

Work Plan for the Supplemental Remedial Investigation/Feasibility Study at the Former Frontier Chemical Waste Process, Inc., Site Site No. 9-32-10 Niagara Falls, New York

September 2001

Prepared for:

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION 625 Broadway Albany, New York 12233

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ist of Acronyms

ARARs applicable, relevant, and appropriate requirements

ASC Analytical Services Center

ASP Analytical Services Protocol

BBL Blasland, Bouck and Lee, Inc.

CERCLA Comprehensive Environmental Response Compensation and Liability Act

CLP Contract Laboratory Program

CRA Conestoga-Rovers and Associates

DNAPL Dense Non-Aqueous Phase Liquid

DOT United States Department of Transportation

DUSR Data Usability Summary Report

E & E Ecology and Environment Engineering, P.C.

EDD electronic data deliverable

Empire Soil Investigations, Inc.

ERCS Emergency Response Cleanup Service

ESA Environmental Services Associates, Inc.

EVE Eagle Vision Environmental

FID flame ionization detector

HASP Health and Safety Plan

ID inner diameter

IDW investigation-derived waste

List of Acronyms (Cont.)

IRMs interim response measures

ISCO ISCO Chemical Company

MBE Minority-owned Business Enterprise

NRTMP Niagara River Toxics Management Plan

NTUs nephelometric turbidity units

NYCRR New York Codes, Rules, and Regulations

NYDSOH New York State Department of Health

NYSDEC New York State Department of Environmental Conservation

OD outer diameter

OVA organic vapor analyzer

PID photoionization detector

POC Point of Contact

PPE personal protective equipment

PPM parts per million

PRC PRC Engineering

PRP Potentially Responsible Party

PVC polyvinyl chloride

QA/QC quality assurance/quality control

QAPP Quality Assurance Project Plan

RCRA Resource Conservation and Recovery Act

ROE ROE Consolidated Holdings

SOW Scope of Work

SRI/FS Supplemental Remedial Investigation/Feasibility Study

SWMUs Solid Waste Management Units

TAGM Technical Administrative Guidance and Memorandum

TBCs to-be-considereds

List of Acronyms (Cont.)

TCL Target Compound List

TSP trisodium phosphate

USEPA United States Environmental Protection Agency

VOC volatile organic compound

WBE Woman-owned Business Enterprise

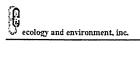
Introduction

Pursuant to Work Assignment No. D003493-30, issued April 10, 2001, Ecology and Environment Engineering, P.C. (E & E) is submitting this work plan to the New York State Department of Environmental Conservation (NYSDEC), Division of Environmental Remediation, for supplemental remedial investigation/feasibility study (SRI/FS) services at the former Frontier Chemical Waste Process, Inc., site on Royal Avenue (Frontier Chemical) (Site No. 9-32-10) in Niagara Falls, New York (see Figures 1-1 and 1-2).

The objectives of this SRI are to:

- Compare current groundwater quality with data obtained in previous investigations;
- Determine the degree and extent of soils contamination across the site:
- Determine the nature, extent, and potential source areas of the waste previously identified at the site;
- Verify pathways of contaminant migration;
- Determine the off-site contaminant loading to the adjacent sewer tunnels; and
- Identify potential remedial alternatives to mitigate contamination problems that pose threats to public health and the environment.

The investigation described herein has been designed in accordance with NYSDEC Technical Administrative Guidance Memorandum (TAGM) No. HWR-89-4025, "Guidelines for RI/FSs," and TAGM No. HWR-90-4030, "Selection of Remedial Actions at In-



1. Introduction

active Hazardous Waste Sites," in order to accomplish these objectives.

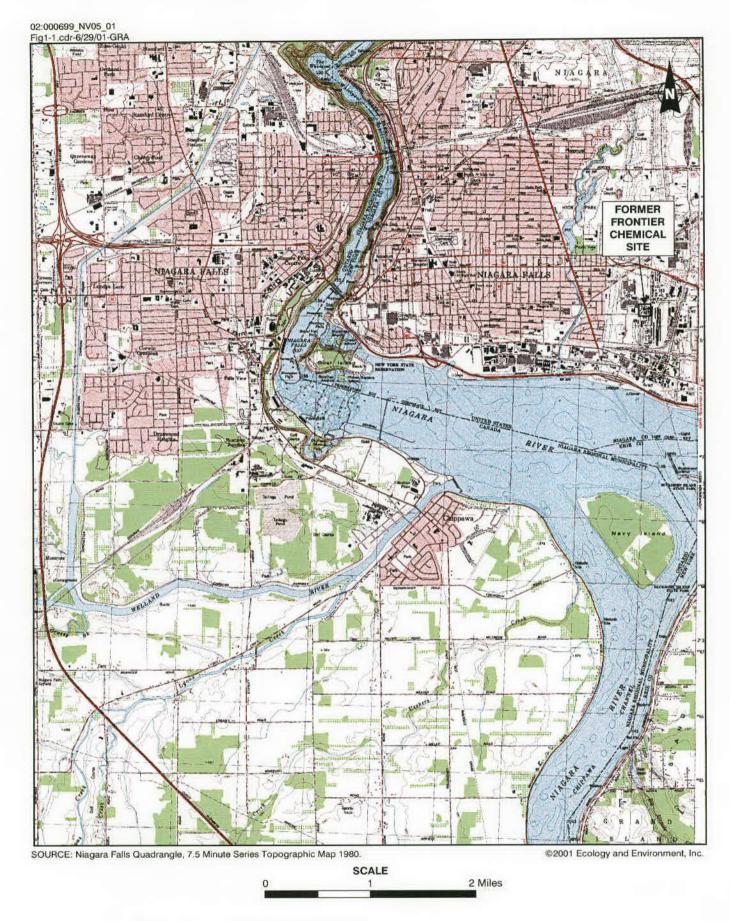
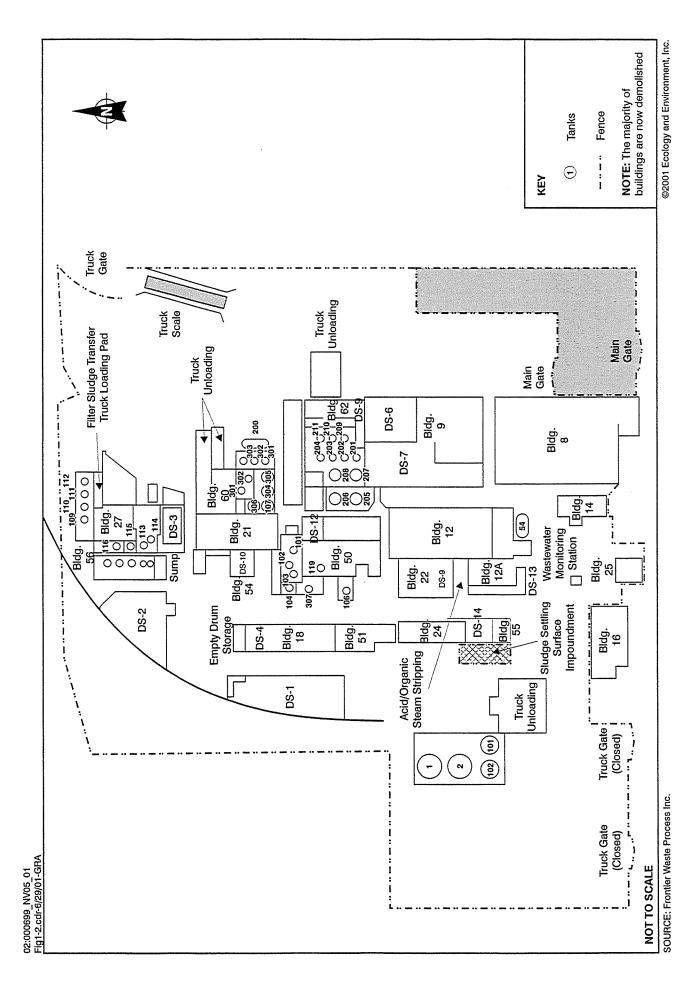


Figure 1-1 SITE LOCATION MAP FORMER FRONTIER CHEMICAL WASTE PROCESS, INC.



FORMER FRONTIER CHEMICAL WASTE PROCESS, INC. SITE MAP Figure 1-2

2

Background Information

2.1 Site Description

Frontier Chemical Waste Process, Inc., occupied approximately 9 acres, bordered by Royal Avenue on the south and 47th Street on the east, in Niagara Falls, New York. The Niagara River lies less than 1 mile south of this site. The facility treated chemical wastes from 1974 to December 1992, when the facility closed. According to PRC Engineering's (PRC) Preliminary Assessment (PRC 1986) conducted for the United States Environmental Protection Agency (USEPA), the Solid Waste Management Units (SWMUs) at the facility included the following:

- A treatment and pretreatment system for aqueous waste;
- Synthetic fuel-blending system for waste solvents and oils;
- A solvent recovery system;
- Bulk and drummed material handling, storage, and transfer facilities; and
- A hydrolysis process, tanks, old surface impoundments, an old waste pile, and site trucks.

When operating, the active waste management units treated or stored approximately 25,140 tons of chemical wastes each year. The wastes, which came from businesses located in the eastern United States and southeastern Canada, can be classified as Resource Conservation and Recovery Act (RCRA)-listed wastes, as well as RCRA-characteristic wastes.

There are two fractured-bedrock water-bearing zones present beneath this site (Fracture Zone A in the weathered zone near the top of bedrock and Fracture Zone B 10 to 15 feet below the top of bedrock). Groundwater from both storm sewer tunnels flows generally in a south/southeasterly direction. Although the flow is toward the Niagara River, it is intersected by the Falls Street and New Road,

south and east of the site, respectively. All of the dry-weather flow from the tunnels is diverted to the City of Niagara Falls wastewater treatment plant and treated before discharge to the River. However, overflow discharges directly to the Niagara River downstream of the Maid-of-the-Mist dock at the base of the falls.

USEPA and NYSDEC added the Frontier Chemical site to the list of sites that contribute a significant amount of contaminants to the Niagara River after extensive groundwater investigation revealed the following chemicals at the site: monochlorotoluene, methylene chloride, chloroform, dichlorobenzene, tetrachloroethene, and other organic contaminants. Dense Non-Aqueous Phase Liquid (DNAPL) was noted in previous investigations in the northern, central, and southern portions of the facility.

In 1999, most of the site buildings were demolished with the rubble remaining on site. Several of the monitoring wells may have been damaged by the demolition activities.

2.2 Site History

The site, located at 4626 Royal Avenue in Niagara Falls, New York, was originally developed in 1906 by ISCO Chemical Company (ISCO) as a caustic-chlorine plant. Sometime during World War II, the International Minerals and Chemicals Corporation bought the site and operated the facility as a caustic soda/potash and chlorine plant. In 1974, Frontier Chemical Waste Process, Inc. (Frontier Chemical), which provided hazardous and non-hazardous chemical treatment, moved their company to the site from Pendleton, New York. Frontier Chemical expanded its operation, which included wastewater treatment, fuels blending, and bulking chemicals for off-site disposal.

In 1985, Frontier Chemical and a sister company, BLT Services, Inc., became wholly owned subsidiaries of Environmental Services Associates, Inc. (ESA). In February 1990, ROE Consolidated Holdings (ROE) obtained 39% of ESA's stock and assumed operational control of ESA, which had operational control of the site.

The first environmental investigation was conducted by Wehran Engineering Corporation in 1981 (Wehran 1982). The purpose of this investigation was to define the nature of the subsurface geologic materials at the site; determine the existence, direction, and rate of flow through groundwater; and establish a groundwater monitoring system for the Frontier facility.

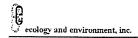
In February 1985, Empire Soils Investigations, Inc., (Empire) conducted a hydrogeologic investigation for Frontier Chemical to

2. Background Information

comply with the NYSDEC requirements for groundwater monitoring at the facility. In June 1985, Empire completed a report of the Frontier site evaluating the groundwater quality. PRC completed a preliminary assessment for USEPA to comply with the 1984 RCRA Hazardous and Solid Waste Amendments. A regional and historic data review was conducted by Golder Associates for Frontier Chemical as part of a groundwater investigation at the site (Golder 1986). In April 1988, Golder Associates conducted a Phase I and II hydrogeological investigation as part of the ongoing process of investigation to determine the sources and extent of groundwater contamination at the site (Golder 1988). ECCO, Inc., conducted a Phase III hydrogeologic investigation for Frontier Chemical in 1990 to evaluate the overburden and bedrock stratigraphy to define potential migration pathways, off-site loading, baseline cancer risk assessment, and potential remediation measures (ECCO 1990). Using the data from this investigation, ECCO submitted a Final Interim Remedial Measure Report to prevent further expansion of the areal and vertical extent of groundwater contamination while a detailed site remedial program was being developed (ECCO 1991).

In August 1991, Eagle Vision Environmental (EVE) became the site's new management. Most of the Frontier staff was terminated in August 1992 due to the financial difficulties EVE experienced. After the layoffs, several reported releases of Comprehensive Environmental Response Compensation and Liability Act (CERCLA) hazardous substances occurred from storage drums. On December 4, 1992, NYSDEC closed the site with the execution of a "Modification to Summary Abatement and Notice of Hearing." This enabled NYSDEC to initiate an Emergency Removal Action at the site requiring the removal of a minimum of 250 drums from the site per week. On December 22, 1992, USEPA began removal activities with an Emergency Response Cleanup Service (ERCS) and 24-hour security at the site. On September 30, 1993, a Phase I removal was initiated by the Potentially Responsible Party (PRP) group to address the 4,092 drums on site. The Phase I Removal activities were completed in May 1994. In September 1994, Blasland, Bouck and Lee, Inc., (BBL) completed a Removal Action Plan to characterize the contents of the tanks addressed in the Phase I removal. In August 1995, Conestoga-Rovers and Associates (CRA) submitted the Phase I Drum Removal Action Completion Report to USEPA.

This facility was formerly regulated under RCRA and 6 New York Codes, Rules, and Regulations (NYCRR) Part 373. The company that operated the facility went bankrupt in 1992. As a result, New York State issued an Order of Consent in December 1992, requir-



ing the owner to begin cleanup of the site by removing all stored waste from the facility. When the company failed to meet the required deadline for waste removal, the State requested that USEPA secure the site and begin a Superfund Response Action to remove the wastes. Two removal action phases were implemented at the site. Initially, a USEPA contractor provided maintenance of the drums and tanks at the facility. Phase I dealt with enforcement actions leading to the removal of over 4,000 drums and 6,700 pounds of laboratory chemicals from the site. Phase II dealt with enforcement actions for the removal of all wastes from the 45 tanks on site.

Phase I began in October 1993, after approximately 5 months of negotiations with 430 PRPs. The PRPs hired a cleanup contractor to remove all laboratory chemicals and drums from the site and send them to multiple disposal facilities. This field work was completed in May 1994 and all wastes were subsequently destroyed at off-site disposal facilities.

Phase II began in July 1994, after approximately 3 months of negotiations with over 400 PRPs. A consultant hired by the PRPs sampled the tanks and prepared a removal action plan that was approved by USEPA. Removal of the tank wastes was completed in March 1995.

2.3 Conceptual Site Model

Although operations at the Frontier Royal Avenue site ceased in 1994, residual contamination exists in the underlying overburden and bedrock. The soils were never analytically characterized in previous investigations, however groundwater contamination was identified in both the overburden and bedrock. The investigations conducted to date have identified and characterized four waterbearing zones beneath the site:

- One water-bearing zone in the overburden consisting of perched water in the fill, glaciolacustrine deposits, and basal till deposits; and
- Three water-bearing zones in the bedrock consisting of the A-fracture Zone, B-fracture Zone, and C-fracture Zone.

The overburden ranges in thickness from approximately 12 to 18 feet. It is composed of up to 8 feet of fill (topsoil, clayey silt, silt, sand, and gravel with some cinder blocks, glass, wood, slag, bricks, crushed stone, concrete, asphalt, and white lime residue) followed by 5 to 10 feet of glaciolacustrine deposits (interbedded clays, silts, and sands) and a basal glacial till (gravel, sand, silt, and

2. Background Information

clay mix) overlying the top of bedrock. The bedrock is Lockport Dolostone, which consists of several hydraulic zones. The first zone (Zone 1) is a 2- to 5-feet-thick weathered zone with a 1.5- to 2-feet-thick high-permeability zone near the top (A-fracture Zone). This zone is followed by an 8- to 10-feet unweathered thick bedded zone of lower permeability (Zone 2). At the base of Zone 2 is a 1- to 2-feet-thick high-permeability marker bed labeled as the B-fracture zone. The B-fracture zone varies in thickness from 1 to 4 feet. Beneath this zone is Zone 3, which is a medium- to thick-bedded fossiliferous zone. Within this zone, the C-fracture zone was identified through in situ aquifer testing (i.e., packer tests) (ECCO 1990). The C-fracture zone is approximately 20 feet below the marker bed and is not as distinct and permeable as the A and B zones.

Groundwater beneath the site generally flows from northwest to southeast. Vertical hydraulic gradient is predominantly downward between the overburden and the A and B-fracture zones, however, an upward gradient exists between the C and B-fracture zones (ECCO 1990). In addition, the site is bordered on the east and south by large-diameter storm sewer tunnels (New Road and Falls Street tunnels, respectively) that intersect the B-fracture zone. Groundwater from this zone was determined, in previous investigations, to be entering the sewer tunnels. Groundwater from the overburden and A-fracture zone is also believed to be entering the sewer tunnels through the tunnel trench backfill materials. To prevent direct discharge of contaminants to the Niagara River not only from the Frontier Royal Avenue site, but also from all other chemical sites adjacent to the sewers, a diversion weir was installed in the Falls Street tunnel. The weir diverts water to the Southside Interceptor, which discharges to the City of Niagara Falls sewage treatment plant. However, there is still a section of the Falls Street Tunnel downstream of the weir that is adjacent to the downgradient side of the Frontier Chemical site. Also, during high-flow conditions (i.e., storms) the weir overflows and contaminated water is directly discharged to the river.

3

Project Tasks

The tasks and requirements of this work assignment are specified in Schedule 1 of E & E's 1995 standby contract, *Work Element II - Phased Remedial Investigation/Feasibility Study*. The following is a summary of the work assignment scope.

3.1 Task 1: Work Plan Development

Phase A: Scoping

E & E met with the NYSDEC Region 9 site representative on May 4, 2001. Pertinent historical site investigation reports were briefly reviewed and sent out for copying that day. Copies were received by E & E on May 10.

A site visit was conducted at the Frontier Chemical site on May 29, 2001, which included representatives from NYSDEC, New York State Department of Health (NYSDOH), and E & E. It was noted during the visit that 80 to 90% of the site structures (buildings and tanks) were demolished and the rubble was stockpiled across the entire central portion of the site. An excavator and operator were on site that day moving some of the rubble around. The operator stated that he was looking out for monitoring wells and that the rubble removal would begin within the next few weeks. Some of the remaining features include the truck scale and associated building in the northeast corner of the site, tanks in the central portion of the site, buildings on the west and southern portions of the site, and less than 10 drums containing solid materials were noted in the rubble of former Drum Storage DS-3. Demolition began sometime in 1999. In June 2000, NYSDEC Region 9 performed a well inventory at the site. Of the 76 wells installed on site, 6 were abandoned under previous investigations, 1 was reported as destroyed in 1985, 54 were found, and 15 were missing. Of the 54 wells that were found, 6 were damaged, probably from demolition activities. The remaining 15 missing wells are believed to be destroyed by the demolition activities. Three of the missing wells (MW-88-90B, -9A, and -9B) were found on May 29, 2001, but the casings were sheared off at ground surface.

Following the site visit on May 29, E & E met with NYSDEC at the Region 9 office to discuss the project scope. In preparation of the Field Activities Plan, E & E discovered that several key drawings (a total of 40) showing the distribution of contaminants across the site were not at the Region 9 office, therefore, they were not copied. The 40 missing maps were obtained from NYSDEC, Albany, on June 21, 2001, and subsequently reviewed by E & E. Based on a review of this data, E & E proposed a modification to the Scope of Work (SOW) originally discussed on May 29. A conference call was held on June 26 to discuss these changes. The revised proposed SOW was incorporated in the Field Activities Plan and submitted to NYSDEC on June 29, 2001, for review. In addition to this plan, as described in Section 3.2 of this work plan, an estimated level of effort and project schedule were also submitted for review and comment. NYSDEC provided comments to the Field Activities Plan on July 5, 2001. Finalization of the Field Activities Plan and costing (Phase B: Final Supplemental RI Work Plan) were then performed and are included in this work plan.

3.2 Task 2: Supplemental Remedial Investigation

3.2.1 Field Investigation

The SRI proposed for the Frontier Chemical site will include an investigation of subsurface soils, groundwater, and buried utilities; a site survey; and analytical services.

3.2.1.1 Subsurface Soil Investigation

Although numerous investigations were performed on this site (see Section 2.2), which included the drilling of 28 boreholes to bedrock and installation of up to 76 monitoring wells, none of the soil samples collected were ever laboratory-analyzed for chemical constituents. Soils from the 28 borings underwent head space analysis in the field using an organic vapor analyzer (OVA) (Golder 1988). Therefore, one of the main objectives of this SRI is to analytically characterize the soils beneath the site.

Acquisition of subsurface soil data will be achieved using Geoprobe technologies. To completely characterize the underlying soils at the site, Geoprobe soil profiling will be performed at 21 locations. The locations are shown on Figure 3-1. Up to four additional locations are included in the project costs, if deemed necessary based on field conditions. The 21 locations were strategically chosen based on results of previous studies by overlaying a 100-feet spaced grid on the overburden groundwater total volatile organic compound (VOC) concentration contours map (ECCO 1990), and taking into consideration the direction of groundwater flow that was identified in the 1990 ECCO hydrologic investiga-

3. Project Tasks

tion. Geoprobe locations were not placed at every grid point and may be slightly offset due to interference by building and tank foundations. However, emphasis was placed on the area of groundwater contamination with fewer points distributed in the outlying areas. Continuous soil cores from each point will be used to visually inspect the underlying soils for contamination (e.g., discoloration or free product) and for the collection of samples for chemical analyses (see Table 3-1). One sample will be collected from each of the 21 points and nine additional samples were included in the project costs, if deemed necessary based on field conditions. Criteria for determining whether multiple samples are necessary at a particular location will be based on whether contamination is present, if it is uniform with depth, and if an uncontaminated zone is encountered beneath contaminated zones:

- Only one sample will be collected if: no contamination is present (based on visual observations or instrument readings); and if contamination is uniform vertically throughout the boring, and no clean zones are detected.
- Two samples may be collected if: contaminants are detected and a clean zone is present beneath the contaminants; and if multiple layers of contamination are present.

The sample from clean Geoprobe points will be collected from the top of bedrock.

The Geoprobe soil profiling will be performed to the top of bedrock if possible. In addition to the soil borings, up to 12 piezometers will be installed in Geoprobe borings shown on Figure 3-1. Costs for groundwater samples from these piezometers are included in the budget estimate.

3.2.1.2 Groundwater Investigation

The last complete round of groundwater sampling performed on this site was in 1989 by ECCO, Inc., as part of Phase III Hydrologic Investigation (ECCO 1990). At that time, 71 wells were sampled. Twenty of those wells were screened in the overburden, 26 were open bedrock wells in the A-fracture zone, 22 were open in the B-fracture zone, and three were open in the C-fracture zone. A detailed series of drawings are presented in the 1990 ECCO report showing the distribution of VOCs in the overburden, A-fracture and B-fracture water-bearing zones (also see Figures 3-1, 3-2, and 3-3, respectively).

