

1.4.2



ecology and environment, inc.

International Specialists in the Environment

840 K Street
Anchorage, Alaska 99501
Tel: (907) 257-5000, Fax: (907) 257-5007

December 22, 2000

RECEIVED

JAN 03 2001

Daniel Benfield, Project Manager
Alaska Department of Environmental Conservation
Aboveground Storage Tank Program
410 Willoughby Avenue, Suite 105
Juneau, Alaska 99801-1795

**ADEC STORAGE
TANK PROGRAM
FAIRBANKS**

Re: Trip Report for the Village of Akiak, Alaska, Notice to Proceed No. 1850011401, Contract No. 18-5001-14

Dear Mr. Benfield:

Enclosed please find a copy of the trip report for the Village of Akiak, Alaska, Aboveground Storage Tank Farm site reconnaissance. As we have discussed in the past, this report presents a preliminary view of conditions at the site. Ecology and Environment, Inc. would be pleased to meet with you in the near future to discuss each tank farm in more detail and explore the various scenarios that are possible at each tank farm.

If you have any questions, please call me or Greg Horner at (907) 257-5000.

Sincerely,

Michael Daigneault
Project Manager

AKIAK ABOVEGROUND STORAGE TANK FARM SITE RECONNAISSANCE

AKIAK, ALASKA

NTP No.: 1850011401

Contract: 18-5001-14

December 2000

Prepared for:

Mr. Daniel Benfield

**Alaska Department of Environmental Conservation
Aboveground Storage Tank Program
Juneau, Alaska**

**Akiak Aboveground Storage Tank Farm
Site Reconnaissance
Akiak, Alaska**

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1.0 Introduction	1
2.0 Local Authorities	2
3.0 Elementary School Tank Farm	2
3.1 Site Description	2
3.2 Site Reconnaissance	3
3.3 Analytical Results	3
3.4 Discussion and Recommendations	4
4.0 High School Tank Farm	4
4.1 Site Description	4
4.2 Site Reconnaissance	5
4.3 Analytical Results	6
4.3 Discussion and Recommendations	6
5.0 Old Corporation Tank Farm	7
5.1 Site Description	7
5.2 Site Reconnaissance	7
5.3 Analytical Results	8
5.4 Discussion and Recommendations	8
6.0 Old City Tank Farm	9
6.1 Site Description	9
6.2 Site Reconnaissance	9
6.3 Analytical Data	10
6.4 Discussion and Recommendations	10
7.0 Reference List	11

APPENDICES

- A SITE FIGURES
- B FIELD LOGBOOK
- C FIELD SCREENING RESULTS
- D ANALYTICAL RESULTS
- E SITE PHOTOGRAPHS

1.0 Introduction

In accordance with Notice to Proceed No. 1850011401 under Contract No. 18-5001-14, Ecology and Environment, Inc. (E & E) performed the site reconnaissance of the Village of Akiak aboveground storage tank (AST) farms on October 19 and 20, 2000. Site reconnaissance was completed with the assistance of local contacts including Mr. Rod Pruitt, Principal of Akiak Schools, and Mr. Philip Philip, City of Akiak employee. Tank farms included in the site reconnaissance were the Elementary School Tank Farm (Akiak Tank Farm No. 1), High School Tank Farm (Akiak Tank Farm No. 2), Old Corporation Tank Farm (Akiak Tank Farm No. 3), and Old City Tank Farm (Akiak Tank Farm No. 4; tank farm numbers correspond to those assigned by the Department of Community and Regional Affairs [DCRA], Division of Energy, as indicated in the site figures in Appendix A). Additional ASTs and AST farms located in Akiak but not included in the site reconnaissance include the new consolidated bulk-fuel facility (Akiak Tank Farm No. 7), an AST at the National Guard Armory Building (Akiak Tank Farm No. 6), an AST at the new City Power Plant (Akiak Tank Farm No. 5), and an AST at the new water treatment facility (not surveyed by DCRA). The National Guard Armory Building AST was not included in the site reconnaissance because the United States Army conducts its own tank management program and the remaining three tank farms were not included in the site reconnaissance because they are newly constructed facilities.

Site reconnaissance consisted of a site visit, collection of soil for field screening and fixed laboratory analysis, gathering of local information, and obtaining site photographs. Soil was collected at suspected sources (e.g., locations of visible staining, stressed vegetation, former tank locations, known spill locations, or major pipe junctions/connections). Soil samples were collected with hand-operated sampling equipment. Soil throughout each tank farm was systematically collected and field-screened via headspace analysis with a photoionization detector (PID). Site conditions were used to identify locations for collection of soil samples for fixed laboratory analysis. Analyses at the fixed laboratory were limited to gasoline-range organics/benzene, toluene, ethylbenzene, and xylenes (GRO/BTEX; Alaska Method 101/EPA Method 8021) and diesel-range organics (DRO; Alaska Method 102). One soil sample was collected for fixed laboratory analysis per tank farm; no field duplicate samples or matrix spike/matrix spike duplicate samples were collected during the site reconnaissance. One trip blank sample was submitted for GRO/BTEX analysis. All samples collected for fixed laboratory analysis were collected in accordance with the *Alaska Department of Environmental Conservation (ADEC), Storage Tank Program, Underground Storage Tanks Procedures Manual, Guidance for Treatment of Petroleum-Contaminated Soil and Water and Standard Sampling Procedures* (ADEC 1999a).

The following report is intended to provide general information regarding the AST farms and the preliminary results of the site reconnaissance. The appendices are included for further detail and

clarification. Appendix A includes figures drawn by DCRA after a survey on October 13, 1998; the figures have not been altered by E & E. A detailed description of daily activities during the site reconnaissance can be found in Appendix B. Analytical data collected as a result of the site reconnaissance is included in Appendices C and D. Appendix E provides a visual picture of the site descriptions found in the following pages; the photograph numbers correspond with the numbers and descriptions contained in the field logbook (Appendix B).

2.0 Local Authorities

Mr. Rod Pruitt, Principal
Yupiit School District
Akiak, Alaska 99552
(907) 765-7212

Mr. Sam Jasper
City of Akiak
P.O. Box 187
Akiak, Alaska 99552
(907) 765-7411

Mr. Bob Carlson
Alaska Department of Environmental Conservation
Bethel, Alaska 99559
(907) 543-3215

3.0 Elementary School Tank Farm

3.1 Site Description

The Yupiit School District operates this AST farm for the storage and supply of fuel oil for heating the Akiak Elementary School and the library building. The Yupiit School District is interested in decommissioning this AST farm and connecting the elementary school and library to the new consolidated bulk fuel storage facility. The following site description was obtained directly from observations made by DCRA during an October 13, 1998, site assessment. The AST farm is located approximately 50 feet west of the elementary school and 350 feet west of the Kuskokwim River. There is a 3.5-foot-high gravel dike and liner around the AST farm. Around this facility is a 5.5-foot-high chain link fence equipped with an unlocked gate. The AST farm consists of two vertical, welded steel, single wall, Bureau of Indian Affairs (BIA) style tanks with removable tops; both have a capacity of approximately 8,000 gallons (see Akiak Tank Farm No. 1, Appendix A). The ASTs are supported on 8-by-8-inch timbers with 2-by-12-inch planking. The ASTs are equipped with a manhole and normal vent on top, but no emergency vent. Each AST has a 1-inch drain valve. The ASTs are connected by a

3-inch-diameter steel header with welded fittings. Each AST has a steel ball valve and flexible connection. The AST valves are not locked. The AST's header piping is connected to a 3-inch-diameter steel fill line with welded fittings. The fill line extends approximately 150 feet to an off-loading header equipped with a gate valve, check valve, pressure relief, camlock fitting, and drip pan. This fill line also connects to AST Farm No. 3. A 1-inch-diameter steel distribution line, with threaded fittings, connects to the school day tank. A ¾-inch diameter branch line connects to the library day tank. These lines are equipped with a gate valve. The ASTs are filled by the fuel barge during its periodic delivery to the village (DCRA 1998). Frequency of filling at the AST farm is unknown.

The tank farm is slightly elevated from the surrounding area. The topography surrounding the AST farm is generally flat and slopes gently east toward the Kuskokwim River. The area north and west of the tank farm has recently been regraded as a result of housing construction. A small stand of trees is located along the east side of the tank farm. Reportedly, groundwater is approximately 18-30 feet below ground surface (bgs; ADEC 1999b). Depending on snow cover, seasonal frost is typically 4-5 feet bgs from May to July; when snow cover remains later in the season, seasonal frost is usually about 3-4 feet bgs (ADEC 1999b). By August, seasonal frost is typically absent (ADEC 1999b). Although the ADEC Preliminary Assessment Report refers to permafrost at the aforementioned depths, it is E&E's belief that the author was referring to seasonal frost rather than permafrost.

Minimal information is available regarding the operational practices at the tank farm; apparently, when the berm area fills with precipitation, water is pumped from the berm area and discharged to nearby road surfaces. It is unknown whether the water is tested for petroleum contaminants before pumping or the exact location of water discharge.

3.2 Site Reconnaissance

Access to the site was granted by Mr. Rod Pruitt. Local children were playing in and around the AST farm during the site reconnaissance. The timbers and planking supporting the ASTs within the berm area were flooded because of precipitation retainment by the berm; a thin layer of ice covered the water surface. A sheen was noted on open water within the berm area. Vegetation was growing within the lined berm area. Soil was collected from a total of nine locations for field screening analysis with the PID (see Appendix B). One soil sample was collected at 2 feet bgs, downslope from the AST farm main valve assembly. Photographs of the site were taken; however, the photographs did not develop properly.

3.3 Analytical Results

PID readings ranged from 3.9 to 714 parts per million (ppm; Appendix C). The maximum PID reading was taken at the AST farm main valve assembly at 2 feet bgs. In the fixed laboratory sample

collected from 2 feet bgs at the AST farm main valve assembly, all BTEX compounds were detected in the sample at concentrations ranging from 0.19 to 53 milligrams per kilogram (mg/kg; Appendix D). Benzene and ethylbenzene concentrations exceed the ADEC Migration to Groundwater Soil Cleanup Level (ADEC 2000). GRO and DRO were also detected in the sample at concentrations of 1,500 and 20,000 mg/kg, respectively. GRO and DRO concentrations exceed Soil Cleanup Levels established by ADEC (ADEC 2000).

