



RECEIVED
N.C. Dept. of EHNR

MAR 17 1993

Winston-Salem
Regional Office

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

JAMES B. HUNT, JR.
GOVERNOR

DIVISION OF HIGHWAYS
P.O. BOX 25201, RALEIGH, N.C. 27611-5201
Geotechnical Unit

SAM HUNT
SECRETARY

March 12, 1993

Ms. Sherry Knight, Supervisor
DEM/Groundwater Section
Winston-Salem Regional Office
8025 North Point Boulevard
Winston-Salem, North Carolina 27106

Re: State Project: 8.1491202 (U-800)
County: Guilford
Description: US 421 (West Market Street) in Greensboro
Subject: UST Closure and Site Investigation Report

Dear Ms. Knight:

Enclosed you will find a copy of the UST Closure Report prepared for NCDOT by Aquaterra, Inc. for the removal of two (2) previously unknown USTs on the referenced project.

The requirements of DEM resulting from the findings of this closure investigation can have a direct effect upon the construction schedule of the highway project. Therefore, we ask that you keep this office notified of any actions your agency may require, as we provide environmental recommendations and field services to DOT Construction offices.

If you should need any additional information on this or any other NCDOT project, please do not hesitate contacting me at (919) 250-4088. Thank you for your time and consideration in the handling of this matter.

Sincerely,

Gregory A. Smith
Environmental Geologist
Geotechnical Unit





AQUATERRA

Environmental Consultants

March 2, 1993

Mr. Gregory A. Smith, Environmental Geologist
North Carolina Department of Transportation
Geotechnical Unit
Post Office Box 25201
Century Center
Raleigh, North Carolina 27611-5201

Reference: Underground Storage Tank Removal and Closure Assessment
NCDOT State Project 8.1491202 (U-800)
NCDOT Right of Way, US 421
Guilford County, North Carolina
Aquaterra Job No. 33004

Dear Mr. Smith:

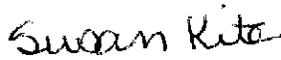
Aquaterra, Inc. (Aquaterra) is pleased to submit this underground storage tank (UST) removal and closure assessment report on NCDOT right of way, on US 421 located in Guilford County, North Carolina. This report includes the technical tasks provided to complete the removal and closure assessment, the results of laboratory analytical testing, and our conclusions and recommendations for the site. The closure assessment was conducted in an effort to satisfy the UST closure assessment requirements set forth in 40 CFR Part 280 Subpart G.

Levels of petroleum hydrocarbons were identified above the North Carolina Department of Environment, Health, and Natural Resources, Division of Environmental Management soil action clean up level of 10 mg/kg in the soils underlying one of the USTs. Based on a site sensitivity evaluation, Aquaterra does not recommend additional assessment at this former UST site.

If any additional information is required, please contact us at (919) 852-5003.

Sincerely,

AQUATERRA, INC.


Susan Kite, P.G.
Project Geologist/Project Manager


C. Earl Jones
Project Manager

SK/CEJ/slw/GR8-93

Corporate Office:
P O Box 50328
Raleigh, NC 27650
(919) 859-9987
FAX (919) 859-9930

Charlotte Office:
P O Box 668107
Charlotte, NC 28266-8107
(704) 525-8680
FAX (704) 527-2792

Greensboro Office:
P O Box 16241
Greensboro, NC 27416-0241
(919) 273-5003
FAX (919) 271-8138

852 5003

**Underground Storage Tank Removal and Closure Assessment
NCDOT State Project 8.1491202 (U-800)
NCDOT Right of Way, US 421
Guilford County, North Carolina
Aquaterra Job No. 33004**

1 Introduction

Aquaterra, Inc. (Aquaterra) has conducted the removal and closure assessment of two underground storage tanks (USTs) on NCDOT right of way, located on US 421 in Guilford County, North Carolina (see Figure 1). The USTs were of unknown size and content. It is Aquaterra's understanding that the NCDOT contacted the North Carolina Department of Environment, Health, and Natural Resources (NCDEHNR), Division of Environmental Management (DEM), and Guilford County Emergency Services (GCES) regarding their intent to remove the USTs.