Table 3-1 Chemical Analysis Summary Table

Name	Table 3-1 Chemical	Analysis Summary	Table	· ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` `	er alle der brauer br	ic this because it does	Cartelina and commit		O Maria	and look his one with one had been
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TCL Senivolatiles OLM04-2						idard Paran				
TCL PestPCBs						1				39
TAL Metals										39
Cyanide										39
Subsurface Soil - Geoprobe/Overburden Monitoring Well Boreholes - Additional Parameters										39
Subsurface Soil - Geoprobe/Overburden Monitoring Well Boreholes - Additional Parameters										39
ICLP Volatiles SW 8260B 3	Percent Solids	ASTM D2216	30	2	0	1	2	2	2	39
ICLP Volatiles SW 8260B 3	Subsurface Soil - Ge	oprobe/Overburd	en Monitori	ng Well Boreb	oles - Add	itional Para	meters			
TCLP Semivolatiles SW 8270C 3	TCLP Volatiles							0	0	3
CLP Extraction SW 8720B 3	TCLP Semivolatiles	SW 8270C		0	0	0	0	0	0	3
CLP Extraction SW 8720B 3	TCLP Metals	SW 8260B		0	0	0	0	0	0	3
Substrace Soil - Utility Investigation	TCLP Extraction	SW 8720B		0	0	0	0	0	0	3
ICL Volatiles	Dioxins			1	0				1	
ICL Volatiles	6 1 6 6 11 711									
TCL Senivolatiles OLM04.2								····		
TCL Pest/PCBs OLM04.2										4
TAL Metals										4
Cyanide										4
Caroundwater - New and Existing Monitoring Wells - Standard Parameters	TAL Metals									4
Caroundwater - New and Existing Monitoring Wells - Standard Parameters	Cyanide									4
TCL Volatiles	Percent Solids	ASTM D2216	4	0	0	0	0	0	0	4
TCL Volatiles	Casaradan Nasa	and Eviation Man	:	la Canadand I					 	
TCL Semivolatiles OLM04.2							31			70
FCL Pest/PCBs OLM04.2										
FAL Metals ILM04.1 44 3 0 0 3 3 3 3 5										56
Cyanide										
Hardness 130.2										
CCL Volatiles										
TCL Volatiles	mardness	1130.2	44	31	- U	U)	31	31	اد	30
CL Semivolatiles	Groundwater - New	and Existing Mon	itoring Well	s - Niagara Ri	ver Toxics	Manageme	nt Plan Para	meters		
CL Semivolatiles	TCL Volatiles ²	OLM04.2	5	1	1	0	1	1	1	10
CL Pest/PCBs										9
Dioxins 1613B 5										
Metals ILM04.1 5										9
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CL Volatiles	Metals"	ILM04.1	5	1	0	0	11	11	1	9
CL Volatiles	Groundwater - Piezo	meters							···	
CL Semivolatiles OLM04.2	TCL Volatiles		12	11	5	0	11	11	11	21
FCL Pest/PCBs OLM04.2 O O O O O O O O O										0
TAL Metals ILM04.1 0 0 0 0 0 0 0 0 0										0
Cyanide ILM04.1 0 <										0
Hardness 130.2 0 0 0 0 0 0 0 0 0										0
Drill Water CL Volatiles OLM04.2 1 0 0 0 0 0 0 0 0 0	Hardness	1.20								0
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FAL Metals ILM04.1 1 0 0 0 0 0 0 Cyanide ILM04.1 1 0 0 0 0 0 0 0 Hardness 130.2 1 0 0 0 0 0 0 0 0										1
Cyanide ILM04.1 1 0 0 0 0 0 Hardness 130.2 1 0 0 0 0 0 0 0 0	TCL Pest/PCBs									l
Hardness 130.2 1 0 0 0 0 0 0	TAL Metals									1
	Cyanide	ILM04.1	1			0	0			1
Total Number of samples: 71	Hardness	130.2	1	0	0	0	0	0	0	1
total Number of Samples:	Total Number of	1						· · · · · · · · · · · · · · · · · · ·	г	Eto
	Total Number of san	ipies:								/10

^{*} Tetrachloroethene (covered under standard VOCs)

Note: Analytical methods reference the most current EPA CLP SOW. The general quality assurance and reporting requirements must follow the NYSDEC ASP 1995.

Key:

ASP = Analytical Services Protocol

CLP = Contract Laboratory Program

MS = matrix spike

MSB = matrix spike blank

MSD = matrix spike duplicate

NYSDEC = New York State Department of Environmental Conservation

Pest = pesticide PCB = polychlorinated biphenyl

SOW = Statement of Work

TAL = Target Analyte List

TCL = Target Compound List

TCLP = Toxicity Characteristic Leaching Procedure

QA = Quality Assurance

QC = Quality Control
USEPA = United States Environmental Protection Agency

^b Benzo(a)anthracene. Benzo(a)pyrene; Benzo(b)fluoranthene; Benzo(k)fluoranthene; Chrysene; and Hexachlorobenzene (covered under standard SVOCs)

⁶ Chlordane; DDTs; Dieldrin; Mirex; Octachlorstyrene; PCBs; and Toxaphene (only Mirex and Octachlorstyrene are not covered under the standard Pest/PCBs)

^d Arsenic, Lead, and Mercury (covered under standard metals)

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A complete round of groundwater sampling will also be performed as part of this investigation and the samples will be tested for the parameters listed in Table 3-1. The data will be compared to the pre-existing data. However, 15 of those wells are now missing, six are damaged, five have been abandoned, and only three of them were replaced. Some of the missing and damaged wells are key wells with respect to previous detections of groundwater contamination. Therefore, to obtain sufficient groundwater data to track plume changes over the past 12 years, some of the missing and damaged wells need to be replaced and some new wells need to be added. The following is a summary of the wells that are recommended to be added or replaced in each of the water-bearing zones:

Overburden

The highest concentration of total VOCs (greater than 1000 parts per million [PPM]) was detected at MW-88-2OB. This well was also reported to contain a DNAPL consisting of chlorobenzene. A secondary area of elevated VOCs (greater than 100 PPM) also occurred at MW-88-8OB, which appears to be from a separate source area. Two of the missing wells (MW-88-70B and MW-88-120B) within or downgradient of the 1989 plume are proposed to be replaced to help track plume migration changes. A new well will also be installed directly downgradient of the main plume approximately 75 feet south of MW-16 (see Figure 3-1). The remaining damaged and missing overburden wells do not appear to be needed at this time based on their proximity to the contamination detected in 1989.

A-Fracture Zone

The highest concentration of total VOCs (greater than 400 PPM) was detected at MW-88-3A. Secondary areas of elevated VOCs (greater than 150 PPM and greater than 250 PPM) occurred at MW-88-2A, and MW-88-12A, respectively, and a DNAPL consisting of monochlorotoluene and trichlorobenzene was detected in BH87-4A (downgradient of MW-88-2A). Contamination in these secondary areas appear to be from separate source areas. Therefore, missing wells MW-88-3A and MW-88-7A need to be replaced to help monitor the main plume; missing wells MW-88-12A and BH87-4A need to be replaced to monitor the secondary plumes; and a new well paired with MW-9 (B-fracture zone well) needs to be installed to monitor contaminants that may migrate off site to the Falls Street Tunnel (see Figure 3-2). The remaining damaged and missing A-fracture zone wells do not appear to be needed at this time based on their proximity to the contamination detected in 1989.

B-Fracture Zone

The highest concentration of total VOCs (greater than 200 PPM) was detected at MW-88-3A. DNAPLs consisting of chlorobenzene and chlorotoluene were detected in downgradient well MW-11 and monochlorotoluene was detected as a DNAPL in decommissioned upgradient well BH87-1A. The upgradient DNAPL is believed to be from an off-site source. Since three of the wells in the B-fracture plume are damaged or missing (MW-88-3B, MW-88-5B, and MW-88-7B), they need to be replaced (see Figure 3-3). The remaining damaged and missing B-fracture zone wells do not appear to be needed at this time based on their proximity to the contamination detected in 1989.

3.2.1.3 Utility Investigation

As stated in Section 2, the site is bordered to the east by the New Road Tunnel and to the south by the Falls Street Tunnel and Southside Interceptor Tunnel. The New Road Tunnel and Falls Street Tunnel are storm sewers set within the B-fracture zone in the underlying bedrock and discharge to the Niagara River. The Southside Interceptor receives diverted water from the Falls Street and New Road Tunnels, which is then treated by the City of Niagara Falls. There are at four connections believed to be coming from the site to the Falls Street Tunnel (see Figure 3-1). The purpose of this investigation is to verify these connections and any other utility connections (e.g., water and gas), and excavate some of these connections to determine if the bedding materials are acting as pathways for contaminant migration. A literature search of the City of Niagara Falls and utility company records will be performed prior to excavations to verify the connections and determine their construction, exact locations, and depths. If the bedding material is determined to be contaminated, a sample will be collected for the chemical analyses presented in Table 3-1. Four samples are included in the project costs.

3.2.2 Field Investigation Methodologies

Laboratory analysis will be performed by E & E's Analytical Services Center (ASC) on a standard turnaround-time basis. Table 3-1 summarizes the proposed sampling and analysis for each medium. Analytical data will be presented in the SRI Report.

All field activities are expected to be conducted by personnel wearing Level D personal protective equipment (PPE). However, field team members will maintain Level C respiratory protection equipment on site, should the need for its use arise.

NYSDEC will first establish access permission to conduct the field investigation at the site. E & E's site investigation activities will commence following establishment of access permission.

Finally, prior to initiating intrusive subsurface activities, E & E will coordinate with the Underground Facilities Protection Organization for the purpose of identifying and locating underground utilities.

3.2.2.1 Geoprobe Soil Profiling and Piezometer Installation and Sampling

Geoprobe Soil Profiling

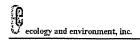
Borehole/piezometer installation activities will be conducted by a subcontracted drilling company. Each Geoprobe borehole will be installed using a truck-mounted, hydraulically powered hammer that drives a 2 1/8-inch outer diameter (OD) rod with an expendable point to the desired depth. Continuous soil cores will be collected at each location to an estimated depth of 12 to 18 feet for the purpose of geologic logging and subsurface soil sample collection. Soil cores will be screened for organic vapors using either a flame ionization detector (FID) or photoionization detector (PID). One soil sample will be collected from each location, at the most contaminated interval (based on instrument readings, color, odor, etc.). If no contamination is detected, then the sample will be collected at the overburden/bedrock interface. If conditions warrant, i.e., there are multiple, distinct contaminated zones, or if there is a "clean" zone beneath an obviously contaminated zone, a second sample may be collected in selected boreholes. Up to four additional samples are included in the cost estimate. All of the samples will be tested for the standard parameters listed in Table 3-1. Up to three samples will also be tested for additional parameters (also listed in Table 3-1). The locations with additional parameters will be chosen in the field.

Using direct-push technology, continuous soil cores would be collected with dedicated acetate liners in a Geoprobe MacroCore sampling system, or equivalent.

Geoprobe boreholes not converted to piezometers will be abandoned after soil sampling by backfilling with bentonite pellets or grout.

Piezometer Installation

Upon completion of selected boreholes, a 1-inch inner diameter (ID) piezometer will be installed in the direct-push borehole to



provide a means for acquiring groundwater samples and water levels. Twelve individual piezometers located in the overburden contaminant plume (see Figure 3-1) are proposed at the site.

All 12 piezometers will be constructed with 5-feet long flush joint Schedule 40, 0.10-inch machine-slotted polyvinyl chloride (PVC) screens, threaded bottom plugs, and sufficient flush-threaded PVC riser pipe to extend to the surface. Depths will be selected in the field based on the elevation of the water table. The formation will be allowed to naturally collapse around the piezometer screen or a silica sand pack will be used in the event that collapse does not occur. The annulus will be sealed to the surface with granular bentonite. Piezometers will be locked and allowed to equilibrate prior to water level measurement.

Piezometers will be purged and sampled using a small diameter bailer or pump. The samples will be sent to E & E's ASC for TCL VOC analysis (see Table 3-1).

Subsurface Soil Sampling

- Equipment and Supplies
 - FID or PID;
 - Decontaminated stainless steel spoons;
 - Appropriate sample containers; and
 - Cooler with ice.

Procedures

- Open acetate sleeve, place on sheet plastic, and scan for organic vapors using the FID or PID.
- Collect soil sample from the most contaminated or other selected depth interval (based on instrument readings, color, odor, etc.) and place into the appropriate sample containers using a dedicated stainless steel spoon (see Table 3-2).
- Upon collection, place the sample in a cooler and cool with ice:
- Describe the soil core in the logbook;
- Upon completion of all sampling for the day, package and ship samples according to procedures outlined Section 3.2.2.5; and
- Handle investigation-derived waste (IDW) in accordance with Section 3.2.2.8.

3. Project Tasks

Table 3-2 Sample Containers, Volumes, Preservation, and Holding Times for Soil Samples

Service Control	ibiee	Number of Containers		
Type of Analysis	Type and Size of Container	And Sample Volume (per sample)	Chemical Preservation ^a	Maximum Holding Time ^a
TCL VOCs	4-oz. VOA jar with Teflon- lined cap or 2 40 ml vials with Teflon septa	Fill completely, leaving as little head space as possible	NA	7 days
TCL SVOCs	8-oz. glass	One	NA	5 days/40 days ^b
TCL Pest/PCB	8-oz. glass		NA	5 days/40 days ^b
TAL Metals	8-oz. glass	One	NA	180 days/26 days for mer- cury
TAL Cyanide	8-oz. glass		NA	180 days/12 days for cya- nide
Dioxin	4-oz. glass	One	NA	30 days/40 days ^b
TCLP VOCs	8-oz. glass	One	NA	7 days
TCLP SVOCs	8-oz. glass		NA	7 days, 40 days for analysis ^c
TCLP Metals	8-oz. glass		NA	28 days ^c for mercury, 180 days for metals

Notes:

All sample bottles will be prepared in accordance with USEPA bottle-washing procedures and QC-tested before use.

^b Holding time from collection to extraction is listed first and from extraction to analysis is listed second.

^c Time listed is from TCLP extraction.

Key:

NA = Not applicable.

TAL = Target analyte list.

oz. = Ounce.

TCL = Target compound list.

PCBs = Polychlorinated biphenyls.

TCLP = Toxicity characteristic leaching procedure.

SVOC = Semivolatile organic compound.

Piezometer Sampling

- **Equipment and Supplies**
 - Water level indicator;
 - Peristaltic pump or disposable polyethylene bailers and new polypropylene line;
 - pH/temperature/conductivity meter;
 - Turbidity meter;

^a All samples to be cooled to 4°C. Holding time applies to aqueous samples; holding times for solid samples are to be the same as aqueous samples. Holding times are based on verified times of sample receipt and are consistent with NYSDEC requirements.

- Appropriate sample containers; and
- Cooler with ice.

Procedures

- All piezometers installed by direct-push technology will be purged prior to sampling using a peristaltic pump or a bailer. Prior to purging, record static water levels to within ±0.01 foot in each well.
- Purge piezometers of three times the standing volume of water in the 1-inch casing. Purged water will be handled as described in Section 3.2.2.8. Temperature, pH, specific conductance, and turbidity will be measured and recorded during purging, at a minimum, after each volume is removed.
- After purging, collect sample with a peristaltic pump or bailer.
- As soon as possible, place the labeled samples in a cooler with ice.
- Upon completion of all sampling for the day, package and ship samples according to procedures outlined Section 3.2.2.5.

3.2.2.2 Groundwater Monitoring Well Installation and Sampling

A total of 11 monitoring wells will be installed at the site. Nine are replacement wells and two are new wells downgradient of the plumes detected in 1989. Three of the wells will be installed in the overburden (see Figure 3-1), five will be shallow bedrock wells (A-fracture zone) (see Figure 3-2), and three will be deeper bedrock (B-fracture zone) (see Figure 3-3). Overburden wells are expected to be less than 18 feet deep, A-fracture wells are expected to be 23 feet deep, and B-fracture wells are expected to be 32 feet deep.

Monitoring Well Installation

Overburden Well Installation Procedures. The overburden wells will be drilled using 4.25-inch ID hollow-stem augers to the top of bedrock. Continuous split-spoon sampling from grade to bedrock. One soil sample for chemical analyses will be collected from each well boring. Two additional samples are also included in the project budget if needed. A 10-feet long segment of 2-inch ID PVC screen with 0.10-inch slot size will be threaded to 2-inch ID Schedule 40 PVC riser to a height of 2.0 feet above grade. A threaded PVC end cap will be placed on the bottom of the screen. All PVC connections will be flush-threaded. A sand pack of Morie #0 sand (or equivalent size) will extend from the bottom of the



screen to a height of 2 feet above the screen. It will be followed by a 2-feet thick seal of pelletized or granular bentonite. A 5% bentonite/cement grout mix will then be installed to grade. The bentonite must be allowed to hydrate at least 30 minutes prior to the installation of the grout mix. Each well will be fitted with a locking steel outer protective casing. Following setting of the grout, a 2-feet diameter concrete anti-percolation pad will be constructed around each well.

Shallow Bedrock Well Installation Procedures. The shallow bedrock wells will be telescope-cased wells to seal off groundwater in the overburden. The overburden will be drilled using 6.25-inch ID hollow-stem augers to the top of bedrock. Spilt spoon sampling will not be required because the wells are either replacement wells, or new wells adjacent to existing wells. A 5.875-inch roller bit will then be used to drill a 1-foot rock socket. A 4-inch carbon steel casing will then be installed through the overburden and into the rock socket and grouted into place. Following a minimum period of 24 hours (or 12 hours if 2% calcium chloride is added to the grout), the shallow bedrock wells will be extended 5 feet below the 4-inch casing by continuous HQ/HX rock coring (to be a total depth of approximately 23 feet bgs). Rock cores will be stored in wooden core boxes. A NQ/NX coring bit may be used, however, the core hole must be reamed with a 3.875-inch roller bit. The wells will be completed as open holes in the bedrock. Each well will be fitted with a locking cover and a 2-feet diameter concrete anti-percolation pad.

Deep Bedrock Well Installation Procedures. The deep bedrock wells will be telescope-cased wells to seal off groundwater in the overburden and shallow bedrock. The overburden will be drilled using 8.25-inch ID hollow-stem augers to the top of bedrock. Spilt spoon sampling will not be required because the wells are replacement wells. A 7.875-inch roller bit will then be used to drill a 1foot rock socket. A 6-inch carbon steel casing will then be installed through the overburden and into the rock socket and grouted into place. Following a minimum period of 24 hours (or 12 hours if 2% calcium chloride is added to the grout), drilling will continue using a 5.875-inch roller bit to a depth of 27-feet bgs. A 4-inch carbon steel casing will then be installed through the 6-inch casing and into the rock and grouted into place. Following a minimum period of 24 hours (or 12 hours if 2% calcium chloride is added to the grout), the deep bedrock wells will be extended 5 feet below the 4-inch casing by continuous HQ/HX rock coring (to a total depth of approximately 32 feet bgs). Rock cores will be stored in wooden core boxes. An NQ/NX coring bit may be used, however, the core hole must be reamed with a 3.875-inch roller bit.

The wells will be completed as open holes in the bedrock. Each well will be fitted with a locking cover and a 2-feet diameter concrete anti-percolation pad.

Monitoring Well Development

Only new monitoring wells will be developed. Development shall begin no sooner than 24 hours after the particular well is constructed. The wells will be developed using PVC or stainless-steel bailers and/or submersible pumps until pH and specific conductance are stable, and turbidity is 50 nephelometric turbidity units (NTUs) or less. The wells will initially be surged to draw fine sediments out of the sand pack and into the well for removal. If, after significant development effort or 2 hours, any of the development criteria have not stabilized, or if the proposed goal of 50 NTUs or less has not been met, E & E and NYSDEC project managers will be notified. Completion of development will then be based upon mutual agreement between E & E and NYSDEC. Development water from the wells will be handled according to the procedures described in Section 3.2.2.8.

Monitoring Well Sampling

One round of groundwater samples will be collected from the new wells and all existing site wells except BH87-3D and BH87-5C (because there are two wells at these locations [BH87-3A and BH87-5A, respectively] screened in the same water bearing zones). Most of the samples will be tested for all of the standard parameters listed in Table 3-1. However, the samples from the following wells will be tested for standard VOCs only:

Overburden Wells	A-fracture Wells	B-fracture Wells	C-fracture Wells
MW-5	MW-4	BH87-3A	BH87-5B
BH87-3C	BH87-2B	MW-88-4B	MW-88-4C
MW-88-40B	BH87-3B	MW-13	
	BH87-28		
	BH87-28		
	MW-88-1A		

In addition to the standard parameters, five wells will also be tested for Niagara River Toxics Management Plan (NRTMP) Parameters (Niagara River Secretariat 2000) (see Table 3-1). Those samples will be chosen in the field. NRTMP parameters include:

Dioxins
Hexachlorobenzene
Lead
Mercury

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Benzo(k)fluoranthene

Mirex

Chlordane

Octachlorostyrene

Chrysene

PCBs

DDTs

Tetrachloroethene

Dieldrin

Toxaphene

■ Equipment and Supplies

Water level indicator;

- Dedicated polyethylene bailers and new polypropylene line;
- Dedicated polyethylene tubing with bottom check valve;
- pH/temperature/conductivity meter;
- Turbidity meter:
- Appropriate sample containers; and
- Cooler with ice.

Procedures

- Prior to sampling, record static water to within ± 0.01 foot in each well.
- Purge well of three to five times the standing volume of water or until dry using a dedicated bailer or dedicated tubing with bottom check valve. Purged water will be containerized in the same manner as the development water, as described in Section 3.2.2.8. Temperature, pH, specific conductance, and turbidity will be measured and recorded during purging.
- Collect sample for TCL VOC analysis first, followed by the other parameters listed in Table 3-1 by slowly lowering and raising a dedicated bailer or tubing and check valve through the water column to obtain the appropriate sample volume. If 50 NTUs could not be obtained after the initial well purging, or if the water becomes cloudy during sampling, the water column in the well will be allowed to settle for no longer than 24 hours before sampling the metals portion. Upon returning to the well, the turbidity will be measured again and recorded. No additional purging will be performed. If 50 NTUs is still not achievable, the E & E and NYSDEC project managers will be contacted. Turbidity at the time of sampling will be noted on the chain-of-custody documents. No field filtering will be performed.
- Record temperature, pH, specific conductance, and turbidity of the sample.
- As soon as possible, place the labeled samples in a cooler with ice.
- Upon completion of all sampling for the day, package and ship samples according to procedures outlined Section 3.2.2.5.

3.2.2.3 Utility Investigation

There are at least four utility (storm sewer) connections from the site to the Falls Street Tunnel along Royal Avenue and there may be other water, sewer, electric, and gas connections from the rightof-ways to the site. The drilling subcontractor will excavate some or all of these sewer connections or any other utility connections discovered during E & E's record search. Excavated materials will be stockpiled adjacent to each pit until the pit is complete. All excavated materials will be placed back into the test pit from which they were excavated. Each pit will be backfilled immediately following completion of its excavation, prior to excavation of any additional pits. At no time shall an open test pit ever be left unattended. Following backfilling, the subcontractor will compact backfilled material using the excavator. The completed pit shall be graded level with ground surface. All excess soils shall be stockpiled at a common on-site location. Excess soils may be used at a later date to regrade the pits if settling occurs. Costs for regrading are not included in the project budget.

3.2.2.4 Air Monitoring

Air monitoring will be performed by the Site Safety Officer during site activities to characterize airborne contaminant concentrations, including those of volatile organic vapors and explosive gases. The air monitoring will be conducted for the protection of site workers and the community and to characterize environmental samples. The Health and Safety Plan (HASP) (see Appendix A) specifies the monitoring equipment to be used for contaminants of interest and the frequency with which the monitoring will be performed.

