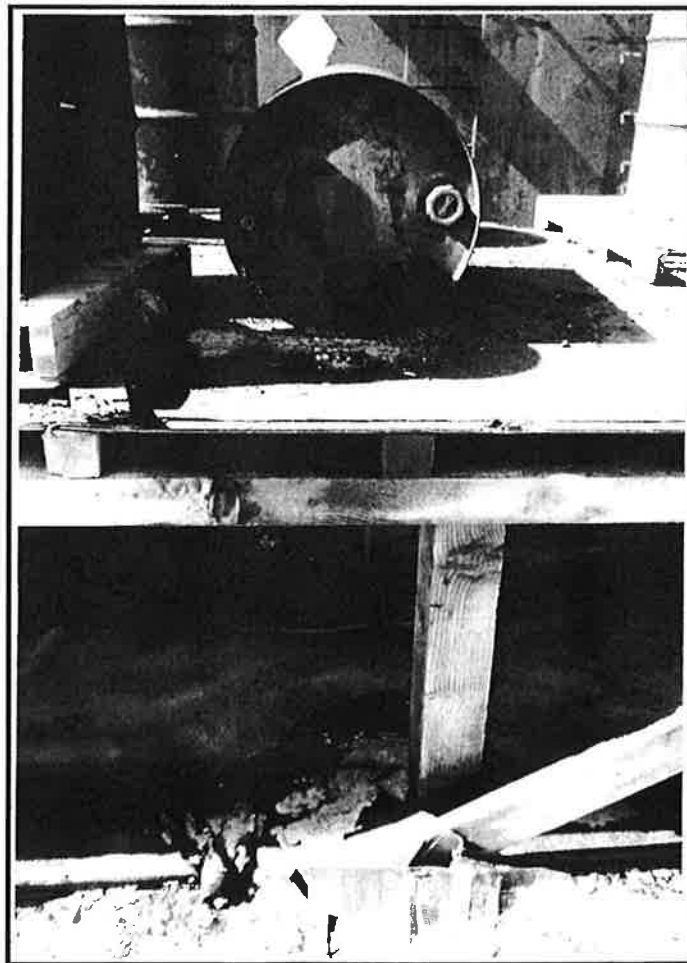


**PHOTO 10:** Six crates of 5-gallon rusted cans of flammable "Acrylic Enamel".





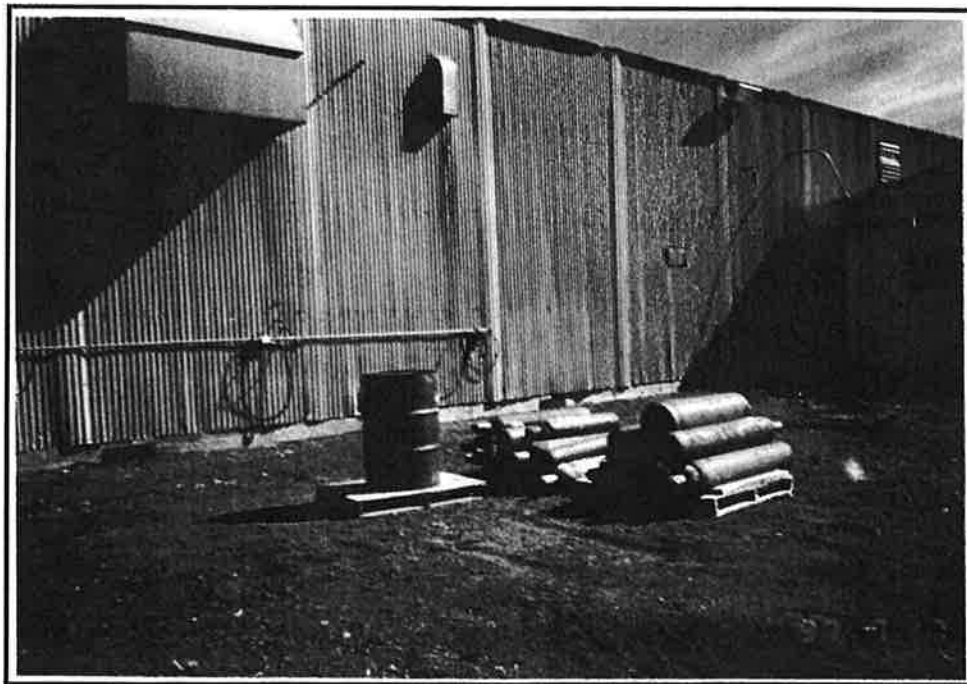
**PHOTO 11:** Eight drums - rusted, dented, and unlabeled.



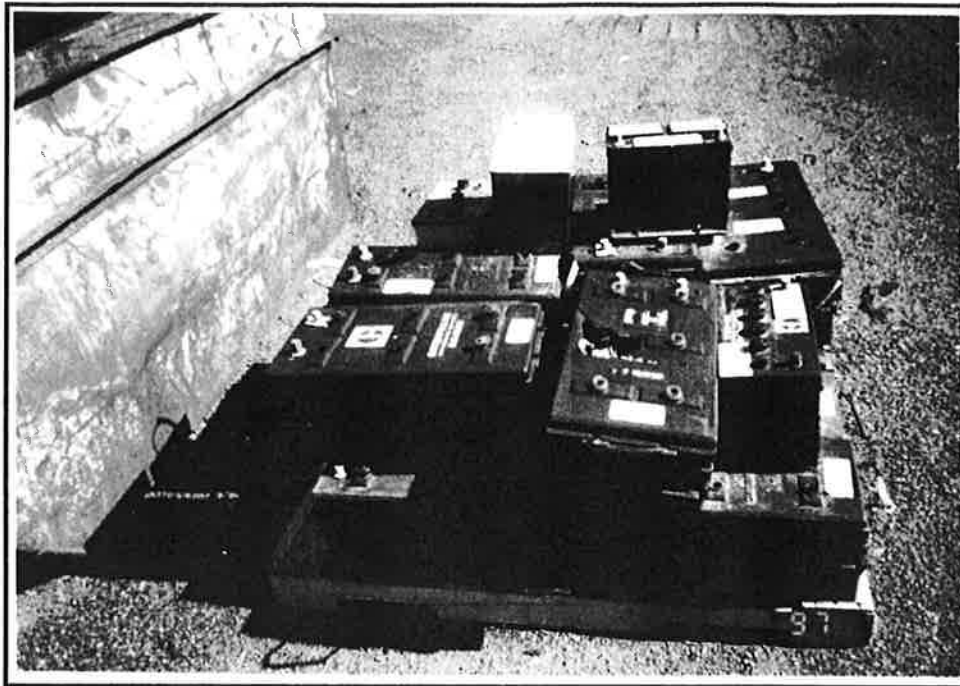
**PHOTO 12:**  
One of the 8 drums described  
above is leaking.



**PHOTO 13:** Pallet of flammable solvents and two nitrogen cylinders located on the north side of the Storage Building.



**PHOTO 14:** Two pallets of compressed gas (acetylene and oxygen) cylinders on west side of Service Shop. Not labeled empty or full.



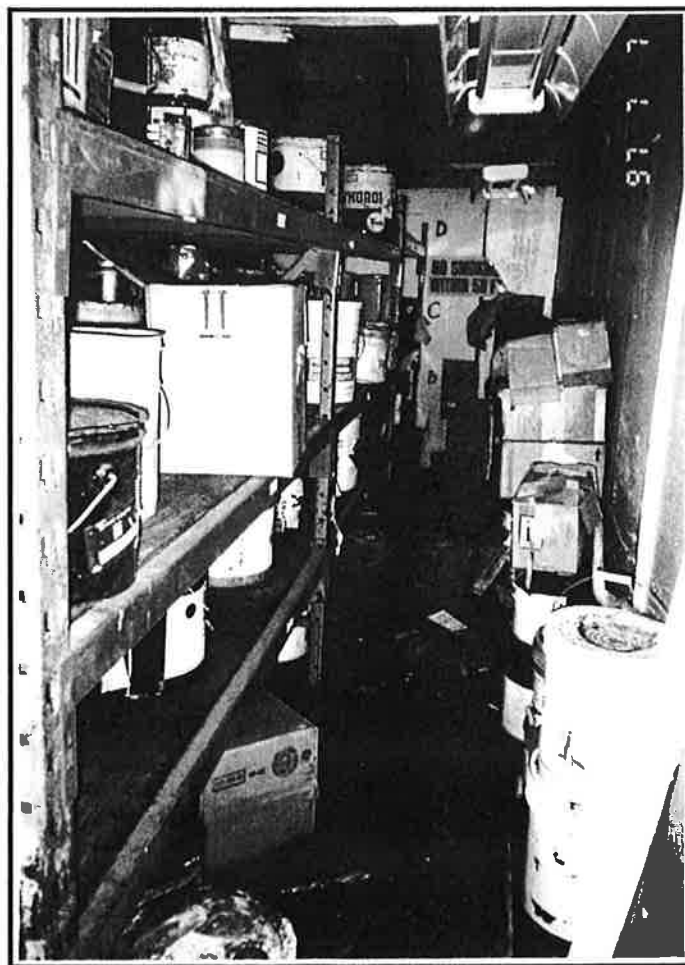
**PHOTO 15:** Used lead-acid batteries stored on pallet east of entrance gate.