2 Scope of Work

2.1 Field Activities

The following work tasks were required to properly close the previously identified USTs:

- remove and properly dispose of all contents remaining in the USTs (40 CFR Part 280.71)
- excavate, remove, and properly dispose of the USTs
- conduct a UST closure assessment in accordance with 40 CFR Part 280 Subpart G and 15A NCAC Chapter 2, Subchapter 2N.

The closure assessment included screening the in situ and excavated soils with an organic vapor analyzer (OVA) for total volatile organic compounds (VOCs). This involved placing soil in a sealed container (half-full) and allowing it to volatilize for approximately 10 minutes. The probe of the OVA was then inserted into the headspace of the container and a total VOC reading was obtained. This procedure is an aid to identifying petroleum hydrocarbon contamination in soils.

2.2 UST Removals

Four Seasons Industrial Services, Inc. (Four Seasons) conducted the excavation and removal of the USTs, which included the following:

- the removal and proper disposal of 40 gallons of a water/petroleum mix from the USTs (see Attachment A for manifest)
- the removal and proper disposal of the USTs (see Attachment A for manifests)



2.3 Site Investigation

On January 27, 1993, Aquaterra mobilized an environmental technician to the US 421 site to conduct a UST closure assessment in conjunction with the removal of two USTs. Based on the liquid removed from the USTs prior to removal, it is believed that the USTs previously contained gasoline. The first UST removed (QP-1) was a 1,000 gallon tank measuring 46 inches (D) x 144 inches (L). The second UST removed (QP-2) was a 880 gallon tank measuring 60 inches (D) x 72 inches (L). Both USTs were visually inspected by the technician and were found to be slightly pitted, however no holes were noted. No staining was observed in the soils and no petroleum odors were noted in the soils. Apparent ground water was not observed to be present.

2.4 Sample Collection and Laboratory Analysis

Four soil samples (QP-1N, QP-1S, QP-2N, and QP-2S) were collected for laboratory analysis using the backhoe bucket from a depth of approximately 2 feet beneath the USTs and placed in laboratory decontaminated glassware (see Figure 2). The soils were screened for emissions of total VOCs according to the methods previously described. The samples were labeled with a tag identifying sample number, date, time, method of collection, job number, job name, analysis to be conducted, and the sampler's initials. The samples were stored in a cooler filled with ice and chilled to approximately 4^o C prior to transport to Hydrologic, Inc., Frankfort, Kentucky, using EPA approved chain-of-custody procedures. The samples were analyzed for total petroleum hydrocarbons (TPH) by gas chromatograph (GC) using EPA SW-846 Extraction Methods 3550 and 5030 as sample preparation. Extraction Method 3550 is used to extract the relatively heavier weight hydrocarbons such as diesel fuel, kerosene, and #2 fuel oil. Extraction Method 5030 is used to extract the relatively lighter weight hydrocarbons such as gasoline.

3 Laboratory Analytical Results

Soil sample laboratory analytical results from soil samples QP-1N, QP-2N, and QP-2S did not exhibit TPH concentrations above the laboratory method detection limit of 1.0 mg/kg (see Table 1 and Attachment B). Soil sample QP-2S exhibited a TPH level of 50 mg/kg identified as gasoline.

4 Site Sensitivity Evaluation

Due to the elevated TPH level in soil sample QP-1S, a Site Sensitivity Evaluation (SSE) has been performed at this site (see Attachment C). The SSE has established a final cleanup level of 300 parts per million (ppm, mg/kg) TPH in the soil at this site.