3.4 Discussion and Recommendations

Petroleum contaminants are present at concentrations above ADEC Soil Cleanup Levels in soil in the vicinity of the main valve assembly. The volume of contaminated soil is unknown. The main valve assembly is not within the berm area and therefore is not contained. It is unknown whether petroleum constituents are present within the berm area or have permeated through the liner; however, because of a petroleum sheen present on water contained within the lined berm, the practice of pumping water from the berm to the nearby road surface to prevent overflow may have caused some migration of petroleum contaminants. Additional information is necessary to assess the extent of contaminant migration at the site and to provide a framework for future needs at the site. Two approaches can be utilized to gather additional information at the site: site characterization with fixed laboratory analysis or soil removal that is directed by quantitative field screening in areas of known contamination with fixed laboratory analysis for confirmation of field screening results. Management of removed soil could be determined during the removal or following future investigations, and would be based on the volume and contaminant levels of soil removed. Management and consolidation with soils removed from the other remedial sites will be considered.

The possibility of decommissioning the AST farm and connecting the elementary school and library to the new consolidated bulk fuel facility should be reviewed. A number of scenarios are possible. Therefore, decisions regarding decommissioning methods, AST reuse, and investigation of potentially contaminated soil should be jointly agreed upon by ADEC and the Yupiit School District.

4.0 High School Tank Farm

4.1 Site Description

The Yupiit School District operates this AST farm for the storage and supply of fuel oil for heating the Akiak High School and for the school's standby generator system (see Akiak Tank Farm No. 2, Appendix A). One AST (tank No. 6) is used for gasoline dispensing for the school's gas operated equipment and vehicles. The Yupiit School District is interested in decommissioning this AST farm and connecting the high school to the new consolidated bulk fuel storage facility. The following site

description was obtained directly from observations made by DCRA during an October 13, 1998, site assessment. The AST farm is located behind the high school, approximately 700 feet from the Kuskokwim River. There is a 2-foot-high gravel dike and liner around the AST farm. Vegetation is growing inside the dike. The facility is not fenced or gated. The AST farm consists of seven vertical, welded steel, single wall, BIA-style tanks with removable tops. The individual ASTs vary in capacity from 5,000 to 9,750 gallons, with a total AST farm capacity of 54,000 gallons. The ASTs are supported on 12-by-12-inch timbers with 2-by-14-inch planking. The ASTs are equipped with a manhole and normal vent on top, but no emergency vent. Each AST has a drain valve. The ASTs, except tank No. 6, are connected to a 3-inch diameter steel header with welded fittings. Each AST has a steel plug valve and flexible connection. The AST valves are not locked. The AST's header piping is connected to a 3-inch diameter welded steel fill line and two 2-inch diameter welded steel distribution lines. The header line has pressure relief. The fill line has a check valve and runs to the off-loading header of AST Farm No. 1. One of the 2-inch diameter distribution lines runs to the school's day tank, and the second runs to the generator day tank. The lines are equipped with a gate valve. Tank No. 6 has a 1-inch diameter steel distribution pipe, with threaded fittings, routed to an electric fuel pump with a meter, hose, and nozzle. The pump is located within the diked area inside a wooden box. The ASTs are filled by the fuel barge during its periodic delivery to the village (DCRA 1998). Frequency of filling at the AST farm is unknown.

The tank farm is slightly elevated from the surrounding area. The topography surrounding the AST farm is generally flat and slopes gently east toward the Kuskokwim River. A small stand of trees is located along the north and west sides of the tank farm. Groundwater and seasonal frost levels are not known, but they are likely similar to those reported for the Elementary School Tank Farm.

Minimal information has been gathered regarding the operational practices at the tank farm; apparently, when the berm area fills with precipitation, water is pumped from the berm area and discharged to nearby road surfaces. It is unknown whether the water is tested for petroleum contaminants before pumping or the exact location of water discharge.

4.2 Site Reconnaissance

Access to the site was granted by Mr. Rod Pruitt. The timbers and planking supporting the ASTs rest upon a sandbag substrate. Stained and darkened soil and sandbags were noted throughout the berm area. Vegetation was growing within the lined berm area. Soil was collected from a total of nine locations for field screening analysis with the PID (see Appendix B). One soil sample was collected at 12 inches bgs, adjacent to the gasoline fuel dispensing pump on the west side of the AST farm.

Photographs of the site were taken and are available in Appendix E; photograph descriptions are in the logbook (Appendix B).

4.3 Analytical Results

PID readings ranged from 9.9 to greater than 2,000 ppm (Appendix C). The maximum PID reading was taken at the gasoline fuel dispensing pump on the west side of the AST farm. In the fixed laboratory sample collected from 12 inches bgs at the gasoline fuel dispensing pump, all BTEX compounds were detected in the sample at concentrations ranging from 96 to 1,500 mg/kg (Appendix D). GRO and DRO were also detected in the sample at concentrations of 9,100 and 4,300 mg/kg, respectively. All BTEX compounds, GRO, and DRO were present at concentrations exceeding the ADEC Soil Cleanup Levels (ADEC 2000).

4.3 Discussion and Recommendations

Petroleum contaminants are present at concentrations above ADEC Soil Cleanup Levels in soil in the vicinity of the gasoline dispensing pump; however, the volume of contaminated soil is unknown. It is unknown whether petroleum constituents are present within the berm area or have permeated through the liner. The sandbags within the berm area are stained throughout and will likely need to be treated as contaminated soil. Because of the presence of stained soil within the lined berm, the practice of pumping water from the berm to the nearby road surface to prevent overflow may have caused some migration of petroleum contaminants. Additional information is necessary to assess the extent of contaminant migration at the site and to provide a framework for future site needs. Two approaches can be utilized to gather additional information at the site: site characterization with fixed laboratory analysis or soil removal directed by quantitative field screening in areas of known contamination with fixed laboratory analysis for confirmation of field screening results. Consistent with the contaminated soils described above for the Elementary School Tank Farm (see Section 3.4), soil treatment and disposal options can be determined during a removal or future investigations. Specific actions will be based on the volume and contaminant concentration of the soil removed.

The possibility of decommissioning this AST farm and connecting the high school to the new consolidated bulk fuel facility should be addressed. Because a number of possible scenarios exist, decisions regarding decommissioning methods, AST reuse, and investigation of potentially contaminated soil should be jointly agreed upon by ADEC and the Yupiit School District.

5.0 Old Corporation Tank Farm

5.1 Site Description

The Kokamiut Corporation operated this AST farm for the storage, supply, and dispensing of gasoline and fuel oil to its village customers. These operations have since been moved to the new consolidated bulk fuel facility in Akiak. The following site description was obtained directly from observations made by DCRA during an October 13, 1998, site assessment. The former AST farm is located approximately 30 feet from the Kuskokwim River and approximately 100 feet from a private well (see Akiak Tank Farm No. 3, Appendix A). The Kuskokwim River bank is rapidly eroding and will eventually overtake this AST farm. The two existing ASTs are within a lined 2-foot-high dirt and gravel dike. The liner is torn and misplaced throughout the AST farm. There is no fence around this facility. The AST farm consists of two vertical, welded steel, single wall tanks; both have a capacity of approximately 24,000 gallons (see Akiak Tank Farm No. 3, Appendix A). The ASTs sit on 12-by-12-inch timbers with 4-by-12-inch planking within the diked area. The ASTs have a normal vent on top, but no emergency vents or manholes. The ASTs each have a 3-inch diameter steel fuel supply line, with threaded fittings, routed to a dispensing shed located adjacent to the AST farm. Both lines have a 3-inch diameter bronze gate valve but no flex connection at the AST. The dispensing shed was equipped with individual gasoline and fuel oil electric pump dispensers with a meter, hose, and nozzle. The shed door was locked and has a warning sign posted. The gasoline AST was filled by a 3-inch diameter off-loading header with a bronze gate valve and cam lock fitting located adjacent to the dispensing shed. The fuel oil AST was filled through a fill cap on top. This AST has a 3/4-inch diameter rubber supply hose which runs to a portable electric fuel transfer pump. The transfer pump, located under a cardboard box cover, is connected to a 3/4-inch diameter dispensing hose which has a nozzle with a meter. The ASTs were filled by the fuel barge during its periodic delivery to the village (DCRA 1998). Frequency of filling at the AST farm is unknown.

The area surrounding the AST farm is generally flat. The AST farm is bordered on the west and south by dirt roads. The Kuskokwim River is adjacent to the site on the east side. A small stand of trees is located north of the AST farm.

5.2 Site Reconnaissance

As described above, the AST farm consisted of two ASTs within a lined berm at the time of the site reconnaissance; however, a third AST existed at this AST farm (DCRA 1998). The former third AST was a 10,000-gallon, horizontal, welded steel, single wall integral diked tank mounted on steel skids sitting directly on a grade south of the existing berm. This AST formerly stored gasoline; the AST

possibly was moved to the new consolidated bulk fuel facility as an AST of identical capacity and similar dimensions currently exists there.

Access to the site was granted by Mr. Philip Philip. The timbers and planking supporting the ASTs were flooded with water because of precipitation retention by the berm and liner. Stained soil and petroleum odor was noted around the fuel dispensing pumps. The liner has been compromised in numerous locations. Soil was collected from a total of 10 locations for field screening analysis with the PID (Appendix B). One soil sample was collected at 16 inches bgs, approximately at the north end of the former 10,000-gallon horizontal gasoline AST. Photographs of the site were taken and are available in Appendix E; photograph descriptions are in the logbook (Appendix B).

5.3 Analytical Results

PID readings ranged from 3.0 to 1,240 ppm (Appendix C). The maximum PID reading was taken at the south side of the fuel dispensing station adjacent to the gasoline pump. In the fixed laboratory sample collected from 16 inches bgs at the north end of the former gasoline AST, no BTEX compounds, GRO, or DRO were detected (Appendix D).

5.4 Discussion and Recommendations

The former Kokamiut Corporation AST farm was operated until the new bulk facility in Akiak was activated. One AST has already been removed from the former site. No contaminants were detected in the fixed laboratory sample collected near the AST that had been removed. The remaining two ASTs are believed to have been emptied. The condition of the berm and liner indicate that contaminants may have migrated to soils directly below the AST farm. Soil staining and petroleum odor was evident near the fuel dispensing pump shed and the maximum PID readings for the site were obtained from soil collected at the dispensing pump shed. Contaminant migration to the Kuskokwim River was not observed based on the absence of soil staining or petroleum seeps in the exposed riverbank and the lack of sheen on surface water along the riverbank. Additional information is necessary to assess the extent of contaminant migration, if any, at the site and to provide a framework for future site needs. Two approaches can be utilized to gather additional information at the site: site characterization with fixed laboratory analysis or soil removal directed by quantitative field screening in areas of suspected contamination. Fixed laboratory analysis will be used for confirmation of field screening results. Management decisions for the ultimate treatment and disposal of removed soil would be made in conjunction with the other AST removals at Akiak. An additional consideration at the Old Corporation Tank Farm is caused by its proximity to the Kuskokwim River. Excavation or other removal options

should be carefully evaluated to determine the potential for increased erosion and thermal instability of the river bank.