**PHOTO 16:** Four of the 7 overpack drums reportedly containing hazardous waste. The drums are unlabeled and have product on top.



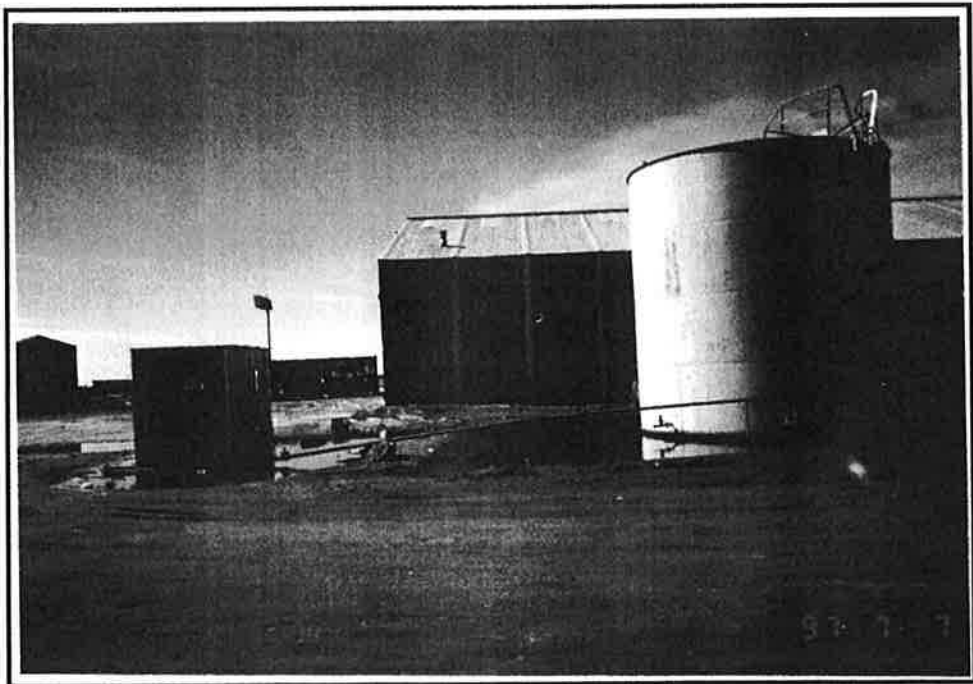
**PHOTO 17:** More reported hazardous waste drums, plus a cut drum that is full, unlabeled, open, and resting on top of a pallet of unlabeled cans.



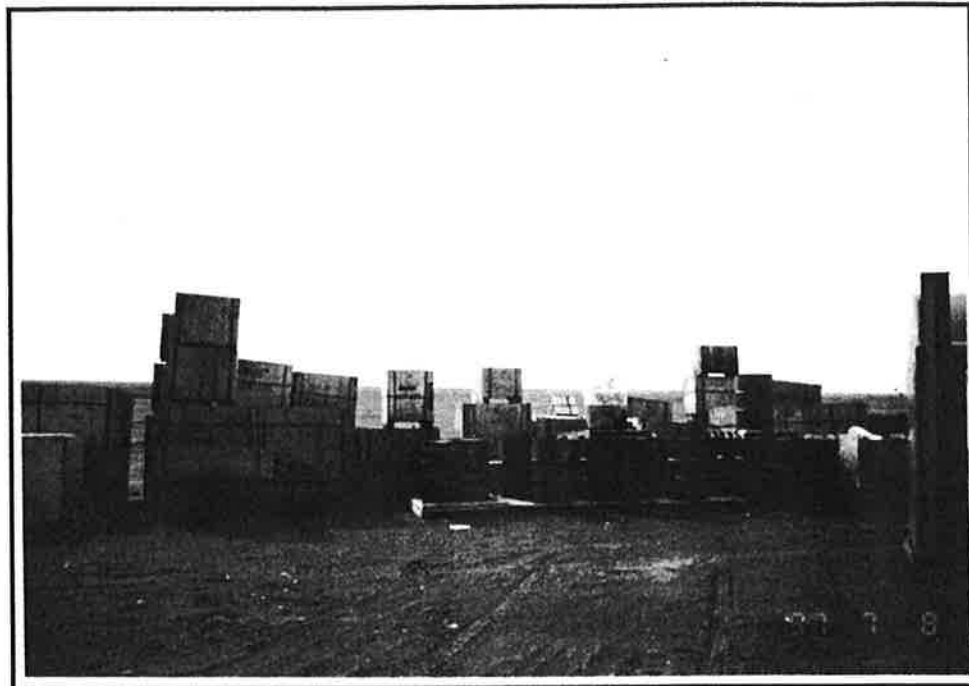
**PHOTO 18:** Inside storage Building, south-western most conex is a flammables storage room.



**PHOTO 19:** Inside Service Shop - 4 drums of contaminated soil dated 5/14/93.



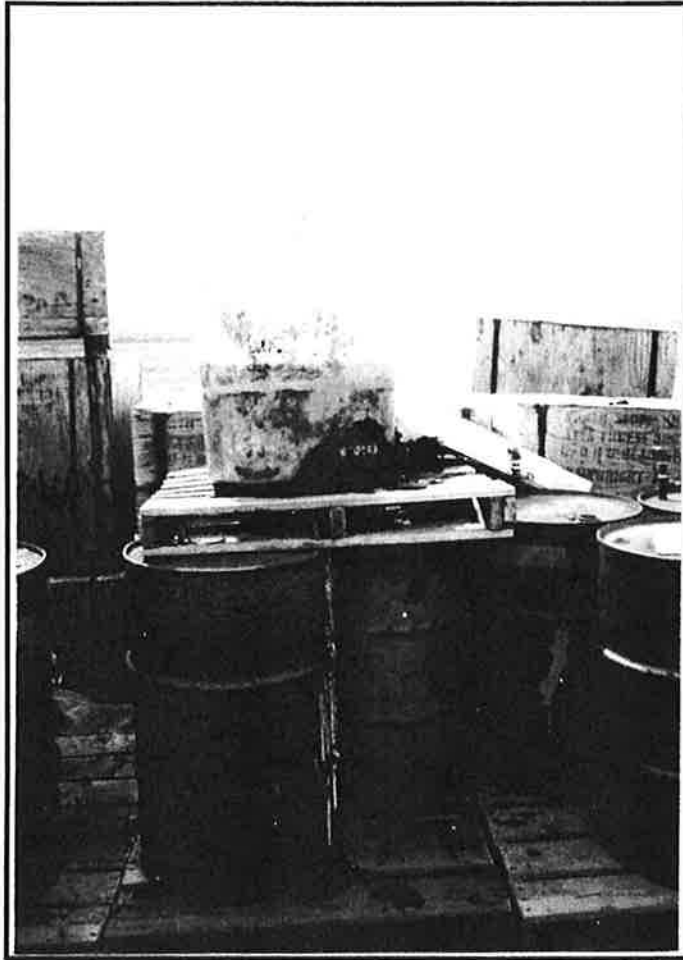
**PHOTO 20:** Bulk fuel AST and dispensing station - two dikes full of water.



**PHOTO 21:** Adjacent (CIPM) property - SW corner - 28 crates of ethylene glycol plus 16 drums; 5 of which are hazardous "Isocyanate compound".