5 Conclusions and Recommendations

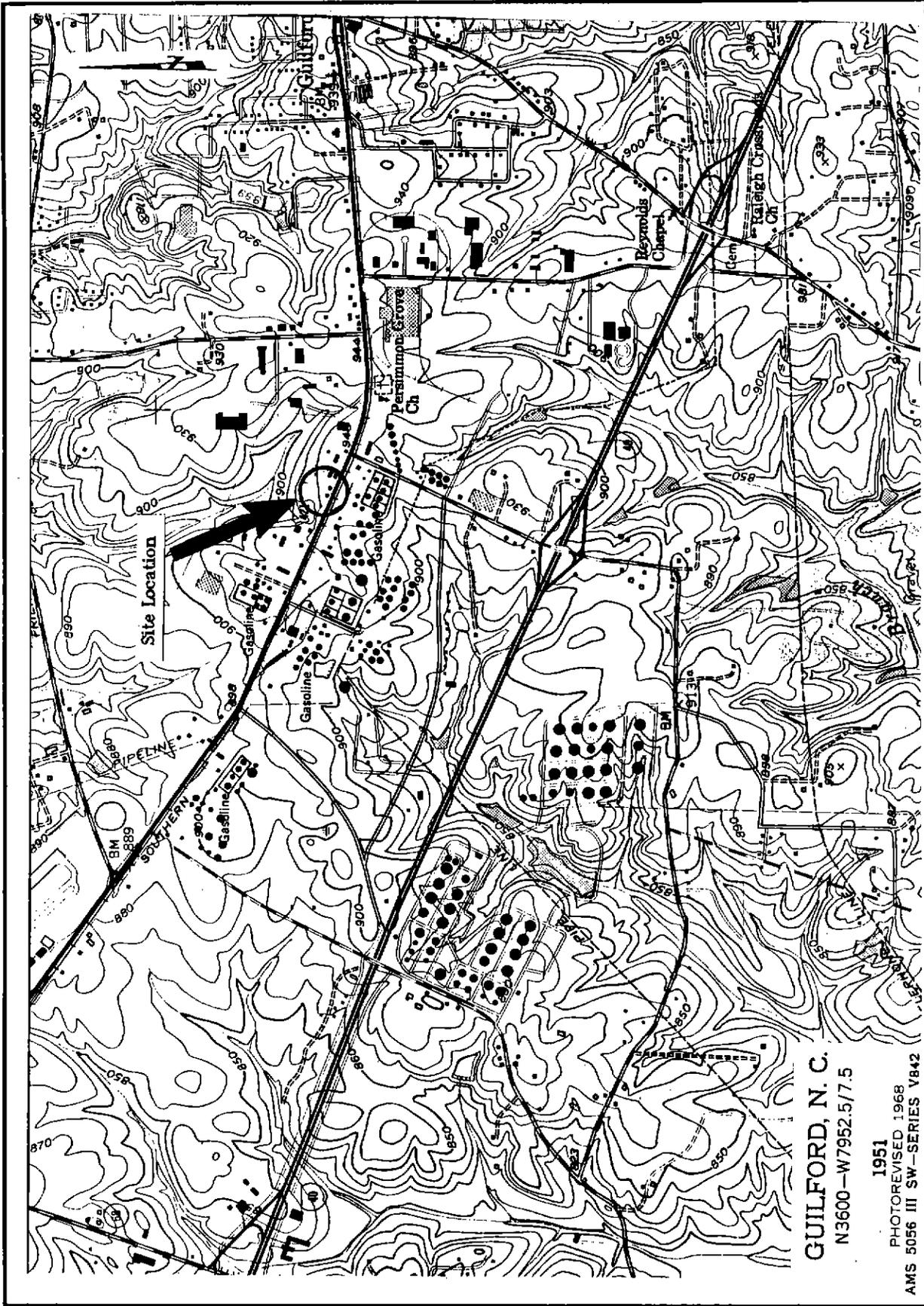
Based on the field investigation, the laboratory analytical results, and the SSE, Aquaterra does not recommend additional assessment at these UST sites. Aquaterra also recommends that a copy of this report be forwarded to the NCDEHNR, DEM, Winston-Salem Regional office and to Ms. Kelly Gage at the GCES office at the following addresses:

NCDEHNR, DEM
Winston-Salem Regional Office
8025 North Point Boulevard
Winston-Salem, North Carolina 27106

Ms. Kelly Gage
Guilford County Emergency Services
Post Office Box 18807
Greensboro, North Carolina 27419