The AST farm is no longer in use; however, remaining equipment presents a possible safety concern to people utilizing the area. The priority of completely decommissioning this AST farm should be determined by ADEC, the Kokamiut Corporation, and the community of Akiak. As a number of possible scenarios exist, decisions regarding decommissioning methods, AST reuse, and investigation of potentially contaminated soil should be jointly agreed upon by ADEC and the Kokamiut Corporation.

6.0 Old City Tank Farm

6.1 Site Description

The City of Akiak Electric Utility operated this AST farm for the storage and supply of fuel oil for its former power plant. These operations have since been moved to the new consolidated bulk fuel facility in Akiak and to an AST located next to the new power plant. The following site description was obtained directly from observations made by DCRA during an October 13, 1998, site assessment. The AST farm is located approximately 1,000 feet from the Kuskokwim River. There is a lined gravel and sand bag dike around the ASTs. There is no fence around this facility. The AST farm consists of two 24,000-gallon, vertical, welded steel, single wall tanks (see Akiak Tank Farm No. 4, Appendix A). The ASTs are in fair condition with extensive rust. The ASTs are supported on 12-by-12-inch timbers with 2-by-12-inch planking. The ASTs are equipped with a spring-loaded emergency vent manhole and a normal vent. The ASTs are connected by a 3-inch diameter steel header with welded fittings. Each AST has a steel gate valve and a flexible connection. The AST valves are not locked, but the stem handles are removed. The AST's header piping, with pressure relief, is extended to an off-loading header which is located outside the diked area. The off-loading header is equipped with a gate valve, check valve, and camlock fitting. Also on the header piping is a 1.5-inch diameter service connection with a ball valve, used by the electric utility for filling the fuel truck. These ASTs were filled by the fuel barge during its periodic delivery to the village (DCRA 1998). Frequency of filling at the AST farm is unknown.

6.2 Site Reconnaissance

Access to the site was granted by Mr. Philip Philip. The area appears to have been recently regraded on the west, north, and east sides of the AST farm. The south side of the AST farm contained numerous piles of gravel fill atop native soil. Native soils were accessed by hand digging through the recently graded or gravel fill layers. The timbers and planking supporting the ASTs were flooded with water because of precipitation retainment by the berm and liner. The dike has been compromised in numerous locations. Soil was collected from a total of seven locations for field screening analysis with

the PID (Appendix B). One soil sample was collected at 3.5 feet bgs, on the south site of the AST farm. Photographs of the site were taken and are available in Appendix E; photograph descriptions are in the logbook (Appendix B).

6.3 Analytical Data

PID readings ranged from 2.0 to 28.5 ppm (Appendix C). The maximum PID reading was taken at the surface soil collected near a capped valve at the southeast corner of the AST farm; piping in this area appeared to run to the Kuskokwim River for filling operations. In the fixed laboratory sample collected from 3.5 feet bgs on the south side of the AST farm, all BTEX compounds except benzene were detected at concentrations ranging from 0.089 to 0.17 mg/kg (Appendix D). GRO and DRO were also detected in the sample at concentrations of 5.2 and 5,700 mg/kg, respectively. DRO was present at a concentration exceeding the ADEC Soil Cleanup Level (ADEC 2000).

6.4 Discussion and Recommendations

The former City of Akiak AST farm was operated until the new bulk facility in Akiak was activated. The ASTs and associated piping were reported to E & E as having been emptied. The ASTs and piping remain on site. The piping that connected this AST farm to the Kuskokwim River for refilling is capped at the southeast corner of the AST farm. The AST farm berm has collapsed in numerous locations, especially along the north edge of the AST farm. Land surrounding the AST farm has been altered recently; areas to the west, north, and east have been regraded as a result of installation of the new bulk fuel facility and the area to the south is used as storage for gravel fill. DRO was detected at a concentration above the ADEC Soil Cleanup Level on the south side of the AST farm in native soils collected under the gravel fill piles. Additional information is necessary to assess the extent of contaminant migration at the site and to provide a framework for future site needs. As described above, two approaches can be utilized to gather additional information at the site: site characterization with fixed laboratory analysis or soil removal directed by quantitative field screening in areas of suspected contamination with fixed laboratory analysis for confirmation of field screening results. The treatment of removed soil will be determined based on the volume and contaminant concentrations present and will be managed in concert with the other remedial needs at Akiak.

The AST farm is no longer in use; remaining equipment presents a possible safety concern to people utilizing the area. The priority of completely decommissioning this AST farm should be determined by ADEC and the community of Akiak. Because a number of possible scenarios exist, decisions regarding decommissioning methods, AST reuse, and investigation of potentially contaminated soil should be jointly agreed upon by ADEC and the City of Akiak.

7.0 Reference List

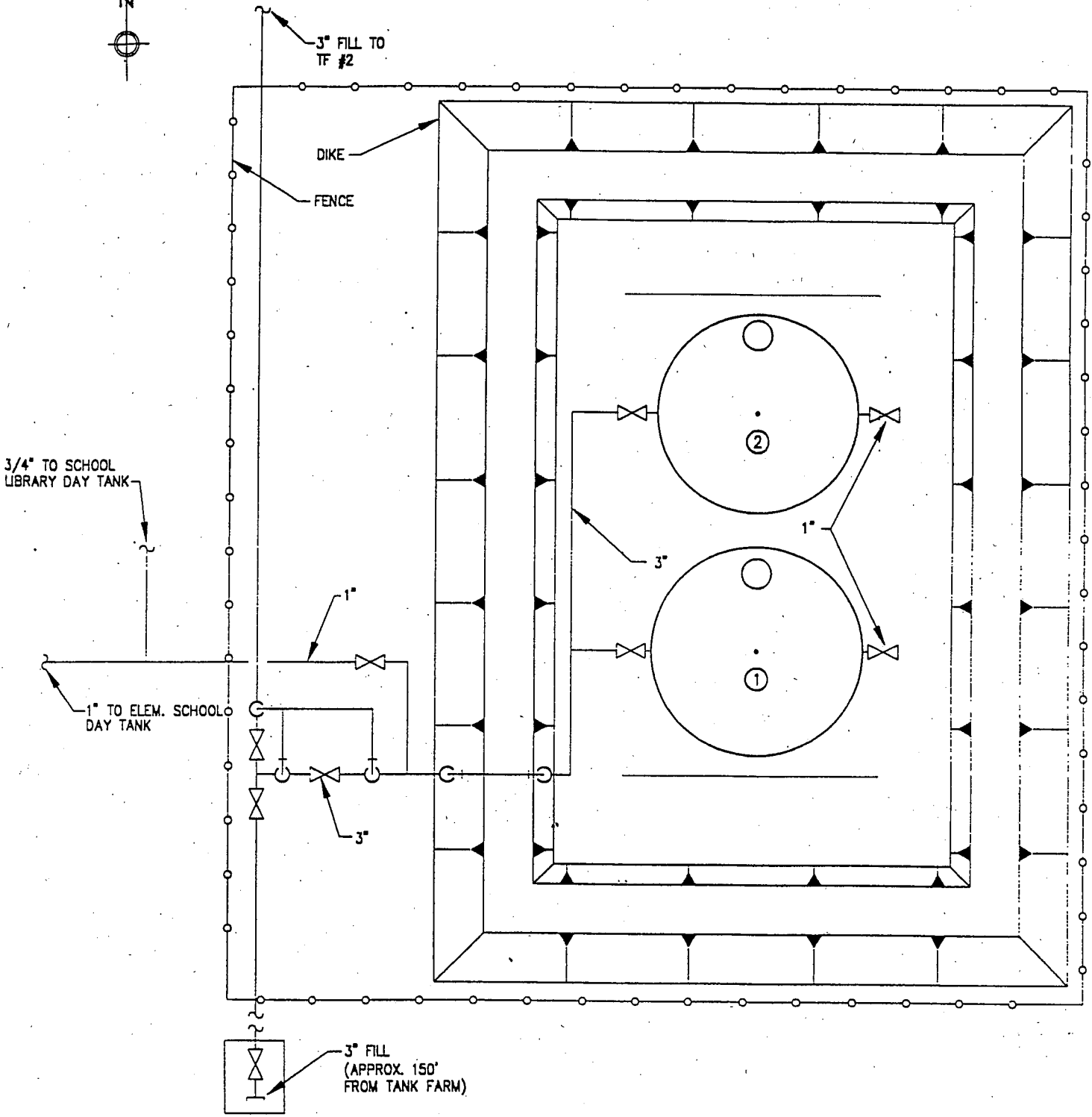
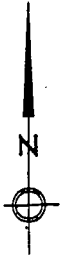
Alaska Department of Environmental Conservation (ADEC), October 28, 2000, *Oil and Other Hazardous Substances Pollution Control, 18 Alaska Administrative Code 75*, Juneau, Alaska.

———, December 1, 1999a, *Storage Tank Program, Underground Storage Tanks Procedures Manual, Guidance for Treatment of Petroleum-Contaminated Soil and Water and Standard Sampling Procedures*, Juneau, Alaska.

———, November 8, 1999b, *Preliminary Site Assessment Report on Akiak, Alaska, October 13-14, 1999*, Division of Spill Prevention and Response, Storage Tank Program, Anchorage, Alaska.

Department of Regional and Community Affairs (DCRA), October 13, 1998, *Akiak Bulk Fuel Storage Assessment Report*, State of Alaska, Division of Energy, Anchorage, Alaska.

APPENDIX A
SITE FIGURES



PROJECT: DOE BULK FUEL ASSESSMENT
PHASE III - BETHEL CLUSTER

TITLE: AKIAK TANK FARM #1.