**PHOTO 22:** Adjacent (CIPM) property - close up of above drums. Note: rust, dents, holes, and bulging indicate poor condition and potential for leaking.



**PHOTO 23:** Adjacent (CIPM) property - close up of drum pile. Note: degraded leaking drum of acid on top of hazardous drums.



## **SECTION SIX ENVIRONMENTAL CONDITIONS DISCUSSION AND CONCLUSIONS**

We have performed a PESA of Lot 2 Block B, U.S. Survey #4615, South Pad. Investigations performed are described in the Scope of Services section of this report. This assessment has revealed the following evidence of recognized environmental conditions in connection with South Pad:

- There is potential for site-wide contamination of the gravel pad associated with numerous spills that have not been cleaned up. Spills observed during the site reconnaissance include an engine fluid spill from a small tractor, seepage from an AST with residual fuel in it, spillage under the drum storage platform from approximately 25% of the unused glycol and oil products stored there, spillage in the same area from the seven reported hazardous waste drums, leakage from at least four drums containing asphalt material, and smaller spills from various unlabeled leaking drums and containers.
- There is potential for soil contamination associated with leaching of chemicals from the lumber stockpile. Although the treatment process used for this lumber was not determined, Chromated Copper Arsenate (CCA) is often used in the process of pressure treating lumber. Arsenic is rated by the EPA as a class A carcinogen. Although CCA retards decay, it does not stop it. Estimates of rot resistance of 20 to 50 years are common, but the wood will eventually decay and leach its metals.
- There is potential for soil contamination at the abandoned fuel tank farm and dispensing area. The 45,000 gallon AST and associated above ground piping is rusted and has higher potential for seepage near the joints and valves. Both diked areas are subject to contamination due to the inherent likelihood of spills in this area and the overflow of rainwater and snowmelt from them to the surrounding area.
- There is potential for soil contamination associated with the numerous fuel storage tanks residing on the pad. It is not known whether they have been emptied and properly cleaned. Some of the tanks show evidence of seeping near the valve stem, and at least one has leaked enough to cause an area of stained soil approximately one foot in diameter.

The brief reconnaissance of the adjacent property, operated by CIPM, revealed no evidence of recognized environmental conditions in connection with NSB's portion of South Pad. Any environmental conditions on this portion of the pad, located west and downgradient of the property, should not affect NSB's portion of South Pad under normal circumstances.

## SECTION SEVEN

## ENVIRONMENTAL CONDITIONS RECOMMENDATIONS

This section provides suggestions to correct the recognized environmental conditions at South Pad discussed in the previous section. A comprehensive sampling plan of the entire gravel pad should be conducted. The number and amount of spills currently existing on site suggest past neglect in regular spill inspections and clean up procedures. The northern portion of South Pad where drums are currently stored as well as the bulk fuel storage and dispensing area near the Service Shop are two areas where sampling efforts should be concentrated. Condemned buildings at South Pad should have all hazardous or regulated substances removed from them and access to the building interior should be closed off.

- Sample the soil at the drum storage area on the north side of the pad to determine the extent of contamination in this area.
- Cleanup any spills that have occurred in the drum storage area and dispose of all clean up materials according to ADEC requirements. To prevent future spills, identify unneeded, unused, or expired materials. Appropriately store materials which are determined to be needed and/or usable. Replace or provide secondary containment for deteriorated containers. Recycle or dispose of the remaining wastes properly.
- The area around the 45,000 gallon AST and dispensing area should also be sampled for contamination. There is a high potential for contamination from seepage from rusted joints and valves and from spills during filling operations. Rainwater and snowmelt have overflowed the secondary containment, possibly contaminating the surrounding areas.
- Appropriately discharge water accumulated in the AST area's secondary containment.
- Other areas that have spills that need to be cleaned up include: the spill from a junk tractor on the east side of the pad, an area of soil beneath a seeping valve on an AST at the north side of the pad, and other areas of discolored soil on the pad. Clean up these areas and dispose of all clean up materials according to ADEC requirements.
- The seven drums of reported hazardous waste should be sampled and tested to characterize the waste and determine appropriate disposal methods. Any unlabeled container whose contents cannot be identified by process of knowledge or other acceptable means should also be sampled and handled accordingly. Label these drums after characterization and store appropriately or dispose of them.
- Although the treatment process used for the lumber at South Pad was not determined, Chromated Copper Arsenate (CCA) is a common chemical used to treat lumber. This type of wood has been tested by the Minnesota Pollution Control Agency, Hazardous Waste section to be over 3000 parts per million arsenic. The exposed ends of the boards are most likely to leach arsenic than the rest of the board, and should be resealed every two years. Particular caution should be taken if the wood has a white, gritty residue on the surface, as these may be arsenic crystals. Disposal is currently allowed in conventional and demolition landfills, but it should be recognized that although CCA retards decay, it does not stop it. Estimates of rot resistance of 20 to 50 years are common. The wood will eventually decay and leach its metals. The wood should not be

## SECTION SEVEN

## ENVIRONMENTAL CONDITIONS RECOMMENDATIONS

burned as it releases toxic fumes and ash resulting in higher levels of airborne arsenic. Since this wood has been stored here for an extended period of time, an appropriate plan for use or disposal should be made as soon as possible.

- The specific chemical preservative used to treat this lumber needs to be determined. Contact the manufacturer of the lumber for information on the chemical processes they use and any associated Material Safety Data Sheets. Water and soil in the vicinity of the wood should be sampled to determine the presence of any contamination due to leaching of the chemicals.
- Since the history of the above ground storage tanks located at South Pad is not known, it must be determined whether there is product inside. If residual product exists, it should be sampled to determine its make up. Once this is determined, the tanks can be appropriately cleaned and reused. If there are no plans to reuse the tanks, they should be cleaned, dismantled and recycled or disposed of properly.

**SECTION EIGHT**

In addition to the above PESA, Woodward-Clyde documented environmental regulatory compliance issues associated with hazardous materials and hazardous waste storage that were observed during the site reconnaissance. Since this was not the main focus of the site reconnaissance, our performance of this additional scope should not be interpreted as conducting an environmental compliance audit. The following environmental regulatory compliance issues were documented:

- Generators of solid wastes must determine if the wastes are hazardous (40 CFR 261.3, 261.24, and 262.11). There is an abundance of 55-gallon drums and smaller containers that have been stored on site for some time. Paint related materials, automotive fluids, overpack drums of contaminated soil, the seven overpack drums of reportedly hazardous waste, and other unlabeled containers are stored at South Pad.
- Numerous spills that have occurred and are present site-wide have not been cleaned up and have not been reported to ADEC. Sampling, delineation, and clean-up of all oil discharges must begin immediately and using approved methods as described in 18 AAC 75.327 (a), 75.337 and 75.347. Discharges of oil must be reported to ADEC according to 18 AAC 75.300(a)(1)(B) and (C) and (a)(2) and (b). Within 15 days of the discharge or cleanup, a final written report must be submitted to ADEC and include all information outlined in 18 AAC 75.307.

Most of the spills on sites appear to be petroleum based fluids such as transmission fluid, lubricants, oils, grease, and diesel fuel. There exists a cumulative discharge greater than 55 gallons in at least two areas on the pad: the area beneath the platform where drums of unused oils and glycol are stored and the area around the tractor vehicle that has leaked fluids. A cumulative discharge, of oil solely to the land in excess of 55 gallons must be reported to ADEC as soon as the person in charge had knowledge of the discharge. For the smaller oil spills (1 to 10 gallons) solely to land, such as the one from the seeping AST valve, a written record must be maintained and provided to ADEC on a monthly basis. Also, the ultimate disposal of oil, soil, and materials used in clean-up of a discharge must be approved by ADEC prior to disposal (18 AAC 75.319).

- Most drums and containers were rusted, dented, bulging, or leaking. 29 CFR 1910.176 (c) states that in areas where hazardous materials are stored, containers are required to be in good condition, not leaking, and tightly sealed.
- Many drums and containers of various sizes contained flammable/combustible materials and were unlabeled. According to 29 CFR 1910.106(d)(6), flammable/combustible materials stored outdoors must be in containers that bear contents, labels, and hazard markings. Additionally, the storage area should be graded to divert spills or surrounded by a curb and should be kept free of waste and other combustible materials.
- The flammables storage room inside the Storage Building does not meet 29 CFR 1910.106(d)(4): It does not have self closing fire doors, it lacks a proper exhaust system, the aisle is not clear, and it exceeds maximum storage capacity limitations. Also, incompatible substances such as oxidizers and flammables are stored together.