Action levels for each monitoring instrument are also detailed in the HASP. Levels of organic vapors will be measured in the workers' breathing zone, on which readings the action levels are based. Oxygen-deficient and combustible atmospheres will not be monitored at the workers' breathing zone. Instead, these monitors will be positioned at a location (e.g., at the top of the boreholes) that will measure a worst-case contaminant level and will provide the earliest possible warning that a hazardous condition may be forming.

3.2.2.5 Sample Containers and Preservation

The volumes and containers for soil and water samples are presented in Tables 3-2 and 3-3, respectively. Sample preservation and holding time requirements are also presented in these tables. For additional information pertaining to sampling requirements (including quality assurance/quality control [QA/QC]), see the

3. Project Tasks

Quality Assurance Project Plan (QAPP) in Appendix B of this work plan. Pre-washed sample containers will be provided by the ASC and prepared in accordance with USEPA bottle-washing procedures.

Samples will be stored on ice pending delivery to the ASC. In addition, all water samples for metals analysis will be preserved by adding concentrated nitric acid until the sample pH is lowered to 2.0 standard units or less. All water samples for cyanide analysis will be preserved by adding concentrated sodium hydroxide until the sample pH is raised to 12.0 standard units or higher. Sample pH will be checked in the field by pouring a small amount of the previously preserved sample into a separate container and checking the pH using indicator paper. Preservation procedures will be documented in the field logbooks.

Sample Labeling, Packaging and Shipping, and Custody

Sample Labeling. All samples will be assigned a unique sample identifier (see QAPP in Appendix B). Labels for each sample container will contain the sample identifier, date of sample collection, analytical parameters, and type of preservation used. Any change in the label information prepared prior to the sample collection will be initialed by the sampler.

Sample Packaging and Shipping. Sample containers will be placed inside sealed plastic bags as a precaution against cross-contamination caused by leakage or breakage. They will be placed in coolers in such a manner as to eliminate the chance of breakage during shipment and ice in plastic bags will be placed in the coolers to keep the samples at 4°C throughout shipment.

Sample shipment will be performed in strict accordance with all applicable United States Department of Transportation (DOT) regulations. The samples will be shipped to the ASC in Lancaster, New York, by an overnight courier service. Arrangements will be made with the ASC Point of Contact (POC) for samples that are to be delivered to a laboratory on a weekend so that holding times are not compromised.

E & E ASC POC:

Mr. William Howard Ecology and Environment Analytical Services Center 4493 Walden Avenue Lancaster, NY 14086 716/685-8080 Table 3-3 Sample Containers, Volumes, Preservation, and Holding Times for Water Samples

Type of Analysis	Type and Size of Container	Number of Containers And Sample Volume (per sample)	Chemical Preservation	Maximum Holding Time
VOCs	40-mL glass vial with Tef- lon-backed septum	Three; fill completely, leaving no head space	NA	7 days
TCL SVOCs	1-L amber glass	Two	NA	5 days/40 days ^d
TCL Pest/PCB	1-L amber glass	Two	NA	5 days/40 days ^d
TAL Metals	1-L HDPE bot- tle	One	HNO ₃ to pH <2	180 days/26 days for mer- cury
TAL Cyanide	1-L HDPE bot- tle	One	NaOH to pH >12	180 days/12 days for cyanide
Hardness	1-L HDPE bot- tle	One (can combine with metals)	HNO ₃ to pH <2	180 days
Dioxins	1-L amber glass	Two	NA	5 days/40 days ^d

Note

Key:

HDPE = High-density polyethylene.

 HNO_3 = Nitric acid. H_2SO_4 = Sulfuric acid.

L = Liter.

NA = Not applicable.

NaOH = Sodium hydroxide.

PCBs = Polychlorinated biphenyls.

SVOC = Semivolatile organic compound.

TAL = Target analyte list.

TCL = Target compound list.

TCLP = Toxicity characteristic leaching procedure.

VOC = Volatile organic compound.

Sample Custody. A sample is considered to be in custody under the following conditions:

- The sample is directly in one's possession,
- The sample is clearly in one's view,
- The sample is placed in a locked location, or
- The sample is in a designated secure area.

In order to demonstrate that the samples and coolers have not been tampered with during shipment, adhesive custody seals will be

All sample bottles will be prepared in accordance with USEPA bottle washing procedures and QC-tested before use.

^aAll samples to be cooled to 4°C. Holding time is based on the time from verified time of sample receipt at the laboratory.

^bTime listed is from TCLP extraction.

^{*}TCLP analysis of water samples assumes less than 0.5% solids.

^dHolding time from collection to extraction is listed first and holding time from extraction to analysis is listed second.

used. The custody seals will be placed around the cap of each sample container and across the cooler lids in such a manner that they will be visibly disturbed upon opening the sample container or cooler. The seals will be signed or initialed and dated by field personnel at the time they are affixed to the container and cooler.

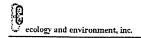
Documentation of sample chain-of-custody is necessary to demonstrate that the integrity of the samples has not been compromised between collection and delivery to the laboratory. Each sample cooler will be accompanied by a chain-of-custody record to document the transfer of custody from the field to the laboratory. All information requested in the chain-of-custody record will be completed. In addition, the airbill number assigned by the overnight courier will be listed on the chain-of-custody record. One copy of the chain-of-custody form will be retained by the samplers and placed in the project records file. The remaining pages will be sealed in a plastic bag and placed inside of the cooler. Upon receipt at the laboratory, the chain-of-custody forms will be completed. It is the responsibility of the ASC to document the condition of custody seals and sample integrity upon receipt.

3.2.2.6 Analytical Program

Table 3-1 provides a summary of sampling and analysis for the former Frontier Chemical site. Analytical methods will follow the most recent version of the USEPA Contract Laboratory Program (CLP) Statement of Work. In addition, the laboratory will follow the QA/QC, holding time, and reporting requirements for CLP as defined in the NYSDEC Analytical Services Protocol (ASP) of June 2000. All laboratory analyses will be performed by the ASC, except for dioxin. Dioxin analysis will be performed by Triangle Laboratories, Inc. Data generated by the ASC will be reported with full data package and standard laboratory electronic data deliverable (EDD). Sample analysis results for the site characterization will undergo independent data review for usability by a third party data validator. Data for waste and water disposal will not be reviewed. The data reviewer will follow the NYSDEC Guidance for the Development of Data Usability Summary Reports, June 1999. Project-specific qualifiers and data review requirements are listed in Appendix B.

Field Quality Control Samples

Table 3-1 also provides a summary of site and field QC samples for the investigation. Field QC samples include field duplicates, trip blanks, and rinsate blanks. Field duplicates will be collected from both aqueous and solid samples at a frequency of one per 20 samples. Trip blanks will be filled at the laboratory and transported to the site with the bottles for each day VOCs are collected.



One trip blank will be taken to the sample locations and returned in the cooler to be shipped to the laboratory. All sample portions for VOCs collected on a single day will be transported in the same cooler. Trip blanks will be used for aqueous matrices only. Rinsate blanks will be collected from any non-dedicated or non-disposable sampling equipment. Rinsate blanks will be collected by passing deionized water obtained from the ASC over the equipment after decontamination is completed. Rinsates will be collected from each set of equipment after it has been used for collection of up to 10 samples. The only non-dedicated equipment planned for use includes direct-push tooling and possibly split spoons. A complete description of field QC requirements are included in the QAPP in Appendix B.

3.2.2.7 Decontamination Procedures

All decontamination will be performed in accordance with NYSDEC-approved procedures. Sampling methods and equipment have been chosen to minimize decontamination requirements and prevent the possibility of cross-contamination. All intrusive and groundwater sampling equipment will be decontaminated before and after each location is drilled and sampled. Special attention will be given to all downhole tooling, which will be decontaminated prior to and following each use. Decontamination of large equipment will consist of the following:

- Removal of foreign matter; and
- High-pressure steam cleaning.

The following alternative procedure will be used for smaller equipment and may also be employed for downhole tooling:

- Initially remove all foreign matter;
- Scrub with brushes in trisodium phosphate (TSP) solution;
- Rinse with deionized water; and
- Allow to air dry.

A temporary decontamination area will be established on site using heavy plastic sheeting as a pad. The primary purpose of the pad will be to decontaminate downhole tooling and drill rig units. Fluids generated during decontamination will be handled according to procedures outlined below.



3.2.2.8 Investigation-derived Waste Handling

The following types of IDW may be generated: soil and rock cuttings from subsurface sampling and drilling, drill water from rock coring, decontamination water, groundwater from purging and sampling, and PPE. Waste streams will not be mixed and will be segregated to the maximum extent possible. IDW will be containerized and staged on site for future disposal. Costs for waste characterization and disposal are not included in the project budget. Future disposal will be performed in accordance with the November 21, 1989 NYSDEC TAGM HWR-89-4032. A registry of all waste containers generated during the project and a description of their sources and contents will be provided to NYSDEC.

Investigation-derived soils and water will be field-screened using visual inspection and an OVA to initially determine whether these wastes are potentially contaminated. Soil cuttings that are not contaminated (based on OVA screenings of 5 ppm or less and visual observations) will be spread on the ground near the site of generation or may be replaced in the hole. If contaminated soils are identified by field screening (e.g., OVA readings greater than 5 ppm [non methane] or abnormal color or odor), these soils will be containerized in DOT-approved 55-gallon drums and stored on site.

If groundwater brought to the surface via drilling, sampling, or well purging is not contaminated (based on OVA screening of 5 ppm or less), it will be discharged to the surface near the site of generation or as close as possible. If the groundwater is determined to be contaminated (e.g., OVA readings greater than 5 ppm [non-methane] or abnormal color or odor), it will be containerized in DOT-approved 55-gallon drums and stored on site.

Unless field screening indicates that PPE and other solid wastes are contaminated, this material will be double-bagged and disposed off site as non-regulated solid waste.

All drums containing IDW will be labeled with the type of generated material, site name, location where the material was generated, and date the material was generated. Drums will be stored on site.

3.2.3 SRI Report

E & E will publish a draft and final SRI report consisting of the site background data compiled during the investigation, investigation procedures undertaken, data gathered, and data interpretation. This document will also include a photolog that documents site activities and findings, as well as groundwater monitoring well soil

boring logs. All analytical data will be reviewed by a third-party data validator who will prepare a Data Usability Summary Report (DUSR). DUSRs for all laboratory chemical analytical data will also be included in the report.

A conceptual site model representing site dynamics for sources, affected media, release mechanisms, and potential contamination pathways and receptors will be developed. The analytical data will be screened against applicable and relevant and appropriate requirements (ARARs) and to-be-considereds (TBCs) to identify areas that might represent unacceptable contamination. This comparison to ARARs and TBCs will serve to evaluate potential exposure risks to humans. Based on the comparison, a qualitative evaluation of potential risk will be presented.

3.3 Task 3: Development of Alternatives 3.3.1 Interim Response Measures

E & E will first identify, based on the SRI data and historical data, whether any additional interim response measures (IRMs) are appropriate for this site. IRMs would be recommended only for situations where contamination is posing an immediate risk to human health or the environment. This would include areas where contaminants are found to be directly releasing to surface water, groundwater, or the atmosphere, and/or where there are existing receptors of site contaminants. In this task, E & E will identify and recommend IRMs, as necessary, but will not design them or provide engineering analysis of their implementation. If such IRMs are needed, the engineering and design would be conducted under a contract modification.

3.3.2 Identification of Potential Technologies

Areas that require possible remediation will have to be identified prior to identifying remedial technologies. E & E will identify the areas that may be of concern by comparing analytical data to ARARs and TBC criteria. Where ARARs are not available (e.g., for the soil medium), E & E will develop a rational basis for identifying which TBC values should be used to identify areas that should be considered for remedial action. These areas will be identified on site maps.

Based on the areas identified by this process and the media impacted, appropriate remedial technologies will be identified.



3.4 Task 4: Preliminary Screening of Alternatives

3.4.1 Alternative Screening

The alternatives developed in Task 3 will be screened against the criteria of effectiveness and implementability to reduce the number of alternatives retained for detailed analysis. Including the no action alternative for each media, E & E assumes that three alternatives will be retained for the contaminated soil and four or five alternatives for groundwater. This task will also identify whether treatability or additional field investigation is required to support the detailed analysis of alternatives.

3.4.2 Progress Meeting

E & E will meet with NYSDEC in Albany to discuss the draft SRI/FS submittal, covering Tasks 2, 3, and 4. The purpose of this meeting will be to review the findings of the SRI and the initial findings of the FS and to scope out additional field work, if required. An interim report in the form of initial chapters of the FS, presenting site history and background, development of alternatives, and preliminary screening of alternatives (Tasks 3 and 4), will be submitted.

3.5 Task 5: Post-Screening Treatability Study

Based on the findings in the SRI and on the alternatives identified, a treatability study may be required to better evaluate technologies in Task 6. Since the nature and scope of such treatability studies can not be determined until the previous tasks are completed, no scope is included for this task at this point, however, some potential costs are included in the project budget.

3.6 Task 6: Detailed Analysis of Alternatives

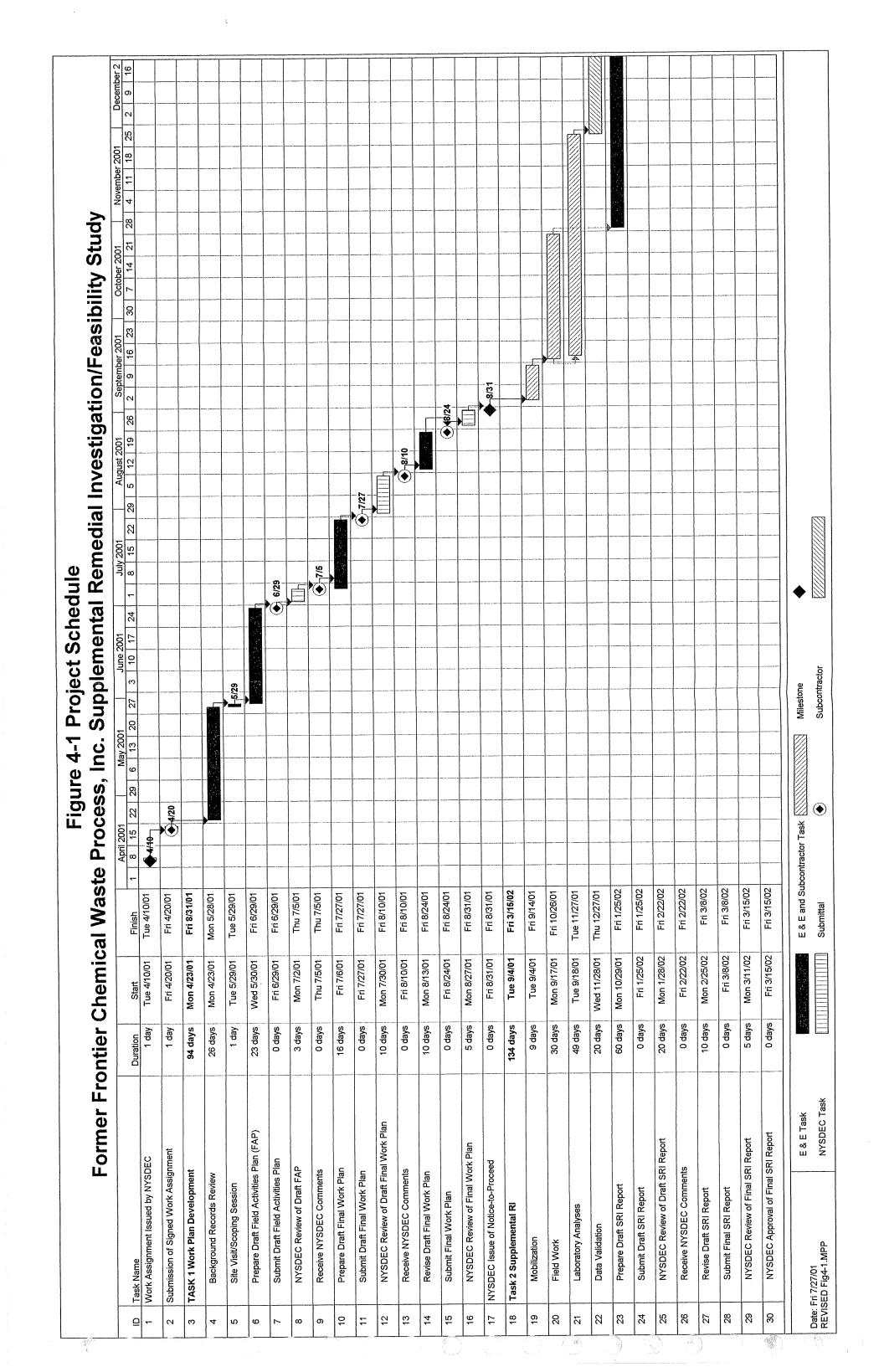
E & E will evaluate in detail the alternatives developed in Task 4 in accordance with NYSDEC TAGM 4030, including evaluation against the seven primary and balancing criteria.

Following detailed analysis of the alternatives with respect to the seven criteria, including cost, E & E will comparatively evaluate the alternatives against each other. A draft FS presenting the results of Tasks 3 through 6 with evaluations of the remaining alternatives will then be submitted for review. Once review comments are received, they will be addressed and a final FS will be submitted.

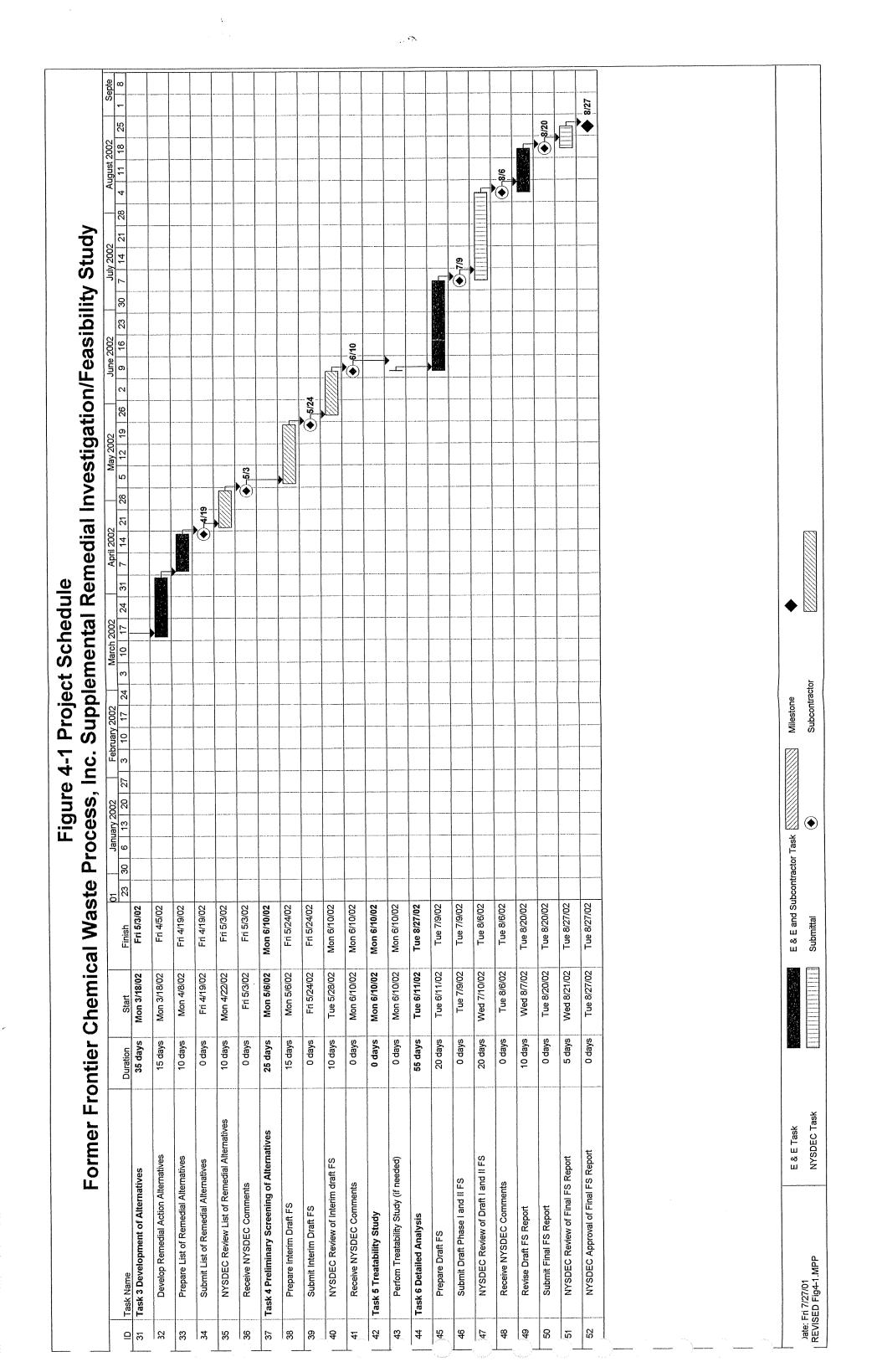


Schedule

The project schedule is presented on Figure 4-1.



1D Task Name Duration 1 Mork Assignment Issued by NYSDEC 1 day		2	January 2002	February 2002	March 2002	April 2002	May 2002	June 2002	July 2002	August 2002	
Work Assignment Issued by NYSDEC		Finish 23 30		3 10 17 24	24	2			l_		25 1 8
	1 day Tue 4/10/01	Tue 4/10/01									
2 Submission of Signed Work Assignment	1 day Fri 4/20/01	Fri 4/20/01									
3 TASK 1 Work Plan Development 94	94 days Mon 4/23/01	Fri 8/31/01									
4 Background Records Review 26	26 days Mon 4/23/01	Mon 5/28/01									
5 Site Visit/Scoping Session	1 day Tue 5/29/01	Tue 5/29/01									
6 Prepare Draft Field Activities Plan (FAP) 23	23 days Wed 5/30/01	Fri 6/29/01									
7 Submit Draft Field Activities Plan 0	0 days Fri 6/29/01	Fri 6/29/01									
8 NYSDEC Review of Draft FAP 3	3 days Mon 7/2/01	Thu 7/5/01									
9 Receive NYSDEC Comments 0	0 days Thu 7/5/01	Thu 7/5/01									
10 Prepare Draft Final Work Plan 16	16 days Fri 7/6/01	Fri 7/27/01									
11 Submit Draft Final Work Plan 0	0 days Fri 7/27/01	Fri 7/27/01									
12 NYSDEC Review of Draft Final Work Plan 10	10 days Mon 7/30/01	Fri 8/10/01									
13 Receive NYSDEC Comments 0	0 days Fri 8/10/01	Fri 8/10/01									
14 Revise Draft Final Work Plan 10	10 days Mon 8/13/01	Fri 8/24/01									and provided in State of the St
15 Submit Final Work Plan 0	0 days Fri 8/24/01	Fri 8/24/01									
16 NYSDEC Review of Final Work Plan 5	5 days Mon 8/27/01	Fri 8/31/01									
17 NYSDEC Issue of Notice-to-Proceed 0	0 days Fri 8/31/01	Fri 8/31/01									
134 Task 2 Supplemental Ri 134	134 days Tue 9/4/01	Fri 3/15/02									
19 Mobilization 9	9 days Tue 9/4/01	Fri 9/14/01									
20 Field Work 30	30 days Mon 9/17/01	Fri 10/26/01									
21 Laboratory Analyses 49	49 days Tue 9/18/01	Tue 11/27/01									
22 Data Validation 20	20 days Wed 11/28/01	Thu 12/27/01									
23 Prepare Draft SRI Report 60	60 days Mon 10/29/01	Fri 1/25/02									
24 Submit Draft SRI Report C	0 days Fri 1/25/02	Fri 1/25/02	1/25	55							
25 NYSDEC Review of Draft SRI Report 20	20 days Mon 1/28/02	Fri 2/22/02									
26 Receive NYSDEC Comments C	0 days Fri 2/22/02	Fri 2/22/02		2722	-2						
27 Revise Draft SRI Report 10	10 days Mon 2/25/02	Fri 3/8/02									
28 Submit Final SRI Report	0 days Fri 3/8/02	Fri 3/8/02			3/8						
29 NYSDEC Review of Final SRI Report	5 days Mon 3/11/02	Fri 3/15/02			,						
30 NYSDEC Approval of Final SRI Report	0 days Fri 3/15/02	Fri 3/15/02			3/15						





Staffing Plan

E & E proposes the following primary staffing plan for completion of this work assignment:

Program Manager/Project Director: S. Blair, P.E.