Figures



GUILFORD, N. C.
 N3600-W7952.5/7.5

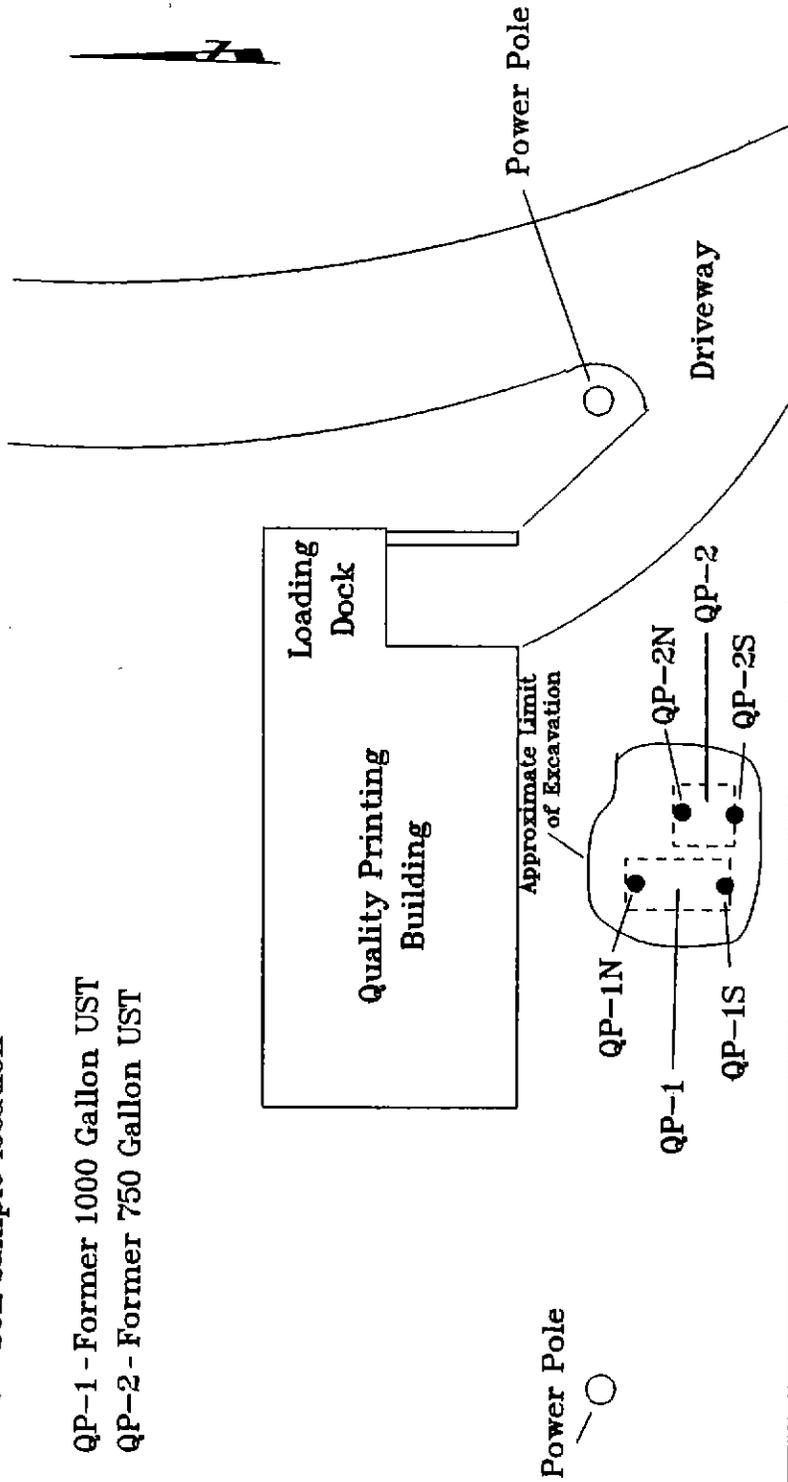
1951
 PHOTO-REVISED 1968
 AMS 5056 III SW-SERIES V842

<p>AQUATERRA, INC. RALEIGH, GREENSBORO, CHARLOTTE NORTH CAROLINA</p> 		Author	ACB	Layers	1	Date	1-31-93	Title	Site Location Map
		Job No.	33004	Drawing	33004-1	Figure	1	Scale	1:24000

Legend

- Soil sample location

NOTE: QP-1 - Former 1000 Gallon UST
 QP-2 - Former 750 Gallon UST



US 421 - West Market Street



AQUATERRA, INC.
 RALEIGH, GREENSBORO, CHARLOTTE
 NORTH CAROLINA

Author
 ACB

Drawing
 33004-2

Layers
 Figure 2

Date
 1-28-93

Title
 Soil Sample Location Map

Job No.
 33004

Revision
 2

Scale
 1" = 20'

Project
 NCDOT- 421
 Greensboro, North Carolina

Tables

Table 1. Laboratory Analytical Results for NCDOT Project 8.1491202 (U-800), Guilford County, North Carolina.