**SECTION EIGHT****RECOMMENDATIONS**

- The four overpack drums containing contaminated soil in the Service Shop may be considered hazardous waste. It is dated May 14, 1993 and has exceeded storage time limitations set in 40 CFR 262.34.
- Characterize and dispose of all regulated or hazardous waste found in South Pad's Service Shop building and annex Storage Building..
- Compressed gas cylinders were stored horizontally on pallets and haphazardly in several locations on site. According to 29 CFR 1910.101, the storage of all compressed gases in cylinders must be done according to the Compressed Gas Association Pamphlet P-1-1-1965. They are not labeled as to whether they are empty or full. If they are full, they should be chained upright in a designated storage area that does not allow exposure to temperature extremes. Additionally, storage areas for flammable compressed gases should be posted NO SMOKING and have appropriate fire extinguishers available. Acetylene and Oxygen cylinders were observed on the same pallet outside of the Service Shop. Flammables and oxidizers are incompatible and pose fire hazards. If the cylinders are empty, they should be shipped out to be refilled.
- Automotive batteries were stored on pallets or directly on the ground and open to the environment. Lead-acid batteries should be brought to designated battery storage areas only if there are no leaks or missing caps and they are placed in leak-proof containers. Records should be kept that include battery identification number, generator, and disposal date. This record should also be updated annually for recycling shipments.
- The transformers observed west of the Storage Building should be tested for PCBs. Specific storage and documentation requirements, outlined in 40 CFR 761, apply for PCB containing transformers.
- The quantity and makeup of discharge from the seven plastic covered hazardous waste drums was not determined. According to 18 AAC 75.300, discharges of hazardous substances must be reported to ADEC immediately. Specific quantities of certain hazardous chemicals that are spilled call for other notification requirements.
- Some of the ASTs on site have inadequate secondary containment according to 40 CFR 112.1(d), 112.7(d), and 112.7(e)(2)(ii). Secondary containment should have the capacity to hold the volume of the largest tank within the containment area, plus enough additional capacity to allow for local precipitation (18 AAC 75.075(a), (c), and (f)). The 45,000 gallon tank near the Service Shop has a small dike area that is completely full of water. If the tank is has been emptied and cleaned, it should be marked as such.

## SECTION NINE

## LIMITATIONS

We have performed our services for this PESA in accordance with our Agreement; no guarantees are either expressed or implied.

No records search was performed as agreed in the Scope of Services.

There is no investigation which is thorough enough to preclude the presence of materials on the Property which presently, or in the future, may be considered hazardous. Because regulatory evaluation criteria are constantly changing, concentrations of contaminants present and considered to be acceptable may, in the future, become subject to different regulatory standards and require remediation.

Opinions and judgments expressed herein, which are based on our understanding and interpretation of current regulatory standards, should not be construed as legal opinions. Unless site conditions change, this document and the information contained herein are valid for a period of 180 days, and have been prepared solely for the use of North Slope Borough. No third party shall have the right to rely on Woodward-Clyde opinions rendered in connection with the services or in this document without Woodward-Clyde's written consent and the third party's agreement to be bound to the same conditions and limitations as client.

Environmental regulatory compliance issues observed during the site reconnaissance. Since this was not the main focus of the site reconnaissance, our performance of this additional scope should not be interpreted as conducting an environmental compliance audit.

### 10.1 CORPORATE

Woodward-Clyde Group, Inc. is the parent firm for three consulting engineering firms, of which Woodward-Clyde is one. The firm, founded in 1950 and with over 90 offices worldwide, provides professional services in engineering and sciences applied to the earth and its environment. One of the main areas of practice is Waste Management and Engineering, which involves the application of science and engineering to contamination assessment and cleanup; the management, minimization, treatment, and disposal of hazardous, solid and industrial waste; and regulatory compliance. Environmental Site Assessments are a part of this practice area and have been conducted by Woodward-Clyde nationwide.

### 10.2 INDIVIDUAL

The qualifications of the Project Manager and of the other Environmental Professionals involved in this PESA meet the Woodward-Clyde corporate requirements for performing PESAs. Resumes of these Environmental Professionals are provided in Appendix C.



## SECTION ELEVEN

## REFERENCES

- Arctic Slope Consulting Group, Ocean Tech., Doug Graether, L.S. Vice President, 302 Arctic Slope Avenue. Status Plats.
- Major Ecosystems of Alaska, Joint Federal-State Land Use Planning Commission for Alaska, July 1973.
- State of Alaska, Office of the Governor and The Joint Federal-State Land Use Planning Commission for Alaska. 1975. Alaska Regional Profiles, Arctic Region. Vol. II.
- U.S. Geologic Survey. 1955. Barrow (B-4), Alaska Quadrangle. 1:63360 Series Topographic Map, minor revisions 1973.
- Personal Communications:
- North Slope Borough, Division of Occupational Safety and Environmental Affairs, Mr. Jack Azizeh, July 7, 1997.
  - North Slope Borough, Division of Occupational Safety and Environmental Affairs, Mr. Don Thornburg, July 7, 1997.
  - North Slope Borough, Division of Occupational Safety and Environmental Affairs, Mr. Chris Cleveland, July 8, 1997.
  - North Slope Borough, Division of Occupational Safety and Environmental Affairs, Mr. John Andersen, , July 28, 1997.
  - U.S. Geological Survey, GWIS, Alaska. Ms. Pat M. Strelakos, July 23, 1997.

# **Appendix A**

## **Field Checklist**

PHASE I ESA - SITE RECONNAISSANCE CHECKLIST

Date 7-8 July 97  
 Project No. \_\_\_\_\_  
 Project Name South Pad ESA  
 Address/Location Banow, AK  
 WC Staff Kimberly Nielsen  
 Key Site Mgr. Don Thompson  
 Phone No. 852-2411  
 Other Interviewees Jack Aziz, Chris Cleveland, Don Thompson

Method(s) Used to Observe Property walk  
around perimeter, then all  
inside. - 2nd trip to adjoining prop.  
 Access/Observation Limitations Some CANIKES locked.

	Observations	Photo	Interviews (Initials)
<b>I. GENERAL SITE SETTING</b>			
1. Current and Past Use(s): . Property . Adjoining properties . Surrounding area	For I-1: Complete Attachment A <u>Staging Area / Storage</u> <u>since early 80's</u>		
2. Site Topography	<u>Low topographic relief</u> <u>gravel pad.</u>		
3. Site Hydrology . Streams . Ponds . Springs, seeps . Surface water flow direction	<u>Closest Lake is 1/2 mile away</u> <u>only sm. ponding water</u> <u>North or NW</u>		
4. Site Geology, Hydrogeology . Sinkholes . Outcrops . Mining activity? . Groundwater occurrence, depth	<u>No groundwater</u>		
5. Structures - General Description . No. buildings . No. stories . Date - orig. construction, renovations . General condition	<u>2 bldgs. ? how many been here</u> <u>but abandoned since 1984-5</u> <u>Pad been there since early 1980's</u>		
6. Site Surface Cover . Vegetation - type . Manmade - type	<u>brush / gravel pad</u>		
7. Roads . Adjoining thoroughfares . Streets, roads, paths - use/ outlet/public access . Parking facilities	<u>Access</u> <u>Roads = Freshwater Lake Rd.</u>		
8. Potable Water Supply . Source	<u>Not in vicinity</u>		
9. Sewage Disposal System . Type . Age	<u>NA - not on site</u>		
<b>II. INTERIOR/EXTERIOR OBSERVATIONS</b>			
1. Aboveground Tanks (ASTs) *Check for tank pads, piping-evidence of former tanks	<u>1 main AST - probably not</u> <u>cleaned but not used for</u> <u>several years. connected to</u> <u>service station</u>	<u>Roll #3</u> <u>Frame 5</u>	
How Many? for Each: . Location . Condition (check for fixture . Contents leakage, ruptures, corrosion, . Age dents, etc.) . Volume (cap.) . Spills/leaks? (check for . Piping stained soil, dead . condition vegetation, etc.)	<u>45' dia. just E</u> <u>1 near Main Bldg.</u> <u>w/ service station attached (empty?)</u> <u>Dike full of water. Adjacent dike</u> <u>contains no tank - but may have</u> <u>at one time. - foundation?</u>		

