



# **GILFILIAN ENGINEERING & ENVIRONMENTAL TESTING, INC.**

COPY

**Professional Environmental Consultants**

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## **PHASE I RELEASE INVESTIGATION REPORT**

**FOR**

### **KASILOF RIVERVIEW**

**Tract E & F, Harley Fellars Subdivision  
Mile 109.5 Sterling Highway, Kasilof, Alaska  
ADEC UST Facility #384**

**Prepared For**

**Joanne Browning  
Owner  
Kasilof Riverview  
Mile 109.5 Sterling Highway  
Kasilof, Alaska 99610**

**GE<sup>2</sup>T Project No. 98013**

**May 15, 1998**

**RECEIVED**

**MAY 18 1998**

Department of  
Environmental Conservation  
KDO



# GILFILIAN ENGINEERING & ENVIRONMENTAL TESTING, INC.

Professional Environmental Consultants

2605 Denali Street, Suite 203 • Anchorage, Alaska 99503-2749  
Tel: (907) 277-2021 • Fax: (907) 274-8683 • E-mail: ge2t@alaska.net

May 15, 1998

Joanne Browning  
Owner - Kasilof Riverview  
Mile 109.5 Sterling Highway  
Kasilof, Alaska 99610

RE: Phase I Release Investigation  
Kasilof Riverview, Mile 109.5 Sterling Highway, Kasilof, Alaska  
ADEC UST Facility ID #384  
GE<sup>2</sup>T Project No. 98013

Dear Ms. Browning:

Attached is the report on the findings of the Phase I Release Investigation completed by Gilfilian Engineering and Environmental Testing, Inc., (GE<sup>2</sup>T) to evaluate the extent of contamination associated with the previously closed 6,000-gallon underground storage tank at the above referenced site. This report describes the drilling of three test borings at the site and analytical test results for soil samples collected from the borings.

A copy of this report will be submitted to the Alaska Department of Environmental Conservation (ADEC) in accordance with the reporting requirements given in 18 AAC 78.090(5).

Sincerely,

Christopher Hawe  
Project Manager

Attachment: Phase I Release Investigation Report

c: Paul Horwath, ADEC Kenai District Office

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## 1.0 INTRODUCTION

### 1.1 Purpose and Scope

Gilfilian Engineering and Environmental Testing, Inc. (GE<sup>2</sup>T), on behalf of Joanne Browning of the Kasilof Riverview, completed this Phase I Release Investigation (RI). The purpose of the release investigation was to evaluate the extent of contamination associated with a previously closed 6,000-gallon unleaded underground storage tank (UST).

The scope of work for the Phase I RI involved drilling three test borings on the subject property. The borings used to investigate subsurface conditions were then backfilled. Soils collected from the borings were screened using a photoionization detector (PID) and selected soil samples were submitted to the laboratory for analytical testing.

The release investigation was completed in accordance with the Environmental Protection Agency (EPA) UST regulations (40 CFR Part 280) and the State of Alaska Department of Environmental Conservation (ADEC) UST regulations (18 AAC 78). The field procedures and methods used during this site assessment were conducted in accordance with the ADEC UST Procedures Manual (September 22, 1995) and our firm's Quality Assurance Program Plan (QAPP) approved by ADEC in May 1993.

### 1.2 Project Organization

- UST System Owner/Operator – Joanne Browning.
- Third Party Environmental Assessor – Christopher Hawe, a Senior GeoEnvironmental Engineer, with Gilfilian Engineering & Environmental Testing, Inc. (GE<sup>2</sup>T).
- Drilling Contractor – Hughes Drilling, Soldotna, Alaska.
- ADEC Certified Laboratory – CT&E Environmental Services Inc. (CT&E), Anchorage, Alaska

## 2.0 BACKGROUND

### 2.1 Site Location

The Kasilof Riverview site is located at mile 109.5 of the Sterling highway. The site has a large log structure divided into three sections including a garage, a general store and a residence. Other site improvements include an UST system used for retail sales that consists of one (1) 2,000-gallon unleaded UST, two (2) 6,000-gallon unleaded USTs and one (1) 2,000-gallon diesel UST. The Sterling Highway is located approximately 200 feet to the east of the UST system, and the Kasilof River is located approximately 300 feet to the south. (See Figures I and II).

## 2.2 Previously Completed Activities

The northern 6,000-gallon unleaded UST was previously closed due to failure of tank tightness tests. Because of the failed tightness tests and the subsequent closure, the Alaska Department of Environmental Conservation (ADEC) required a release investigation be completed to define the extent of any potential contamination associated with the closed 6,000-gallon UST. A release investigation workplan dated April 13, 1998, was completed by GE<sup>2</sup>T and submitted to ADEC. The workplan was approved by ADEC in a letter dated April 15, 1998.

## 3.0 PHASE I RELEASE INVESTIGATION

### 3.1 Soil Borings and Monitoring Well Installations

As part of this Phase I RI, three (3) test borings were drilled on April 29, 1998, at the locations shown in Figure III. The test borings were drilled with a Central Mining Equipment Model 75 (CME-75) drill rig using an 8-inch outside diameter hollow stem auger. The soil test borings TB-1, TB-2 and TB-3 were advanced to depths of 26, 27 and 27 feet below ground surface (bgs), respectively. The borings were used to sample subsurface soils and were backfilled using four feet of saturated bentonite chips in the bottom of the borings, soil cuttings to approximately 8 feet below ground surface (bgs), bentonite grout from 3 to 8 feet bgs, and soil cuttings from 3 feet bgs to ground surface.

### 3.2 Subsurface Geology

The subsurface geology observed in the three borings drilled during the Phase I RI was similar in each boring. The soils observed had the following sequence: Approximately 1.5 to 3 feet of brown/black sandy gravel with silt was located immediately below ground surface. This gravel was underlain to depths of approximately 14 feet bgs by 10 to 12.5 feet of gray silt and silty fine sand. Some zones in this silt had occasional small gravel as well as organics. Below this gray silt from depths of 19.5 to 23 feet bgs was approximately 5 to 10 feet of rusty brown sand and gravel with cobbles. Below the sand and gravel to the total depths drilled was a fine to medium sand with silt having tan/brown/rust/gray colors.

Ground water was encountered at approximately 27 feet bgs in the test borings. Soils, approximately 1 foot above ground water, measured at 27 feet bgs in the hollow stem augers, were moist to wet.

### 3.3 Soil Sampling

Soil samples were collected through the bottom of the CME-75 drill rig auger using a 2.5-inch diameter split spoon sampler driven into undisturbed soils with a hydraulically operated, 340-pound hammer. Split spoon soil samples were screened for volatile petroleum hydrocarbons using a Photovac Model HL-2020

photoionization detector (PID). Soils were screened by taking PID headspace measurements from air above collected soil samples that were placed in sealed half full ziplock baggies and heated. All locations and results of screened soil samples are in the boring logs included in Appendix A.