Project Manager: G. Florentino, P.G.

Task 1: Work Plan

G. Florentino: Prepare work plan S. Blair: Review work plan

Task 2: Remedial Investigation

B. Cervi: Field Team Leader

Geologist/Engineer from Watts Engineers: Field Assistant

V. Angelaki: Data evaluation/summary M. Galloway: Quality Assurance Officer

G. Florentino: Report Author S. Blair: Report Reviewer

Task 3: Development of Alternatives

W. Kawar: Technology Evaluation/Alternatives Development

S. Blair and G. Florentino: Review

Task 4: Preliminary Screening of Alternatives

W. Kawar: Alternatives Screening S. Blair and G. Florentino: Review

Task 5: Detailed Analysis of Alternatives

W. Kawar: Detailed Analysis S. Blair and G. Florentino: Review

Task 6: Selection of Remedy

W. Kawar: Detailed Analysis S. Blair and G. Florentino: Review



Subcontracting Requirements

One subconsultant and three subcontractors will be used for this project. The subconsultant was chosen based on its status as a Minority-owned Business Enterprise (MBE), and the subcontractors were chosen based on their pricing (i.e., lowest bid). MBE and Woman-owned Business Enterprise (WBE) firms were included on the bidders list for all subcontracted tasks, however, since the criteria for award was price, the MBE/WBE firms may not have been selected.

Subconsultant

The MBE subconsultant (Watts Engineers of Buffalo, New York) will be used for field assistance. The scope of work and cost estimate for Watts Engineers is included in Appendix C.

Subcontractors

The following is a summary of the subcontracted services and winning subcontractors for this project:

- Site Survey: MacIntosh and MacIntosh, P.C. of Lockport, New York;
- Geoprobe/Drilling/Utility investigation: SJB Services, Inc., of Hamburg, New York.
- Third party data validation: Chemworld Environmental, Inc., of Rockville, Maryland.

The SOW and cost estimate for each subcontractor is presented in Appendix D.



Budget Estimate

The following Schedule 2.11 contains a breakdown of estimated costs associated with completion of this work assignment.

E & E has prepared this schedule in accordance with the contractual requirements of the standby contract. Also indicated on Schedule 2.11(b-1) are direct administrative labor hours budgeted as requested in NYSDEC's cover letter to the Work Assignment for these sites.

Section 7

Schedule 2.11(a) Summary of Work Assignment Price

ECOLOGY AND ENVIRONMENT ENGINEERING, P.C. State Superfund Standby Contract #D003493 Work Assignment #: D003493-

Project Name: F Frontier Chemical

\$55,315 \$102,334 \$78,905

Direct Salary Costs (Schedule 2.11(b))	sts (Schedule 2.	11(b))	
Indirect Costs			
Direct Non-	Direct Non-Salary costs (Schedules 2.11(c) and (d))	les 2.11(c) and (d))	
Subcontract Costs	t Costs		
Cost-Plus-F	ixed-Fee Subcontrac	Cost-Plus-Fixed-Fee Subcontracts (Schedule 2.11(e))	
Name A Watts B	Name of Subcontractor Watts	Services to be Performed Field Assistance	Subcontract Price \$19,950
D			
Total Cost	Total Cost-Plus-Fixed-Fee Subcontracts	ontracts	\$19,950
Unit Price	Unit Price Subcontracts (Schedule 2.11(f))	le 2.11(f))	
Nam A SJB B McIn C Cher D Para	Name of Subcontractor A SJB B McIntosh C Chemworld D Paradigm	Services to be Performed Driller Survey Data Validation Dioxin and Furans Treatability Study	Subcontract Price \$24,218 \$7,725 \$7,810 \$9,450
Total Unit	Total Unit Price Subcontracts		\$74,203
Subcontra	Subcontract Management Fee		\$1,969
Total Sub	Total Subcontract Costs (Lines 4+5+6)	(+2+6)	
Fixed Fee			
Total Work	Total Work Assignment Price (Lines 1+2+3+7+8)	nes 1+2+3+7+8)	

NOTE: Rates are in accordance with Section 2.10 of the State Superfund Standby Contract #D003493

\$11,824

\$344,499

\$96,122

Section 7 Schedule 2.11(b) Direct Labor Hours Budgeted ECOLOGY AND ENVIRONMENT ENGINEERINGg, P.C. State Superfund Standby Contract #D003493 Work Assignment #: D003493-Project Name: Frontier Chemical

DIRECT LABOR HOURS BUDGETED - BY NSPF GRADE

Rates for Year Ending February 1, 2001	1, 2001**				JIHECI LAI	SOH HOU	1S BUDGE	EU - BY N	DIRECT LABOR ROURS BODGETED - BY NSPE GHADE	ш					
NSPE Grade	×	III/	II	>	>	≥	==	=	_	Total	Labor	Overhead		Fee	
Rate/Hour \$70.10	\$70.10	\$46.88	\$40.38	\$34.16	\$29.11	\$23.78	\$21.10	\$18.71	\$14.35	Hours	Cost	185%	SUBTOTAL	7.50%	TOTAL
TASK DESCRIPTION										and a second sec		**************************************			
Work Plan Development	0	2	4	16	146	24	99	120	20	392	\$9,421	\$17,429	\$26,850	\$2,014	\$28,864
Supplemental RI - Field Work	0	0	8	80	132	0	360	20	0	558	12,970	23,995	36,965	2,772	39,737
Supplemental RI - Report	0	8	0	80	164	09	150	170	40	672	16,228	30,022	46,250	3,469	49,719
Development of Alternatives (Phas	0	80	0	14	32	0	40	8	8	110	2,893	5,352	8,245	618	8,863
Preliminary Screening (Phase 2 FS	0	8	0	24	40	16	09	8	8	164	4,270	7,900	12,170	913	13,083
Treatability Study	0	4	0	12	16	16	40	12	83	108	2,627	4,860	7,487	562	8,049
Detailed Analysis (Phase 3 FS)	0	8	0	24	68	40	56	64	28	288	906'9	12,776	19,682	1,476	21,158
Est. Direct Labor Hours	0	38	12	178	598	156	766	432	112	2,292					
Est. Direct Labor Cost	\$0	\$0 \$1,781	\$485	\$6,080 \$1	\$17,408	\$3,710	\$16,163	\$8,083	\$1,607	TOTALS	\$55,315	\$102,334	\$157,649	\$11,824	\$169,473
										ı					

Date Prepared: 07/25/01

Engineer/Contract # D003493

Project Name: Frontier Chemical

Work Assignment No. 30

Schedule 2.11(b-1)

			Direct ,	Administ	rative La	bor Hour	Direct Administrative Labor Hours Budgeted	pe		
			r	(L		•		•	Total No. of Direct Administrative
NSPE Labor Classification	ຄ	æ	,	9	သ	4	3	7		Labor Hrs. Budgeted
Task 1 Work Plan/ Background			0	0.5	9	_	2.5	5		16
Task 2 Supplemental RI - Field			0.5	0	5	0	14.5	2	0	22
Work							-			
Task 3 Supplemental RI -		0.5		3.5	6.5	2.5	9	6.5	1.5	27
Report										
Task 4 Development of		0.5		0.5	_		1.5	0.5	0.5	4.5
Alternatives (Phase 1 FS)										
Task 5 Preliminary Screening				_	1.5	0.5	2.5	0.5	0.5	6.5
(Phase 2 FS)										
Task 6 Treatability Study				0.5	1	0.5	1.5	0.5	0	4
Task 7 Detailed Analysis		0.5		_	3	1.5	2	2.5	_	11.5
(Phase 3 FS)										
Task 8										
Task 9										
Task 10										
Task 11										
Task 12										
Total Hours		1.5	0.5	7.0	24	0.9	30.5	17.5	4.5	91.5

Contract/Project administrative hours would include (subject to contract allowability) but not necessarily be limited to the following activities:

- Conflict of Interest Check Work Plan Development
- Develop budget schedules and supporting documentation
 - Review work assignment (WA) progress ri
 - Conduct progress reviews
- Prepare monthly project report Update WA progress schedule
- Prepare monthly M/WBE Utilization Report
 - Review work assignment costs €;
- Prepare monthly cost control report
 Cost control reviews

- CAP Preparation
- Respond to payment issues/disallowances Oversee and prepare monthly CAP
 - NSPE list updates
- Equipment Inventory
 - 5.
- Manage subcontracts Implement and management and staffing
- Conduct Health and Safety Reviews

plans

- Word processing and graphic artists

 - Report Editing

Contract/Project administration hours would not include activities such as:

- Technical oversight by management QA/QC reviews
 Technical oversight by ma
 Develop subcontracts
 Work plan development
 Review of deliverables

Section 7

Schedule 2.11(c) Direct Non-Salary Costs

ECOLOGY AND ENVIRONMENT ENGINEERING, P.C. State Superfund Standby Contract #D003493 Work Assignment #: D003493- Project Name: Frontier Chemical

	Maximum		Estimated	Total
ITEM	Reimbursement Rate	Unit	No. of Units	Estimated Costs
A. IN-HOUSE COSTS*				
Communication Costs	\$ 5.00	Call	296	1,480.00
Reproduction	\$ 0.05	Page	23,000	1,150.00
Blueprinting	\$ 1.75	Page	400	700.00
CAD Computer Usage	\$ 10.00	Hour	168	1,680.00
Protective Clothing: Level D	\$ 15.00	Day	37	555.00
Protective Clothing: Level C	\$ 50.00	Day	5	250.00
Protective Clothing: Level B	\$ 70.00	Day	•	•
Shipping: Lab Samples		lbs.	1	ŧ
Shipping: Equipment		lbs.	i	ı
Shipping: Other Fedex Priority	\$ 22.00	5 lbs.	9	132.00
Postage (FED-EX PRIORITY)	\$ 17.00	2 lbs.	ı	1
Purchased Items - Incidentals		Lump Sum		1,000.00
Outside Equipment Rental		Lump Sum		
Miscellaneous Field Supplies/ODCs		Lump Sum		4,731.00
E&E Analytical Services		Lump Sum		
			Subtotal	al 73,238.00
B. MISCELLANEOUS				
Airfare: Buffalo/Albany	\$ 352.00	Н	7.00	2,464.00
Per Diem: Albany	\$ 34.00	Day	7.00	238.00
Per Diem: Rochester	\$ 34.00	Day	ı	ı
Lodging: Albany	\$ 70.00	Night	,	•
Auto Rental	\$ 65.00	Day	7.00	455.00
Mini Van Rental	\$ 300.00	Week	0.00	1,800.00
Local Mileage	\$ 0.34	Mile	470.00	159.80
Parking		Day	ı	•
Gasoline/Tolls	\$ 50.00	ВТ	11.00	220.00
			Subtotal	al 5,666.80

TOTAL DIRECT NON-SALARY COSTS

NOTES: *PPE Costs are estimated. Actual costs will be billed.

\$ 78,904.80

Schedule 2.11(c) - 1

Direct Non-Salary Costs, Proposed Sampling Costs Work Assignment D003493-30, Frontier Chemical

Item		Maximum Reimbursement	Estimated	Turn-Around	Total Estimated
Analysis	Method	Rate (Specify Unit) (\$)	Number of Units	Mark-up (\$)	Cost (\$)
TCL Volatiles (VOCs)	OLM04.2	\$ 100.00	144	\$0	\$14,400.00
TCL Semivolatiles (BNAs)	OLM04.2	\$ 240.00	100	0\$	\$24,000.00
TCL PCB / Pesticides	OLM04.2	\$ 100.00	100	\$0	\$10,000.00
TCL PCB / Pesticides additional para OLM04.2	OLM04.2	\$ 105.00	6	\$0	\$945.00
TAL Metals	ILM04.0	\$ 80.00	100	0\$	\$8,000.00
Cyanide	ILM04.0	\$ 20.00	100	\$	\$2,000.00
% Solids		\$ 10.00	42	0\$	\$420.00
TCLP Volatiles (VOCs)		\$ 115.00	3	0\$	\$345.00
TLCP Semivolatiles (BNAs)		\$ 160.00	3	0\$	\$480.00
TCLP Metals		\$ 80.00	3	\$0	\$240.00
TCLP Extraction		\$ 50.00	3	0\$	\$150.00
Hardness	130.2	\$ 10.00	25	0\$	\$570.00
Total Number of Samples to be Analyzed	lyzed		664		
			Total Cost:		\$61,550.00

Section 7 Schedule 2.11(d) Equipment Usage Schedule

ECOLOGY AND ENVIRONMENT ENGINEERING, P.C. State Superfund Standby Contract #D003493 Work Assignment #: D003493-Project Name: Frontier Chemical

ID No ITEM

Time Period Maximum Reimbursement Rate

Estimated Estimated Total Estimated No. of Periods No. of Units Cost

NO EQUIPMENT RENTAL CHARGES ARE ALLOWED PER STANDBY CONTRACT

Schedule 2.11(d) - 1

Equipment Purchase Under Contract D003493-30, Frontier Chemical

Equipment Purchase Items	Unit Cost	Number of	O&M Rate	Term of Usage	Tax	Cost
	(\$)	Units	(\$/month)	(months)	8%	(\$)
Total Equipment Purchase						

No non-expendable equipment will be purchased.

Vendor Rented Equipment D003493-30, Frontier Chemical

Equipment To Be Rented	Unit Cost (\$)	Number of Units	Time Period	Estimated Periods	Cost (\$)
oH/Conductivity/Temperature Meter Rental	\$231.00	1	1 month	1	\$231.00
Hydrogen Tank	\$133.75	1	1 month	1	\$133.75
Field Tailer	\$182.00	1	1 month	2	\$364.00
Portable Toilet	\$69.55	1	1 month	2	\$139.10

Schedule 2.11(d) - 3

Site Dedicated Equipment D003493-30, Frontier Chemical

Equipment Purchase Items	Number of Units	Unit Cost (\$)	Cost (\$)
1500-Gal Poly Tank	2	\$486.00	\$972.00
Poly Tank Delivery	1	\$150.00	\$150.00
Niagara Mohawk Electrical Connection	1	\$678.00	\$678.00
McGill Electric, Inc. Trailer Electric Hookup and Inspection	1	\$1,270.00	\$1,270.00
Field Trailer mobilization/demobilization	1	\$575.00	\$575.00
Weighted Polyethylene Bailers 1.6" OD x 36" Length (24/case); incl. Shipping (attached quote does not include tax and shipping charges)	3	\$119.16	\$357.48
Total Purchased Dedicated Equipr		¥	\$4,002.48

Notes:

See quotes in Appendix E.

Work Assignment Number D003493-30

D003493-30	Frontier	Chemical

I. NA	ME OF SUBCONTRAC	TOR	SERVICES TO BE	PERFORMED		SUBCONTRACT PRICE
Wat	ts Engineers		Field Work			\$ 19,950.30
A. Direct Salary Cos (Cost	ing compliant with NYSDEC	C Form 2.11(e),		Schedule E3.10	(a) - 4/19/99)	
Professional Responsibility Level	Labor Classification	Avg. Reimbursement Rate	Max. Reimbursement Rate		Est. # Hours	Est. Direct Salary Cost (Avg. Reimb. Rate)
Associate	NSPE VII	\$34.73	\$34.73	Management	10	\$347.30
Proj. Environ. Scienti	NSPE VI	\$31.26	\$31.26			\$0.00
enior Environ. Scientis	NSPE V	\$29.45	\$29.45	HASP	10	\$294.50
roject Environ. Scienti:	NSPE IV	\$25.90	\$27.96			\$0.00
roject Environ. Scienti:	NSPE III	\$21.34	\$24.31			\$0.00
Environ. Scientist	NSPE II	\$16.74	\$19.45	Fieldwork	360	\$7,002.00
Field Technician	NSPE I	\$13.42	\$15.90			\$0.00
	Total Direct Salary Costs					\$7,643.80
B. Indirect Costs (115% - 5	Schedule E3.10(g) - 4/19/99)					
Amount budgeted for indirec	et costs is:					\$8,790.37
C. Maximum Reimbursem	ent Rates for Direct Non-Sal	lary Costs				

	Item		mber of Units	Total Estimated Cost
	1 Travel	react that	<u> </u>	TOTAL ZONA THE COURT
	Overnight Expenses	\$55.00 Night	oΓ	5 -
	Dinner Only	\$24.00 Dinner	0	
	Breakfast Only	\$6.00 Breakfast	0	
	Tolis (30 days - Grand Island)	\$1.00 Round-Trip	30	\$ 30.00
	Mileage (30 days @ 40mi/day)	\$0.33 Mile (RT)	1200	\$ 396.00
	Total Travel	· ,		\$ 426.00
	2 Supplies			
	Level D Protection	\$15.00 Day	25	s 375.00
	Level C Protection	\$45.00 Day	5	\$ 225.00
	Miscellaneous Expenses	\$25.00 Lump Sum	1	\$ 25.00
	Total Supplies	·		S 625.00
	Total Travel and Supplies Cost			s 1.051.00
D. Fixed Fee				
			г	\$2,465.13
	The Fixed Fee is: 15%		L	\$2,403.13
		HASP Preparation and Field Work		S 19,950.30

Schedule 2.11(f) - 1

Unit Price Subcontractors, Work Assignment Number D003493-30, Frontier Chemical

	Sevices to be	Subcontract Price	Management Fee
Name of Subcontractor	Performed	(\$)	(\$)
Chemworld Environmental, Inc.	Data Validation	\$ 7,810.00	0

				Da	ta Va	idation
			Number of	Unit		Total
Analysis	Method	Matrix	Samples	Price		Cost
TCL Volatiles	OLM04.2	Soil	42	\$15.00	\$	630.00
TLC Semivolatiles	OLM04.2	Soil	42	\$17.00	\$	714.00
TLC Pest/PCBs	OLM04.2	Soil	42	\$14.00	\$	588.00
TAL Inorganics (Metals)	ILM04.1	Soil	42	\$15.00	\$	630.00
Cyanide	ILM04.1	Soil	42	\$2.00	\$	84.00
Percent Solids		Soil	42	\$0.00	\$	-
TCLP Volatiles	130.2	Soil	3	\$14.00	\$	42.00
TCLP Semivolatiles		Soil	3	\$14.00	\$	42.00
TCLP Inorganics (Metals)		Soil	3	\$14.00	\$	42.00
TCL PCBs/Pest		Soil	3	\$12.00	\$	36.00
Dioxins		Soil	7	\$30.00	\$	210.00
TCL Volatiles	OLM04.2	Water	112	\$15.00	\$	1,680.00
TLC Semivolatiles	OLM04.2	Water	58	\$17.00	\$	986.00
TLC Pest/PCBs	OLM04.2	Water	58	\$14.00	\$	812.00
TAL Inorganics (Metals)	ILM04.1	Water	58	\$15.00	\$	870.00
Cyanide	ILM04.1	Water	58	\$2.00	\$	116.00
Hardness		Water	58	\$1.00	\$	58.00
Dioxins		Water	9	\$30.00	\$	270.00
				T-1-1		7.010.00

Total \$ 7,810.00

Unit Price Subcontractors, Work Assignment Number D003493-30, Frontier Chemical

Name of Culturation	Sevices to be	Subcontract Price	Management Fee
Name of Subcontractor	Performed	(\$)	(\$)
	Soil Boring and		
	Monitoring Well		
SJB Services, Inc.	Installation	\$24,218.00	\$968.72
	Maximum		Total
	Reimbursement	Estimated	Estimated
Item	Rate (Specify Unit)	Number of	Cost
	(\$)	Units	(\$)
SEE BID SHEET IN APPENDIX D WIT	<u> H UNIT RATES,QUANTITI</u>	ES AND TOTALS	
		Total Cost	\$ 8,396.00

SUBTOTAL SUBCONTRACT	\$24,218.00
SUBCONTRACT MANAGEMENT FEE	\$969
TOTAL	\$25,186.72

See quotes in Appendix D.

Unit Price Subcontractors, Work Assignment Number D003493-30, Frontier Chemical

Name of Subcontractor	Sevices to be Performed	Subcontract Price (\$)	Management Fee (\$)
McIntosh & McIntosh, P.C.	Site Survey	\$7,725.00	
ltem	Maximum Reimbursement Rate (Specify Unit) (\$)	Estimated Number of Units	Total Estimated Cost (\$)
		Total Cost	\$ 8,396.00

SUBTOTAL SUBCONTRACT	\$7,725.00
SUBCONTRACT MANAGEMENT FEE	\$0
TOTAL	\$7,725.00

See quotes in Appendix D.

Schedule 2.11(f) - 4

Unit Price Subcontractors, Work Assignment Number D003493-30, Frontier Chemical

9	\$0.00	Total	Estimated	per of Cost	(\$)	each 9450	each 0	each 0	hour 0	
(\$)	\$9,450.00			Estimated Number of	Units	14 e	Э	Э		
Performed	Dioxin and Furan Analysis	Maximum	Reimbursement	Rate (Specify Unit)	(\$)	<u> </u>				
Name of Subcontractor	Paragim Analytical Laboratories, Inc. Dioxin and Furan Analysis			Item '		Dioxin and Furan Analysis				

Tax 8% \$ - Total Cost \$ 9,450.00	Subtotal Cost	\$ 9,4	9,450.00
\$	Tax 8%	\$,
	Total Cost	\$ 9,4	50.00

0

gallon

9,450.00 ÷ SUBCONTRACT MANAGEMENT FEE SUBTOTAL SUBCONTRACT

\$

\$9,450.00

See quotes in Appendix D.