Sample No.	Date	Depth (feet)	OVA (ppm)	TPH by GC	
				Method 3550 (ppm)	Method 5030 (ppm)
QP-1N	1-27-93	8	<0.1	<1.0	<1.0
QP-1S	1-27-93	8	<0.1	<1.0	50
QP-2N	1-27-93	8	<0.1	<1.0	<1.0
QP-2N	1-27-93	8	<0.1	<1.0	<1.0

*Analytical Laboratory: Hydrologic, Inc.
Frankfort, Kentucky*

*Aquaterra Job No. 33004
GR8-93*

Attachment A



FOUR SEASONS INDUSTRIAL SERVICES, INC.

Post Office Box 16590
Greensboro, North Carolina 27416
(919) 273-2718

NO 10228

NON-HAZARDOUS WASTE MANIFEST

Manifest # 10228 (F.S.I.S. JOB # 9350030) Date: 1/27/93
 Generator: AQUA TERRA (D.O.T.) Phone No.: _____
Greensboro, N.C. EPA ID No.: N/A
 Contact: ALAN BURCHELL

Process which generated waste:

I certify that the materials described below are properly described, classified, packaged, marked & labeled, and are in proper condition to be transported in commerce under the applicable regulations of the State, the Environmental Protection Agency and the Department of Transportation. I certify that the waste described below is non-hazardous. I certify that the specific waste was delivered to the carrier named below for legal treatment, storage, or disposal at the site indicated.

Date 1-27-93 Signature Alan Burchell

Description of waste	Circle Form	Quantity	Circle Units	Container	
				No.	Type
<u>PETRO & WATER</u> <u>MIXTURE</u>	<u>Liquid</u> Solid Gas Sludge	<u>40 GAL.</u>	<u>Gallons</u> Cu. Yds. Pounds Tons	<u>1</u>	<u>TT</u>

Transporter: FOUR SEASONS IND. SER. Unit Number(s) P-7
3107 S. ELM. EUGENE ST. Phone No.: 919-273-2718
Greensboro, N.C. EPA ID No.: NCD991277732
 Vehicle License Tag Number(s) LT-1794 Container: VAC. TRK.

I certify that the specified waste was transferred in a registered (licensed) vehicle to the disposal treatment, storage, or disposal facility named below and was accepted.

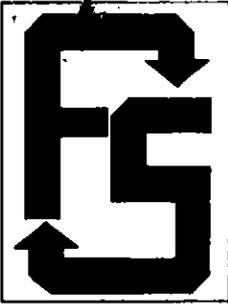
Pick-up Driver's Signature Bobby J. Anderson Date 1-27-93 Delivering Driver's Signature Bobby J. Anderson Date 1-27-93

Facility: FOUR SEASONS IND. SER. Phone No. 273-2718
PATTON AV.
Greensboro, N.C. Contact: Waymon

Handling Method: PT5032

I certify that the transporter above delivered the specified material to this TSD facility and was accepted and properly handled in the above manner. We are authorized and qualified by the State of NC to handle this material.

Date 1-27-93 Signature: Waymon



FOUR SEASONS INDUSTRIAL SERVICES, INC.