Soil samples collected for analytical testing were from soil horizons selected to determine if contamination had migrated to ground water. Ten soil samples in all, including one blind duplicate sample, were collected from the three test borings drilled as part of this Phase I RI. Soil sample S13 collected from 27 feet bgs in test boring TB-3 was a duplicate of sample S12 collected at the same location and depth. The results of the collected soil samples are discussed in Section 4.2 below.

### 3.4 Tap Water Sampling

Ground water was not sampled from the three test borings. However, a restroom tap water sample was collected to test the water supply well. The results of the collected water sample is discussed in Section 5.2 below.

## 4.0 SOIL ANALYTICAL RESULTS

### 4.1 Soil Sample Analysis

Soil samples selected for laboratory analyses were placed in clean laboratory supplied amber glass jars with teflon-lined lids. Collected soil samples were stored in a cooler with blue ice and delivered under chain-of-custody procedure to CT&E Environmental Services, Inc., in Anchorage, Alaska. The submitted soil samples were analyzed for:

- Gasoline Range Organics (GRO) by Alaska Method AK101; and
- BTEX by EPA Method 8020.

### 4.2 Soil Analytical Results

A copy of the laboratory analytical reports and the executed Chain-of-Custody for the submitted soil samples are provided in Appendix B. The analytical results for BTEX and GRO in the soil samples submitted for analytical testing and field-collected PID data are shown in Table 1 and in Figure III.

TABLE 1: SOIL SAMPLE ANALYTICAL RESULTS

Sample #	Location	CONCENTRATION (mg/kg)			PID Head Space <sup>1</sup>
		GRO	Benzene	BTEX	
S1	TB-1 11.5'	80.4	9.26	36.48	990
S2	TB-1 16'	4.29	0.211	1.0188	260
S4	TB-1 26'	ND(2.31)	ND(0.0579)	0.3283	20.1
S5	TB-2 12'	221	4.91	68.27	455
S6	TB-2 17'	7.03	0.449	2.282	23.5
S8	TB-2 27'	ND(1.89)	ND(0.0472)	ND(0.0472)	8.0
S9	TB-3 12'	2440	32.8	587.0	1260
S11	TB-3 22'	ND(2.43)	0.111	0.263	41.3
S12	TB-3 27'	ND(2.78)	ND(0.0695)	0.0910	0.5
S13	Duplicate of S12	ND(2.33)	ND(0.0583)	ND(0.0583)	0.5
	Trip Blank	ND(2.0)	ND(0.0500)	ND(0.0500)	—
Category A Cleanup Levels		50	0.1	10	NA

Legend:

<sup>1</sup> Reported units relative to calibration of PID with a 96 ppmv isobutylene standard.

ND = Not Detectable, method detection limits shown in parentheses.

Shading with bold numbers indicate concentrations that exceed the ADEC Category A levels

As shown in Table 1, only the samples collected at depths of 11.5 and 12 feet had GRO and BTEX concentrations that exceed the ADEC Category A cleanup level. Benzene concentrations exceeded the Category A cleanup level in deeper samples; however, the levels drop considerably from the 12 feet depths to the 16 and 17 feet depths. In addition, benzene in the sample collected from 22 feet in test boring TB-3 was only marginally above the Category A cleanup level. At the 26 and 27 feet depths, benzene was not detectable in the three borings. Ethylbenzene was also non-detectable in the samples collected from 26 and 27 feet, but toluene and xylenes were detected at very low levels at these depths.

#### 4.3 Soil Sample Quality Assurance/Quality Control

CT&E completed laboratory soil analyses. All laboratory analyses were conducted following standard laboratory Quality Assurance/Quality Control (QA/QC) procedures. A review of the laboratory QA/QC provided in the analytical reports indicates that all laboratory QA/QC criteria for soil samples submitted for analytical testing as part of this Phase I RI were met.

The information provided in the soil results was also used to calculate the completeness and precision of the soil sample analyses, and whether the sample extractions were performed within the limits of the quality control objectives indicated in our QAPP. The holding times, precision, and completeness for the duplicate sample set for gasoline range organics (GRO) and BTEX are shown in Table 2.

**TABLE 2: Soil Sample QA/QC Results**

Parameter	Laboratory Ref. No.	Holding Time (Extract/Analysis)	Precision (RPD*)	Completeness %
GRO (Soil)	A7061104 Sample S8	(ASAP/14 days) 0 days/7 days	0 (± 50)	100 (85)
BTEX (Soil)	A7061104 Sample S8	(ASAP/14 days) 0 days/7 days	0 (± 40)	100 (85)

**LEGEND:**

\* Relative Percent Difference

The numbers in parentheses indicate Data Quality Objectives, as established in GE<sup>2</sup>T's QAPP, Table 1 and Table 2.

The extraction and analysis for all collected samples for the release investigation were conducted within the maximum allowable holding times. The duplicate sample set (sample S12 and S13) collected as part of this Phase I RI displays that the precision of the analytical results are within our QA/QC objectives shown in Table 2. Sample S12 BTEX result of 0.091ppm was less than 1.5 times laboratory PQL and not statistically significant for precision measurement. Therefore, the soil samples collected as part of this Phase I RI are considered accurate, complete and acceptable analytical data for interpretation of soil contaminants in the subsurface at the site.

**5.0 TAP WATER ANALYTICAL RESULTS****5.1 Tap Water Sample Analysis**

The tap water sample submitted for laboratory analysis of BTEX by EPA Method 602M and GRO by AK 101, was placed in clean laboratory supplied clear glass vials with teflon-lined lids. Collected water samples were stored in a cooler with blue ice, and delivered under chain-of-custody procedure to CT&E.

**5.2 Tap Water Analytical Results**

Copies of the laboratory analytical reports and the executed Chain-of-Custody for the submitted tap water samples are provided in Appendix C. The analytical results are summarized in Table 3.

**TABLE 3: TAP WATER SAMPLE ANALYTICAL RESULT**

Sample ID	CONCENTRATION (mg/l)				
	GRO	Benzene	Toluene	Ethylbenzene	Xylenes
Restroom Tap	ND(0.040)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
(MCL)	NA	0.005	1.0	0.70	10.0

**Legend:**

ND = Not Detectable with the method detection limits shown in parentheses

MCL = maximum contaminant limits for drinking water established by the ADEC.

As shown in Table 3, no contaminants were detectable in the restroom tap water sample.



### 5.3 Ground Water Sample Quality Assurance/Quality Control

CT&E completed the laboratory water analyses. All laboratory analyses were conducted following standard laboratory Quality Assurance/Quality Control (QA/QC) procedures. A review of the laboratory QA/QC provided in the analytical reports indicates that all laboratory QA/QC criteria for water samples submitted for analytical testing as part of this Phase I RI were met.

The information provided in the water analytical reports is also used to calculate the completeness and precision of the analyses, and whether the sample extractions were performed within the limits of the quality control objectives indicated in our QAPP. A duplicate sample was not taken for the water sample, thus precision and completeness data for GRO and BTEX are not available (NA), as shown in Table 4.