	Observations	Photo	Interviews (Initials)
2. Underground Tanks (USTs) *Check for vent and fill pipes, pump pads, cover plates, other aboveground access ways <u>Manv? for Each:</u> . Location . Condition/inspections? . Contents . Spills/leaks? . Volume (cap.) . Piping/condition? . Age . If closed - closure date, procedure used	None		
3. Odors . Describe . Source(s)?			
4. Pools of Liquids . Type? . Sumps w/liquids?	- Under drum storage - <del>two unknown</del> 18/16 - Under trailer - FOL <del>other is asphalt</del> 21 Rail 2 - 25 Rail 2 / Rail 3, From U		
5. Drums . Location . Type . Contents . Size/capacity . Labels . Leakage? . Condition (check for seals, bulges, rusting, proper closure) . Spill control features?	Drum stockpile of unused product, leaks overpacks of hazardous waste, unlabeled Asphalt mat in drums, spilling leaking drums overpacks of cont. sol.	R2, F15, 16 R2, F12/19 R2, F10, 21. R2, F22, 23 R3, F10	
6. Other Containers . Location . Type . Contents . Approx. size/quantity . Labels . Leakage? . Storage conditions . Spill control features?	Buffers on pallet 5 gal. containers in corner 175 gal. blue unlabeled in corner Fuel tanks ASTs out of service other unlabeled or leaking containers	R2, F11 R2, F12 R2, F13 R2, F14 R2, F17, 19, & R3, F3	
7. PCB Items . Check electrical, hydraulic equipment, esp. transformers; do not include fluorescent light ballasts . Location . Type . Age . Labels/ID No.s? . Condition . Leakage?	Unlabeled transformers 25 of. located on top of platforms in middle of pool just W. of collapsed bldg.		
<b>III. INTERIOR OBSERVATIONS</b>			
1. Heating/Cooling System . Type . Fuel source . Boiler room . Exhaust(s)	Abandoned Buildings. • 1 collapsing in back shape - <del>data not enter</del> • other in poor cond. / Elect. still on but not used since early 80s.		
2. Stains/Corrosion . Floors . Walls . Ceilings . Sources?	• Some water on floor Not many stains / sources unknown		
3. Drains/Sumps . Where go?	No		
4. Flooring Material	concrete		
5. Insulation Type (If asbestos - see optional asbestos section at end of checklist)	?		
6. Process Equipment Check For: . Paint booths? . Cleaning units/degreasers? . Dip tanks? . Plating? . Sanding?	None at this time. Seems to have been a shop for large equipment.		

IV. EXTERIOR OBSERVATIONS				
.. Pits, Ponds, Lagoons Location . What used for/contents Age . Size Type of const. . General condition Discharge? To what? . Pollution control? Monitoring? (If wells - note number, location, depth, condition) Any leaks, seeps, spill evidence?	Small ponds located <del>near</del> surrounding pad. - collects drainage off of pad. Dikes <del>around</del> <sup>at</sup> AST for secondary containment - full of water. <del>2nd</del> <del>1st</del> <del>2nd</del> <del>1st</del>			
2. Stained Soil, Pavement Describe . Sources?	Stained soil under 2 abandoned tanks on pad <del>but</del> POL smell, under valves, one actively dripping → Well #2, 14, 25			
3. Stressed Vegetation Describe Use of herbicides? Pesticides? - Location - Amount/frequency of application - Who applied	Unknown			
4. Solid Waste Disposal - Landfills, Waste Piles (incinerators) *Check for fills, mounds, depressions, ash/burnt areas, construction debris. Off site disposal - dumpsters? Contractor name?	mostly "Storage" but much of this stuff is unused and has been here for several years. No disposal on site. Landfill off site = NSB			
For Each On-Site Waste Disposal Area/Facility: - Location - Age - Size - Type of construction - General condition - Discharge? To what? - Pollution control? - Monitoring? (If wells - note location, number, depth, condition) Any leaks, seeps, spills evidence?	None			
5. Wastewaters/Stormwaters Discharge to drains? Ditches? Streams? Manholes? . Oil/water separators? Wastewater treatment? What kind? If sludge generated, where disposed?	none			
6. Wells - Dry Wells, Water Wells, Irrigation, Injection, Oil and Gas, Monitoring, Abandoned Type . Location Condition	none			
7. On Site Septic System - Tanks, Cesspools Type . Condition	none			
8. Pipelines General location . Type (substances carried) Age . Construction Depth . Size Leakage? Tests?	abandoned? pipeline from AST to Service Station (unused) seems empty but no record or knowledge or indication of cleaning done.			
9. Air Emissions Exhausts . Stacks Vents . Incinerators Air pollution control equipment (baghouses, cyclones, etc.) Sources, emissions?	none			
QUESTIONS - HELPFUL DOCUMENTS, LEGAL PROCEEDINGS				
1. Site Plans	none			

2. Aerials			
3. ESA Reports - none			
4. Environmental Audit Reports - none			
5. Environmental Permits (e.g., solid waste, haz. waste, NPDES, air, wastewater, pretreatment, UIC)	- none		
Type			
Status			
6. UST/AST Registrations - none			
7. UST/AST Inspections - none			
8. UST/AST Inventory Reports - none			
9. MSDS Sheets - none			
10. Community Right-to-Know Plan - none			
11. Safety, SPCC Plans			
12. Spill Reports - none			
13. Fire Dept. Hazardous Use Permits/Inspections			
14. Pipeline Inspection Reports - none			
15. Hazardous Waste Generator, Notification or Reports	- none avail.		
16. Hazardous Waste Manifests/Solid Waste Disposal Documentation	- none avail.		
17. Hydrogeologic Reports - none			
18. Geotechnical Studies - none			
19. Correspondence RE: Violations or Env. Liens	- none avail.		
20. Knowledge of Any Pending, Threatened, or Past Litigation, Administrative Proceedings, or Notices of Possible Env. Liability?	- none avail.		
VI. SKETCH MAP	COMPLETE ATTACHMENT B		
OPTION - ASBESTOS - Preliminary Survey			
Asbestos in construction materials?			
Age of construction/renovation(s)?			
Any asbestos survey conducted? Results?			
Visual Indications of ACM:			
- Insulation - pipes, etc.			
- Floor tiles (esp. 9"x9")			
- Spray-on material - ceilings			
- Others			

~~check for Aerials~~  
~~Not in Scope~~

SPCC Plan includes  
bulk fuel farm @ Barrow

No

## **Appendix B**

### **Field Notes**



BALCON

07 July 97

W- South Rd

- 23-

1011 #2

(11) Batteries on pallet (view E)  
some broken, no caps,  
no leak proof container (N side of Rd)

(12) new W. inside corex on N  
Side of Pad - 2) 5 gal  
containers - one badly  
damaged + leaking

(13) At least (7) sealed blue plastic  
containers full - unlabeled,  
(may be more - snow covered)  
(view W) inside corex.