Post Office Box 16590
Greensboro, North Carolina 27416-0590
(919)273-2718

TANK DISPOSAL MANIFEST

1)	Tank Owner/Authorized Representative: Name and Mailing Address _____ <u>Aqua Terra (D.O.T.)</u>		
2)	Tank Owner/Authorized Representative: Phone No. () _____		
3)	Description of Tanks:		
	<u>Tank No.</u>	<u>Capacity</u>	<u>Previous Contents</u>
	<u>D.O.T</u> <u>#1</u>	<u>1,000 Gal.</u>	<u>PETRO</u> <u>WATER</u>
			<u>Comments</u> <u>GOOD</u> <u>#24</u>
4)	Tank Owner/Authorized Representative Certification: The undersigned certifies that the above listed storage tanks have been removed from the premises of the tank Owner.		
	<u>Alan Buchell</u>	<u>Alan Buchell</u>	<u>1-27-93</u>
	Printed/Typed Name	Signature	Month Day Year
5)	Transporter: The undersigned certifies that the above listed storage tanks have been transported to the Four Seasons Industrial Services facility at 519 Patton Ave. Greensboro, N.C.		
	<u>NAT Festerman</u>	<u>NAT Festerman</u>	<u>1-27-93</u>
	Printed/Typed Name	Signature	Month Day Year
6)	Decontamination Manager: The undersigned certifies that the above listed storage tanks have been cleaned and scrapped.		
	<u>Paul T. Mayer</u>	<u>Paul T. Mayer</u>	<u>1/27/93</u>
	Printed/Typed Name	Signature	Month Day Year
7)	Disposal Certification: The undersigned certifies that the above-named storage tank(s) have been cut into scrap pieces and accepted by the metal recycling facility.		
	Recycling Facility: <u>W H Shipp's Welding Co.</u>		
	<u>Robert Fields</u>	<u>Robert Fields</u>	<u>1-28-93</u>
	Printed/Typed Name	Signature	Month Day Year



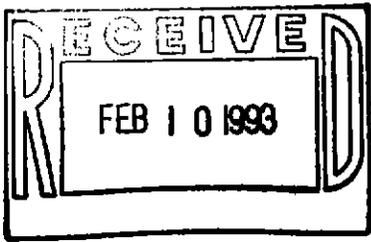
FOUR SEASONS INDUSTRIAL SERVICES, INC.

Post Office Box 16590
Greensboro, North Carolina 27416-0590
(919)273-2718

TANK DISPOSAL MANIFEST

1)	Tank Owner/Authorized Representative: Name and Mailing Address _____ <u>AQUA TERPA (D.O.T.)</u> <u>Greensboro, N.C.</u>			
2)	Tank Owner/Authorized Representative: Phone No. () _____			
3)	Description of Tanks:			
	<u>Tank No.</u>	<u>Capacity</u>	<u>Previous Contents</u>	<u>Comments</u>
	<u>D.O.T.</u> <u># 2</u>	<u>500 GAL.</u> <u>880 gal based</u> <u>on measurements</u> <u>Susan Kite</u>	<u>PETROL &</u> <u>WATER</u>	<u>GOOD</u> <u>#25</u>
4)	Tank Owner/Authorized Representative Certification: The undersigned certifies that the above listed storage tanks have been removed from the premises of the tank Owner.			
	<u>Alan Burchell</u> Printed/Typed Name	<u>Alan Burchell</u> Signature	<u>1-27-93</u> Month Day Year	
5)	Transporter: The undersigned certifies that the above listed storage tanks have been transported to the Four Seasons Industrial Services facility at 519 Patton Ave. Greensboro, N.C.			
	<u>NAT FOSTERMAN</u> Printed/Typed Name	<u>Nat Foster</u> Signature	<u>1-27-93</u> Month Day Year	
6)	Decontamination Manager: The undersigned certifies that the above listed storage tanks have been cleaned and scrapped.			
	<u>Paul T. Mayer</u> Printed/Typed Name	<u>Paul T. Mayer</u> Signature	<u>1/27/93</u> Month Day Year	
7)	Disposal Certification: The undersigned certifies that the above-named storage tank(s) have been cut into scrap pieces and accepted by the metal recycling facility.			
	Recycling Facility: <u>W H Griffin Wrecking Co.</u>			
	<u>Robert Fields</u> Printed/Typed Name	<u>Robert Fields</u> Signature	<u>1-28-93</u> Month Day Year	

Attachment B



February 5, 1993

REPORTING:

Aquaterra, Inc.
319-J Westgate Drive
Greensboro, NC 27407

Attention: Susan Kite

INVOICING:

Aquaterra, Inc.
319-J Westgate Drive
Greensboro, NC 27407

PROJECT NUMBER: FL930205

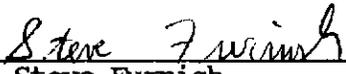
DATE COMPLETED: February 5, 1993
DATE RECEIVED: January 28, 1993

PROJECT DESCRIPTION:

#33004/DOI-421--4 Soil samples for TPH 3550/5030. Sampled on 1/27/93 by Alan Buchell.