DRAWN BY: KA

SURVEYED BY: CLC

FILE NAME: AKIAKTF1

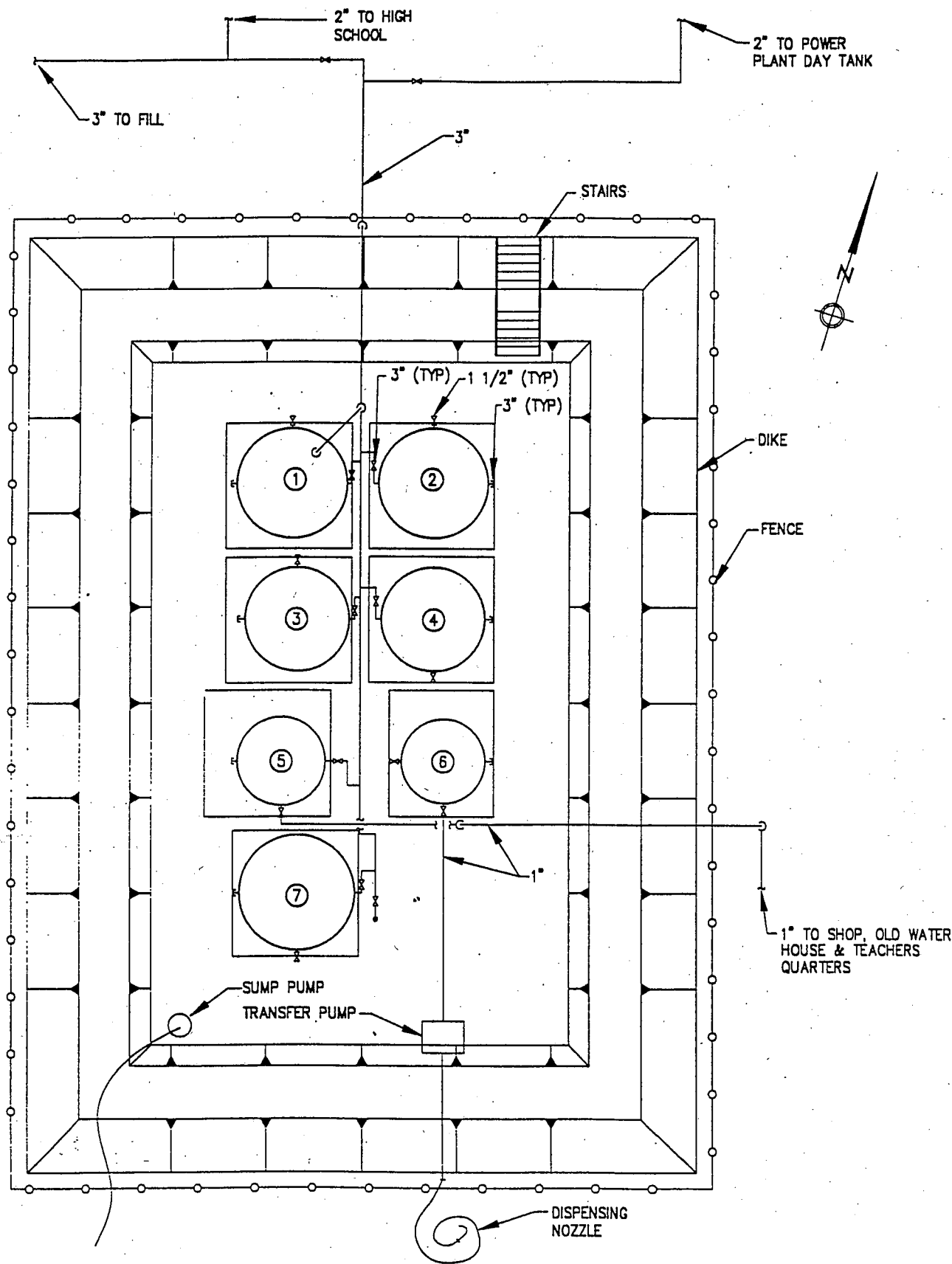
SCALE: 1"=7'

DATE OF SURVEY: 10/13/88

SHEET: 1 OF 1

STATE OF ALASKA
DEPARTMENT OF COMMUNITY & REGIONAL AFFAIRS
DIVISION OF ENERGY

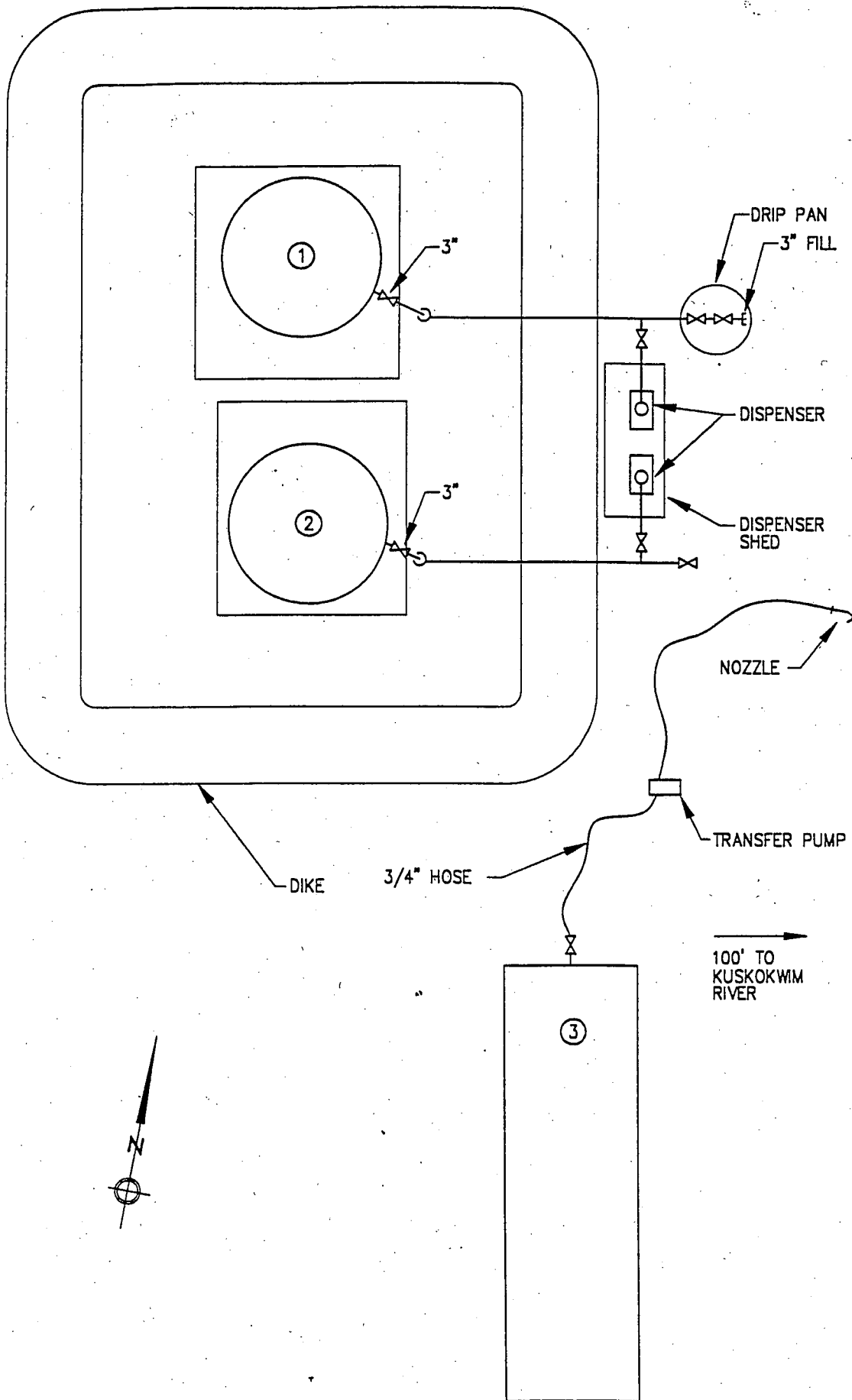
333 W. 4th AVENUE, SUITE 220 ANCHORAGE, AK 99501



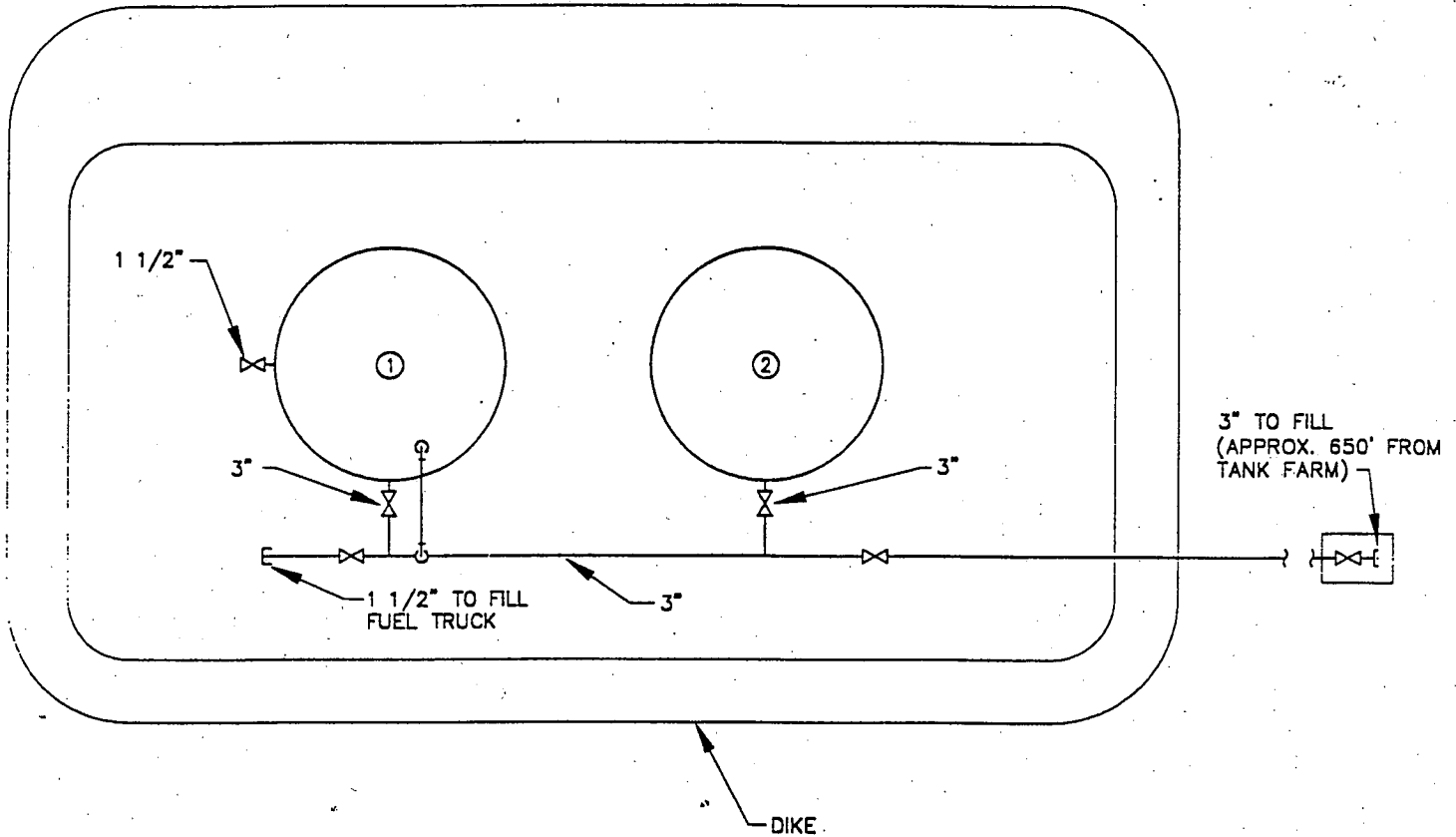
PROJECT: DOE BULK FUEL ASSESSMENT
 PHASE III - BETHEL CLUSTER