TOTAL

ECOLOGY AND ENVIRONMENT ENGINEERING, P.C. State Superfund Standby Contract #D003493 Work Assignment #: D003493-Project Name: Frontier Chemical

Page _____ of Date Prepared ___ Billing Period ____ Invoice No. ____

Approved Estimated Budget Under/Over (G-F)	\$55,315	\$102,334	\$157,649	\$5,667	\$73,238	\$78,905	\$94,153	\$1,969	\$332,676	\$11,824
	€	\$1	₩.		<i>₩</i>	₩.	0,		₩	0 7
rs Estimated Total Nork Assignment Price (A+B+E)										
Estimated Costs										
ed Total Costs E Incurred to Date (A+B+C)										
C Total Disallowed to Date										
B d Paid to Date										
A Costs Claimed This Period										
SUMMARY SCHEDULE Expenditure Category	1. Direct Salary Costs	2. Indirect Costs (185%)	3. Subtotal Direct Salary & Indirect Costs	4. Travel	5. Other Non-Salary Costs	6. Subtotal Direct Non-Salary Costs	7a. Subcontractors	7b. Subcontract Management Fee	8. Total Work Assignment Cost	9. Fixed Fee

\$344,499

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Page _____ o
Date Prepared ___
Billing Period ___

ECOLOGY AND ENVIRONMENT ENGINEERING, P.C. State Superfund Standby Contract #D003493 Work Assignment # : D003493-Project Name: Frontier Chemical

owed Total Costs Estimated Costs Estimated Incurred to Date to Completion Work (A+B+C) Pric	Work Plan Development	٧	В	ပ	D	Ш	ш	5	
\$9,421 \$17,429 \$26,850 \$1,113 \$1,113 \$1,136		Costs Claimed This Period	Paid to Date	Total Disallowed to Date	Total Costs Incurred to Date	Estimated Costs to Completion	Estimated Total Work Assignment	Approved Budget	Estimated Under/Over
ti Costs	Expenditure Category				(A+B+C)		Price (A+B+E)		(G-F)
of Cooks	1. Direct Salary Costs							\$9,421	
st Costs	2. Indirect Costs (185%)							\$17,429	
S250	3. Subtotal Direct Salary & Indirect Costs							\$26,850	
	4. Travel							\$24	
\$2.50	5. Other Non-Salary Costs							\$1,113	
	6. Subtotal Direct Non-Salary Costs							\$1,136	
	ra. Subcontractors							\$0	
 Assignment Cost 	7b. Subcontract Management Fee							0\$	
	8. Total Work Assignment Cost							\$27,986	
	9. Fixed Fee							\$2,014	

\$30,000

Section 7

Schedule 2.11(g) Monthly Cost Control Report/Summary of Fiscal Information

5

Billing Period ______

ECOLOGY AND ENVIRONMENT ENGINEERING, P.C. State Superfund Standby Contract #D003493 Work Assignment #: D003493- Project Name: Frontier Chemical

Supplemental RI - Field Work	A	8	O	Q	Ш	Ľ.	5	T
	Costs Claimed This Period	Paid to Date	Total Disallowed to Date	Total Costs Incurred to Date	Estimated Costs to Completion	Estimated Total Work Assignment	Approved	Estimated Under/Over
Expenditure Category				(A+B+C)		Price (A+B+E)		(G-F)
1. Direct Salary Costs							\$12,970	

2. Indirect Costs (185%)

3. Subtotal Direct Salary & Indirect Costs

4. Travel

5. Other Non-Salary Costs

6. Subtotal Direct Non-Salary Costs

7a. Subcontractors

7b. Subcontract Management Fee

8. Total Work Assignment Cost

9. Fixed Fee

Į	Estimated Under/Over (G-F)											
5	· et et	\$12,970	\$23,995	\$36,965	\$2,286	\$68,581	\$70,867	\$69,153	696\$	\$177,954	\$2,772	\$180,726
i.	Estimated Total Work Assignment Price (A+B+E)										1	II
Ш	Estimated Costs te to Completion											

Billing Period ____ Invoice No. ____

ECOLOGY AND ENVIRONMENT ENGINEERING, P.C. State Superfund Standby Contract #D003493 Work Assignment #: D003493- Project Name: Frontier Chemical

	al Approved Estimated ant Budget Under/Over (G-F)	\$16,228	\$30,022	\$46,250	0\$	\$1,417	\$1,417	0\$	0\$	\$47,667	007
Ш	Estimated Total Work Assignment Price (A+B+E)										
Ш	Estimated Costs to Completion										
D	Total Costs Incurred to Date (A+B+C)										
ပ	Total Disallowed Total Costs Estin to Date Incurred to Date to C (A+B+C)										
В	aid to Date										
A	Costs Claimed This Period										
Supplemental RI - Report	Expenditure Category	1. Direct Salary Costs	2. Indirect Costs (185%)	3. Subtotal Direct Salary & Indirect Costs	4. Travel	5. Other Non-Salary Costs	6. Subtotal Direct Non-Salary Costs	7a. Subcontractors	7b. Subcontract Management Fee	8. Total Work Assignment Cost	

\$51,136

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Page _______ Oate Prepared ___ Billing Period ___ Invoice No. _____

ECOLOGY AND ENVIRONMENT ENGINEERING, P.C. State Superfund Standby Contract #D003493 Work Assignment #: D003493- Project Name: Frontier Chemical

T	Estimated Under/Over	(G-F)										
9	Approved Budget		\$2,893	\$5,352	\$8,245	\$952	\$728	\$1,680	\$0	\$	\$9,925	\$618
Ŧ	Estimated Total Work Assignment	Price (A+B+E)										
ш												
O	Total Costs Incurred to Date	(A+B+C)										
O	Total Disallowed Total Costs Es to Date Incurred to Date to											
В	Paid to Date											
4	Costs Claimed This Period											
Development of Alternatives (Phase 1 FS)		Expenditure Category	1. Direct Salary Costs	2. Indirect Costs (185%)	3. Subtotal Direct Salary & Indirect Costs	4. Travel	5. Other Non-Salary Costs	6. Subtotal Direct Non-Salary Costs	7a. Subcontractors	7b. Subcontract Management Fee	8. Total Work Assignment Cost	9. Fixed Fee

\$10,543

Billing Period Invoice No.

ECOLOGY AND ENVIRONMENT ENGINEERING, P.C. State Superfund Standby Contract #D003493 Work Assignment # : D003493-Project Name: Frontier Chemical

I	Estimated Under/Over	(G-F)										
ŋ	Approved Budget		\$4,270	\$7,900	\$12,170	0\$	\$445	\$445	\$0	80	\$12,615	\$913
ட	Estimated Total Work Assignment	Price (A+B+E)								,		
ш	Estimated Costs to Completion											
О	Total Costs Incurred to Date	(A+B+C)										
O	Total Disallowed Total Costs E to Date Incurred to Date											
В	Paid to Date											
٧	Costs Claimed This Period											
Preliminary Screening (Phase 2 FS)		Expenditure Category	1. Direct Salary Costs	2. Indirect Costs (185%)	3. Subtotal Direct Salary & Indirect Costs	4. Travel	5. Other Non-Salary Costs	6. Subtotal Direct Non-Salary Costs	7a. Subcontractors	7b. Subcontract Management Fee	8. Total Work Assignment Cost	9. Fixed Fee

\$13,528

ECOLOGY AND ENVIRONMENT ENGINEERING, P.C. State Superfund Standby Contract #D003493 Work Assignment #: D003493- Project Name: Frontier Chemical

Treatability Study	A	8	O	Q	Ш	L	9	I
	Costs Claimed	Paid to Date	Total Disallowed		Total Costs Estimated Costs	Estimated Total	Approved	Estimated
Expenditure Category				(A+B+C)		Price (A+B+E)	196ppg	(G-F)
1. Direct Salary Costs							\$2,627	
2. Indirect Costs (185%)							\$4,860	
3. Subtotal Direct Salary & Indirect Costs	S						\$7,487	
4. Travel							\$952	
5. Other Non-Salary Costs							\$535	
6. Subtotal Direct Non-Salary Costs							\$1,487	
7a. Subcontractors							\$25,000	
7b. Subcontract Management Fee							\$1,000	
8. Total Work Assignment Cost							\$34,974	
9. Fixed Fee							\$562	
10. Total Work Assignment Price							\$35,536	

ECOLOGY AND ENVIRONMENT ENGINEERING, P.C. State Superfund Standby Contract #D003493 Work Assignment #: D003493- Project Name: Frontier Chemical

Billing Period Invoice No.

Schedule 2.11(G) Supplemental **Cost Control Report** Subcontracts

Ecology and Environment Engineering, P.C. D003493 **ENGINEER:**

PROJECT NAME: WORK ASSIGNMENT NO. CONTRACT NO.:

Frontier Chemical 30

Date Prepared: Billing Period: Invoice No. Page 1 of 1

	A	В	ပ	۵	ш	L	9
	SUBCONTRACT COSTS CLAIMED THIS APPLICATION	SUBCONTRACT COST APPROVED FOR PAYMENT		SUBCONTRACT			
SUBCONTRACTORS NAME	INCL. RESUBMITTALS	ON PREVIOUS APPLICATIONS	COST TO DATE (A PLUS B)	APPROVED BUDGET	MANAGEMENT FEE BUDGET	MANAGEMENT FEE PAID	TOTAL COSTS TO DATE (C PLUS F)
1. SJB Services	00:0	0.00	00.0	24,218.00	968.72	00.00	00.00
2. McIntosh & McIntosh	00:0	00.00	00.0	7,725.00	00.0	00.0	00.00
3.Chemworld	00:00	0.00	00'0	7,810.00	00.0	00.0	00:00
4. Paradigm	0.00	0.00	00'0	9,450.00	00.0	00.0	00:00
5. To Be Determined	00.00	0.00	00.0	25,000.00	1,000.00	00.0	00:00
6.	0.00	0.00	00.0	00.00	00'0	00.0	00.0
7.	00.00	0.00	00.00	00.0	00'0	00.0	00:00
8.	00.00	0.00	00.00	00.0	00'0	00.0	00.0
9.	0.00	0.00	00.00	00.0	00'0	00'0	0.00
10.	00:0	0.00	00'0	00.0	00'0	00.0	00:00
11. TOTALS	00:0	0.00	00'0	\$74,203.00	\$1,968.72	00.0	00.0
						DATE:	
						-	

NOTES: (1) Costs in Columns A, B, C, & D do not include any management fee cost.
(2) Management fee is applicable to only properly procured, satisfactorily completed, unit price subcontracts over \$10,000.
(3) Line 11, Column G should equal Line 7 (Subcontractors), Column D Summary Cost Control Report.

Section 7 Schedule 2.11(h) Summary of Labor Hours

9

Page ______ On the page ____ Billing Period ___ Invoice No. ____

ECOLOGY AND ENVIRONMENT ENGINEERING, P.C. State Superfund Standby Contract #D003493 Work Assignment #: D003493-Project Name: Frontier Chemical

Rates for Year Ending February 1, 2001																			
NSPE Grade	×		NIII	5	=	>	_	>		=		=		=		_		TOT	<u>ال</u>
Rate/Hour	\$70.10	₹	\$46.88	\$40.38	38	\$34.16	16	\$29.1	=	\$23.	78	\$21.10		\$18.	7	\$14.35		HOU	35
TASK	EXP./ EST.	EXP./	EXP./ EST.	EXP./ EST.	EST.	EXP./	EST.	EXP./ EST.	EST.	EXP./ EST.	EST.	EXP./ EST.	1	EXP./ EST.	EST.	EXP./ EST.	1	EXP./ EST.	EST.
Work Plan Development	0 0	0	63	0	4	0	16	0	146	0	24	0	0	0	120	0	0	0	392
Supplemental RI - Field Work	0 0	0	0	0	8	0	8	0	132	0	0	0	0	0	20	0	0	0	558
Supplemental RI - Report	0 0	0	8	0	0	0	80	0	164	0	09	0	150	0	170	0	40	0	672
Development of Alternatives (Phase 1	0	0	8	0	0	0	7	0	35	0	0	0	40	0	8	0	8	0	110
Preliminary Screening (Phase 2 FS)	0 0	0	89	0	0	0	24	0	40	0	16	0	09	0	8	0	89	0	164
Treatability Study	0 0	0	4	0	0	0	12	0	16	0	16	0	40	0	12	0	8	0	108
Detailed Analysis (Phase 3 FS)	0 0	0	8	0	0	0	24	0	68	0	4	0	29	0	64	0	28	0	288
TOTAL HOURS	0		38	12	12	!	178		598		156		766		432		112	1	2,292
TOTAL COST	0\$		\$1,781		\$485		\$6,080		\$17,408		\$3,710	97	516,163		\$8,083		\$1,607	67	55,317

Consultant/Contractor Detailed MBE/WBE and EEO Utilization Plan New York State Department of Environmental Conservation

Consultant/Contractor Name: Ecology & Environment Engineering, P.C.	onment Engineering, P.C.	Contract #/Type: D003493-30
Address 368 Pleasant View Drive	City Lancaster	State NY Zip Code 14086
Project Owner Name NYSDEC		Project/Grant No.: D003493-29
Address 625 Braodway	City Albany	State NY Zip Code 12233-7017
Authorized Representative: Mr. Jeff Konsella, P.E.	.E.	Title: Project Manager
Authorized Cienothro.		

Authorized Signature:

EEO and MBE/WBE Contract Summary

	%	Amount		%	No./Emp.	Wk./Hrs.
1. Total Dollar Value of the	001	\$344,499	,499 5. Total No. Employees/Work			
Prime Contract			Hours			
2. MBE Goal Applied to the	15	\$51,675	,675 6. Total Goal for Minority			
Contract			Empoyees			
3. WBE Goal Applied to the	5	\$17,225	,225 7. Total Goal for Female Em-			
Contract			ployees			
4. MBE/WBE Combined Totals	20	\$68,900	\$68,900 8. EEO Combined Totals			

Bureau of Minority & Business Programs Use Only

Propos	Proposed Goals	Date Approved	Date Disapproved	Initials
MBE (%)	EEO-Minorities (%)			
WBE (%)	EEO-Minorities (%)			

Contract Description: Conduct Supplemental Remedial Investigation at the Former Frontier Chemical site in Niagara Falls, NY

Page 2

In order to achieve the MBE Goals, New York State Certified MINORITY-OWNED firms are expected to participate in the following manner. Section I – MBE Information:

		Projected MBE			
	Description of Work	Contract	Contract	Contract	Project
MBE Firm	MBE	Award Date	Start Date	Schedule	Completion
Name:	Survey Services				
McIntosh and McIntosh, PC					
Address:		\$7,725			
429 Pine Street, P.O. Box 490					
City:					
Lockport					
State/Zip Code:		Date: 7/26/01			
1, 140.7					
Telephone No.: (716) 433-2535					
Name:	Travel Arrangements			The same of the sa	
Alvarez & Bremmer	•				
Address:		\$5,667			
9336 Transit Road					
City:					· · · · · · · · · · · · · · · · · · ·
East Amherst					
State/Zip Code:		Date: 7/26/01			
NY, 14251					
Telephone No.:					
Name:	Field Assistance				
Watts Engineers					
Address:		\$19,950			
3826 Main Street			***************************************		
City:			***************************************		
Buffalo				200,000	
State/Zip Code:		Date:			
NY, 14226					
Telephone No.: 716 826 2320					
07C7-0C0-011					

Page 3

Section II – WBE Information: In order to achieve the WBE Goals, New York State Certified WOMEN-OWNED firms are expected to participate in the following manner.

WRF Firm	Description of Work WBE	Projected WBE Contract Amount and Award Date	Contract Schedule Start Date	Contract Payment Schedule	Project Completion Date
무	Data Validation Services.				
Address: 14 Orchard Way North		\$7,810			
City: Rockville State/Zip Code:		Date: 726/01			
Telephone No.: (301-294-6144					
Name:					
Address:		65			
City:					
State/Zip Code:		Date:	ann an ann an ann an ann an ann an ann an a		
Telephone No.:					
Name:					
Address:		\$ 7			
City:					
State/Zip Code:		Date:			
Telephone No.:					

In order to achieve the EEO Goals, Minorities and Females are expected to be employed in the following job categories for the specified amount of work hours: Section III EEO Information:

		All Employees	loyees		Minority E	Minority Employees	
Job Categories	Total Work Hours of Contract	Males	Females	Black	Asian	Native American	Hispanic
Officials/							
Managers							
Professional							
Technicians							
Sales Workers							
Office/Clerical							
Craftsmen							
Laborers							
Service/Workers							
Totals							

orms/I



MBE/WBE Utilization Plan

8.1 Introduction

E & E fully subscribes to the New York State policy that MBE/WBE firms be afforded the maximum opportunity to participate in contracts offered by New York State agencies. As a prime contractor to NYSDEC, E & E is committed to full compliance with Executive Law Article 15-A and pertinent federal regulations to further MBE/WBE goals and to achieve significant participation by MBE/WBE firms to a level commensurate with their capabilities and responsibilities.

This section describes E & E's general MBE/WBE Utilization Plan, including goals for this work assignment and details regarding the services, firms, and portions of work scheduled to be provided by MBE/WBE firms under this work assignment.

8.2 General MBE/WBE Utilization Strategy

E & E maintains an up-to-date affirmative action plan and MBE/WBE hiring plan to ensure equal opportunity for all job applicants, employees, and subcontractors. For the New York State Superfund standby contract, E & E uses the following procedures and resources to meet the established MBE/WBE goals for each work assignment:

- The E & E program and project managers identify and evaluate work that requires or is appropriate for subcontractor services during work plan development. These subcontracting opportunities are then divided into discrete tasks that may each be completed by MBE or WBE firms.
- When the discrete tasks are identified, E & E's Program or Project Manager reviews the New York State Directory of Certified Minority and Women-Owned Business Enterprises on the Internet at www.empire.state.ny.us.

8. MBE/WBE Utilization Plan

■ The project manager identifies qualified MBE/WBE contractors and solicits these firms for bids as outlined in Section 8.4 of this plan, Criteria for Selection.

8.3 Typically Subcontracted Services

Typically, E & E has found that opportunities exist for MBE/WBEs in the following work categories:

- Site security fencing;
- Protective services;
- Drilling and monitoring well installation;
- Soil borings;
- Physical soil tests:
- Site and topographical surveys;
- Title searches:
- Engineering services;
- Structural engineering;
- Geophysical engineering;
- Geophysical surveys;
- Photographic services:
- Heavy equipment rental;
- Laboratory data validation;
- Travel services; and
- Photocopying report reproduction services.

8.4 Criteria for Selection

8.4.1 Subcontractors (Nonprofessional Services)

The criteria described below are used to obtain and evaluate bids for nonprofessional subcontracted services. Following the identification of discrete tasks and potential MBE/WBE firms by the program and project managers, bid solicitations are requested from qualified firms and, to the extent possible, one or more MBE/WBE

firms are requested to bid on each task. If the bids exceed \$10,000, at least five bids will be obtained. If the bids range between \$5,000 and \$10,000, three bids will be obtained. If the bids are less than \$5,000, E & E plans to enlist a sole-source procurement from an MBE/WBE firm.

8.4.2 Subconsultants (Professional Services)

Professional services will be subcontracted to MBE/WBE firms pursuant to applicable New York State regulations.

8.4.3 Small Direct Non-Salary Purchase and Rentals

When appropriate, E & E will purchase miscellaneous supplies and services and rent field equipment with New York State Certified MBE/WBE supply vendors and travel agencies. If an item costs less than \$1,000, E & E will be satisfied that the price is reasonable. For items costing between \$1,000 and \$1,500, two bids will be obtained. Three bids will be obtained for items costing between \$1,500 and \$2,500.

8.5 Work Assignment No. 30 Goals

The established percentage goals on this work are as follows:

	<u>Dollar Amount</u>
Total project amount:	344,499
Total percent of MBE/WBE work goal: 20%	68,900
Total percent of MBE work goal: 15%	51,675
Total percent of WBE work goal: 5%	17,225

8.6 Proposed MBE/WBE Utilization Work Assignment No. 30

Four elements within one of the tasks of the former Frontier Chemical SRI/FS have been identified as appropriate for subcontracting. The elements to be subcontracted, the proposed MBE/WBE subcontractor, and the value of work are identified on Table 8-1. The scope of work and price quotes for the subconsultant/subcontracted services are included in Appendices C and D, respectively.

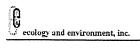


Table 8-1 MBE/WBE Subcontractor Information

-last		Subcontract or	MBEWBE	
Task	Task Description SRI Fieldwork	Scope of Work Field Assistant	Subcontractor Watts Engineers (MBE)	Value (\$) 19,950
2	SIG I ICIGWOIK	services	watts Engineers (MDE)	19,930
2	SRI Fieldwork	Vehicle Rental	Alvarez & Bremer	5,667
			Travel, Inc. (MBE)	
2	SRI Analytical	Data validation	Chemworld Environ-	7,810
	Data Validation		mental, Inc.	
Total MB	E Subcontract			25,617
Total WB	E Subcontract			7,810
Total Con	tract			344,499
Percent To	otal Contract (MBE)			7.4%
Percent To	otal Contract (WBE)			2.3%



References

- Blasland, Bouck & Lee, Inc., 1994, Removal Action Plan, Frontier Chemical-Royal Avenue Site, Niagara Falls, NY, Rochester, NY.
- Ecco, Inc., 1990, *Hydrologic Investigation Phase III*, Frontier Chemical Waste Process, Inc., Niagara Falls, NY, Buffalo, NY.
- ______, 1991, Interim Remedial Measure Report, Frontier Chemical Waste Process, Inc., Niagara Falls, NY, Buffalo, NY.
- Golder Associates, 1986, Regional and Historical Data Review, Royal Avenue Part Site, Niagara Falls, NY.
- ______, 1988, Results of the Phase I and II Hydrological Investigations, Frontier Chemical, Niagara Falls, NY.
- Niagara River Secretariat, June 2000, Niagara River Toxics Management Plan Progress Report and Work Plan.
- Planning Research Corporation (PRC), 1986, Preliminary Assessment, Frontier Chemical Waste Process, Inc., Chicago, IL.
- Wehran Engineering Corp., 1982, Hydrogeologic Investigation Frontier Chemical Waste Process, Inc., Niagara Falls, NY.



Site-specific Health and Safety Plan

HEALTH AND SAFETY PLAN	
Project: Frontier Chemical	
Project No.: 000699.NV05.01	
TDD/PAN No.:	
Project Location: 47 th Street and Royal Avenue. Niagara Falls, New Y	ork
Proposed Date of Field Activities: Fall, 2001	
Project Director: Steve Blair	
Project Manager: Gene Florentino	
Prepared by: Gregory Jones	Date Prepared: July 10, 2001
Approved by: On law	Date Approved: $7/23/0/$

ecology and environment, inc.

SITE-SPECIFIC

1. INTRODUCTION

1.1 POLICY

It is E & E's policy to ensure the health and safety of its employees, the public, and the environment during the performance of work it conducts. This site-specific health and safety plan (SHASP) establishes the procedures and requirements to ensure the health and safety of E & E employees for the above-named project. E & E's overall safety and health program is described in *Corporate Health and Safety Program for Toxic and Hazardous Substances* (CHSP). After reading this plan, applicable E & E employees shall read and sign E & E's Site-Specific Health and Safety Plan Acceptance form.

This SHASP has been developed for the sole use of E & E employees and is not intended for use by firms not participating in E & E's training and health and safety programs. Subcontractors are responsible for developing and providing their own safety plans.

This SHASP has been prepared to meet the following applicable regulatory requirements and guidance:

Applicable Regulation/Guidance
29 CFR 1910.120, Hazardous Waste Operations and Emergency Response (HAZWOPER)
Other:

1.2 SCOPE OF WORK

Description of Work:	Conduct Geoprobe soil profiling and soil sampling. Piezometer and Monitoring Well installation, Groundwater
Sampling, and Utilitie	s Investigation

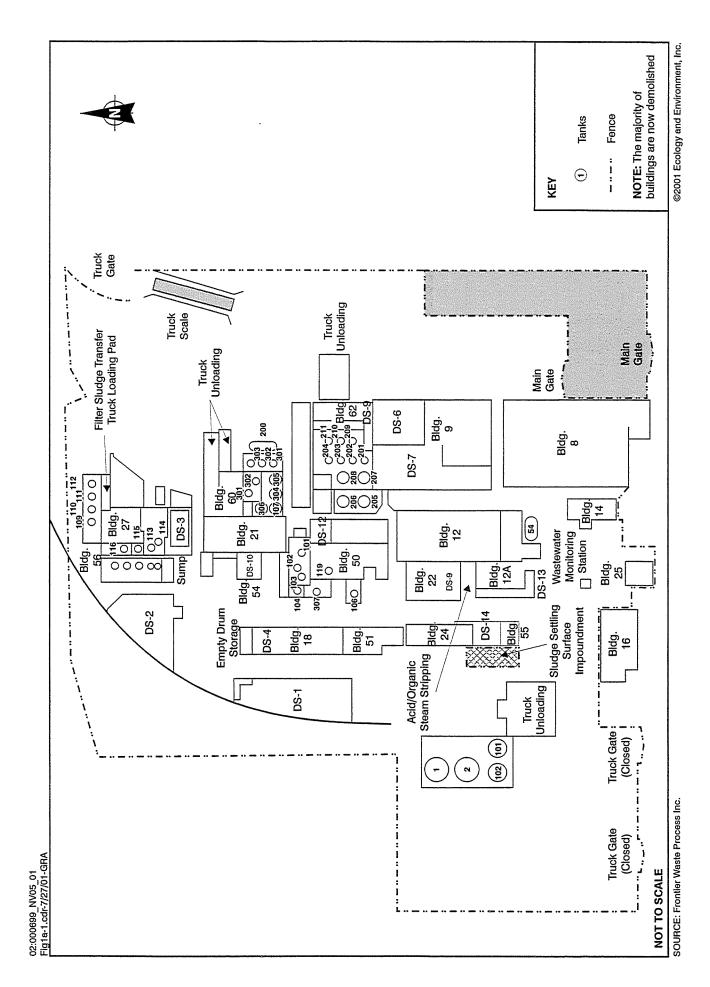
Equipment/Supplies: Attachment 1 contains a checklist of equipment and supplies that will be needed for this work.