**TABLE 4: GROUND WATER SAMPLE QA/QC RESULTS**

Parameter	Laboratory Ref. No.	Holding Time (Extract/Analysis)	Precision (RPD*)	Completeness %
GRO (Water)	981945011 Sample S14	(ASAP/14 days) 3 days/4 days	NA (± 30)	NA (85)
BTEX (Water)	981945011 Sample S14	(ASAP/14 days) 3 days/4 days	NA (± 30)	NA (85)

**LEGEND:**

\* Relative Percent Difference

The numbers in parentheses indicate Data Quality Objectives, as established in GE<sup>2</sup>T's QAPP, Table 1 and Table 2.

The extraction and analysis, for the collected ground water sample for the release investigation, were conducted within the maximum allowable holding times. All laboratory QA/QC met acceptable criteria. Therefore, the ground water sample collected as part of this Phase I RI is considered accurate, complete and acceptable analytical data for interpretation of water contaminants in the subsurface at the site.

## 6.0 CONCLUSIONS

The three test borings drilled during this Phase I RI were located to determine the potential impact associated with the previously closed 6,000-gallon UST and the related dispensers. Data collected show that soils at depths of 11.5 and 12 feet in all borings have benzene, BTEX and GRO concentrations above the ADEC Category A cleanup level. However, the concentrations at these shallow depths were shown to have diminished considerably at depths of 16 and 17 feet in test borings TB-1 and TB-2, respectively, where only benzene exceeded the Category A cleanup level. In addition, at a depth of 22 feet in test boring TB-3 benzene was only marginally above the Category A cleanup level, and no benzene was detectable in soils at the ground water interface at a depth of approximately 27 feet. Very low levels of toluene and xylenes were the only contaminants detected in soils at ground water.

The UST system at the site is scheduled for upgrade in May 1998. The upgrades will include lining the USTs and installing an impressed current cathodic protection system. The new system will also be constructed with new dispensers and the Total Containment release detection system that includes sumps at the turbine/suction pumps and dispensers, and Enviroflex double wall piping between the two sumps. A Veeder Root in-tank monitoring system will also be installed.

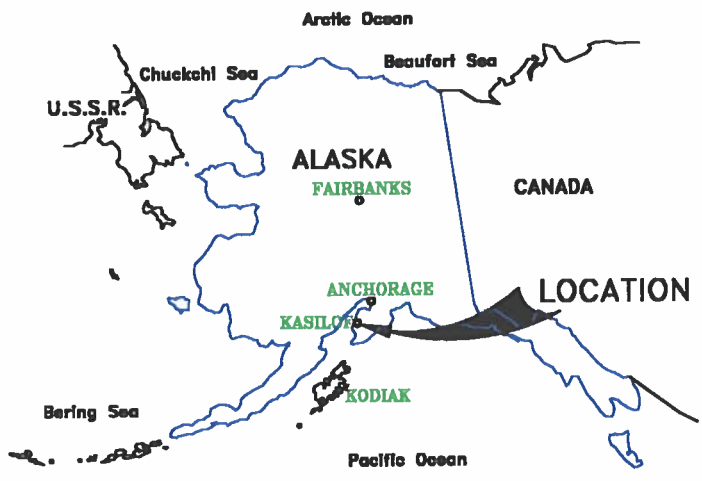
Further delineation of the contaminated soil area will be completed during the environmental site assessment to be completed in conjunction with the UST system upgrades. Following the results obtained from the site assessment, recommendations for site cleanup and further release investigation will be provided for ADEC review and approval.