DRAWN BY: KA	SCALE: 1"=15'
SURVEYED BY: CLC	DATE OF SURVEY: 10/13/98
FILE NAME	SHEET

STATE OF ALASKA
 DEPARTMENT OF COMMUNITY & REGIONAL AFFAIRS
 DIVISION OF ENERGY



PROJECT: DOE BULK FUEL ASSESSMENT PHASE II - BETHEL CLUSTER	DRAWN BY: KA	SCALE: 1"=10'	STATE OF ALASKA DEPARTMENT OF COMMUNITY & REGIONAL AFFAIRS DIVISION OF ENERGY 333 W 4TH AVENUE, SUITE 220 ANCHORAGE, AK 99501
	SURVEYED BY: CLC	DATE OF SURVEY: 10/13/98	
FILE NAME: AKIAK TANK FARM #3	FILE NAME: AKIAK TANK FARM #3	SHEET: 1	



PROJECT: DOE BULK FUEL ASSESSMENT
PHASE III - BETHEL CLUSTER

TITLE: AKIAK TANK FARM #4.

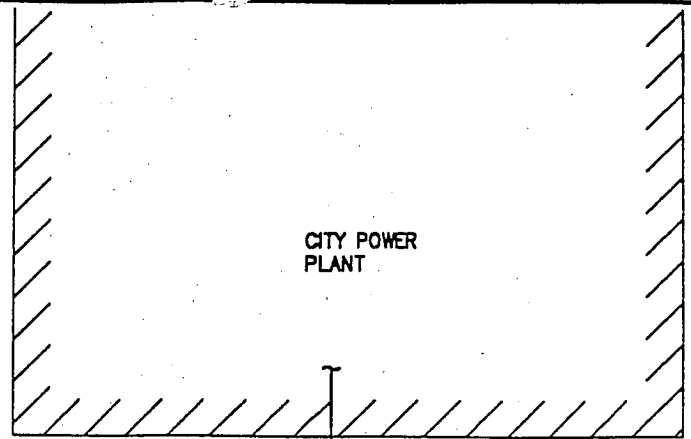
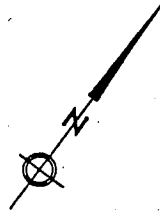
DRAWN BY: KA SCALE: 1"=9'

SURVEYED BY: CLC DATE OF SURVEY: 10/13/98

FILE NAME: AKIAKTF4 SHEET: 1 OF 1

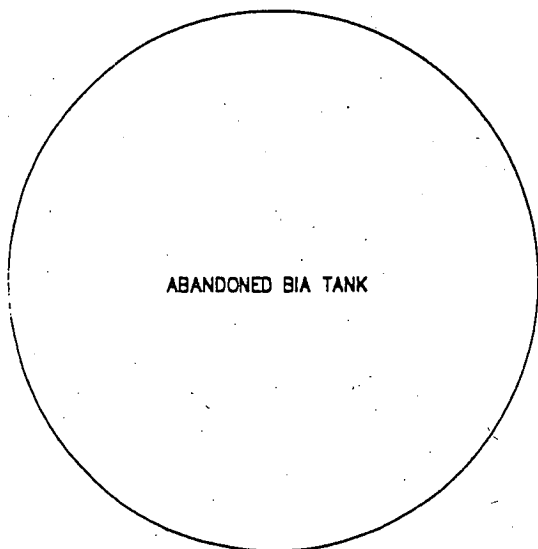
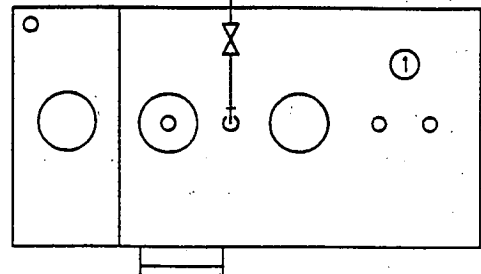
STATE OF ALASKA
DEPARTMENT OF COMMUNITY & REGIONAL AFFAIRS
DIVISION OF ENERGY

333 W. 4th AVENUE, SUITE 220 ANCHORAGE, AK 99501



CITY POWER
PLANT

1" FOS



ABANDONED BIA TANK

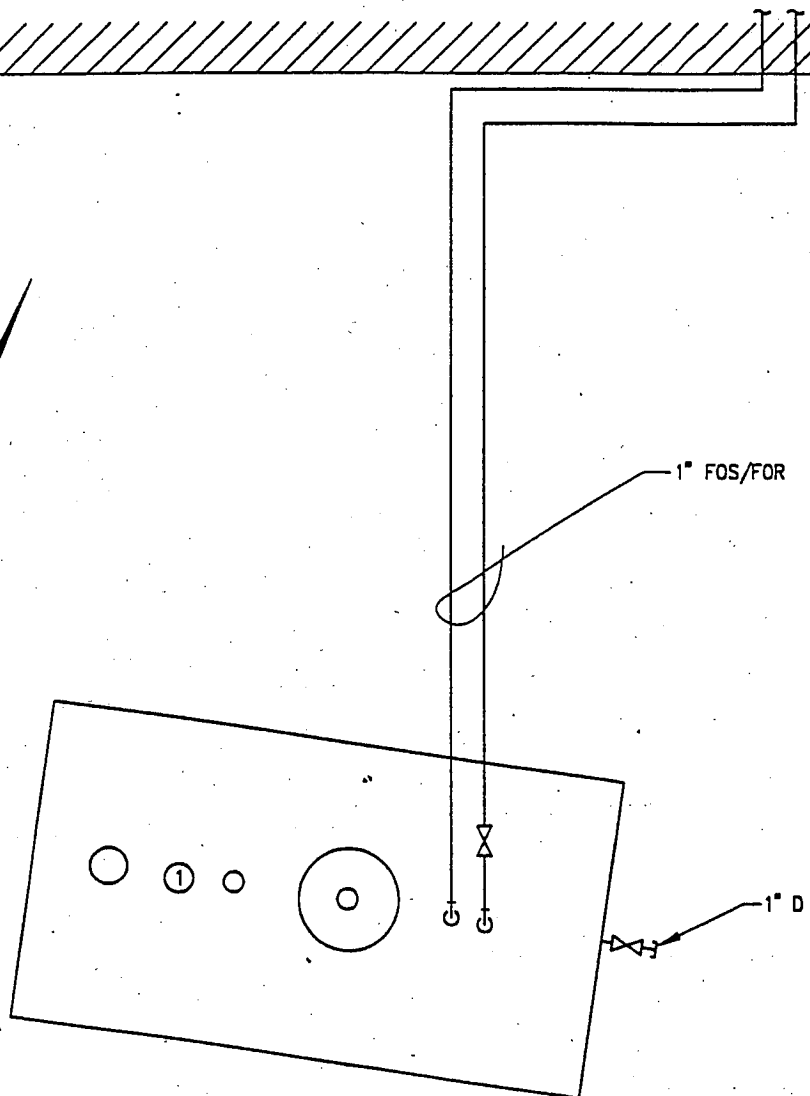
PROJECT: DOE BULK FUEL ASSESSMENT
PHASE III - BETHEL CLUSTER

DRAWN BY: KA	SCALE: 1"=5'
SURVEYED BY: CLC	DATE OF SURVEY: 10/13/98
FILE NAME: AKIAKTF5	SHEET: 1 OF 1

TITLE: AKIAK TANK FARM #5

STATE OF ALASKA
DEPARTMENT OF COMMUNITY & REGIONAL AFFAIRS
DIVISION OF ENERGY
333 W. 4th AVENUE, SUITE 220 ANCHORAGE, AK 99501