Enclosed is the laboratory report for the project described above. If you have any questions or if we can be of further assistance, please feel free to contact us. We appreciate your business and look forward to serving you again soon.

Respectfully,



Steve Furnish
Laboratory Director

H Y D R O L O G I C , I N C .

COMPANY NAME: Aquaterra, Inc.
COMPANY PROJECT: #33004/DOT-421
HYDROLOGIC PROJECT NUMBER: FL930205
HYDROLOGIC SAMPLE NUMBER: 12540
SAMPLE IDENTIFICATION: QP-1N
DATE SAMPLED: 01/27/93
DATE EXTRACTED: 02/01/93
DATE/TIME ANALYZED: 02/02/93 02/02/93

METHOD TPH 3550/5030

<u>ANALYSIS</u>	<u>CAS NO.</u>	<u>SDL</u> (mg/kg)	<u>RESULT</u> (mg/kg)
DIESEL		1.0	BDL
GASOLINE		1.0	BDL

BDL = Below Sample Detection Limit
SDL = Sample Detection Limit

COMMENTS: _____

H Y D R O L O G I C , I N C .

COMPANY NAME: Aquaterra, Inc.
COMPANY PROJECT: #33004/DOT-421
HYDROLOGIC PROJECT NUMBER: FL930205
HYDROLOGIC SAMPLE NUMBER: 12541
SAMPLE IDENTIFICATION: QP-1S
DATE SAMPLED: 01/27/93
DATE EXTRACTED: 01/29/93
DATE/TIME ANALYZED: 01/29/93 02/04/93

METHOD TPH 3550/5030

<u>ANALYSIS</u>	<u>CAS NO.</u>	<u>SDL</u> (mg/kg)	<u>RESULT</u> (mg/kg)
DIESEL		1.0	BDL
GASOLINE		1.0	50

BDL = Below Sample Detection Limit
SDL = Sample Detection Limit

COMMENTS: _____

H Y D R O L O G I C , I N C .

COMPANY NAME: Aquaterra, Inc.
COMPANY PROJECT: #33004/DOI-421
HYDROLOGIC PROJECT NUMBER: FL930205
HYDROLOGIC SAMPLE NUMBER: 12542
SAMPLE IDENTIFICATION: QP-2N
DATE SAMPLED: 01/27/93
DATE EXTRACTED: 01/29/93
DATE/TIME ANALYZED: 01/29/93 02/04/93

METHOD TPH 3550/5030

<u>ANALYSIS</u>	<u>CAS NO.</u>	<u>SDL</u> (mg/kg)	<u>RESULT</u> (mg/kg)
DIESEL		1.0	BDL
GASOLINE		1.0	BDL

BDL = Below Sample Detection Limit
SDL = Sample Detection Limit

COMMENTS: _____

H Y D R O L O G I C , I N C .

COMPANY NAME: Aquaterra, Inc.
COMPANY PROJECT: #33004/DOI-421
HYDROLOGIC PROJECT NUMBER: FL930205
HYDROLOGIC SAMPLE NUMBER: 12543
SAMPLE IDENTIFICATION: QP-2S
DATE SAMPLED: 01/27/93
DATE EXTRACTED: 01/29/93
DATE/TIME ANALYZED: 01/29/93 02/04/93

METHOD TPH 3550/5030

<u>ANALYSIS</u>	<u>CAS NO.</u>	<u>SDL</u> (mg/kg)	<u>RESULT</u> (mg/kg)
DIESEL		1.0	BDL
GASOLINE		1.0	BDL

BDL = Below Sample Detection Limit
SDL = Sample Detection Limit

COMMENTS: _____

Attachment C

Table 1
Site Sensitivity Evaluation (SSE)
 Site Characteristics Evaluation (Step 1)