The following is a description of each numbered task:

Task Number	Task Description						
1	Collect sub-surface soil samples, conduct soil profiling and install piezmeters with the Geoprobe						
2	Install overburden and bedrock Monitoring Wells and collect groundwater samples						
3	Conduct utilities investigation with test pits and collect bedding samples						
4	IDW						
5	Decon drilling and digging equipment along with associated tools						

1.3 SITE DESCRIPTION

Site Map: See Figure 1A-1.
Site History/Description (see project work plan for detailed description): Currently the site is not in operation, and located on 9.2 acres
In the industrial area of Niagara Falls. Frontier Chemical was a treatment and storage facility of hazardous waste between 1974 and 1992.



FORMER FRONTIER CHEMICAL WASTE PROCESS, INC. SITE MAP Figure 1A-1

Is the	site currently in operation? Yes		X No					
Locati	ons of Contaminants/Wastes: Chemic	al c	ontaminates are locate	ed tl	hroughout the site in t	he ı	underlying soils and groundwater. The	
Hexav	valent Chromium concentration from p	revi	ous analysis were 0.0	8 p <u>r</u>	om, the concentration	of I	Lead were 0.02 mg/m3, and the	
conce	ntrations of total volatile organic comp	oun	ds in the groundwater	r wa	as greater than 1000 p	pm.		
Types	and Characteristics of Contaminants/	Was	tes:					
X	Liquid	X	Solid	X	Sludge	X	Gas/Vapor	
X	X Flammable/Ignitable X Volatile X Corrosive Acutely Toxic							
X	Explosive	X	Reactive		Carcinogenic		Radioactive	
	Medical/Pathogenic	Otl	ner:	- 				

2. ORGANIZATION AND RESPONSIBILITIES

E & E team personnel shall have on-site responsibilities as described in E & E's standard operating procedure (SOP) for Site Entry Procedures (GENTECH 2.2) The project team, including qualified alternates, is identified below.

Name	Site Role/Responsibility
G. Florentino	Project/Task Manager
Watts Engineers	Site Safety Officer
B. Cervi	Site Geologist/ Field Team Leader

3. TRAINING

Prior to work, E & E team personnel shall have received training as indicated below. As applicable, personnel shall have read the project work plan, sampling and analysis plan, and/or quality assurance project plan prior to project work.

Training	Required
40-Hour OSHA HAZWOPER Initial Training and Annual Refresher (29 CFR 1910.120)	Х
Annual First Aid/CPR	X
Hazard Communication (29 CFR 1910.1200)	X
40-Hour Radiation Protection Procedures and Investigative Methods	

Training	Required
8-Hour General Radiation Health and Safety	
Radiation Refresher	
DOT and Biannual Refresher	X
Other:	
4. MEDICAL SURVEILLANCE	
4.1 MEDICAL SURVEILLANCE PROGRAM	
E & E field personnel shall actively participate in E & E's medical surveillance program as descriving the past year, an appropriate physical examination and health rating.	ribed in the CHSP and shall have received,
E & E's health and safety record (HSR) form will be maintained on site by each $E & E$ employees $E & E$ employees should inform the site safety officer (SSO) of any allergies, medical condition the safe conduct of the work to which this SHASP applies.	
Is there a concern for radiation at the site? Yes No If no, go to 5.1.	
4.2 RADIATION EXPOSURE 4.2.1 External Dosimetry	
Thermoluminescent Dosimeter (TLD) Badges: TLD badges are to be worn by all E & E field per	ersonnel on certain required sites.
Pocket Dosimeters:	
Other:	
4.2.2 Internal Dosimetry	
☐ Whole body count ☐ Bioassay ☐ Other	
Requirements:	
4.2.3 Radiation Dose	
Dose Limits: E & E's radiation dose limits are stated in the CHSP. Implementation of these dos	e limits may be designated on a site-
specific basis.	
Site-Specific Dose Limits:	

ALARA Policy: Radiation doses to E & E personnel shall be maintained as low as reasonably achievable (ALARA), taking into account the work objective, state of technology available, economics of improvements in dose reduction with respect to overall health

and safety, and other societal and socioeconomic considerations.

5. SITE CONTROL

Vermiculite Handling: Respiratory protection (i.e., high-efficiency particulate air filtration) is recommended when vermiculite is used	
to package samples into shipping containers (some vermiculite contains low concentrations of asbestos).	
Oil - C C W. I Parting	
Other Safe Work Practices:	

6. HAZARD EVALUATION AND CONTROL

6.1 PHYSICAL HAZARD EVALUATION AND CONTROL

Potential physical hazards and their applicable control measures are described in the following table for each task.

Hazard	Task Number	Hazard Control Measures
Biological (flora, fauna, etc.)		 Potential hazard: Establish site-specific procedures for working around identified hazards. Other:
Cold Stress	1,2,3,4,5	 Provide warm break area and adequate breaks. Provide warm noncaffeinated beverages. Promote cold stress awareness. See Cold Stress Prevention and Treatment (attached at the end of this plan if cold stress is a potential hazard).
Compressed Gas Cylinders		 Use caution when moving or storing cylinders. A cylinder is a projectile hazard if it is damaged or its neck is broken. Store cylinders upright and secure them by chains or other means. Other:
Confined Space		 Ensure compliance with 29 CFR 1910.146. See SOP for Confined Space Entry. Additional documentation is required. Other:
Drilling	1,2,3	 See SOP for Health and Safety on Drilling Rig Operations. Additional documentation may be required. Landfill caps will not be penetrated without prior discussions with corporate health and safety staff. Other: <u>Backhoe or excavator</u>
Drums and Containers		 Ensure compliance with 29 CFR 1910.120(j). Consider unlabeled drums or containers to contain hazardous substances and handle accordingly until the contents are identified. Inspect drums or containers and assure integrity prior to handling. Move drums or containers only as necessary; use caution and warn nearby personnel of potential hazards. Open, sample, and/or move drums or containers in accordance with established procedures; use approved drum/container-handling equipment. Other:

Hazard	Task Number	Hazard Control Measures
Electrical	1,2,3	Ensure compliance with 29 CFR 1910 Subparts J and S.
		Locate and mark energized lines.
		De-energize lines as necessary.
		Ground all electrical circuits.
		Guard or isolate temporary wiring to prevent accidental contact.
		 Evaluate potential areas of high moisture or standing water and define special electrical needs.
		• Other:
Excavation and Trenching	3	 Ensure that excavations comply with and personnel are informed of the requirements of 29 CFR 1926 Subpart P.
		 Ensure that any required sloping or shoring systems are approved as per 29 CFR 1926 Subpart P.
		 Identify special personal protective equipment (PPE) (see Section 7) and monitoring (see Section 8) needs if personnel are required to enter approved excavated areas or trenches.
		 Maintain line of sight between equipment operators and personnel in excavations/trenches. Such personnel are prohibited from working in close proximity to operating machinery.
		 Suspend or shut down operations at signs of cave in, excessive water, defective shoring, changing weather, or unacceptable monitoring results.
		• Other:
		Other:
Fire and Explosion	1,2,3	• Inform personnel of the location(s) of potential fire/explosion hazards.
		Establish site-specific procedures for working around flammables.
		 Ensure that appropriate fire suppression equipment and systems are available and in good working order.
		Define requirements for intrinsically safe equipment.
		• Identify special monitoring needs (see Section 8).
		Remove ignition sources from flammable atmospheres.
		 Coordinate with local fire-fighting groups regarding potential fire/explosion situations.
		Establish contingency plans and review daily with team members.
		Other:
Heat Stress	1,2,3,4,and 5	Provide cool break area and adequate breaks.
		Provide cool noncaffeinated beverages.
		Promote heat stress awareness.
		Use active cooling devices (e.g., cooling vests) where specified.
		• See <i>Heat Stress Prevention and Treatment</i> (attached at the end of this plan if heat stress is a potential hazard).
Heavy Equipment Operation	1,2,3	Define equipment routes, traffic patterns, and site-specific safety measures.
	1,2,3	 Ensure that operators are properly trained and equipment has been properly inspected and maintained. Verify back-up alarms.
		 Ensure that ground spotters are assigned and informed of proper hand signals and communication protocols.
		Identify special PPE (Section 7) and monitoring (Section 8) needs.
	1,2,3	Ensure that field personnel do not work in close proximity to operating
		equipment.

Hazard	Task Number	Hazard Control Measures
		Ensure that lifting capacities, load limits, etc., are not exceeded. Other:
Heights (Scaffolding, Ladders, etc.)		 Ensure compliance with applicable subparts of 29 CFR 1910. Identify special PPE needs (e.g., lanyards, safety nets, etc.) Other:
Noise	1,2,3	 Establish noise level standards for on-site equipment/operations. Inform personnel of hearing protection requirements (Section 7). Define site-specific requirements for noise monitoring (Section 8). Other:
Overhead Obstructions	1,2,3	Wear hard hat. Other:
Power Tools	1,2,3,4	Ensure compliance with 29 CFR 1910 Subpart P. Other:
Sunburn	1,2,3,4,and 5	 Apply sunscreen. Wear hats/caps and long sleeves. Other:
Utility Lines	1,2,3	 Identify/locate existing utilities prior to work. Ensure that overhead utility lines are at least 25 feet away from project activities. Contact utilities to confirm locations, as necessary. Other:
Weather Extremes	1,2,3,4 and 5	 Potential hazards: Establish site-specific contingencies for severe weather situations. Provide for frequent weather broadcasts. Weatherize safety gear, as necessary (e.g., ensure eye wash units cannot freeze, etc.). Identify special PPE (Section 7) needs. Discontinue work during severe weather. Other:
Other:		•
Other:		•

6.2 CHEMICAL HAZARD EVALUATION AND CONTROL

6.2.1 Chemical Hazard Evaluation

Potential chemical hazards are described by task number in Table 6-1. Hazard Evaluation Sheets for major known contaminants are attached at the end of this plan.

Odor Threshold/ Description	Sweet mint	1.6 ppm Aromatic	4.68 ppm Aromatic	0.21 ppm Mild almond		192 ppm sweet	5 ppm	Odorless	Odorless	
Acute Symptoms	Irritation of eyes, dry mouth Throat, nausea, dizztness	Irritation of eyes, URT/ skin Fatigue, confusion	Dizz, GD , nausea, pulmonary edema,	Drowsiness, dizziness, unconsciouness	Drowsiness, irregular heart Beat, death	HA, drowsiness, death, Dizziness, unconsciousness	Irritation, Salivation,Dizz, Vomiting, nausca	Decreased, appetite, Muscle pain	Skin rash, irritation, mucous membrane	
Route(s) of Exposure	Inhalation, Ingestion, Eye, shin	Inhalation, Ingestion, Eye, skin	Inhalation, Ingestion, Eye, Skin	Ingestion, Inhalation, Eye, Skin	Inhalation, Ingestion, Eye, Skin	Inhalation, Ingestion, Eye. Skin	Inhalation, Ingestion, Eye, Skin	Inhalation, Ingestion, Skin	Ingestion, Inhalation, Skin, Eye	
Dermal Hazard (Y/N)	¥	z	Υ	Å.	Å	Y	>	Z	Υ	
TLV	1000 ppm	50 ppm	0.5 ppm	udd 01	100 ppm	10 ppm	100 ppm	0.05 mg/3	0.05 mg/3	
REL	250 ppm	100 ppm	0.1	l	HWC	5ppm	100 ppm	<0.1 mg/3	0.001 mg/3	
PEL	500 ppm	200 ppm	l ppm	75 ppm	1000 ppm	2 ppm	100 ppm	0.05 mg/m3	0.1 mg/m3	
Compound	Acetone	Toluene	Benzene*	Chloro- benzene	Chloro- ethane	Chloroform	Dichloro- Benzene 1,1	Lead	Chromium (hexavalent)	
Task Number	1,2,3,5	1,2,3,5	1,2,3,5	1,2,3,5	1,2,3,5	1,2,3,5	1,2,3,5	1,2,3,5	1,2,3,5	

10.97

ı

11.42

65 %

ŀ

1

i

Ioniz. Poten. (eV)

Relative Response

Exposure Limits (TWA)

FID/PID

CHEMICAL HAZARD EVALUATION

Table 6-1

69.6

60 % 63 %

8.82

100 %

9.25

150 % 100 %

9.07

200 %

Note: Use an asterisk (*) to indicate known or suspected carcinogens.

An appropriate combination of engineering/administrative controls, work practices, and PPE shall be used to reduce and maintain employee exposures to a level at or below published exposure levels (see Section 6.2.1). Applicable Engineering/Administrative Control Measures: Drill cuttings shall be monitored via Organic Vapor Analyzer, and drummed if Readings are above action levels. PPE: See Section 7. 6.3 RADIOLOGICAL HAZARD EVALUATION AND CONTROL 6.3.1 Radiological Hazard Evaluation Potential radiological hazards are described below by task number. Hazard Evaluation Sheets for major known contaminants are attached at the end of this plan. Task DAC Route(s) of Major Energy(s) Radiation(s) Number Radionuclide (µCi/ml) **Exposure** (MeV) Half-Life 6.3.2 Radiological Hazard Control Engineering/administrative controls and work practices shall be instituted to reduce and maintain employee exposures to a level at or below the permissible exposure/dose limits (see sections 4.2.3 and 6.3.1). Whenever engineering/administrative controls and work practices are not feasible or effective, any reasonable combination of engineering/administrative controls, work practices, and PPE shall be used to reduce and maintain employee exposures to a level at or below permissible exposure/dose limits. Applicable Engineering/Administrative Control Measures:

7. LEVEL OF PROTECTION AND PERSONAL PROTECTIVE EQUIPMENT

7.1 LEVEL OF PROTECTION

PPE: See Section 7.

6.2.2 Chemical Hazard Control

The following levels of protection (LOPs) have been selected for each work task based on an evaluation of the potential or known hazards, the routes of potential hazard, and the performance specifications of the PPE. On-site monitoring results and other information obtained from on-site activities will be used to modify these LOPs and the PPE, as necessary, to ensure sufficient personnel protection. The authorized LOP and PPE shall only be changed with the approval of the regional safety coordinator or designee. Level A is not included below because Level A activities, which are performed infrequently, will require special planning and addenda to this SHASP.

Task Number	В	C	D	Modifications Allowed
1,2,3,4 and 5		(X)	X	
,				

Note: Use "X" for initial levels of protection. Use "(X)" to indicate levels of protection that may be used as site conditions warrant.

7.2 PERSONAL PROTECTIVE EQUIPMENT

The PPE selected for each task is indicated below. E & E's PPE program complies with 29 CFR 1910.120 and 29 CFR 1910 Subpart I and is described in detail in the CHSP. Refer to 29 CFR 1910 for the minimum PPE required for each LOP.

			Task Nun	nber/LOP		
PPE	1	2	3	4	5	
Full-face APR						
PAPR						
Cartridges:						
Н						
GMC-H, GMC-P100		(X)	(X)		(X)	
GME-H, GME-P100						
Other:				1		
Positive-pressure, full-face SCBA						
Spare air tanks (Grade D air)						
Positive-pressure, full-face, supplied-air system						
Cascade system (Grade D air)						
Manifold system						
5-Minute escape mask						
Safety glasses	Х					
Monogoggles						
Coveralls/clothing	X	(X)	(X)	(X)	(X)	
Protective clothing:						
Tyvek	X	X	X	X	X	
Saranex		(X)	(X)	(X)	(X)	
Other:						

			Task Nu	mber/LOP		
PPE	1	2	3	4	5	
Splash apron						
Inner gloves:						
Cotton						
Nitrile	X	(X)	(X)	(X)	(X)	
Latex						
Other:						
Outer gloves:						
Viton						
Rubber						
Neoprene		(X)	(X)	(X)	(X)	
Nitrile						
Other:						
Work gloves						
Safety boots (as per ANSI Z41)	X	(X)	(X)	(X)	(X)	
Neoprene safety boots (as per ANSI Z41)						
Boot covers (type:)						
Hearing protection (type: _X)	X	(X)	(X)			
Hard hat	X	(X)	(X)	(X)	(X)	
Face shield						
Other:						
Other:						

8. HEALTH AND SAFETY MONITORING

Health and safety monitoring will be conducted to ensure proper selection of engineering/administrative controls, work practices, and/or PPE so that employees are not exposed to hazardous substances at levels that exceed permissible exposure/dose limits or published exposure levels. Health and safety monitoring will be conducted using the instruments, frequency, and action levels described in Table 8-1. Health and safety monitoring instruments shall have been appropriately calibrated and/or performance-checked prior to use.

				Table 8-1		
			неастн а	HEALTH AND SAFETY MONITORING	ONITORING	
Instrument	Task Number	Contaminant(s)	Monitoring Location	Monitoring Frequency	Action Levels ^a	els
X PID (e.g., HNu IS-101) X FID (e.g., OVA 128-GC)	1,2,3	See Hazards Bvaluation shects	Drilling, Trenching, Sampling	Continuous	Unknown Vapors Background to 1 ppm: Level D 1 to 5 ppm above background: Level C 5 to 500 ppm above background: Level B >500 ppm above background: Level A	Contaminant-Specific
Oxygen Meter/Explosimeter	1,2,3	See Hazard Evaluation sheets	Drilling, Trenching	Continuous	Oxygen <19.5% or >22.0%. Evacuate area; eliminate ignition sources; reassess conditions. 19.5 to 22.0%. Continue work in accordance with action levels for other instruments.	Explosivity \$\leq\$10% LEL.: Continue work in accordance with action levels for other instruments; monitor continuously for combustible atmospheres. >10% LEL.: Evacuate area; eliminate ignition sources; reassess conditions.
Radiation Alert Monitor (Rad-mini or RAM-4) Mini-Ram Particulate Monitor					 40.1 mR/hr: Continue work in accordance with action levels for other instruments. 50.1 mR/hr: Evacuate area; reassess work plan and contact radiation safety specialist. General/Unknown Contaminant-Specific Evaluate health and safety measures when dust levels exceed 2.5 milligrams per cubic meter. 	h action levels for other instruments. n and contact radiation safety specialist. Contaminant-Specific
HCN/H ₂ S (Monitox) Draeger Colorimetric Tubes	ΝΑ				≥4 ppm: Leave area and consult with SSO. Tube Action Level	d Action
Air Monitor/Sampler Type: Sampling medium:	N/A				Action Level	Action

				Table 8-1	
			HEALTH A	HEALTH AND SAFETY MONITORING	ONITORING
Instrument	Task Number	Contaminant(s)	Monitoring Location	Monitoring Frequency	Action Levels ^a
Personal Sampling Pump					Action Level
Type: Sampling medium:					
Micro R Meter					<2 mR/hr: Continue work in accordance with action levels for other instruments. 2 to 5 mR/hr: In conjunction with a radiation safety specialist, continue work and perform stay-time calculations to ensure compliance with dose limits and ALARA policy. >5 mR/hr: Evacuate area to reassess work plan and evaluate options to maintain
Ion Chamber					See micro R meter action levels above.
Radiation Survey Ratemeter/Scaler with External Detector(s)					Detector Action Level Action
Noise Dosimeter (Sound Level Meter)					 \$65 decibels as measured using the A-weighed network (dBa): Use hearing protection if exposure will be sustained throughout work shift. >85 dBA: Use hearing protection. >120 dBA: Leave area and consult with safety personnel.
Other:					
Other:					

Unless stated otherwise, airborne contaminant concentrations are measured as a time-weighted average in the worker's breathing zone. Acceptable concentrations for known airborne contaminants will be determined based on OSHA/NIOSH/ACGIH and/or NRC exposure limits. As a guideline, 1/2 the PEL/REL/TLV, whichever is lower should be used.

9. DECONTAMINATION PROCEDURES

All equipment, materials, and personnel will be evaluated for contamination upon leaving the exclusion area. Equipment and materials will be decontaminated and/or disposed and personnel will be decontaminated, as necessary. Decontamination will be performed in the contamination reduction area or any designated area such that the exposure of uncontaminated employees, equipment, and materials will be minimized. Specific procedures are described below.
Equipment/Material Decontamination Procedures (specified by work plan): All drilling and trenching equipment and associated
equipment shall be steam cleaned, with the Decon water drummed for disposal pending analytical data
Ventilation: All decontamination procedures will be conducted in a well-ventilated area.
Personnel Decontamination Procedures: All personal shall wash hands and face upon exiting the work area
PPE Requirements for Personnel Performing Decontamination: <u>Level D</u>
FFE Requirements for Fersonner Ferforming Decontamination.
Personnel Decontamination in General: Following appropriate decontamination procedures, all field personnel will wash their hands
and face with soap and potable water. Personnel should shower at the end of each work shift.
Disposition of Disposable PPE: Disposable PPE must be rendered unusable and disposed as indicated in the work plan.
Disposition of Decontamination Wastes (e.g., dry wastes, decontamination fluids, etc.): All waste shall remain at the site pending NYSDEC approval to remove from site.
141 5D De approvar to remove from site.
10. EMERGENCY RESPONSE
This section contains additional information pertaining to on-site emergency response and does not duplicate pertinent emergency response information contained in earlier sections of this plan (e.g., site layout, monitoring equipment, etc.). Emergency response procedures will be rehearsed regularly, as applicable, during project activities.
10.1 EMERGENCY RESPONSIBILITIES
All Personnel: All personnel shall be alert to the possibility of an on-site emergency; report potential or actual emergency situations
to the team leader and SSO; and notify appropriate emergency resources, as necessary.
Team Leader: The team leader will determine the emergency actions to be performed by E & E personnel and will direct these
actions. The team leader also will ensure that applicable incidents are reported to appropriate E & E and client project personnel and
government agencies.
SSO: The SSO will recommend health/safety and protective measures appropriate to the emergency.