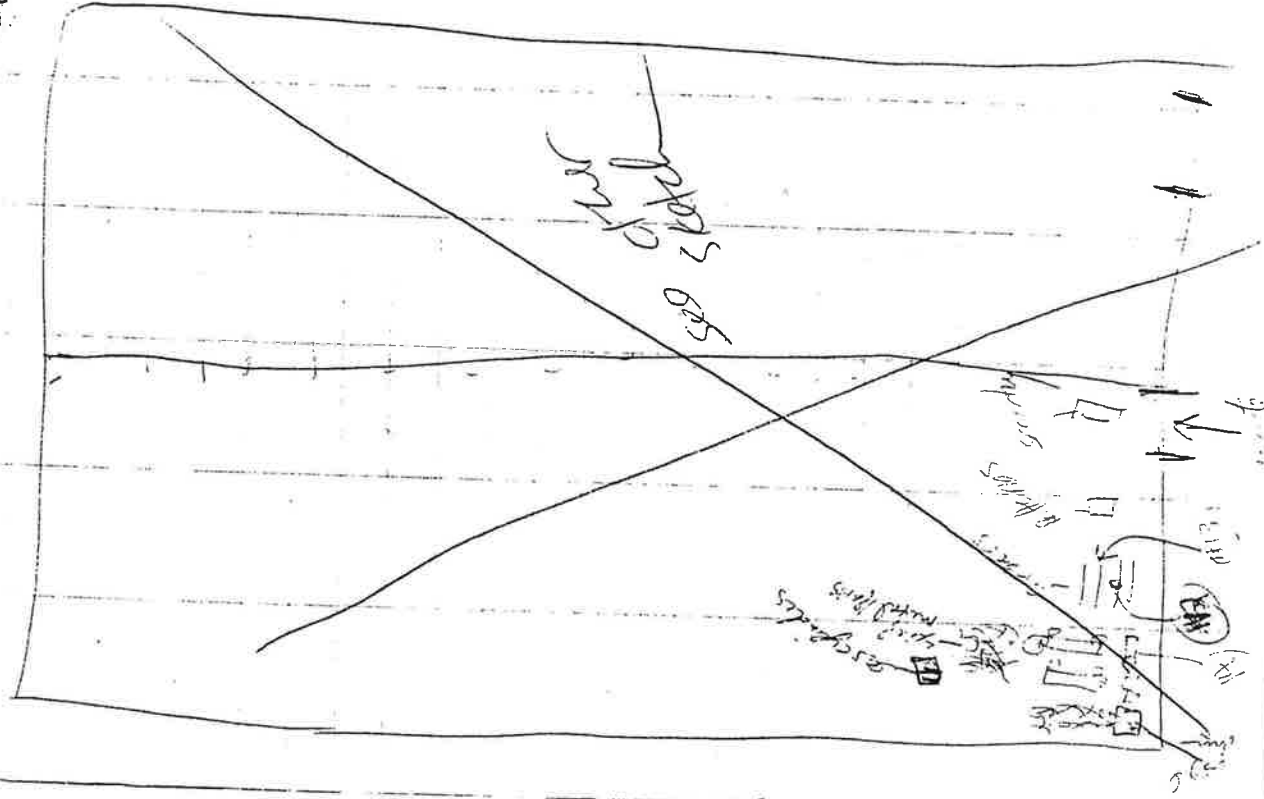
(14) → old fuel tank - decommissioned  
but no "OUT OF SERVICE"  
sign, seeping around fire - still  
on ground. (view E)

(15) gas cylinders - view S. - some  
unlabeled - Arroyo Co., Arroyo  
? empty or full

drum open bung, 1/2 full, unlabeled  
fuel, etc.

Remedial

- 26-



07 July 97

27

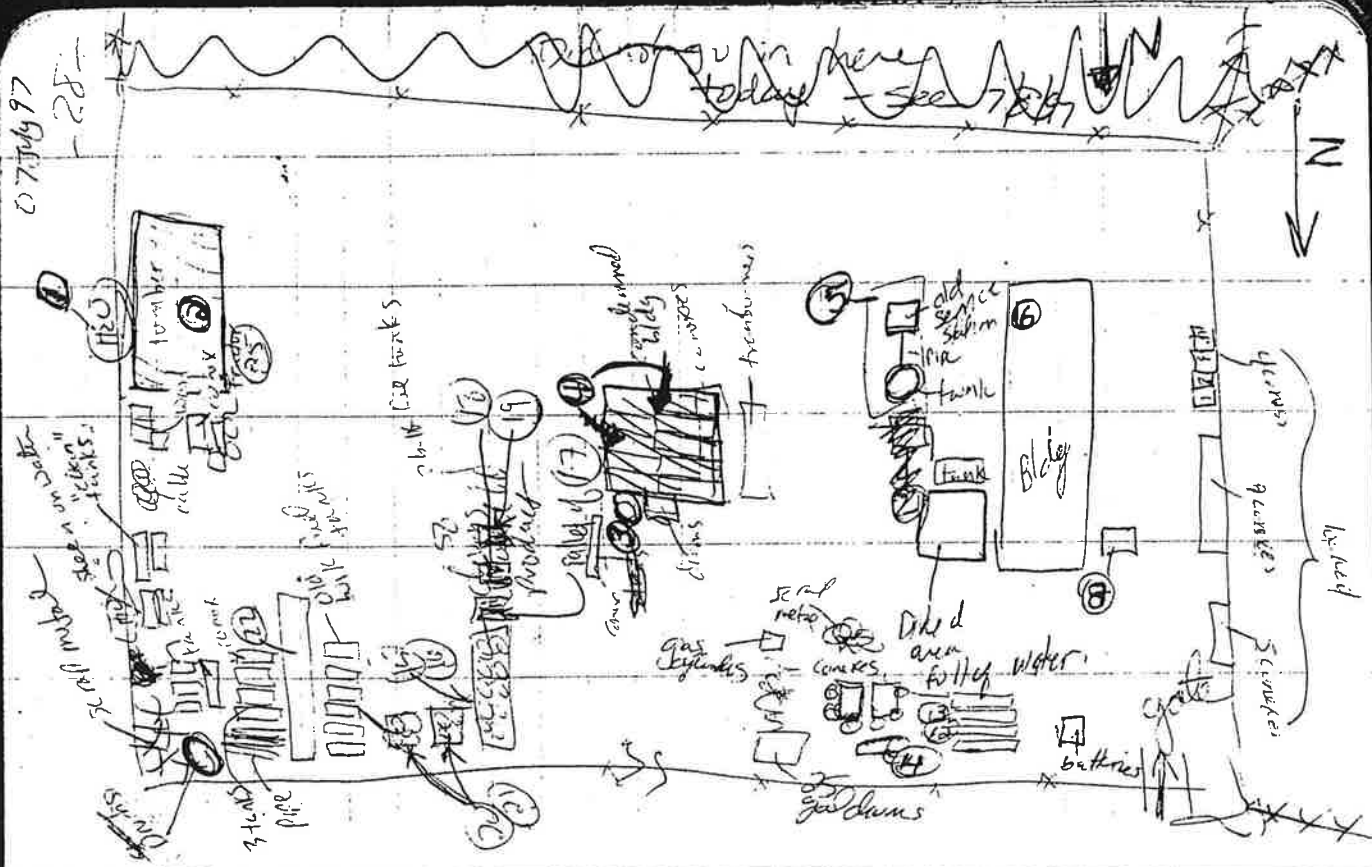
(15) View of hills, don't staple (newse). about 50 clients various product including Anti leak, gasoline, oil, tube, etc. (newse)

(16) some drums like this one (unlabeled) are leaking. Significant spillage on ground beneath platform 700; also on

(17) "Acrylic Enamel" (Flamander)  
 Co-sites of (10) & gal  
 Coars - visted (view?)

7 everynet drums of unknown  
has waste - dead birds  
have been seen here - so  
covered w/ plastic bags.

(19)



-27-

Barnard  
South Pad

07 July 97

2 Shag 55 gal drums rusted  
on ground just S of drum  
stockpile.

(20) View N. of (4 pallets high)  
asphalt material over 170 drums  
Also drums to B in photo include 13 more

(21) Spilling drum in Talore fib. &  
on E side. All drums in  
poor condition. Some bulging

hydrocarbon  
stored. 4 of  
these are  
spilling or to ground

drums to fur (R) in photo #120  
are only filled w/ chan.

To E of these is 6 old bulk fuel  
tanks.

(22) View NE - 8 drums - badly  
rusted & dented none unlabeled

Hambley & Dick

Barnard

South Pad

07 July 97

-30-

(23) - one of these drums is leaking  
into gravel (view W).

Canex 56 of these has 5 55 gal cans  
of grease, ~~at~~ some unlabeled, 110  
open. Plus 2 55 gal drums of  
grease

DRUMS → just E of pipe are about  
10 drums, 2 are empty.  
one open bag, 4 unlabeled,  
2 oil lubes, 1 transmission fluid.  
All very rusted & dented.  
One gas cylinder of compressed air

(24) Screen on water just E of Pad.  
Only seen abt. Draining ribs  
of pad in this direction.

(25) All product spill - ? from  
tractor.