## **FIGURES**

**FIGURE I: Site Vicinity Map**

**FIGURE II: Site Plan**

**FIGURE III: Test Boring Locations**



(SVE) 98013\98013-VMAP.DWG

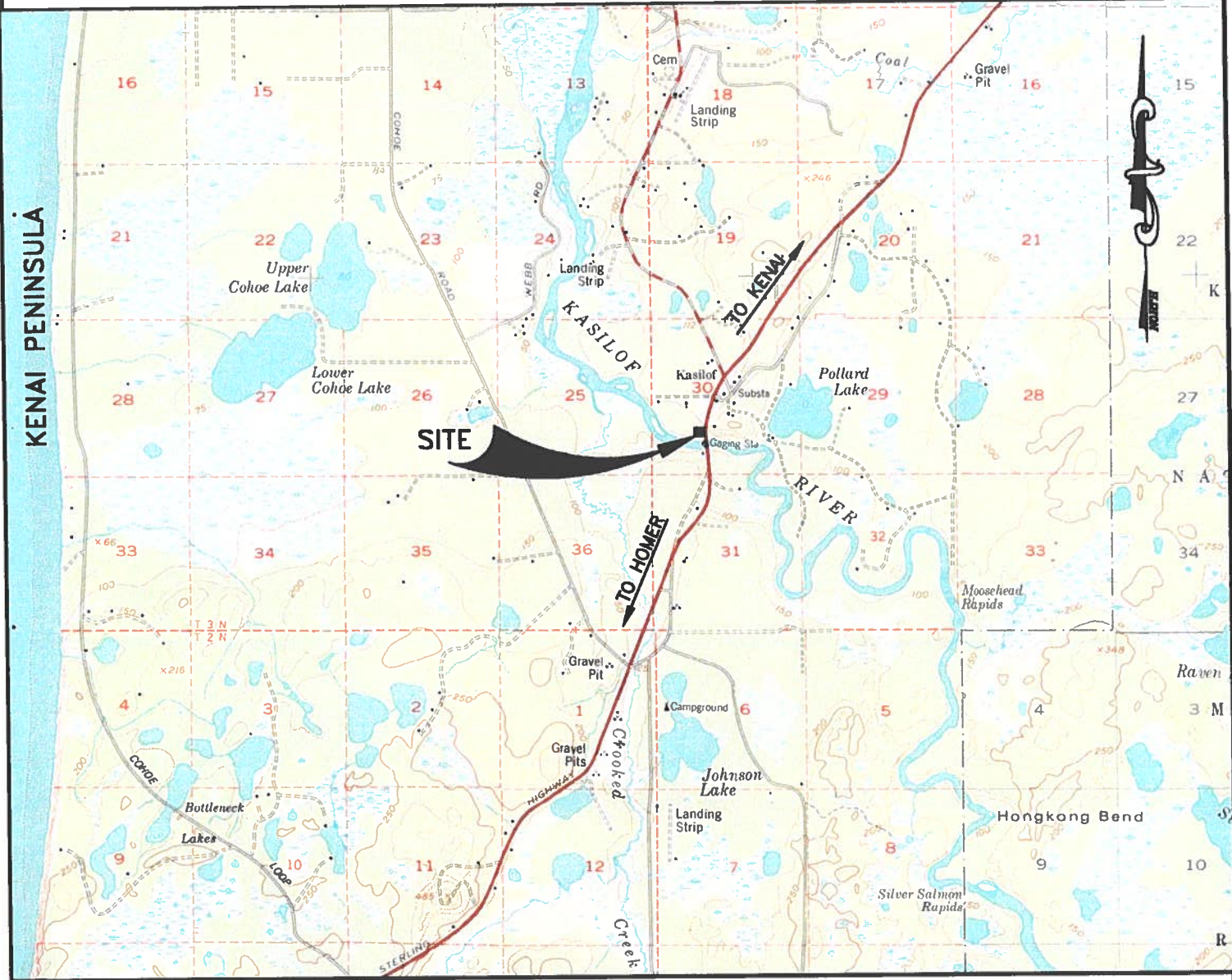


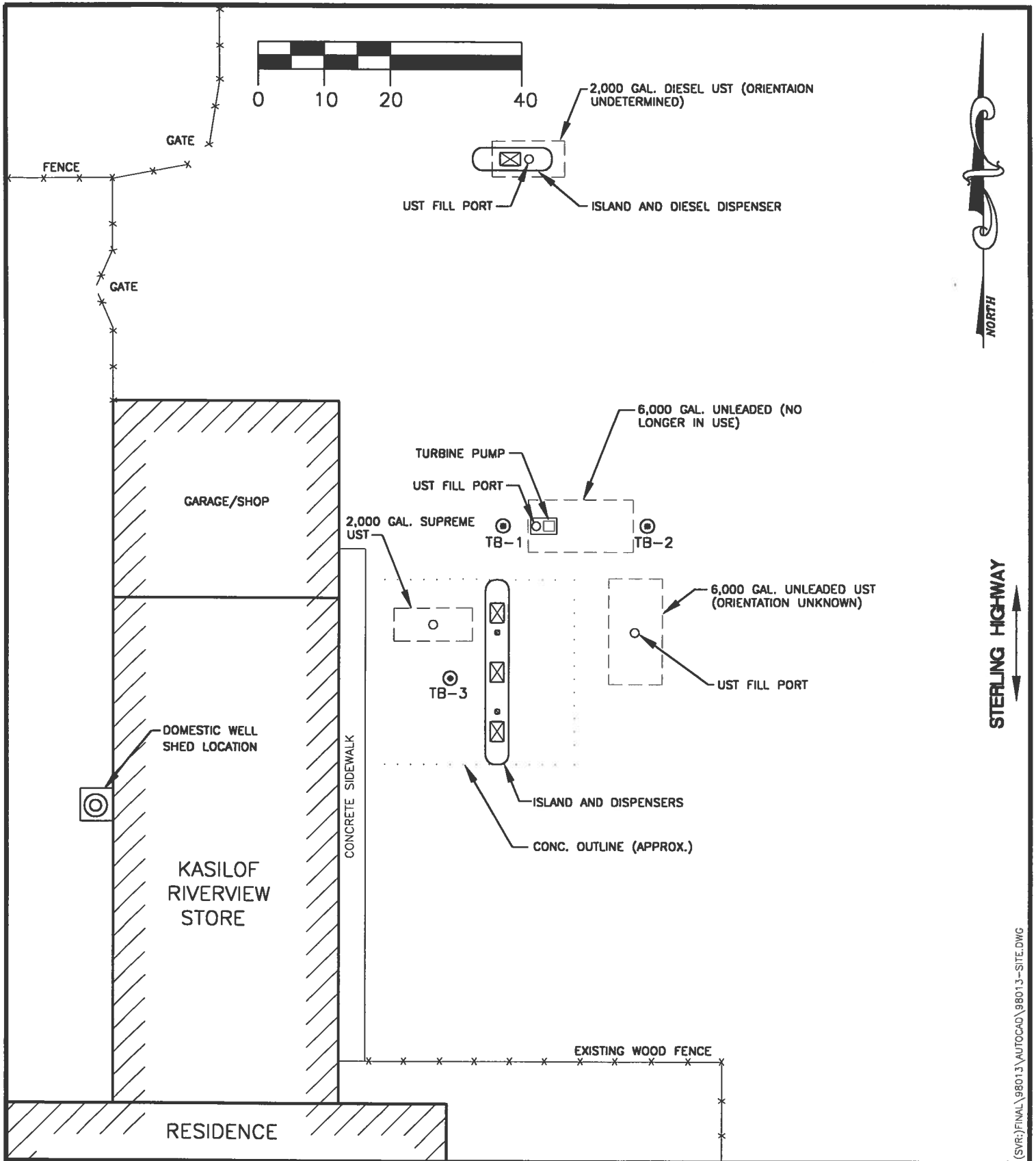
FIGURE 1 KASILOF RIVERVIEW - VICINITY MAP



**GILFILIAN ENGINEERING &  
ENVIRONMENTAL TESTING, INC.**

2605 Denali St., Suite 203, Anchorage, Alaska 99503-2749

SCALE:	N.T.S.
DATE:	05/15/98
PROJECT No.	98013E



(SVR:FINAL\98013\AUTOCAD\98013-SITE.DWG

FIGURE II KASILOF RIVERVIEW - SITE PLAN



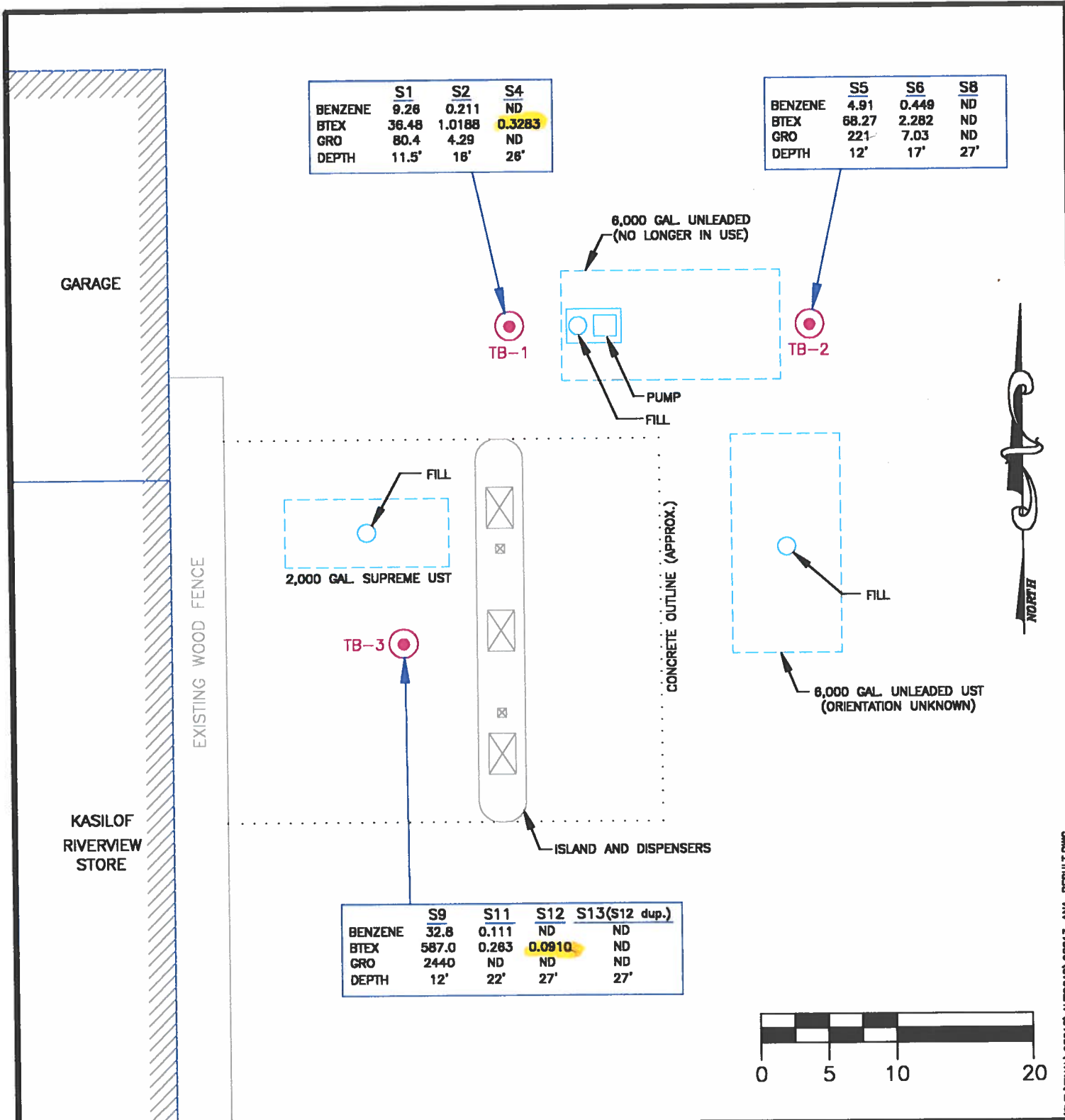
**GILFILIAN ENGINEERING &  
ENVIRONMENTAL TESTING, INC.**