ALASKA ARMY
 NATIONAL GUARD
 ARMORY



PROJECT: DOE BULK FUEL ASSESSMENT
 PHASE III - BETHEL CLUSTER

FILE: AKIAK TANK FARM #6

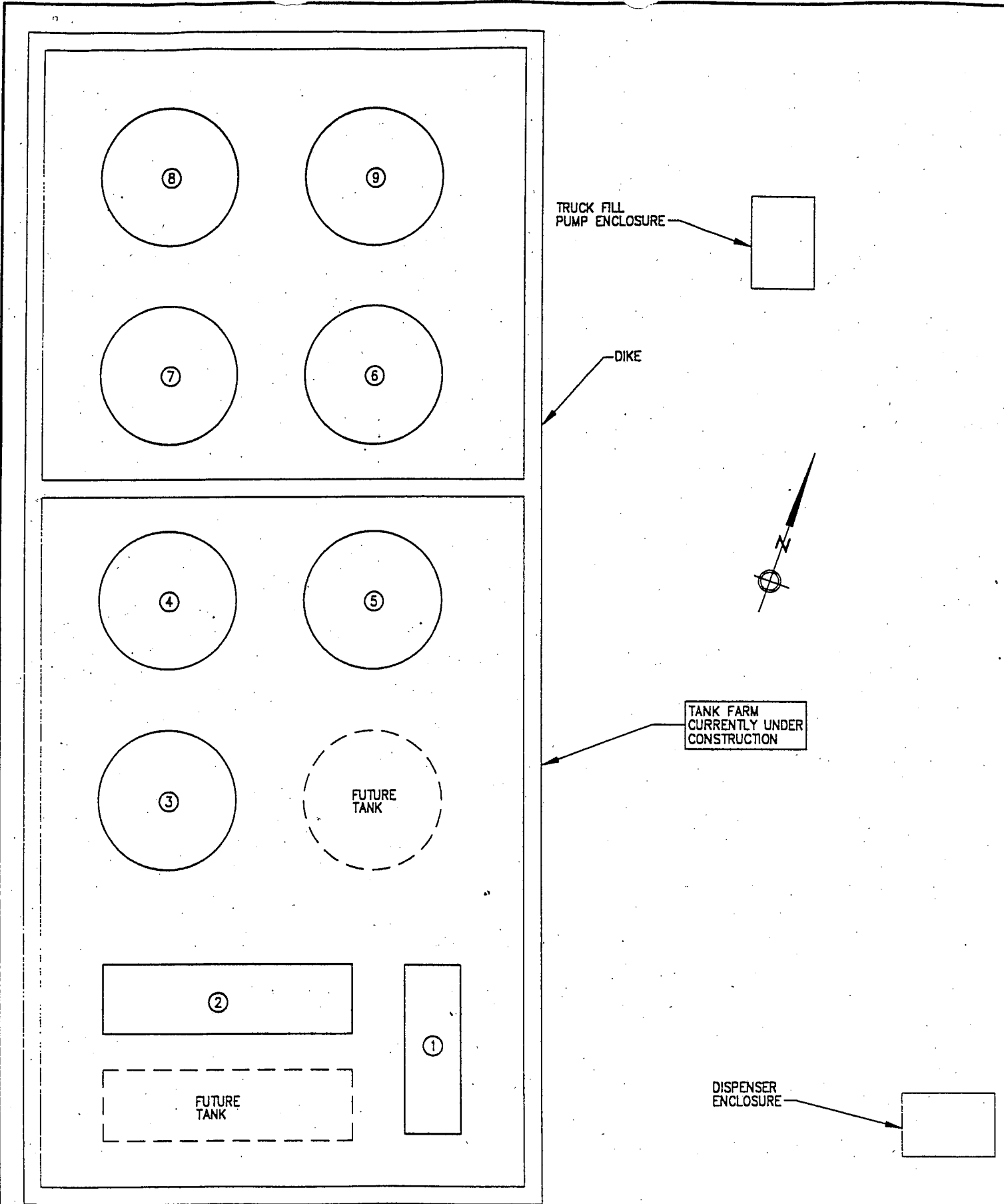
DRAWN BY: KA SCALE: 1"=5'

SURVEYED BY: CLC DATE OF SURVEY: 10/13/98

FILE NAME: AKIAKTF6 SHEET: 1 OF 1

STATE OF ALASKA
 DEPARTMENT OF COMMUNITY & REGIONAL AFFAIRS
 DIVISION OF ENERGY

333 W. 4th AVENUE, SUITE 220 ANCHORAGE, AK 99501



PROJECT: DOE BULK FUEL ASSESSMENT
 PHASE III - BETHEL CLUSTER

DRAWN BY: KA SCALE: 1"=15'
 SURVEYED BY: CLC DATE OF SURVEY: 10/13/98

FILE: AKIAK TANK FARM #7

FILE NAME: AKIAKTF7 SHEET: 1 OF 1

STATE OF ALASKA
 DEPARTMENT OF COMMUNITY & REGIONAL AFFAIRS
 DIVISION OF ENERGY
 333 W. 4th AVENUE, SUITE 220 ANCHORAGE, ALASKA 99501

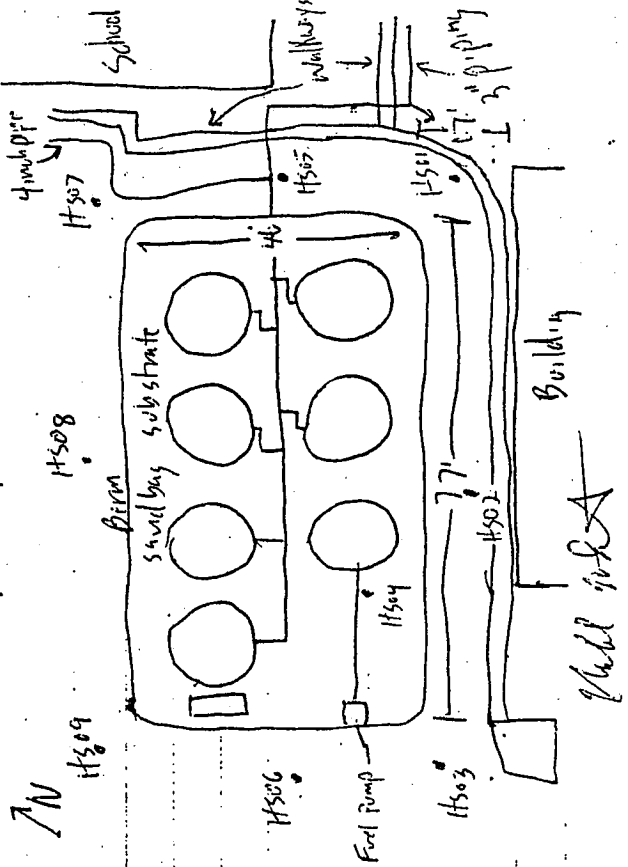
APPENDIX B
FIELD LOGBOOK

10/14/00

1515 Arrive @ Akiak; met @ Arrstrop by Philip Philip; mobilize gear to school

1530 Meet Rod Pruitt (Principal) & Brian (science teacher); organize personal gear in library and sampling equipment in science classroom

1600 Mobilize to School District Tank Farm behind High School; assess site and identify sample locations as indicated below:



1615 Tank Farm consists of 7 BIA size Tanks; six are connected to a 4 inch pipe that ~~exits~~ exits the tank farm on the east and connects to school facilities; the seventh tank (south corner) connects to a fire dispensing pump via a 1 1/2 inch pipeline; the valve @ the tank is stuck (locking); an ~~eight~~ 8th tank exists in the west corner but is not connected to anything; berm area is sand bag substrate

1630 begin collection of soil for field screening analysis

- H501, fine silty sand; 4-6 inches bys; root material in soil.
- H502; silty sand; root material; 2-4 inches bys
- H503; sandy silt; 6-8 inches; root material
- H504; silty sand; 4 inches bys; no roots
- H505 ~~silty~~ muddy clayey silty sand; 2 feet bys
- H506 silty sand; 1.7 inches bys; petroleum odor

Michael August

10/19/00

AKI 08

1730 Collect soil sample ~~H501~~ @ field
Screen location H506 for lab analysis
of GRO/BTEX & DR0; sample collected
@ 12 inches bgs
GRO-npl

GPS coordinates N 60° 54' 34.5"
W 161° 13' 09.2"

1740 Continue collection of soil for field screening

H507 clay silty sand; 6-8 inches bgs; some
moist root material
H508 silty sand; 2-4 inches bgs; root material
H509 silty sand; 8-10 inches bgs

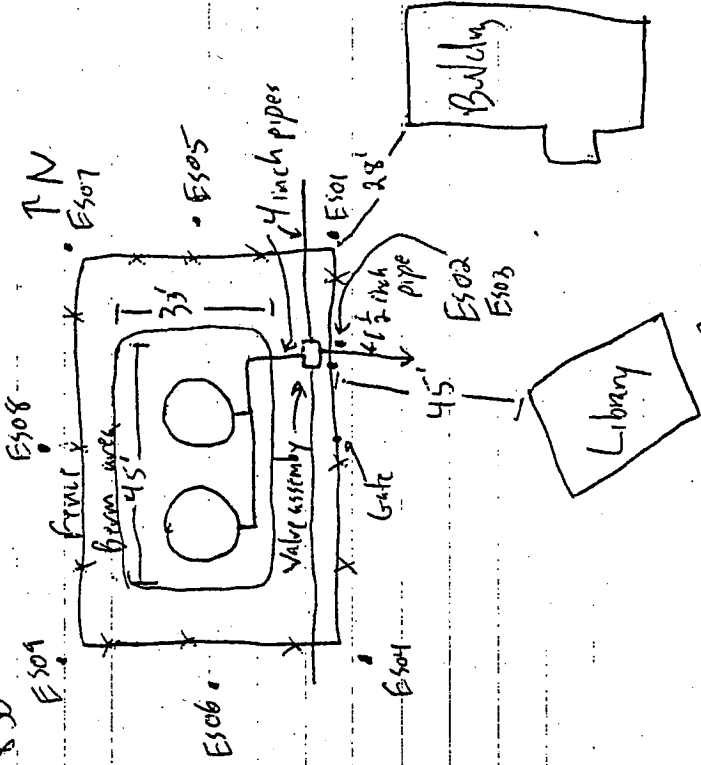
1800 Complete soil collection @ High School Farm;
mobilize equipment to Elementary
School tank Farm

1815 Arrive Elementary School Tank Farm;
access site (see sketch & sample
locations)

Michael A. G. A.

10/19/00

1830



Tank Farm consists of 2 BIA
style Tanks w/ a valve assembly that
directs fuel to ~~three~~ in three directions
broom area is flooded; shown noted on
water

Michael A. G. A.