Roll - (D) - same

Hambley & Dick

Barrow  
South Pad

073497

141-  
(3497)

① water to E. of lumber  
skatepole has some discoloration  
and gum on it. ? natural

② Lumber, pressure treated, stockpile  
is 25 x 20 x 4 bundles.

About 5 transformers located on  
top of platform - 2 PCQ's?  
in middle of pad by canexps

note: ~~Don't go inside bldg in center~~  
of pad - collapsing & water  
on floor. Some claims visible inside.  
↳ outside is 11 drums  
only 2 have fluid in them  
"Sublens oil"

③ Pallet Solvents in Sgal & legal as less  
can be located N of this bldg.  
Includes chemical, gas, automotive  
paint, paint, carburetor cleaner,  
Brake fluid, engine primer, fuel  
Also 2 oxygen tanks, Nitrogen, for back  
Kendall Co. 4/11

Barrow  
South Pad

073497

-32-

④ S. entrance of building  
(~~contaminated~~) to left  
is flammable storage.  
Various 55gal containers

Includes Methyl ethyl ketone Oxide  
97% active oxygen (organic peroxide)

⑤ Dito full of water - old tank  
& service station? at 2  
service (should be marked)

Canexps on W side along fence  
are locked -

⑥ Inside building (main) is 4  
bundles of contaminated soil from  
5/14/69 (New E)

Several drums of unused product including  
centrifuge + gear oil hyperacutely stored  
but drums in good condition.  
— over buckets (4) in here could be  
utilized. 1/11/69



07569

Panor south Pad

33

(view SE)

2 pellets of gas cylinders  
stored outside.

(6)

— close up of acetylene + O<sub>2</sub>  
stored next to each other.

(7)

Not marked empty or full

*Handley Dick*

-45-

Roll #4

Barron 8 July 98  
South Pad. adj pup

S side / SW corner  
28 crates various sizes  
of unused glycol (ethanol)  
16 drums, 12 unlabeled  
5 labeled

← containing  
"ISO grade  
Compound"  
→ HAZARDOUS

drums  
labeled  
with  
oil  
oil  
oil

on top is stored

Acid, to plastic line  
still usable  
metal drum  
corroded away

① → big drum  
2 one w hole in side  
HAZARDOUS drums w/  
Acid on top.

②  
Kimbaly of Dick

8 July 97

Barron

South Pad adj. pup. -46-  
Several tanks on W. side -  
Savage / Fuel a 15.

Several corys - locked  
one marked "HAZARDOUS"  
but, locked.

Kimbaly of Dick

Barion 8 July 97

-47-

~~South~~  
PAD → in Marc. N.  
~~seems to be same~~

③ Dam Forge

↳ Badly corroded drum - galling

④ stored veg behind wind plate  
in handle 6' x 4' x 1'

2 large tanks in main bldg

1/2 drum "excess" solvent

stained soil sidewalk

CIPM - adj. prop.

Capital Improvements Project  
Manager

22 tanks - plus large tank  
connected to  
Bunker 3 drum

Samuel Treker



# Appendix C

## Resumes

**AREAS OF EXPERTISE**

- multidiscipline project management
- contract administration & cost estimation
- remediation
- contaminated site assessment
- environmental permitting
- geological investigations

**EDUCATION**

West Georgia University:  
B.S., Geology

University of California,  
Riverside: Certified  
Hazardous Materials  
Manager

**REGISTRATION**

American Institute of  
Professional Geologist:  
Certified Professional  
Geologist

State of Alaska: Licensed  
Underground Storage Tank  
Worker Supervisor

State of California:  
Licensed Hazardous  
Materials Removal and  
Remedial Actions

State of California:  
Licensed General  
Engineering Contractor

**REPRESENTATIVE EXPERIENCE**

Mr. Massengale has over 20 years of experience in project management, mining exploration and development, civil construction, and environmental consulting. Mr. Massengale's experience can be summarized as "turnkey" involving taking projects from the conceptual stages through the design, permitting, and construction phases.

- As manager of Woodward-Clyde's Alaska Operations, Mr. Massengale is responsible for managing 25 professional engineers, geologists, and environmental scientists performing on primarily civil and geological engineering projects and sciences applied to the earth and its environment. In 1996 the Alaskan office managed projects in Alaska and internationally that totaled over \$25,000,000.
- Project Manager for a remote Alaska open pit mine site closure, for an area several tens of miles square. The client, under a Consent Order (CO) with ADEC, was required to perform Remedial Investigations/Feasibility Studies (RI/FS) and perform remediation at the mine site in order to close the mine. The scope of work included assessment for halogenated solvents, antifreeze, heavy metals and petroleum hydrocarbon contaminants in the mine's groundwater and soil, RCRA waste determinations, and remediation/disposal of contaminated soil and water. Successfully negotiated cleanup levels with ADEC above TBCs on non ARARs waste.
- Project Manager for Environmental Investigation of 65 Alascom sites and RI/FS and Corrective Actions at 25 sites identified as having been impacted by petroleum products, asbestos, solutions, PCBs, and heavy metals.
- Adjunct Instructor for the University of California Extension Service's EPA and California State Water Board sponsored *Underground Storage Tank and Fuel Systems Installation and Removal* class, taught statewide with over 500 students consisting of engineers, regulators, consultants, and contractors.
- Environmental Project Manager for the removal of Underground Storage Tanks (USTs) at over 50 different sites and multiple corrective actions at Anchorage International Airport.
- Project Manager/Geologist for soil fixation/stabilization remediation project. Managed project from

**PROFESSIONAL HISTORY**

Woodward-Clyde  
Consultants, Manager of  
Alaska Operations, 1994 to  
date

Municipality of Anchorage,  
Merrill Field Airport,  
Environmental Manager,  
1992-1993

Western Environmental  
Consultants, Environmental  
Manager 1990-1992

University of California  
Extension Service,  
Instructor UST Removal  
and Installation, 1990

JETCO Environmental,  
Murrieta Ca., Remediation  
Projects Manager 1987-  
1990

Beta and Walski  
Construction, Field  
Engineer 1986-1987

Aurum Philosophorum  
Mining and Exploration,  
Manager 1982-1986

Tri-Con Mining, Assistant  
Geologist 1981-1982

State of Alaska, Cadastral  
Engineer 1979-1980

**AFFILIATIONS**

American Institute of  
Professional Geologists

Alaska Miners Association

Anchorage Wednesday  
Round Table

Anchorage Concert  
Association

conceptualization through design, permitting, construction, and site closure. Project scope of work included RI/FS and final corrective action/remediation by reagent fixation of 1,000 tons of hydrocarbon, solvent, and heavy metal contaminated soil rendering it into sub-base fill and utilizing the recycled soil for airplane parking lot construction. The project was conducted at the Anchorage Municipal Airport and was selected by the Alaska Commission on Science and Technology for demonstration of unique technology grant funding.

- Project Manager for Phase I and II Environmental Site Assessments for contaminated sites, UST removal, and new UST system installation for California Milk Producers. Conducted waste categorizations for corrective/remedial actions and final bioremediation of 2,500 tons of contaminated soil. Designed statistically valid sampling verification plan in accordance with EPA's document SW-846. Interfaced with four different California government regulatory agencies.
- Project Manager for contaminated soil remediation project for the Rancho California Municipal Water District Scope of Work included: removed gasoline and diesel tanks, performed Phase I environmental site assessment, performed Phase II environmental site assessment to delineate contaminant plumes, designed and implemented Remedial Action Plan, excavated contaminated soil, designed and implemented sampling and field screening plan for corrective action verification, performed thermal remediation of approximately 2,600 tons of contaminated soil, designed sampling plan using EPA SW 846 protocols for verification of thermal-remediation, designed and installed groundwater monitoring well system, designed and implemented water sampling program for corrective action verification.
- Project Manager for the UST removals at 13 Ventura County, California Fire Department's Stations and performing corrective actions at sites discovered to be contaminated with petroleum hydrocarbons.
- Program Manager for UST removals, installations and fuel systems upgrades at over 20 General Telephone sites in California.