2605 Denali St., Suite 203, Anchorage, Alaska 99503-2749

SCALE: 1" = 20'

DATE: 05/15/98

PROJECT No. 98013E



(SVR)FINAL\98013\AUTOCAD\98013-ANA-RESULT.DWG

**LEGEND:**

TB-# = TEST BORING LOCATION

\*NOTE:  
ALL SOIL ANALYTICAL RESULTS IN mg/kg.

**FIGURE III KASILOF RIVERVIEW - SOIL ANALYTICAL RESULTS**



**GILFILIAN ENGINEERING & ENVIRONMENTAL TESTING, INC.**

2605 Denali St., Suite 203, Anchorage, Alaska 99503-2749

SCALE: 1" = 10'  
DATE: 05/15/98  
PROJECT No. 98013E

## **APPENDICES**

**APPENDIX A**  
**Soil Boring Logs**  
**(3 Pages)**



DEPTH (feet)	BLOWS/FT.	PID (units)	SAMPLE NUMBER	SAMPLES	GRAPHIC LOG	MATERIALS DESCRIPTION
						(GM) Brn/Blk Sandy/Silty Gravel, top 2' unfrozen
5	18	1340	HS			(SM-ML) Tan/Brn Silty Fine-Medium Sand, some gravel, frozen
	23					
	13	1450	HS			(ML-SM) Gray Silt and Fine Sand, occasional small, frozen
	14					Same Drilling
10	8					(SM-ML) Tan Sandy Silt/Silty Fine Sand, minor small gravel, thin gray medium sand from 11.0'-11.4'
	10	990	S1			
15	13	260	S2			(GP) Rusty/Brn Medium-Coarse Sand and Gravel
	63					
20	22	20.1	S3			(GP) Gray Sandy Gravel with a trace of silt, large gravel and cobbles, dry
25	48					(SP) Brn/Rusty Medium Sand, moist-wet, wet in bottom of split spoon sampler
	56	27.3	S4			
TOTAL DEPTH = 26.0'						

HS = Headspace Screening

PROJECT	Kasilof Riverview	DRILLING COMPANY	Hughes Drilling
LOCATION	Mile 109.5 Sterling Highway, Kasilof, Alaska	DATE DRILLED	4/29/98
JOB NUMBER	98013	SURFACE ELEVATION	Unknown
ENGINEER	Christopher Hawe	TOTAL DEPTH OF HOLE (feet)	26
DRILL RIG	CME-75, 8" Hollow Stem Auger	DEPTH TO GROUNDWATER (feet)	

DEPTH (feet)	BLOWS/FT.	PID (units)	SAMPLE NUMBER	SAMPLES	GRAPHIC LOG	MATERIALS DESCRIPTION
						(GM) Brn/Blk Sandy/Silty Gravel, unfrozen, moist
						(ML) Gray Silt with fine sand, occasional small gravel, frozen
5	10					As above, frozen
	24	645	HS			Tan medium sand with silt and small gravel from 4.5' to 4.9'
	14					Back into gray silt but with less sand, occasional very small gravel and coarse sand, frozen
	18	725	HS			Same Drilling
10	12					(ML) Gray Silt with Sand, occasional 1/4" - 3/4" gravel, slightly frozen in top 1.5' of split spoon, organics in bottom, moist
	14	455	S5			
15	27					(GP) Tan/Rusty/Gray Medium-Coarse Sand and gravel with cobbles, trace of silt, dry
	31	23.5	S6			
20	27					(SP) Rusty/Tan Medium Sand, some silt, dry-moist
	41	10.7	S7			
25	41					As above, moist-wet, saturated in very end of split spoon, ground water at 26.9' inside auger
	49	8.0	S8			
						▼ TOTAL DEPTH = 27.0'

HS = Headspace Screening

PROJECT	Kasilof Riverview	DRILLING COMPANY	Hughes Drilling
LOCATION	Mile 109.5 Sterling Highway, Kasilof, Alaska	DATE DRILLED	4/29/98
JOB NUMBER	98013	SURFACE ELEVATION	Unknown
ENGINEER	Christopher Hawe	TOTAL DEPTH OF HOLE (feet)	27
DRILL RIG	CME-75, 8" Hollow Stem Auger	DEPTH TO GROUNDWATER (feet)	26.9

DEPTH (feet)	BLOWS/FT.	PID (units)	SAMPLE NUMBER	SAMPLES	GRAPHIC LOG	MATERIALS DESCRIPTION
						(GM) Brn Sandy/Silty Gravel, unfrozen, moist
		130	HS			(ML) Gray Sandy Silt with gravel, moist
5	10					
	13	1770	HS			(ML) Gray Silt with occasional gravel, dry-moist
						Getting sandier (fine sand), same gray color
10	9					
	12	1260	S9			(ML) Tan/Gray Silt with fine sand, moist, some medium sand also, occasional gravel, organics at 11.5'- 12'
15	8					
	13	17.4	S10			(GP) Brn/Rusty Medium-Coarse Sand and gravel with cobbles, trace of silt, moist
20	15					
	37	41.3	S11			(SP) Gray Fine-Medium Sand, some silt, dry-moist
25	26					
	43	0.5	S12/S13			As above, moist-wet, saturated in very end of split spoon, ground water at 26.9' inside auger, rusty mottling above ground water
						▼ TOTAL DEPTH = 27.0'

HS = Headspace Screening

PROJECT	Kasilof Riverview	DRILLING COMPANY	Hughes Drilling
LOCATION	Mile 109.5 Sterling Highway, Kasilof, Alaska	DATE DRILLED	4/29/98
JOB NUMBER	98013	SURFACE ELEVATION	Unknown
ENGINEER	Christopher Hawe	TOTAL DEPTH OF HOLE (feet)	27
DRILL RIG	CME-75, 8" Hollow Stem Auger	DEPTH TO GROUNDWATER (feet)	26.9

## **APPENDIX B**

### **Soil Analytical Reports**



# CT&E Environmental Services Inc.

Laboratory Division

## Laboratory Analysis Report

May 11, 1998

Chris Hawe  
Gilfilian Engr/Env Testing Inc  
2605 Denali St #203  
Anchorage, AK 99503

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<b>Client Name</b>	Kasilof River View
<b>Project ID</b>	Kasilof Riverview 98013E [981945]
<b>Printed</b>	May 11, 1998

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Enclosed are the analytical results associated with the above project.