Characteristic	Condition	Rating	
Grain Size*	Gravel	150	0
	Sand	100	
	Silt	50	
	Clay	0	
Are relict structures, sedimentary structures, and/or textures present in the zone of contamination and underlying "soils".	Present and intersecting the water table.	10	5
	Present but <u>not</u> intersecting the water table.	5	
	None present.	0	
Distance from location of deepest contaminated soil** to water table.	5 - 10 feet	20	10
	>10 - 40 feet	10	
	>40 feet	0	
Is the top of bedrock or transmissive indurated sediments located above the water table?	Yes	20	0
	No	0	
Artificial conduits present within the zone of contamination.	Present and intersecting the water table.	10	5
	Present but <u>not</u> intersecting the water table.	5	
	Not present.	0	

Total Site Characteristics Score: 20

* Predominant grain size based on Unified Soil Classification System or U.S. Dept. of Agriculture's Soil Classification Method.
 ** (>10 ppm TPH by Method 5030; >40 ppm TPH by Method 3550; >250 ppm O&G by Method 9071)

Table 2
Site Sensitivity Evaluation (SSE)
 Initial Cleanup Level (Step 2) Final Cleanup Level (Step 3)

Low Boiling Point Hydrocarbons				
Total Site Characteristics Score	Initial Cleanup Level TPFH (ppm) EPA Method 5030	Select Site Category* →	Final Cleanup Level	
>150	≤10		Category A & B (Multiply initial cleanup level by 1)	1 x _____ = _____ ppm
121-150	20		Category C & D (Multiply initial cleanup level by 2)	2 x _____ = _____ ppm
91-120	40		Category E (Multiply initial cleanup level by 3)	3 x <u>100</u> = <u>300</u> ppm
61-90	60		_____	_____
31-60	80			
0-30	100			

Medium Boiling Point Hydrocarbons				
Total Site Characteristics Score	Initial Cleanup Level TPFH (ppm) EPA Method 3550	Select Site Category* →	Final Cleanup Level	
>150	≤40		Category A & B (Multiply initial cleanup level by 1)	1 x _____ = _____ ppm
121-150	80		Category C & D (Multiply initial cleanup level by 2)	2 x _____ = _____ ppm
91-120	160		Category E (Multiply initial cleanup level by 3)	3 x _____ = _____ ppm
61-90	240			
31-60	320			
0-30	400			

Oil & Grease (O&G)				
Total Site Characteristics Score	Initial Cleanup Level O&G (ppm) EPA Method 9071	Select Site Category* →	Final Cleanup Level	
>150	≤250		Category A & B (Multiply initial cleanup level by 1)	1 x _____ = _____ ppm
121-150	400		Category C & D (Multiply initial cleanup level by 2)	2 x _____ = _____ ppm
91-120	550		Category E (Multiply initial cleanup level by 3)	3 x _____ = _____ ppm
61-90	700			
31-60	850			
0-30	1000			

* See Site Category Descriptions

**TABLE 3
SITE SENSITIVITY EVALUATION (SSE)**

SITE CATEGORY DESCRIPTIONS

CATEGORY A (*Site meets any one of the criteria*)

1. Water Supply well(s) contaminated and not served by accessible public water supply.
2. Vapors present in confined areas at explosive or health concern levels.
3. Treated surface water supply in violation of the safe drinking water standards.

CATEGORY B (*Any One*)

1. Water supply well(s) contaminated, but served by accessible public water supply.
2. Water supply well(s) within 1500 feet of site, but not contaminated and not served by accessible public water supply.
3. Vapors present in confined areas but not at explosive or health concern levels.

CATEGORY C (*Both*)

1. No known water supply well(s) contaminated.
2. Water supply well(s) greater than 1500 feet from site but not served by accessible public water supply.

CATEGORY D (*Both*)

1. No known water supply well(s) contaminated.
2. Water supply well(s) within 1500 feet of site but served by accessible public water supply.

CATEGORY E (*Both*)

- * 1. No known water supply well(s) contaminated or within 1500 feet of site.
- * 2. Area served by accessible public water supply.