**AREAS OF EXPERTISE**

- Ocean Engineering
- Coastal Processes
- Data Acquisition

**EDUCATION**

Florida Institute of  
Technology, B.S., Ocean  
Engineering, 1993

**PROFESSIONAL  
HISTORY**

Woodward-Clyde  
Consultants, Anchorage,  
AK, Staff Engineer,  
present

Florida Institute of  
Technology, Melbourne,  
FL, Oceanography Lab  
Assistant, 1992 to 1993

Woods Hole  
Oceanographic Institution,  
Woods Hole, MA, Guest  
Student, 1991

**AWARDS**

National Collegiate  
Engineering Award

**TRAINING**

40-Hour HAZWOPER  
Phase I ESA  
Advanced SCUBA diving  
CPR & First Aid

**AFFILIATIONS**

Marine Technology  
Society  
Society of Women  
Engineers

**REPRESENTATIVE EXPERIENCE**

Ms. Nielsen is an engineer with marine emphasis and has experience in engineering design, laboratory science, and field science. Ms. Nielsen is a dedicated scientist who provides thorough and efficient work to various projects.

**Engineering Design**

- Proposed, fabricated, and tested an original design for an Autonomous Underwater Vehicle (AUV) in 18 weeks. This vehicle utilizes a GPS and an onboard computer in conjunction with other navigational equipment to follow a preset course underwater.
- Developed a wave gage that houses a pressure transducer, data logger, battery pack, and circuitry. This device measures wave height above the instrument which can be moored at any point in the water column.

**Laboratory Science**

- Carried out an array of tests on an experimental plankton pump. This required the use of a flume and a Laser Doppler Velocimeter to test the flow regime and boundary layers near the pump as well as pump performance.
- Analyzed and counted biological organisms from sea floor core samples at Woods Hole Oceanographic Institution for a benthic study in Cape Cod Bay, Massachusetts.
- Calibrated, tested, and repaired oceanographic field equipment for use in the Indian River Lagoon, Florida.

**Field Science**

- Contributed to an extended study at sea of fish, benthic organisms, and current and sound velocity profiles between Florida and the Bahamas. Studies concentrated on the Gulf Stream and the area directly near the Bahamas Islands.
- Participated in a sampling program to describe the benthic community of the central Beaufort Sea, Alaska. Sediment samples were collected and analyzed for benthic organisms as well as contaminants typically associated with drilling muds and cuttings related to petroleum

exploration. A current study was also performed to indicate possible transport of these sediments.

- Performed field sampling and/or data analysis for hydrography studies worldwide, including Mikkelsen Bay in Alaska, the Caspian Sea near Azerbaijan, and the Medeteranean Sea off Tunisia. Salinity, Temperature, and Current data was analyzed to describe the coastal processes of these waters for oil exploration and production purposes.
- Executed surface and tidal current studies in Lynn Canal, Alaska to be used for a spill response plan at Kensington Mine. Data analysis was performed to predict the extent and available response time of a worst case hypothetical fuel spill during refueling activities at the mine.
- Fulfilled internal environmental site assessments in accordance with the ECAMP guidelines at 15 Long Range Radar Sites in Alaska. The ECAMP assesses compliance with RCRA, SARA, CWA, CAA, SDWA, ESA, NEPA, CERCLA, fuel storage tank regulations, NPDES permit requirements, wastewater regulations, and hazardous materials and hazardous waste regulations.

**AREAS OF EXPERTISE**

- multidiscipline project management
- chemical engineering
- arctic/cold regions engineering
- budgeting
- contract administration & costing

project  
estimating construction

**EDUCATION**

University of Alaska  
Anchorage, M.S., Arctic  
Engineering, 1994

Rensselaer Polytechnic  
Institute, B.S., Chemical  
Engineering, 1967

**PROFESSIONAL  
HISTORY**

Woodward-Clyde, Senior  
Project Engineer, 1996-  
present

City of Unalaska, Capital  
Projects Manager, 1995-96

Municipality of  
Anchorage, Assistant  
Manager-Merrill Field  
Airport, 1994

Municipality of  
Anchorage, Department of  
Public Works,  
Construction Engineer,  
1989-1994

Petroleum  
Construction/Chevron  
USA, Alaska Project  
Manager, 1987

**REPRESENTATIVE EXPERIENCE**

Mr. Wood is a Project Manager - Engineer with 30 years of experience, 25 of which have been in Alaska. Mr. Wood is a graduate Chemical Engineer with a Masters in Arctic Engineering. Mr. Wood has been overseeing multi-million dollar, multi-disciplinary projects for the past 16 years.

Representative work experience includes:

- Mr. Wood managed more than 30 projects valued at more than \$14 million as Capital Projects Manager for the City of Unalaska. He oversaw most of the city's capital project program including designing and constructing the new, state-of-the-art landfill and designing the baling equipment and building. Projects ranged from \$10,000 to \$7 million and included design, feasibility studies, environmental assessment studies, and construction.
- Published thesis on development of reinforcing steel and concrete bond strengths in concrete cured below freezing temperatures with anti-freeze additives.
- As Construction Engineer for the Municipality of Anchorage, Mr. Wood was in charge of the Construction Division of the Department of Public Works with a staff of 15 and the support of 15 to 20 private architectural and engineering firms. The Construction Division was responsible for all the horizontal construction of Anchorage's infrastructure including roads, bridges and stormwater collection. Annual capital budgets ranged from \$20 to \$30 million and included legislative grants, general obligation bonds, and tax revenues, each of which has to be accounted for in a different way.
- While Project Manager for Petroleum Construction Co. and Chevron USA, Mr. Wood erected two state-of-the-art retail gasoline stations in Anchorage, Alaska, which required the coordinating the efforts of 10 specialty contractors in south Anchorage and Eagle River. Projects were completed in record time and under budget.
- Mr. Wood was Alaskan Project Manager for Perini - Majestic JV. The project consisted of structural upgrade of two DEW-Line facilities. Point Barrow and Oliktok Point were upgraded for the new General Electric backscatter radar systems. The work entailed management of contractors from Fairbanks to the lower 48, the design engineers in Boston, and the delivery of all materials via NORAD aircraft from Colorado.

**PROFESSIONAL  
HISTORY** (concluded)

Perini International  
Construction, Project  
Manager, 1986

Tikigaq Construction, Inc.,  
General Manager, 1979-  
1983

State of Alaska,  
Department of  
Transportation, Project  
Manager/Engineer, 1978-  
1979

State of Alaska, Office of  
the Governor, Lease  
Enforcement Officer,  
1974-1977

Shell Chemical Company,  
Chemical, Electrical &  
Mechanical Engineer -  
Petrochemical Process  
& Project Engineer, 1967-  
1972

Business and Construction  
Consultant, 1972-1989

**AFFILIATIONS**

Project Management  
Institute

American Concrete  
Institute

American Public Workers  
Association

- Mr. Wood owned and operated a general contracting firm specializing in civil excavation projects in rural Alaska. Completed over ten projects in both Anchorage and the Lower Kuskokwim River villages.
- As founder and operator of a general contracting firm for the village of Point Hope, he completed design and construction of hundreds of housing units and commercial buildings on the North Slope. Mr. Wood oversaw a construction effort which exceeded \$12 million per year. In a joint venture with AIC, Mr. Wood oversaw the Point Lay village move, and provided the village of Point Hope with an emergency potable water source. Additionally, Mr. Wood operated a construction camp at Point Lay.
- While functioning as staff engineer for several consulting firms, Mr. Wood evaluated electrical, mechanical, and process instrumentation systems throughout Alaska. He provided electrical and mechanical system code-deficiency evaluations in hundreds of rural State of Alaska buildings. He also evaluated Flow Stations 1, 2, and 3 at Prudhoe for instrumentation failures and subsequent Flow Station shutdown and identified faulty electrical and instrumentation design, remedying the problem.
- While Mr. Wood was Field Surveillance Officer for the Pipeline Coordinator's Office, he oversaw construction of the Trans-Alaskan Pipeline System for the State of Alaska. The job consisted of enforcing stipulations of the Right of Way Lease and required a thorough knowledge of engineering and construction methods. All areas of biological, environmental, hydrological, and geological science were combined with known (and some unknown) engineering and construction methods in an arctic environment.
- As Project/Process Engineer with Shell Chemical Company in Woodbury, N. J., Mr. Wood completed more than 50 projects in an operating polypropylene plant. Work entailed design and construction of process-enhancing changes to the existing plant. Included were engineering economic feasibility studies, project design, budget preparation, construction documents, erection, project start up, and operating procedures.