As required by the state of Alaska and the USEPA, a formal Quality Assurance/Quality Control Program is maintained by CT&E. A copy of our Quality Control Manual that outlines this program is available at your request.

Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth in our Quality Assurance Program Plan.

If you have any questions regarding this report or if we can be of any other assistance, please call your CT&E Project Manager at (907) 562-2343.

The following descriptors may be found on your report which will serve to further qualify the data.

- U - Indicates the compound was analyzed for but not detected.
- J - Indicates an estimated value that falls below PQL, but is greater than the MDL.
- B - Indicates the analyte is found in the blank associated with the sample.
- \* - The analyte has exceeded allowable limits.
- GT - Greater Than
- D - Secondary Dilution
- LT - Less Than
- ! - Surrogate out of range



CT&E Ref.# 981945001
Client Name Kasilof River View
Project Name/# Kasilof Riverview 98013E
Client Sample ID S1 TB-1 11.5'
Matrix Soil
Ordered By
PWSID

Client PO#
Printed Date/Time 05/11/98 08:36
Collected Date/Time 04/29/98 10:20
Received Date/Time 04/30/98 11:15
Technical Director: Stephen C. Ede

Released By J Wundebank

Sample Remarks:

Table with 9 columns: Parameter, Results, PQL, Units, Method, Allowable Limits, Prep Date, Analysis Date, Init. Rows include Total Solids, GRO/8021 Combo (Gasoline Range Organics, Benzene, Toluene, Ethylbenzene, P & M -Xylene, o-Xylene), and Surrogates (4-Bromofluorobenzene, 1,4-Difluorobenzene).



CT&E Ref.# 981945002
Client Name Kasilof River View
Project Name/# Kasilof Riverview 98013E
Client Sample ID S2 TB-1 16'
Matrix Soil
Ordered By
PWSID

Client PO#
Printed Date/Time 05/11/98 08:36
Collected Date/Time 04/29/98 10:40
Received Date/Time 04/30/98 11:15
Technical Director: Stephen C. Ede

Released By J Windebank

Sample Remarks:

Table with 9 columns: Parameter, Results, PQL, Units, Method, Allowable Limits, Prep Date, Analysis Date, Init. Rows include Total Solids, GRO/8021 Combo, Gasoline Range Organics, Benzene, Toluene, Ethylbenzene, P & M -Xylene, o-Xylene, and Surrogates.



CT&E Ref.# 981945003  
 Client Name Kasilof River View  
 Project Name/# Kasilof Riverview 98013E  
 Client Sample ID S4 TB-1 26'  
 Matrix Soil  
 Ordered By  
 PWSID

Client PO#  
 Printed Date/Time 05/11/98 08:36  
 Collected Date/Time 04/29/98 11:15  
 Received Date/Time 04/30/98 11:15  
 Technical Director: Stephen C. Ede

Released By *J. Windebank*

Sample Remarks:

---

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
Total Solids	85.6		%	SM18 2540G			05/06/98	DAR
GRO/8021 Combo								
Gasoline Range Organics	2.31 U	2.31	mg/Kg	AK101/8021		04/29/98	05/06/98	GSM
Benzene	0.0579 U	0.0579	mg/Kg	AK101/8021		04/29/98	05/06/98	GSM
Toluene	0.0721	0.0579	mg/Kg	AK101/8021		04/29/98	05/06/98	GSM
Ethylbenzene	0.0579 U	0.0579	mg/Kg	AK101/8021		04/29/98	05/06/98	GSM
P & M -Xylene	0.185	0.0579	mg/Kg	AK101/8021		04/29/98	05/06/98	GSM
o-Xylene	0.0712	0.0579	mg/Kg	AK101/8021		04/29/98	05/06/98	GSM
Surrogates								
4-Bromofluorobenzene <Surr>	66.6		%	AK101/8021	(50-150)	04/29/98	05/06/98	
1,4-Difluorobenzene <Surr>	91.1		%	AK101/8021	(50-150)	04/29/98	05/06/98	





CT&E Ref.# 981945004  
 Client Name Kasilof River View  
 Project Name/# Kasilof Riverview 98013E  
 Client Sample ID S5 TB-2 12'  
 Matrix Soil  
 Ordered By  
 PWSID

Client PO#  
 Printed Date/Time 05/11/98 08:36  
 Collected Date/Time 04/29/98 12:30  
 Received Date/Time 04/30/98 11:15  
 Technical Director: Stephen C. Ede

Released By *J. Windelbank*

Sample Remarks:

GRO/BTEX - Surrogate Bromofluorobenzene does not meet QC goals due to matrix interference.

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
Total Solids	86.9		%	SM18 2540G			05/06/98	DAR
GRO/8021 Combo								
Gasoline Range Organics	221	10.7	mg/Kg	AK101/8021		04/29/98	05/06/98	GSM
Benzene	4.91	0.267	mg/Kg	AK101/8021		04/29/98	05/06/98	GSM
Toluene	19.1	0.267	mg/Kg	AK101/8021		04/29/98	05/06/98	GSM
Ethylbenzene	7.85	0.267	mg/Kg	AK101/8021		04/29/98	05/06/98	GSM
P & M -Xylene	26.6	0.267	mg/Kg	AK101/8021		04/29/98	05/06/98	GSM
o-Xylene	9.81	0.267	mg/Kg	AK101/8021		04/29/98	05/06/98	GSM
Surrogates								
4-Bromofluorobenzene <Surr>	239		%	AK101/8021	(50-150)	04/29/98	05/06/98	
1,4-Difluorobenzene <Surr>	121		%	AK101/8021	(50-150)	04/29/98	05/06/98	



CT&E Ref.# 981945005
Client Name Kasilof River View
Project Name/# Kasilof Riverview 98013E
Client Sample ID S6 TB-2 17'
Matrix Soil
Ordered By
PWSID

Client PO#
Printed Date/Time 05/11/98 08:36
Collected Date/Time 04/29/98 12:50
Received Date/Time 04/30/98 11:15
Technical Director: Stephen C. Ede

Released By J W Indebank

Sample Remarks:

Table with 9 columns: Parameter, Results, PQL, Units, Method, Allowable Limits, Prep Date, Analysis Date, Init. Rows include Total Solids, GRO/8021 Combo, Gasoline Range Organics (Benzene, Toluene, Ethylbenzene, P & M -Xylene, o-Xylene), and Surrogates (4-Bromofluorobenzene, 1,4-Difluorobenzene).