10.2 LOCAL AND SITE RESOURCES (including phone number	rs)	
Ambulance: 911		
Hospital: Memorial Hospital	***************************************	
Directions to Hospital (map attached at the end of this plan): Exit site Avenue west (right) to Hyde Park Blvd. Go north (right) on Hyde Park Hospital. Hospital is on left (see Figure 10-1).	rk Blvd to Pine Avenue. Go v	west (left) on Pine Avenue to Memoria
Poison Control: 911		
Police Department: 911		
Fire Department: 911		
Client Contact: Mr. Jeffrey Konsella (NYSDEC Albany) 518-402-96	669	
Site Contact: None		
On-Site Telephone Number: <u>TBD</u>		
Cellular Telephone Number: <u>TBD</u>		
Radios Available:		
Other:		
10.3 E & E EMERGENCY CONTACTS		
E & E Emergency Response Center (24 Hours):	716/684-8940	
Corporate Health and Safety Director, Dr. Paul Jonmaire:	716/684-8060 (office)	
Regional Office Contact:	716/655-1260 (home)	(office)
Other:		(home) (office)
a. E & E Emergency Response Center:	716/684-8940	
b. Corporate Health and Safety Director, Dr. Paul Jonmaire:	716/684-8060 (office) 716/655-1260 (home)	
c. Corporate Safety Officer, Tom Siener	716/684-8060 (office) 716/662-4740 (home)	
10.4 OTHER EMERGENCY RESPONSE PROCEDURES On-Site Evacuation Signal/Alarm (must be audible and perceptible at	pove ambient noise and light l	evels):
On-Site Assembly Area:		

Off-Site Assembly Area: TBD
Preferred Means of Reporting Emergencies: Telephone
Site Security and Control: In an emergency situation, personnel will attempt to secure the affected area and control site access.
Emergency Decontamination Procedures: Personal shall be washed with potable water
PPE: Personnel will don appropriate PPE when responding to an emergency situation. The SSO and Section 7 of this plan will
provide guidance regarding appropriate PPE.
Emergency Equipment: Appropriate emergency equipment is listed in Attachment 1. Adequate supplies of this equipment shall be
maintained in the support area or other approved work location.
Incident Reporting Procedures: The Site Safety Officer and Field Team Leader Shall prepare a written report and submit to the corporate
safety officer.

	ATTACHM ENT/SUPPL	ENT 1 IES CHECKLIST	
INSTRUMENTATION	No.	EMERGENCY EQUIPMENT	No.
OVA	1	First aid kit	2
Thermal desorber	į	Stretcher	4
O ₂ /explosimeter w/cal. kit	1	Portable eye wash	2
Photovac tip		Blood pressure monitor	
HNu (probe: 10.2 and 11.7eV)	1	Fire blanket	
Magnetometer	1	Fire extinguisher	2
Pipe locator		Thermometer (medical)	
Weather station		Spill kit	1
Draeger tube kit (tubes:)			
Brunton compass			***
Real-time cyanide monitor	1		A
Real-time H ₂ S monitor			
Heat stress monitor			
Noise equipment		DECONTAMINATION EQUIPMENT	
Personal sampling pumps and supplies		Wash tubs	3
MiniRam dust monitor		Buckets	3
Mercury monitor		Scrub brushes	2
Spare batteries (type:)		Pressurized sprayer	1
		Spray bottle	2
		Detergent (type: TSP)	
RADIATION EQUIPMENT/SUPPLIES		Solvent (type:)	
Documentation forms		Plastic sheeting	1
Portable ratemeter		Tarps and poles	
Scaler/ratemeter		Trash bags	
1" NaI gamma probe		Trash cans	
2" NaI gamma probe		Masking tape	
ZnS alpha probe		Duct tape	
GM pancake probe		Paper towels	X
Tungsten-shielded GM probe		Face mask	
Micro R meter		Face mask sanitizer	
Ion chamber		Step ladders	
Alert monitor		Distilled water	
Pocket dosimeter		Deionized water	X
Dosimeter charger			
Radiation warning tape			
Radiation decon supplies			
Spare batteries (type:			
SAMPLING EQUIPMENT		MISCELLANEOUS (Cont.)	
8-oz. bottles		Gatorade or equivalent X	
Half-gallon bottles		Tables	
VOA bottles	X	Chairs	

EQUIPN	ATTACHM MENT/SUPPL	IENT 1 IES CHECKLIST	
String		Weather radio	
Hand bailers	X	Two-way radios	
Thieving rods with bulbs		Binoculars	
Spoons	X	Megaphone	
Knives		Cooling vest	
Filter paper			
Bottle labels	X		
		SHIPPING EQUIPMENT	
		Coolers	x
MISCELLANEOUS		Paint cans with lids, 7 clips each	
Pump		Vermiculite	
Surveyor's tape		Shipping labels	
100' Fiberglass tape		DOT labels:	
300' Nylon rope		"Up"	
Nylon string		"Danger"	
Surveying flags		"Inside Container Complies"	
Camera		Hazard Group	
Film		Strapping tape	
Bung wrench	X	Baggies	
Soil auger		Custody seals	X
Pick		Chain-of-custody forms	X
Shovel		Federal Express forms	
Catalytic heater		Clear packing tape	X
Propane gas		Permanent markers	
Banner tape			
Surveying meter stick			
Chaining pins and ring			
Logbooks (X large, X small)			
Required MSDSs			
Intrinsically safe flashlight			
Potable water	X		

Slip Sheet

Slip Sheet Figure 10A-1 (8 $\frac{1}{2}$ x 11) color page 1 of 2

Slip Sheet Figure 10A-1 (8 $\frac{1}{2}$ x 11) color page 2 of 2

ecology and environment, inc.

PREPARATION DATE: 4/11/95 HAZARD EVALUATION OF CHEMICALS Job No:

CHEMICAL NAME: Benzene*

DOT NAME/ID NO: UN 1114 CAS NUMBER: 71-43-2 SYNONYMS: BENZOL, BENZOLE, CYCLOHEXATRIENE, BENZOLENE, BICARBURET OF HYDROGEN, CARBON OIL, COAL NAPHTHA

CHEMICAL AND PHYSICAL PROPERTIES:

MOLECULAR WEIGHT: 78.1 CHEMICAL FORMULA: C6H6

PHYSICAL STATE: Colorless liquid with a pleasant odor.

FLAMMABLE LIMITS: UPPER - 8.0 %;LOWER - 1.3 %.

ODOR CHARACTERISTIC: Aromatic

SOLUBILITY: Slightly soluble SPG/D: 0.88 FLASH POINT: 12F (11C)

VAPOR PRESSURE: 75 mmhg at 68F (200C)

Incompatabilities:

BOILING POINT: 80 C (176 F) STRONG OXIDIZING AGENTS, SULFURIC ACID, NITRIC ACID FREEZING POINT: 42F

ODOR THRESHOLD: 4.68 ppm

BIOLOGICAL PROPERTIES

TLV-TWA: 10 ppm

PEL - TWA: 1 ppm

RAT/MOUSE (LC50): LD50 (ORAL-RAT)(MG/KG)-4894; AQUATIC: TERATOGEN: CARCINOGEN: Yes HUMAN (LCLO):

ROUTE OF EXPOSURE: Inh, Ing, Eye, Skin

HANDLING RECOMMENDATIONS (PERSONAL PROTECTIVE MEASURES)

Use SCBA at 10 ppm. Personal protection: Polyvinyl-Alcohol-E; Teflon-VG; Viton-E; Saranax - G; Butyl - P

Gloves:

E = Excellent (> 8 hours); VG = Very Good (4 - 8 hrs); G = Good (1 - 4 hours); P = Poor (< 1 hour)

MONITORING RECOMMENDATIONS

Monitoring:

HEALTH HAZARDS:

Skin irritant, CNS depressant, mostly by inhalation. Initial excitation, followed by dizziness, headache, nausea, vomiting and delirium, may see tremors, blurred vision, shallow respiration and convulsions with severe exposure. Acute Symptoms:

Anorexia, drowsiness, anemia, bleeding under skin, reduced blood clotting, liver, kidney, bone marrow damage, leukemia. Chronic Symptoms:

FIRST AID:

FIRST AID-INHAL: Remove the person from exposure. Begin rescue breathing if breathing has stopped and CPR if heart action has stopped.

FIRST AID-EYE: Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids.

FIRST AID-SKIN: Quickly remove contaminated clothing. Immediately wash area with copious amounts of soap and water. Seek medical attention.

DISPOSALWASTE TREATMENT:

DISPOSAL OF WASTE:

ecology and environment, inc. PREPARATION DATE: 4/11/95 HAZARD EVALUATION OF CHEMICALS : Job No:

CHEMICAL NAME: Chlorobenzene

CAS NUMBER: 108-90-7

DOT NAME/ID NO: UN 1134

SYNONYMS: MCB, Phenyl chloride, Chlorobenzol

CHEMICAL AND PHYSICAL PROPERTIES:

MOLECULAR WEIGHT: 112.56 CHEMICAL FORMULA: C6H5CL

PHYSICAL STATE: Colorless liquid with an aromatic almond-like

FLAMMABLE LIMITS: UPPER - 9.6 %; LOWER - 1.3 %.

VAPOR PRESSURE: 8.8 mm Hg at 68F (20C)

FLASH POINT: 84F (28.9C)

BOILING POINT: 132 C (270 F)

SOLUBILITY: Slightly soluble

SPG/D: 1.11

STRONG OXIDIZING AGENTS Incompatabilities: ODOR CHARACTERISTIC: Mild almond

FREEZING POINT: -50F

BIOLOGICAL PROPERTIES:

PEL - TWA: 75 ppm TLV-TWA: 10 ppm IDLH: 2400 PPM

ODOR THRESHOLD: 0.21 ppm

RAT/MOUSE (LC50): HUMAN (LCLO):

TERATOGEN:

CARCINOGEN:

AQUATIC:

ROUTE OF EXPOSURE: Inh, Ing, Eye, Skin

HANDLING RECOMMENDATIONS (PERSONAL PROTECTIVE MEASURES):

Wear solvent-resistant gloves and clothing. Wear splash-proof chemical goggles and face shield when working with liquid. Respiratory Protection. Personal protection:

Polyvinyl-Alcohol-VG; Teflon-VG; Viton-VG. Gloves: E = Excellent (> 8 hours); VG = Very Good (4 - 8 hrs); G = Good (1 - 4 hours); P = Poor (< 1 hour)

MONITORING RECOMMENDATIONS:

Monitoring:

HEALTH HAZARDS:

Drowsiness, dizziness, incoordination, unconsciousness.Irritate the skin, causing a rash or burning feeling.Irritate the eyes, nose and throat. Acute Symptoms: May damage the liver.skin burns.Reduced memory and concentration, personality changes (withdrawal, irritability),fatigue, sleep disturbances. Chronic Symptoms:

FIRST AID:

FIRST AID-INHAL: Remove the person from exposure. Begin rescue breathing if breathing has stopped and CPR if heart action has stopped. Transfer promptly to a medical facility.

FIRST AID-EYE: Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids.

FIRST AID-SKIN: Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of soap and water.

DISPOSALWASTE TREATMENT:

DISPOSAL OF WASTE

ecology and environment, inc. PREPARATION DATE: 4/11/95 HAZARD EVALUATION OF CHEMICALS Job No:

CHEMICAL NAME: Chloroethane

DOT NAME/ID NO: CAS NUMBER: 75-00-3

SYNONYMS: ETHYLCHLORIDE, HYDROCHLORIC EHTER

CHEMICAL FORMULA:

CHEMICAL AND PHYSICAL PROPERTIES:

FLAMMABLE LIMITS: PHYSICAL STATE:

MOLECULAR WEIGHT:

FREEZING POINT:

Incompatabilities:

SOLUBILITY:

SPG/D:

BOILING POINT:

FLASH POINT:

BIOLOGICAL PROPERTIES:

ODOR CHARACTERISTIC: ---

VAPOR PRESSURE:

PEL - TWA: 1000 ppm TLV-TWA: 1000 ppm

ODOR THRESHOLD: ---

RAT/MOUSE (LC50): TERATOGEN: HUMAN (LCLO): CARCINOGEN:

AQUATIC:

ROUTE OF EXPOSURE: Inh, Ing, Eye, Skin

HANDLING RECOMMENDATIONS (PERSONAL PROTECTIVE MEASURES):

Personal protection:

Gloves:

E = Excellent (> 8 hours); VG = Very Good (4 - 8 hrs); G = Good (1 - 4 hours); P = Poor (< 1 hour)

MONITORING RECOMMENDATIONS:

Monitoring:

HEALTH HAZARDS:

Drowsiness, unconsiousness, irregular heart beat, death, IRR (eyes/skin) Acute Symptoms:

10.97 Chronic Symptoms:

FIRST AID:

FIRST AID-INHAL:

FIRST AID-EYE:

FIRST AID-SKIN:

DISPOSAL/WASTE TREATMENT:

DISPOSAL OF WASTE:

ecology and environment, inc. PREPARATION DATE: 4/11/95 HAZARD EVALUATION OF CHEMICALS ************************* Job No:

CHEMICAL NAME: Chloroform*

CAS NUMBER: 67-66-3

DOT NAME/ID NO: UN 1888

SYNONYMS: TRICHLOROMETHANE, FORMYLTRICHLORIDE

CHEMICAL AND PHYSICAL PROPERTIES:

MOLECULAR WEIGHT: 119.38 CHEMICAL FORMULA: CHCL3

PHYSICAL STATE: Colorless liquid with a pleasant, sweet odor.

SOLUBILITY: Slightly soluble SPG/D: 1.48

FLAMMABLE LIMITS:

FREEZING POINT: -82F VAPOR PRESSURE: 160 mm Hg at 68F (20C) ODOR CHARACTERISTIC: Sweet

STRONG BASES, ALKALI METALS, ALUMINUM, MAGNESIUM, STRONG OXIDIZING AGENTS Incompatabilities:

BOILING POINT: 61 C (142 F)

FLASH POINT:

BIOLOGICAL PROPERTIES:

PEL - TWA: 2 ppm TLV-TWA: 10 ppm IDLH: 1000 PPM

ODOR THRESHOLD: 192 ppm RAT/MOUSE (LC50): LD50 (ORAL-RAT)(MG/KG)-1194; HUMAN (LCLO):

AQUATIC: TERATOGEN: Yes CARCINOGEN: Yes

ROUTE OF EXPOSURE: Inh, Ing, Eye, Skin

HANDLING RECOMMENDATIONS (PERSONAL PROTECTIVE MEASURES):

Avoid skin contact with Chloroform. Wear solvent resistant gloves and clothing. Eye Protection. Respiratory Protection. Personal protection:

Polyvinyl-Alcohol-E; Teflon-VG; Viton-E. Gloves: E = Excellent (> 8 hours); VG = Very Good (4 - 8 hrs); G = Good (1 - 4 hours); P = Poor (< 1 hour)

MONITORING RECOMMENDATIONS:

Monitoring:

HEALTH HAZARDS:

HA, drowsiness, death,irritate the skin,irritate the nose and throat,severe eye burns,headache., dizziness, unconsciousness, irregular heart beat Acute Symptoms:

PROBABLE CARCINOGEN in humans, skin drying and cracking. Chronic Symptoms:

FIRST AID:

FIRST AID INHAL: Remove the person from exposure. Begin rescue breathing if breathing has stopped and CPR if heart action has stopped. Transfer promptly to a medical facility.

FIRST AID-EYE: Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids. Seek medical attention immediately.

FIRST AID-SKIN: Quickly remove contaminated clothing. Immediately wash area with large amounts of soap and water. Seek medical attention immediately.

DISPOSAL/WASTE TREATMENT:

DISPOSAL OF WASTE

ecology and environment, inc. PREPARATION DATE: 4/11/95 HAZARD EVALUATION OF CHEMICALS Job No:

CHEMICAL NAME: Chromium (hexavalent)*

DOT NAME/ID NO: CAS NUMBER: 7440-47-3

SYNONYMS: CHROMIC OXIDE, SOLUBLE CHROMIC SALTS

CHEMICAL FORMULA:

CHEMICAL AND PHYSICAL PROPERTIES:

FLAMMABLE LIMITS: PHYSICAL STATE:

MOLECULAR WEIGHT:

SPG/D:

SOLUBILITY:

VAPOR PRESSURE:

FREEZING POINT:

Incompatabilities:

BOILING POINT:

FLASH POINT:

ODOR CHARACTERISTIC: Odorless

PEL - TWA: 0.1 mg/m3 C TLV-TWA: 0.05 mg/m3 BIOLOGICAL PROPERTIES: IDLH: 250 MG/M3

ODOR THRESHOLD: ...

TERATOGEN: HUMAN (LCLO): CARCINOGEN:

AQUATIC:

RAT/MOUSE (LC50):

ROUTE OF EXPOSURE: Inh, Ing, Eye, Skin

HANDLING RECOMMENDATIONS (PERSONAL PROTECTIVE MEASURES):

Personal protection:

Gloves:

E = Excellent (> 8 hours); VG = Very Good (4 - 8 hrs); G = Good (1 - 4 hours); P = Poor (< 1 hour)

MONITORING RECOMMENDATIONS:

Monitoring:

HEALTH HAZARDS:

Skin rash; Irr.: eye/skin/mucous membranes. Acute Symptoms:

Chronic Symptoms:

FIRST AID:

FIRST AID-INHAL:

FIRST AID-EYE:

FIRST AID-SKIN:

DISPOSAL/WASTE TREATMENT:

DISPOSAL OF WASTE:

ecology and environment, inc. PREPARATION DATE: 4/11/95 HAZARD EVALUATION OF CHEMICALS Job No:

CHEMICAL NAME: Dichlorobenzene, 1,1-

CAS NUMBER: 75-34-3

DOT NAME/ID NO:

SYNONYMS: ETHYLDIENE CHLORIDE, ETHYLENE DICHLORIDE, DCA

CHEMICAL AND PHYSICAL PROPERTIES:

CHEMICAL FORMULA: PHYSICAL STATE:

FLAMMABLE LIMITS:

MOLECULAR WEIGHT:

SPG/D:

SOLUBILITY:

BOILING POINT:

FREEZING POINT:

Incompatabilities:

FLASH POINT:

ODOR CHARACTERISTIC: ---VAPOR PRESSURE:

RAT/MOUSE (LC50): TLV-TWA: 100 ppm

BIOLOGICAL PROPERTIES:

TERATOGEN: HUMAN (LCLO): CARCINOGEN:

AQUATIC:

ODOR THRESHOLD: 5 ppm PEL - TWA: 100 ppm

ROUTE OF EXPOSURE: Inh, Ing, Eye, Skin

HANDLING RECOMMENDATIONS (PERSONAL PROTECTIVE MEASURES):

Personal protection:

Polyvinyf-Alcohol-G; Viton-G.

Gloves:

E = Excellent (> 8 hours); VG = Very Good (4 - 8 hrs); G = Good (1 - 4 hours); P = Poor (< 1 hour)

MONITORING RECOMMENDATIONS:

Monitoring:

HEALTH HAZARDS:

IRR (URT/eyes/skin), salivation, sneezing, coughing, DIZZ, NAU, VOM. Acute Symptoms:

Chronic Symptoms:

FIRST AID:

FIRST AID-INHAL:

FIRST AID-EYE:

FIRST AID-SKIN:

DISPOSAL/WASTE TREATMENT:

DISPOSAL OF WASTE:

ecology and environment, inc. PREPARATION DATE: 4/11/95 HAZARD EVALUATION OF CHEMICALS

CHEMICAL NAME: Lead

Job No:

CAS NUMBER: 7439-92-1

DOT NAME/ID NO: None

SYNONYMS: WHITE LEAD, PLUMBUM

CHEMICAL AND PHYSICAL PROPERTIES:

CHEMICAL FORMULA: PB

PHYSICAL STATE: A heavy, soft gray metal

FLAMMABLE LIMITS:

VAPOR PRESSURE: -1.77 mm Hg at 1832F

SPG/D: 11.34

MOLECULAR WEIGHT: 207.2

SOLUBILITY: Slightly soluble

BOILING POINT: 3164F

FLASH POINT:

ODOR CHARACTERISTIC: Odorless

Incompatabilities: STRONG OXIDIZERS, HYDROGEN PEROXIDE, ACIDS

FREEZING POINT:

BIOLOGICAL PROPERTIES:

PEL - TWA: 0.05 mg/m3 TLV-TWA: 0.05 mg/m3

RAT/MOUSE (LC50):

ODOR THRESHOLD:

IDLH: VARIABLE HUMAN (LCLO):

AQUATIC: TERATOGEN: Yes

ROUTE OF EXPOSURE: Inh, Ing, Eye, Skin

HANDLING RECOMMENDATIONS (PERSONAL PROTECTIVE MEASURES):

Avoid skin contact with Lead dust and fume. Wear protective gloves, full body and hat clothing. Wear dust-proof goggles. Respiratory Protection. Personal protection:

Gloves:

E = Excellent (> 8 hours); VG = Very Good (4 - 8 hrs); G = Good (1 - 4 hours); P = Poor (< 1 hour)

MONITORING RECOMMENDATIONS:

Monitoring

HEALTH HAZARDS:

Decreased appetite, muscle pain, seizures Acute Symptoms: Lead may decrease fertility in males and females, fredness, trouble sleeping, stomach problems, constipation, headaches and moodiness, trouble concentrating and remembering things. Chronic Symptoms:

FIRST AID:

FIRST AID-INHAL: Resp support

FIRST AID-EYE: Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids.

FIRST AID-SKIN: Remove contaminated clothing. Wash contaminated skin with soap and water.

DISPOSAL/WASTE TREATMENT:

DISPOSAL OF WASTE:

ecology and environment, inc. HAZARD EVALUATION OF CHEMICALS

PREPARATION DATE: 4/11/95

CHEMICAL NAME: Toluene

Job No: DOT NAME/ID NO: UN 1294 CAS NUMBER: 108-88-3

SYNONYMS: PHENYL METHANE, METHYL BENZENE

CHEMICAL AND PHYSICAL PROPERTIES:

MOLECULAR WEIGHT: 92.14 CHEMICAL FORMULA: C6H5CH3

PHYSICAL STATE: Colorless liquid with a sweet pungent odor.

FLAMMABLE LIMITS: UPPER - 7.1 %;LOWER - 1.2 %.

VAPOR PRESSURE: 22 mm Hg at 68F

STHONG OXIDIZING AGENTS, NITRIC ACID, SULFURIC ACID, CHLORINE Incompatabilities:

FREEZING POINT: -139F

FLASH POINT: 40F

BOILING POINT: 111 C (232 F)

SOLUBILITY: Slightly soluble

SPG/D: 0.87

ODOR CHARACTERISTIC: Aromatic

BIOLOGICAL PROPERTIES:

TLV-TWA: 50 ppm

ODOR THRESHOLD: 1.6 ppm

RAT/MOUSE (LC50): LD50 (ORAL-RAT)(MG/KG)-5000; PEL - TWA: 200 ppm IDLH: 2000 PPM HUMAN (LCLO):

AQUATIC: TERATOGEN: CARCINOGEN: Yes

ROUTE OF EXPOSURE: Inh, Ing, Eye, Skin

HANDLING RECOMMENDATIONS (PERSONAL PROTECTIVE MEASURES):

Avoid skin contact with Toluene. Wear solvent resistant gloves and clothing. Wear splash proof chemical goggles and face shield. Respiratory Protection. Personal protection:

Polyvinyl-Alcohol-E; Teflon-E; Viton-E. Gloves:

E = Excellent (> 8 hours); VG = Very Good (4 - 8 hrs); G = Good (1 - 4 hours); P = Poor (< 1 hour)

MONITORING RECOMMENDATIONS:

Monitoring:

HEALTH HAZARDS:

Irritation of eyes/URT/skin; fatigue, weakness, confusion, HA, DIZZ, LOC Acute Symptoms: May damage the developing fetus, may damage bone marrow, causing low blood cell count, headaches, loss of appetite, nausea, and liver and kidney damage, and may cause brain damage. Chronic Symptoms:

FIRST AID:

FIRST AID-INHAL: Remove the person from exposure.

FIRST AID-EYE: Immediately flush with large amounts of water for at least 15 minutes, occasionally iliting upper and lower lids.

FIRST AID-SKIN: Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of soap and water.