6
10/18/00
MOB

1840 Begin collecting soil for field screening
E501 silty sand, root material; 6-8 inches
E502 " " " " "
E503 silty sand, gray; 2 ft. BGS
E504 silty sand; 6 inches bgs
E505 gray clayey silt; root material; 8 inches bgs

1855 Collect soil sample ^{AKI 01} ~~ES01~~ from
2 ft depth @ field screen location ES03
for Lab analysis of GR/BTEX + DRO
GPS location N 60° 54' 36.6"
W 161° 13' 02.4"

1905 Continue soil collection for field
screening
E506 silty sand w/ root material 6-8 inches bgs
E507 sandy silt w/ root material 6-8 inches bgs
E508 silty sand w/ root material " " "

1930 Complete sampling @ Elem. School; mob
equipment to school storage

Michelle J. SpA

10/19/00

1945 Lay samples on fabric to allow soil to
attain temperature of 50°F; mob
walk to Old Cooperation Tank Farm ~~AK~~
for cursory look; Tank Farm consists
of 2 BIA style Tanks with
connections to 2 fuel dispensing pumps;
the tanks are beamed but the berm
is not secured in place; a dirt road
separates the fuel pumps and the banks
of the Kuskokwim River; a building
is located next to the tanks and fuel
pumps

2000 Mob back to school
2015 Arrive at school; setup and calibrate
PID and prepare soil for screening;
field screen soil from High School and
Elementary School Tank Farms

2130 Complete Field Screening (see data sheets)
organize equipment; mob to library;
done for day

Michelle J. SpA

10/20/00

0945 Begin collecting soil for field screening, analysis

10/20/00

0800 Pack Personal gear, vans to school storage area; ~~get map~~

0815 Organize sample equipment for the day 0001 Brown silty sand; root material

0845 Mob to Old Cooperation Tank Farm along Muskokwum 0002 sand w/ gravel & root material, 8-10 inches bags

call Philip Philip - re answer of city or of those 0003 clayey silty sand; no ~~gravel~~ ^{root} fragments, 10-12 inches bags

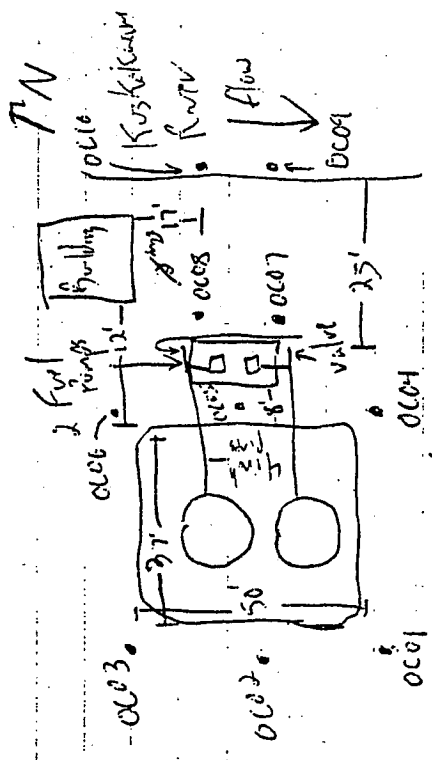
0900 Arrive @ Old Coop. Tank Farm; assess silt and identify sampling locations as defined below 0004 gray rusty silt w/ oxidized root material; 14-16 ~~inches~~ ^{inches} bags

1030 Collect soil sample ~~0002~~ ^{AK503} from field Section location ~~0004~~ ^{AK504} for lab analysis of GRC/BTEX & BTEX DRU

GRC weight - 22.1 g
GRC coordinates NGR 54' 49.8" W 161° 12' 57.2"

1040 Continue soil collection for field screening 0005 gray silt sand; tree roots; 10-12 inches bags
0006 gray silt w/ oxidized roots; 10-12 ~~inches~~ ^{inches} bags

Michael ~~AK504~~



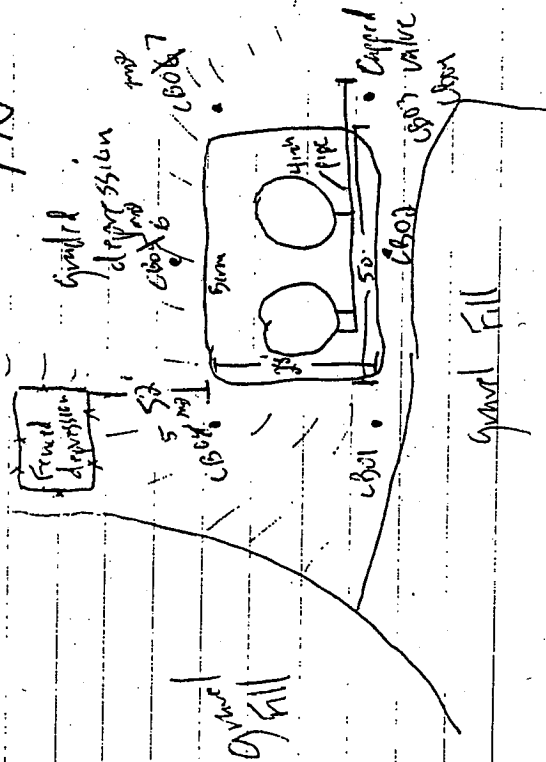
Michael ~~AK504~~

10/20/02

1050 Continue soil collection for field screening
 OC07 silty sand (gray); color; 15-17 inches bgs
 MP068 OC08 gray silty sand; color; 5-7 inches bgs
 VC09 brown silty sand; 4 ft. bgs
 OC10 " " " " "

110 Complete soil collection @ old Corporation Tank Farm; organize equipment. mobilize to City Bulk Fuel Tank Farm

1130 Arrive @ City Bulk Fuel Storage Tank Farm near new Tank Farm



10/20/00

1145 Begin collecting soil for field screening as indicated by site sketch; area has been recently graded and has areas of fresh gravel; therefore necessary to dig below these layers to reach natural soils

CB01 silty sand; 10-12 inches bgs
 CB02 gray rusty silt; 3.5 ft. bgs

1800 Collect soil sample ^{AKI 04} ~~CB02~~ from field. Screen location CB02 for fixed lab analysis of GRE/BTEX + PFO collected @ 3.5 ft. bgs
 G-RO height 22.25
 GPS Coordinates N 60° 54' 48.8" W 161° 13' 11.6"

1200 Continue collecting soil for field screening
 CB03 1 foot to 10 inches bgs; gray silty sand w/ root material; 10-12 inches bgs
 CB04 gray silty sand; 3 ft. bgs

Michael Pugh

10/22/00

1215 Continue collecting soil for field screening
 C805 rusty gray silt; trace roots; 12-16 inches logs
 C806 rusty gray silt; 12 inches logs
 C807 gray silty sand; 12 " "

1240 Complete soil collection @ City Bulk Fuel Tank
 Farm; organize gear; mob to school

1255 Arrive @ school; spread samples out for
 warming; package gear for demobilization

1330 Field screen soil from old Corporation
 Tank Farm and City Bulk Fuel Tank
 Farm

1415 Perform quick demonstrations for
 High school science classes

1450 Mobilize to ~~old~~ new City Power Plant
 Tank Farm

1505 Arrive @ new Power Plant near Air strip;
 meet Philip Philip

Michael A. G. S.

10/22/00

1510 Old Tank @ new Power Plant
 was moved from Elementary School
 approximately 5 years ago by
~~it was~~ Sam Jasper according to Philip
 Philip; Tank was empty when moved
 and has not been used since;
 no need to sample at this tank
 location;

New Power Plant has new double walled
 tank as does the new water
 treatment facility across the street;
 take some photos of the area

1530 Depart from power plant area; mob
 to Alaska National Guard Army;
 observe site + take photograph

1600 Return to school; ~~at~~ mob
 package gear for demobilization

1700 Depart to Air strip; unload gear
 + wait for Grant's Aviation plane

Michael A. G. S.

¹⁴
10/20/00

1745 Pilot arrives; load gear

1800 Depart for Bethel

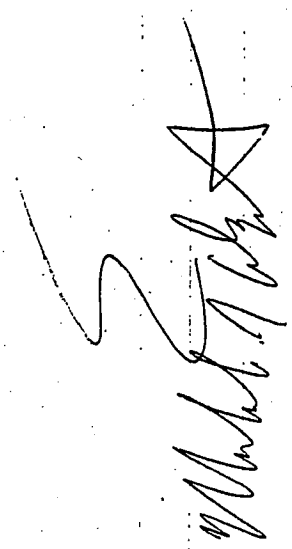
1820 ~~Stand gear~~ Arrive in Bethel;
unload gear; transfer to
Alaska Airlines

1840 Arrive Alaska Air Cargo; separate
equipment & personal gear;
ship 6 pieces

1855 Take remaining gear & sample for
flight check-in

2000 Depart Bethel

2130 Arrive Anchorage; door w/ site near



Date	Roll-Frame	Orientation/Description	Photographer	Date	Roll-Frame	Description/Orientation	Photographer
10/19/00	1630	1-1 NW edge of High School Tank Farm; view NE	MD	10/20/00	1100	1-10 Old Corporation Tank Farm; view NW	MD
1634	1-2	Fuel Dispensing pump connected to sump southwest fuel Tank & High School Tank Farm; view NE	MD	1104	1-11	Old Corp Tank Farm, N	MD
1637	1-3	SW corner of High School Tank Farm; view N, school in background	MD	1106	1-12	Compromised, unsecured line @ old Corp. Tank Farm; view SE	MD
1639	1-4	N corner of High School Tank Farm; view S	MD	1108	1-13	Southern fill pit and connection to fuel dispensing pumps; view NW	MD
1930	1-5	SE corner of Elementary School Tank Farm; view NW	MD	1220	1-14	City Bulk Fuel Tank Farm; fenced depression on left; N	MD
1931	1-6	Valve assembly @ Elementary school tank farm	MD	1222	1-15	City Bulk Fuel Tank Farm w/ fenced depression and new tank farm in background; NW	MD
1932	1-7	NW corner of Elementary School Tank Farm w/ library & Elem. school in background; view SE	MD	1224	1-16	Piping assembly @ City Bulk Fuel Tank Farm; NE	MD
1937	1-8	Pipe configuration @ Elem. School Tank Farm	MD	1225	1-17	Compromised berm along N edge of City Bulk Fuel Tank Farm; view NE	MD
10/20/00	1655	Soil layers in Kuskebaum river bank @ CLO4 @ old Corp Tank Farm; view W	MD	1227	1-18	Graded depression area to NE of City Bulk Fuel Storage Tank Farm; view NE	MD