CT&E Ref.# 981945006
Client Name Kasilof River View
Project Name/# Kasilof Riverview 98013E
Client Sample ID S8 TB-2 27'
Matrix Soil
Ordered By
PWSID

Client PO#
Printed Date/Time 05/11/98 08:36
Collected Date/Time 04/29/98 13:20
Received Date/Time 04/30/98 11:15
Technical Director: Stephen C. Ede

Released By J. Windebank

Sample Remarks:

Table with 9 columns: Parameter, Results, PQL, Units, Method, Allowable Limits, Prep Date, Analysis Date, Init. Rows include Total Solids, GRO/8021 Combo, Gasoline Range Organics, Benzene, Toluene, Ethylbenzene, P & M -Xylene, o-Xylene, and Surrogates.



CT&E Ref.# 981945007  
 Client Name Kasilof River View  
 Project Name/# Kasilof Riverview 98013E  
 Client Sample ID S9 TB-3 12'  
 Matrix Soil  
 Ordered By  
 PWSID

Client PO#  
 Printed Date/Time 05/11/98 08:36  
 Collected Date/Time 04/29/98 16:45  
 Received Date/Time 04/30/98 11:15  
 Technical Director: Stephen C. Ede

Released By *J. W. Winkler*

Sample Remarks:  
 GRO/BTEX - Surrogates do not meet QC goals due to dilution.

Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
Total Solids	86.7		%	SM18 2540G			05/06/98	DAR
GRO/8021 Combo								
Gasoline Range Organics	2440	189	mg/Kg	AK101/8021		04/29/98	05/06/98	GSM
Benzene	32.8	4.73	mg/Kg	AK101/8021		04/29/98	05/06/98	GSM
Toluene	172	4.73	mg/Kg	AK101/8021		04/29/98	05/06/98	GSM
Ethylbenzene	70.4	4.73	mg/Kg	AK101/8021		04/29/98	05/06/98	GSM
P & M -Xylene	226	4.73	mg/Kg	AK101/8021		04/29/98	05/06/98	GSM
o-Xylene	85.8	4.73	mg/Kg	AK101/8021		04/29/98	05/06/98	GSM
Surrogates								
4-Bromofluorobenzene <Surr>	!	2080	%	AK101/8021	(50-150)	04/29/98	05/06/98	
1,4-Difluorobenzene <Surr>	!	287	%	AK101/8021	(50-150)	04/29/98	05/06/98	



CT&E Ref.# 981945008
Client Name Kasilof River View
Project Name/# Kasilof Riverview 98013E
Client Sample ID S11 TB-3 22'
Matrix Soil
Ordered By
PWSID

Client PO#
Printed Date/Time 05/11/98 08:36
Collected Date/Time 04/29/98 17:35
Received Date/Time 04/30/98 11:15
Technical Director: Stephen C. Ede

Released By J Windelbank

Sample Remarks:

Table with 10 columns: Parameter, Results, PQL, Units, Method, Allowable Limits, Prep Date, Analysis Date, Init. Rows include Total Solids, GRO/8021 Combo (Gasoline Range Organics, Benzene, Toluene, Ethylbenzene, P & M -Xylene, o-Xylene), and Surrogates (4-Bromofluorobenzene, 1,4-Difluorobenzene).



CT&E Ref.# 981945009
Client Name Kasilof River View
Project Name/# Kasilof Riverview 98013E
Client Sample ID S12 TB-3 27'
Matrix Soil
Ordered By PWSID

Client PO#
Printed Date/Time 05/11/98 08:36
Collected Date/Time 04/29/98 17:55
Received Date/Time 04/30/98 11:15
Technical Director: Stephen C. Ede

Released By J Windelbank

Sample Remarks:

Table with 10 columns: Parameter, Results, PQL, Units, Method, Allowable Limits, Prep Date, Analysis Date, Init. Rows include Total Solids, GRO/8021 Combo, Gasoline Range Organics, Benzene, Toluene, Ethylbenzene, P & M -Xylene, o-Xylene, Surrogates, 4-Bromofluorobenzene, and 1,4-Difluorobenzene.



CT&E Ref.# 981945010  
 Client Name Kasilof River View  
 Project Name/# Kasilof Riverview 98013E  
 Client Sample ID S13 TB-4 12'  
 Matrix Soil  
 Ordered By  
 PWSID

Client PO#  
 Printed Date/Time 05/11/98 08:37  
 Collected Date/Time 04/29/98 18:20  
 Received Date/Time 04/30/98 11:15  
 Technical Director: Stephen C. Ede

Released By *J. Wundebank*

Sample Remarks:

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Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
Total Solids	83.4		%	SM18 2540G			05/06/98	DAR
GRO/8021 Combo								
Gasoline Range Organics	2.33 U	2.33	mg/Kg	AK101/8021		04/29/98	05/06/98	GSM
Benzene	0.0583 U	0.0583	mg/Kg	AK101/8021		04/29/98	05/06/98	GSM
Toluene	0.0583 U	0.0583	mg/Kg	AK101/8021		04/29/98	05/06/98	GSM
Ethylbenzene	0.0583 U	0.0583	mg/Kg	AK101/8021		04/29/98	05/06/98	GSM
P & M -Xylene	0.0583 U	0.0583	mg/Kg	AK101/8021		04/29/98	05/06/98	GSM
o-Xylene	0.0583 U	0.0583	mg/Kg	AK101/8021		04/29/98	05/06/98	GSM
Surrogates								
4-Bromofluorobenzene <Surr>	68		%	AK101/8021	(50-150)	04/29/98	05/06/98	
1,4-Difluorobenzene <Surr>	89.8		%	AK101/8021	(50-150)	04/29/98	05/06/98	



CT&E Ref.# 981945013
Client Name Kasilof River View
Project Name/# Kasilof Riverview 98013E
Client Sample ID Trip Blank
Matrix Soil
Ordered By
PWSID

Client PO#
Printed Date/Time 05/11/98 08:37
Collected Date/Time
Received Date/Time 04/30/98 11:15
Technical Director: Stephen C. Ede

Released By J. Wundebank

Sample Remarks:

Table with columns: Parameter, Results, PQL, Units, Method, Allowable Limits, Prep Date, Analysis Date, Init. Rows include Total Solids, GRO/8021 Combo, Gasoline Range Organics, Benzene, Toluene, Ethylbenzene, P & M -Xylene, o-Xylene, and Surrogates.





# GILFILIAN ENGINEERING & ENVIRONMENTAL TESTING, INC.

981945

Professional Environmental Consultants

2605 Denali Street, Suite 203 o Anchorage, Alaska 99503-2749  
Tel: (907) 277-2021 o Fax: (907) 274-8683

## CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

PROJECT NAME: <b>KASILOF RIVERVIEW</b>	PROJECT No: <b>98013E</b>
CONTACT PERSON: <b>CHRIS HAWE</b>	SAMPLER: <b>CHRIS HAWE</b>

ID No.	Description/Location	Date	Time	Type	#Cont	Analysis	QA
① S1	TB-1 11.5'	4/29/98	1020	SOIL	2-8oz	GR0/BTEX (AK101/802)	Standard ADEC
② S2	TB-1 16'	"	1040	"	"	" "	↓
③ S4	TB-1 26'	"	1115	"	"	" "	
④ S5	TB-2 12'	"	1230	"	"	" "	
⑤ S6	TB-2 17'	"	1250	"	"	" "	
⑥ S8	TB-2 27'	"	1320	"	"	" "	
⑦ S9	TB-3 12'	"	1645	"	"	" "	
⑧ S11	TB-3 22'	"	1735	"	"	" "	
⑨ S12	TB-3 27'	"	1755	"	"	" "	
⑩ S13	TB-4 12'	"	1820	"	"	" "	
⑪ S14	Restroom TAP	4/29/98	1830	WATER	2-40ml	GR0/BTEX (AK101/602)	
⑫	TRIP BLANK			WATER	2-40ml	" "	
⑬	TRIP BLANK			SOIL	1-4oz	GR0/BTEX (AK101/802)	

REINQUIRED BY SAMPLER	RECEIVED BY	REINQUIRED BY	RECEIVED BY
Signature: <i>Christopher Howe</i>	Signature: <i>Joyce Windebank</i>	Signature:	Signature:
Printed Name: <b>Christopher Howe</b>	Printed Name: <b>Joyce Windebank</b>	Printed Name:	Printed Name:
Date/Time: <b>4/29/98 1115</b>	Date/Time: <b>4/30/98 1115</b>	Date/Time:	Date/Time:
* Comments: Bill TO: <b>JOE BROWNING</b> Kasilof Riverview Mile 109.5 STERLING HWY P.O. BOX 254 KASILOF ALASKA 99610 Reports TO: <b>GE2T</b>			

## **APPENDIX C**

### **Water Analytical Reports**



CT&E Ref.# 981945011  
 Client Name Kasilof River View  
 Project Name/# Kasilof Riverview 98013E  
 Client Sample ID S14 Restroom Tap  
 Matrix Water (Surface, Eff., Ground)  
 Ordered By  
 PWSID

Client PO#  
 Printed Date/Time 05/11/98 08:37  
 Collected Date/Time 04/29/98 18:30  
 Received Date/Time 04/30/98 11:15  
 Technical Director: Stephen C. Ede

Released By *J Wendelbank*

Sample Remarks:

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Parameter	Results	PQL	Units	Method	Allowable Limits	Prep Date	Analysis Date	Init
<b>GRO/602 Combo</b>								
Gasoline Range Organics	0.0400 U	0.0400	mg/L	AK101/602 Combo		05/01/98	05/02/98	GSM
Benzene	0.0010 U	0.0010	mg/L	AK101/602 Combo		05/01/98	05/02/98	GSM
Toluene	0.0010 U	0.0010	mg/L	AK101/602 Combo		05/01/98	05/02/98	GSM
Ethylbenzene	0.0010 U	0.0010	mg/L	AK101/602 Combo		05/01/98	05/02/98	GSM
P & M -Xylene	0.0010 U	0.0010	mg/L	AK101/602 Combo		05/01/98	05/02/98	GSM
o-Xylene	0.0010 U	0.0010	mg/L	AK101/602 Combo		05/01/98	05/02/98	GSM
<b>Surrogates</b>								
4-Bromofluorobenzene <Surr>	79.6		%	AK101/602 Combo (50-150)		05/01/98	05/02/98	
1,4-Difluorobenzene <Surr>	90		%	AK101/602 Combo (50-150)		05/01/98	05/02/98	



CT&E Ref.# 981945012
Client Name Kasilof River View
Project Name/# Kasilof Riverview 98013E
Client Sample ID Trip Blank
Matrix Water (Surface, Eff., Ground)
Ordered By
PWSID

Client PO#
Printed Date/Time 05/11/98 08:37
Collected Date/Time
Received Date/Time 04/30/98 11:15
Technical Director: Stephen C. Ede

Released By J. W. Winkler

Sample Remarks:

Table with columns: Parameter, Results, PQL, Units, Method, Allowable Limits, Prep Date, Analysis Date, Init. Rows include GRO/602 Combo, Gasoline Range Organics, Benzene, Toluene, Ethylbenzene, P & M -Xylene, o-Xylene, and Surrogates (4-Bromofluorobenzene, 1,4-Difluorobenzene).



# GILFILIAN ENGINEERING & ENVIRONMENTAL TESTING, INC.

981945

Professional Environmental Consultants

2605 Denali Street, Suite 203 o Anchorage, Alaska 99503-2749  
Tel: (907) 277-2021 o Fax: (907) 274-8683

## CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

PROJECT NAME: <b>Kasilof RIVERVIEW</b>	PROJECT No: <b>Q8013E</b>
CONTACT PERSON: <b>CHRIS HAWE</b>	SAMPLER: <b>CHRIS HAWE</b>

ID No.	Description/Location	Date	Time	Type	#Cont	Analysis	QA	
① S1	TB-1 11.5'	4/29/98	1020	SOIL	2-8oz	GRO/BTEX (AK101/802)	Station ADEC	
② S2	TB-1 16'	"	1040	"	"	" "	↓	
③ S4	TB-1 26'	"	1115	"	"	" "		
④ S5	TB-2 12'	"	1230	"	"	" "		
⑤ S6	TB-2 17'	"	1250	"	"	" "		
⑥ S8	TB-2 27'	"	1320	"	"	" "		
⑦ S9	TB-3 12'	"	1645	"	"	" "		
⑧ S11	TB-3 22'	"	1735	"	"	" "		
⑨ S12	TB-3 27'	"	1755	"	"	" "		
⑩ S13	TB-4 12'	"	1820	"	"	" "		
⑪ S14	Restroom Tap	4/29/98	1830	WATER	2-4oz	GRO/BTEX (AK101/602)		
⑫	TRIP BLANK			WATER	2-4oz	" "		
⑬	TRIP BLANK			SOIL	1-4oz	GRO/BTEX (AK101/802)		

REINQUISHED BY	RECEIVED BY	REINQUISHED BY	RECEIVED BY
SAMPLER:			
Signature: <i>Christopher Howe</i>	Signature: <i>Joyce Windebank</i>	Signature:	Signature:
Printed Name: <i>Christopher Howe</i>	Printed Name: <i>Joyce Windebank</i>	Printed Name:	Printed Name:
Date/Time: <i>4/29/98 1115</i>	Date/Time: <i>4/30/98 1115</i>	Date/Time:	Date/Time:
* Comments: Bill TO: <i>JOE BROWNING</i> Kasilof RIVERVIEW Mile 109.5 STERLING HWY P.O. BOX 254 KASILOF ALASKA 99610 Reports TO: <i>GE2T</i>			