Michael Spitzer


Michael Spitzer

Date	Time	Roll-Frame	Description/orientation	Photographer	Date	Time	Roll-Frame	Description/orientation	Photographer
12/30	12:30	1-19	Interior of new consolidated Tank farm; 2 sections steel & wood wood ^{wood} beam, sheet metal clasp not appear welded & overlap	MD	12/30/54	1540		National Guard Armory Building w/ Ast; same view N	Photographer
12/31	12:31	1-20	Depressional Area east of new Tank farm; view E	MD					
12/36	12:36	1-21	Fuel dispensing area and depressional area on west side of new tank farm. w	MD					
12/38	12:38	1-22	New Tank farm complex w/ City Bulk Fuel tank farm @ Right. view N	MD					
5	14:30	1-23	Old Tank located @ new Power plant w/ new double walled tank in front of Building	MD					
5	14:35	1-24	old tank (blue) in left and New floor flat w/ double walled tank, view NE	MD					
15	15:30		New tank @ new water Treatment at ^{new} facility view N	MD					

of M. H. 1954

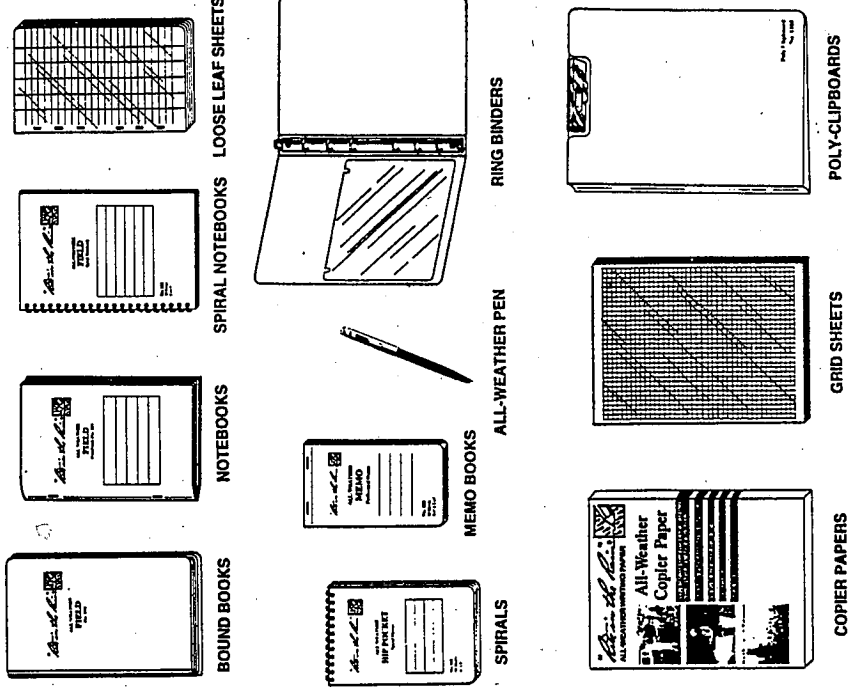
Site Contacts

Dan Benfield (ADEC) 465-5207; 723-8737 (cell)
 Philip Philip 765-7411; 765-7103 vHF 3271
 Sam Jasper 765-7411; 765-7320
 Red Pruitt 765-7212
 Lillian Liabara (Mayor) 765-7411
 Haglund (Scott) 543-3800
 Grant Aviation 543-2000; 800-764-7607
 B+G Express (FedEx - Bethel) 543-2345
 AK Air Cargo 243-3322; 800-225-2752
 Sealed Analytical (Darby Powell) 253-922-2310
 Hannah Instrumentation (Marty) 694-6807
 AK Air Reservations 800-252-7522



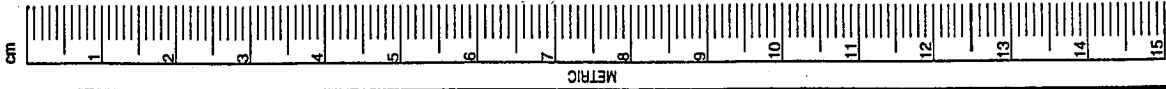
"Write in the Rain"
 ALL-WEATHER WRITING PAPER

Outdoor writing products ...
 ... for outdoor writing people.



BOUND BOOKS NOTEBOOKS SPIRAL NOTEBOOKS LOOSE LEAF SHEETS
 MEMO BOOKS ALL-WEATHER PEN RING BINDERS
 SPIRALS GRID SHEETS POLY-CLIPBOARDS
 COPIER PAPERS

Field data . . . if its worth collecting, its worth protecting.



APPENDIX C
FIELD SCREENING RESULTS

Table C-1

YUPIK SCHOOL DISTRICT/ELEMENTARY SCHOOL TANK FARM - HEADSPACE ANALYSIS
AKIAK AST TANK FARM RECONNAISSANCE
AKIAK, ALASKA

Sample No.	PID Reading	Temperature (°F)	Meter Response Time	Sample Time (after temperature attainment)	Comments (include soil type, presence of organics)
ES 01	38.7	57.8	0:10	15:00	silty sand; root material; 6-8 inches bgs; SE corner
ES 02	3.9	58.9	0:20	20:00	silty sand; root material; 6-8 inches bgs; main valve assembly and connection pipes
ES 03	714	59.9	0:03	22:00	gray, silty sand; 2 feet bgs; main valve assembly and connection pipes
ES 04	6.9	60.3	0:10	23:00	silty sand; 6 inches bgs; SW corner
ES 05	230	62.1	0:05	25:00	gray, clayey silt; root material; 8 inches bgs; east-central border
ES 06	8.3	62.8	0:18	26:00	silty sand; root material; 6-8 inches bgs; west-central border
ES 07	4.3	63.1	0:08	27:00	sandy silt; root material; 6-8 inches bgs; NE corner
ES 08	6.3	64	0:18	29:00	silty sand; root material; 6-8 inches bgs; north-central border
ES 09	6.5	65	0:30	31:00	silty sand; root material; 6-8 inches bgs; NW corner

Key:

AST = Aboveground storage tank.
 bgs = Below ground surface.
 °F = Degrees Fahrenheit.
 NE = Northeast.
 No. = Number.
 NW = Northwest.
 PID = Photoionization detector.
 SE = Southeast.
 SW = Southwest.

Table C-2

YUPIK SCHOOL DISTRICT/HIGH SCHOOL TANK FARM - HEADSPACE ANALYSIS
AKIAK AST TANK FARM RECONNAISSANCE
AKIAK, ALASKA

Sample No.	PID Reading	Temperature (°F)	Meter Response Time	Sample Time (after temperature attainment)	Comments (include soil type, presence of organics)
HS 01	11.1	58.9	0:15	12:00	fine, silty sand; root material; 4-6 inches bgs; SE corner; calibrate
HS 02	15.3	50.2	1:20	10:00	silty sand; root material; 2-4 inches bgs; wet during analysis (originally frozen); south-central border
HS 03	33.7	54.2	0:50	18:00	sandy silt; root material; 6-8 inches bgs; SW corner
HS 04	1036	58.1	0:03	22:00	silty sand; 4 inches bgs; wet during analysis; gasoline AST drain pipe
HS 05	25.2	56.2	0:30	25:00	clayey, silty sand; 2 feet bgs; east-central border, main tank farm drain pipe
HS 06	>2000	56.7	0:01	26:00	silty sand; 12 inches bgs; petroleum odor; west-central border, gasoline dispensing pump
HS 07	22.3	57.1	0:10	28:00	clayey, silty sand; root material; 6-8 inches bgs; NE corner
HS 08	9.9	49.9	0:30	32:00	silty sand; root material; 2-4 inches bgs; north-central border
HS 09	48.2	53.8	0:50	34:00	silty sand; 8-10 inches bgs; NW corner

Key:

AST = Aboveground storage tank.
 bgs = Below ground surface.
 °F = Degrees Fahrenheit.
 NE = Northeast.
 No. = Number.
 NW = Northwest.
 PID = Photoionization detector.
 SE = Southeast.
 SW = Southwest.

Table C-3

OLD KOKAMIUT CORPORATION TANK FARM - HEADSPACE ANALYSIS
AKIAK AST TANK FARM RECONNAISSANCE
AKIAK, ALASKA

Sample No.	PID Reading	Temperature (°F)	Meter Response Time	Sample Time (after temperature attainment)	Comments (include soil type, presence of organics)
OC 01	3	58	0:04	11:00	brown, silty sand; root material; 12-14 inches bgs; calibrate; SW corner
OC 02	3.8	57.8	0:25	12:00	gravelly sand; root material; 8-10 inches bgs; west-central border
OC 03	1075	55.1	0:03	13:00	clayey, silty sand; 10-12 inches bgs; NW corner
OC 04	4	53.6	0:08	15:00	gray, rusty silt; oxidized root material; 14-16 inches bgs; SE corner
OC 05	210	54.1	0:06	17:00	gray, silty sand; trace root material; 10-12 inches bgs; east-central border
OC 06	5.7	53.8	0:45	20:00	gray silt; oxidized root material; 10-12 inches bgs; NE corner
OC 07	1240	58.5	0:03	21:00	gray, silty sand; petroleum odor; 15-17 inches bgs; SE corner of dispensing station
OC 08	616	59.9	0:02	23:00	gray, silty sand; petroleum odor; 5-7 inches bgs; NE corner of dispensing station
OC 09	5.8	60.7	0:15	25:00	brown, silty sand; 4 feet bgs; bank of Kuskokwim River parallel to SE corner
OC 10	4.8	59.2	0:15	26:00	brown, silty sand; 4 feet bgs; bank of Kuskokwim River parallel to NE corner

Key:

AST = Aboveground storage tank.
 bgs = Below ground surface.
 °F = Degrees Fahrenheit.
 NE = Northeast.
 No. = Number.
 NW = Northwest.
 PID = Photoionization detector.
 SE = Southeast.
 SW = Southwest.

Table C-4

CITY OF AKIAK POWER PLANT TANK FARM - HEADSPACE ANALYSIS
 AKIAK AST TANK FARM RECONNAISSANCE
 AKIAK, ALASKA

Sample No.	PID Reading	Temperature (°F)	Meter Response Time	Sample Time (after temperature attainment)	Comments (include soil type, presence of organics)
CB 01	3.6	61.4	1:04	30:00	brown, silty sand; 10-12 inches bgs; SW corner
CB 02	24.4	60.7	0:07	34:00	gray, rusty silt; 3.5 feet bgs; south-central border
CB 03	28.5	59.9	0:12	35:00	gray, silty sand; root material; 10-12 inches bgs; SE corner
CB 04	5.8	59.4	0:09	37:00	gray, silty sand; 3 feet bgs; SE corner
CB 05	4.1	58.5	0:03	38:00	rusty, gray silt; trace root material; 12-16 inches bgs; NW corner
CB 06	2	59.2	0:22	40:00	rusty gray silt; 12 inches bgs; north-central border
CB 07	6.7	59.9	0:11	42:00	gray, silty sand; 12 inches bgs; calibrate; NE corner

Key:

- AST = Aboveground storage tank.
- bgs = Below ground surface.
- °F = Degrees Fahrenheit.
- NE = Northeast.
- No. = Number.
- NW = Northwest.
- PID = Photoionization detector.
- SE = Southeast.
- SW = Southwest.

APPENDIX D
ANALYTICAL RESULTS