DISPOSAL/WASTE TREATMENT:

DISPOSAL OF WASTE: DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL

COLD STRESS PREVENTION AND TREATMENT

Cold temperatures are potentially hazardous, especially when work is conducted without appropriate precautions. The following sections describe cold stress prevention and the recognition and treatment of cold stress emergencies.

Preventing Emergencies Due to Cold Stress

When working in situations where the ambient temperature is low, especially if low temperatures are accompanied by windy conditions, personnel should use the following cold-stress prevention measures:

- Wear warm, dry, loose-fitting clothing that is preferably worn in layers.
 Outer clothing should be waterproof and windproof. Inner clothing should be capable of retaining warmth even when it is wet (e.g., wool or polypropylene) or have wicking capabilities (to draw moisture and perspiration away from the skin).
- Wear lined and insulated footwear and warm gloves or mittens.
- Alternately remove and don clothing layers as necessary to regulate body temperature and reduce excess perspiration.
- Drink warm fluids as often as desired.
- Take frequent breaks to provide for cold stress monitoring.

Cold Stress Emergencies

Hypothermia. Exposure to cold can cause the body's internal temperature to drop to a dangerously low level. Hypothermia occurs when a person's body loses heat faster than it can be produced. The body's normal deep-body temperature is approximately 98.6 degrees Fahrenheit. If body temperature drops to 95 degrees Fahrenheit, uncontrollable shivering may occur. If cooling continues, these other symptoms may occur:

- Vague, slow, slurred speech;
- Forgetfulness, memory lapses;
- Inability to use hands;
- Frequent stumbling;
- Drowsiness;
- Exhaustion, collapse;
- Unconsciousness; and
- Death.

Hypothermia impairs the judgment of the victim. Hypothermia is possible even in temperatures above freezing and can be prevented by remaining warm and dry and avoiding overexposure to the cold.

If a person shows symptoms of hypothermia, perform the following:

- Remove the victim from exposure to wet and cold weather.
- Remove wet clothing.
- If the victim is only mildly affected, provide warm drinks and dry clothing.
- If the victim is more seriously affected (clumsy, confused, unable to shiver), begin safe-warming procedures such as hugging, wrapping in dry blankets, and the use of warm objects such as hot water bottles or heat packs, and arrange for evacuation. Do not give the victim warm drinks until he or she exhibits a clear level of consciousness and appears to be warming up.

Frostbite. Frostbite occurs when body tissue freezes. Severe frostbite can lead to reduced circulation and the possible need for amputation. To prevent frostbite, maintain good circulation and keep extremities warm and dry. In extreme cold, it is important to prevent heat loss from as many areas of the body as possible. Exposed limbs and the head are major areas of heat loss.

Tall, thin people; those in poor physical condition; people with chronic diseases; heavy smokers; children; the elderly; and those who have been drinking alcohol are more susceptible to frostbite than other people due to poor circulation, poor production of body heat, or both.

There may be no pain or numbness experienced with gradual freezing of body tissues. While in the cold, it is important to test extremities for sensation and ensure that clothing is loose-fitting and warm. Exposed parts of the body should be inspected routinely. Just before freezing, skin becomes bright red. As freezing continues, small white patches will appear and the skin will become less elastic, often remaining pitted after it is touched or squeezed.

Serious freezing is most common in the feet because people are less aware of them, circulation and sensation are poorer, and warm footwear is difficult to obtain. Hands are usually the next to freeze. Exposed parts of the head will freeze less rapidly because they are conditioned to exposure and have a better blood supply.

In very cold weather, avoid touching cold metal with bare body parts. In the event that this happens, release the skin gently using heat, warm water, or urine. Avoid handling gasoline, kerosene, or similar liquids which, when handled in cold weather, can cause immediate frostbite.

If a person shows symptoms of frostbite, consult a medical professional, if possible, and perform the following:

• Initiate rewarming only if subsequent refreezing is not a possibility (thawing and refreezing should always be avoided because this is very injurious to tissue). Rewarm body parts in water that is approximately 100 to 105

degrees Fahrenheit. Do not try to thaw the body parts using cold water, snow, or intense heat from fires or stoves. The whole body may be immersed in warm water if necessary.

- If a large portion of an extremity is frozen when rewarming is initiated, the deep body temperature may drop as cooled blood begins to circulate throughout the body. Provide warm liquids to alleviate this situation.
- Move the afflicted part gently and voluntarily during rewarming.
- Use pain medication if it is available. Rewarming can be acutely painful. After thawing is completed, a deep pain may persist for several days, depending on the severity of the frostbite. Pain may be a good sign as it indicates that nerve function is present.
- A dull purple color, swelling, or blisters indicate serious injury and the need for medical attention. Consult a medical professional.

HEAT STRESS PREVENTION AND TREATMENT

Elevated temperatures are potentially hazardous, especially when work is conducted without appropriate precautions. The following sections describe heat stress prevention and the recognition and treatment of heat emergencies.

Effects of Heat

(

A predictable amount of heat is generated as a result of normal oxidation processes within the body. If heat is liberated rapidly, the body cools to a point at which the production of heat is accelerated, and the excess heat brings the body temperature back to normal.

Interference with the elimination of heat leads to its accumulation and to the elevation of body temperature. This condition produces a vicious cycle in which certain body processes accelerate and generate additional heat. Afterward, the body must eliminate not only the heat that is normally generated but also the additional quantities of heat.

Most body heat is brought to the surface by the bloodstream and escapes to cooler surroundings by conduction and radiation. If moving air or a breeze strikes the body, additional heat is lost by convection. When the temperature of the surrounding air becomes equal to or rises above the body temperature, all the heat must be lost by vaporization of the moisture or sweat from skin surfaces. As the air becomes more humid (contains more moisture), vaporization from the skin decreases. Weather conditions including high temperatures (90 to 100 degrees F), high humidity, and little or no breeze cause the retention of body heat. Such conditions or a succession of such days (a heat wave) increase the chances of a medical emergency due to heat.

Preventing Emergencies Due to Heat

When working in situations where the ambient temperatures and humidity are high, and especially in situations where protection levels A, B, or C are required, the site safety officer should:

- Ensure that all employees drink plenty of fluids (Gatorade or its equivalent);
- Ensure that frequent breaks are scheduled so overheating does not occur; and
- Revise work schedules, when necessary, to take advantage of the cooler parts of the day (i.e., 5:00 a.m. to 11:00 a.m. and 6:00 p.m. to nightfall).

When protective clothing is required, the suggested guidelines correlating ambient temperature and maximum wearing time per excursion are:

Ambient Temperature	Maximum Wearing Time per Excursion
Above 90 degrees F	15 minutes
85 to 90 degrees F	30 minutes
80 to 85 degrees F	60 minutes
70 to 80 degrees F	90 minutes

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60 to 70 degrees F 50 to 60 degrees F

120 minutes 180 minutes

One method of measuring the effectiveness of an employee's rest-recovery regime is by monitoring the heart rate. The "Brouha guideline" is one such method and is performed as follows:

- Count the pulse rate for the last 30 seconds of the first minute of a 3-minute period, the last 30 seconds of the second minute, and the last 30 seconds of the third minute; and
- Double each result to yield beats per minute.

If the recovery pulse rate during the last 30 seconds of the first minute is 110 beats/minute or less, and the deceleration between the first, second, and third minutes is at least 10 beats/minute, then the work-recovery regime is acceptable. If the employee's rate is above the rate specified, a longer rest period will be required, accompanied by an increased intake of fluids.

Heat Emergencies

Heat Cramps. Heat cramps usually affect people who work in hot environments and perspire a great deal. Loss of salt from the body causes very painful cramps in leg and abdominal muscles. Heat cramps may also result from drinking iced water or other drinks either too quickly or in too large a quantity. The symptoms of heat cramps are:

- Painful muscle cramps in legs and abdomen;
- Faintness; and
- Profuse perspiration.

To provide emergency care for heat cramps, move the patient to a cool place. Give him or her sips of liquids such as Gatorade or its equivalent. Apply manual pressure to the cramped muscle. Move the patient to a hospital if there is any indication of a more serious problem.

Heat Exhaustion. Heat exhaustion also may occur in individuals working in hot environments and may be associated with heat cramps. Heat exhaustion is caused by the pooling of blood in the vessels of the skin. The heat is transported from the interior of the body to the surface by the blood. The skin vessels become dilated and a large amount of blood is pooled in the skin. This condition, plus the blood that is pooled in the lower extremities when in an upright position, may lead to an inadequate return of blood to the heart and eventual physical collapse. The symptoms of heat exhaustion are:

- Weak pulse;
- Rapid and usually shallow breathing;
- Generalized weakness;
- Pale, clammy skin;

- Profuse perspiration;
- Dizziness/faintness; and
- Unconsciousness.

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To provide emergency care for heat exhaustion, move the patient to a cool place and remove as much clothing as possible. Have the patient drink cool water, Gatorade, or its equivalent. If possible, fan the patient continually to remove heat by convection, but do not allow chilling or overcooling. Treat the patient for shock and move him or her to a medical facility if there is any indication of a more serious problem.

Heat Stroke. Heat stroke is a profound disturbance of the heat-regulating mechanism and is associated with high fever and collapse. It is a serious threat to life and carries a 20% mortality rate. Sometimes this condition results in convulsions, unconsciousness, and even death. Direct exposure to sun, poor air circulation, poor physical condition, and advanced age (over 40) increase the chance of heat stroke. Alcoholics are extremely susceptible. The symptoms of heat stroke are:

- Sudden onset;
- Dry, hot, and flushed skin;
- Dilated pupils;
- Early loss of consciousness;
- Full and fast pulse;
- Deep breathing at first, followed by shallow or faint breathing;
- Muscle twitching, growing into convulsions; and
- Body temperature reaching 105 to 106 degrees F or higher.

When providing emergency care for heat stroke, remember that it is a life-threatening emergency. Transportation to a medical facility should not be delayed. Move the patient to a cool environment, if possible, and remove as much clothing as possible. Ensure an open airway. Reduce body temperature promptly by dousing the body with water or, preferably, by wrapping the patient in a wet sheet. If cold packs are available, place them under the arms, around the neck, at the ankles, or any place where blood vessels that lie close to the skin can be cooled. Protect the patient from injury during convulsions.





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HEALTH AND SAFETY ON DRILLING RIG OPERATIONS

H&S 5.3

REVISED:

April 1998

HEALTH AND SAFETY ON DRILLING RIG OPERATIONS

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TITLE

HEALTH AND SAFETY ON DRILLING RIG OPERATIONS

CATEGORY:

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1. Introduction

This document is meant to be used in conjunction with Ecology and Environment, Inc., (E & E) standard operating procedures (SOPs) for field operations and hazardous waste site operations, and incorporates by reference all safety precautions required therein. It specifically addresses the functions and responsibilities of personnel working on or around drilling operations.

E & E personnel are frequently required to oversee a subcontractor's work in the field using drill rigs to take soil and rock samples, and install piezometers and monitoring wells. This document discusses the supervision of subcontract drillers by E & E.

2. Responsibilities and Authority of Subcontract Driller

The subcontract driller has authority to direct its personnel within the area while drilling operations are in progress. Access to the hazardous area around the auger and borehole is restricted by a "super exclusion zone" delineated by a 4-foot by 8-foot sheet of plywood centered over the borehole before drilling. A large hole cut in the plywood allows penetration of the augers. No E & E personnel are allowed in this "super exclusion zone" at any time while drilling is underway.

Housekeeping around the rig is the responsibility of the driller, but all team members should, when necessary, participate in this effort.

2.1 Responsibility and Authority of E & E Personnel

E & E personnel working at a drilling site must act as support to the subcontract drilling team by providing any necessary support functions; however, it is important that E & E personnel are careful not to interfere with the drilling process. Personnel are restricted from approaching the "super exclusion zone" while drilling is underway. If an E & E crew member recognizes an unsafe condition in the work area or on the rig, he should bring it to the attention of the site safety officer (SSO) and team leader if it is not resolved in a timely manner by the subcontractor driller. If conditions are still deemed to be hazardous, team members have the option of contacting their regional safety coordinator (RSC) or Corporate Health and Safety Group in Buffalo.

It is the responsibility of all E & E personnel to have with them on site their issued nondisposable gear, including hard hat, face shield, respirator, steel-toed boots, eyepiece inserts, safety glasses, and appropriate outerwear for the expected weather. It is the E & E employee's responsibility to ensure that all of his/her equipment is in proper working order.



All personnel should be aware of emergency facilities, egress routes, and special medical conditions of their team members. As with all E & E fieldwork, the buddy system is to be enforced.

3. Training Requirements for Site Personnel

3.1 E & E Site Safety Officer

In addition to basic health and safety training, annual health and safety refresher training, first aid, cardiopulmonary resuscitation (CPR), and necessary training in field monitoring of personnel, an SSO should have previous experience as a team member on field drilling projects in order to have a working knowledge of the drill rig and the extreme hazards that can occur with its operation. Where monitoring instrumentation is to be used, the SSO must be properly trained prior to fieldwork. The SSO must have an understanding of the hazards of heat and cold stress, their associated symptoms, and proper work modifications to protect field staff from potential injury.

3.2 Other E & E Personnel

All E & E personnel present on site shall have taken the basic 40-hour health and safety course and annual 8-hour refresher training course. Field personnel also must meet medical and respiratory fitness test requirements established by E & E and Occupational Safety and Health Agency (OSHA).

3.3 Subcontract Driller and Other Subcontract Drilling Personnel

Subcontract drillers and their support personnel on site must, at a minimum, have passed basic 40-hour health and safety training as prescribed by OSHA 29 Code of Federal Regulations (CFR)1910.120. They shall be medically approved and trained to use the level(s) of respiratory protection required on site. Certification of training by the subcontractor shall be required as a deliverable included in E & E's contractual documentation. This training shall be verbally verified and logged on site by the SSO or team leader before starting work.

4. Supervision of Subcontract Drillers

4.1 Responsibilities and Authority of Site Safety Officer

The responsibilities of the SSO at a drilling site where subcontracted drillers are used include the following: rig inspections, personnel monitoring, and personnel protection.

A rig inspection should begin by verifying the following:



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- The mast must be located at least 25 feet from any overhead or underground utility lines;
- The location and operation of operational and unencumbered kill switches must be reiterated to all site personnel;
- Outriggers, stabilizers, or jacks are in place, and the rig is level;
- A geophysical survey (e.g., electromagnetic or ground-penetrating radar)
 or a reliable site history must be obtained to verify the absence of underground utilities, buried obstacles, tanks, and drums;
- A first aid kit and filled eyewash bottle must be readily available;
- A fire extinguisher should be charged to the proper pressure and placed at the rear of the rig during drilling;
- The condition of ropes, chains, and cables must be checked;
- A lifeline or safety belt must be available if mast climbing is necessary;
- The Site Safety Plan (SSP) must be posted with emergency phone list and map of hospital route; and
- A "super exclusion zone" must be established around the borehole, using traffic cones or a 4-foot by 8-foot sheet of plywood. This defined area will be entered during active drilling only by the subcontract driller and his helper(s), except in emergency situations.

If, upon review, the SSO deems that any material item noted above requires replacement or repair, the SSO must make necessary the arrangements for that repair or replacement, and later verify that repair or replacement is sufficient before actual drilling begins. Similarly, if the conditions listed above are not met, the SSO must request that they be met to his satisfaction before allowing drilling to proceed. Working together, the SSO and the subcontract driller should verify that the rig has been checked against the operator's checklist.

The SSO's monitoring duties include calibration and setup of the appropriate monitoring devices, as specified in the SSP. At a minimum, this generally includes an O₂/explosimeter and real-time organic-vapor monitoring capabilities (e.g., HNU, organic vapor analyzer [OVA]). Noise and heat-stress monitoring are employed where appropriate. If the SSO believes additional monitoring devices beyond the directive of the SSP should be employed (e.g., Rad Mini, Mini Ram), it is his/her responsibility to obtain this equipment from the nearest E & E office through the cooperation of the RSC or the Corporate Health and Safety Group. The SSO is also responsible for ensuring that a trained operator for this additional equipment is on site.



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It is the responsibility of the SSO to ensure that all safety equipment is in good working order. Day-to-day operations, as well as calibration data, must be recorded in the equipment log or SSO log. Adequate supplies such as breathing air, drinking liquids, and calibration gas must be maintained.

E & E personnel are forbidden from entering the "super exclusion zone" around the borehole while drilling is underway. The SSO must not attempt to take air readings in or around the auger while it is in use, or from cutting samples while the auger is in motion. If possible, an O_2 /explosimeter should be set up for unmanned (alarmed) operations at the rig, using an extension hose to continuously draw samples from the borehole area during drilling operations.

The SSO has ultimate authority over the subcontractor with regard to whether work practices meet the requirements of the SSP. Shutdown of work or restriction of personnel are options available to the SSO. The SSO should hold informal site safety briefings at the start of both fieldwork and daily work shifts throughout the course of the project. Although E & E contractually requires subcontractors to provide properly trained and outfitted staff, the SSO should verify verbally at the start-up meeting that the field staff has necessary respiratory approval and OSHA-mandated training, especially at hazardous waste sites. Site safety briefing topics, as well as the names of attendees, will be recorded in the site safety log.

If the SSO has reason to believe that either E & E or subcontractor personnel are under the influence of alcohol or drugs, or are otherwise ill before or during work on site, he or she should consider restricting those team members from site work. Personnel who are to perform work that requires Level C protection must be clean-shaven or they may be restricted at the discretion of the SSO.

The following is a list of basic topics to be discussed at site safety meetings:

- Personnel responsibilities;
- Planned investigation and presumed potential hazards;
- Levels of protection, monitoring plan, and equipment;
- Emergency scenario plans, including use of kill switches;
- Location and operation of kill switches, fire extinguisher, and first aid kits;
- Heat and cold stress hazards;
- "Super exclusion zone" around borehole; and
- Warnings to subcontractors about hazards of climbing the mast without proper safety equipment.

Because heat stress is a constant threat during warm weather, the SSO is responsible for determining whether conditions are unsuitable for work. If site conditions require the assistance



of work modifications, cooling vests, and other cooling means, the SSO may decide that work should not continue. The need for worker monitoring through blood pressure and oral temperature checks will be determined by the SSO with assistance from the RSC and Corporate Health and Safety Group staff, if necessary.

The SSO will be responsible for shutting down the drilling operation if electrical storms occur in the site area.

No refueling operations will be performed until rig engines are shut down. Motor fuels should be stored and dispensed from spring-loaded, OSHA/Factory Mutual-approved metal or polyethylene gas cans.

The SSO should ensure and document that no boreholes are left open or unfilled after drilling equipment is moved. In instances where a hole must be left open and unattended, suitable barricades or the equivalent will be staged around the hole to prevent personnel and equipment from falling in.

4.2 Responsibilities and Authority of Other E & E Personnel

All E & E personnel on site are required to follow the terms of the SSP and the direction of the SSO. Because the SSO cannot be in all places at all times, the crew should observe the subcontractors and condition of their equipment at all times, and report immediately to the team leader and SSO any safety-related issues that are unresolved. Included are such details as dressout, site functions, and decontamination. It is important that the SSO be involved so that proper log entries can be made.

It is a policy of E & E not to provide safety equipment or monitoring instrumentation to subcontractors. Some projects, however, may be arranged in such a manner that allows E & E personnel and subcontractors to share the same expendable supplies.

E & E personnel are forbidden from approaching augers during drilling. Activities at the borehole, such as sampling, require that the operation of equipment be stopped.

5. Drilling Hazards

5.1 General Drilling Hazards

Drilling operations present numerous health and safety hazards to site personnel, subcontractor drillers, and members of the public who may approach the rigs. Drilling hazards that apply to all drilling methods and possible control methods include:

- Slip/trip/fall hazards;
- Ergonomic hazards;
- Moving objects;



- Unguarded points of operation;
- Heat/cold stress;
- Noise:
- Buried or overhead utilities;
- · Radiological hazards;
- Lightning;
- · Chemical hazards; and
- Biological hazards.

5.2 Physical Hazards (Slip/Trip/Fall Hazards)

Personnel may be injured if they trip over tools or objects, walk on uneven terrain, fall from heights or into holes, or slip on surfaces.

Controls

- Store all tools and supplies away from the super exclusion zone;
- Personnel should use caution when walking on uneven surfaces so that they do not lose their balance;
- Subcontractor drillers must wear a lifeline or safety belt if mast climbing is necessary;
- Boreholes should be barricaded or marked with flags when drilling has been completed to prevent personnel from stepping in the hole; and
- Soil or sand should be applied to wet or slippery surfaces.

5.3 Ergonomic Hazards

Muscle strains, sprains, and injuries can occur when personnel use improper lifting methods, lift objects that are too heavy, improperly reach for objects, or work in awkward positions.



Controls

- Lift with the back as straight as possible, bend the knees, and keep the object close to the body;
- Use two people to move heavy objects such as augers;
- · Avoid excessive stretching of the arms when picking up objects; and
- Avoid sudden twisting of the back or working in awkward positions.

5.4 Moving Objects

Site personnel may be injured if they are struck by debris from the borehole or by drilling machinery or components.

Controls

- Wear the appropriate personal protective equipment such as safety boots, safety glasses, and a hard hat; and
- Adequate inspection and maintenance of the drill rig will reduce the likelihood of worn equipment or parts falling and causing accidents.

5.5 Unguarded Points of Operation

The spinning auger on a drill rig or the V-belt drive on a motor are unguarded points of operation that can pull site personnel into the machinery and cause serious injuries.

Controls

- Mechanical guards cannot be placed around the spinning auger on a drill rig. Site personnel must stay away from the spinning auger and avoid wearing loose clothing that could get caught in the auger; and
- Mechanical guards must be placed over V-belt drives.

5.6 Heat/Cold Stress

Drilling is a strenuous job, and heat stress is a major hazard in hot, humid environments, especially when personnel are wearing protective equipment such as coveralls, gloves, boots, and respirators. Cold injury can occur at low temperatures and when the wind-chill factor is low.





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Heat Stress

Controls

- Recognize the signs and symptoms of heat stress;
- Monitor workers who are wearing protective clothing; and
- Provide fluid replacement and schedule rest periods in cool locations.

Cold Stress

Controls

- Recognize the signs and symptoms of cold stress;
- Personnel must wear appropriate clothing during cold weather; and
- A warm rest location and fluid replacement should be provided.

5.7 Noise

Excessive noise can cause hearing damage, distract workers, and interfere with communications.

Controls

• In excessive noise areas, wear the hearing protection recommended by the SSO.

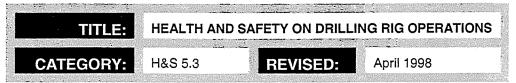
5.8 Buried or Overhead Utilities

Contact of drilling tools with electric, gas, steam, process, or other utility lines can result in fires, explosions, electric shock hazards, burns, etc.

Controls

- The boom on the drill rig must be kept at least 25 feet from overhead and buried utilities;
- After buried utilities have been located using an appropriate geophysical survey, the line locations should be marked with flags. Maps of underground utilities should also be checked, if available, to verify locations; and





• Drilling operations should proceed slowly in areas near buried utilities, as the actual utility location may not exactly correspond to the area identified by a flag or as illustrated on a map.

5.9 Radiological Hazards

5.9.1 Nonionizing Radiation

Nonionizing radiation is radiation that emits photon energy that is not sufficient to produce ionization in biological systems. Radio frequencies (including radar and microwave), infrared, visible light, and ultraviolet regions of the electromagnetic spectrum are considered to be nonionizing. Ultraviolet radiation from the sun is usually the major nonionizing radiation hazard present during drilling operations. Ultraviolet radiation can damage the skin and eyes. Potential effects include, but are not limited to, sunburn, skin cancer, photosensitization, and cataracts.

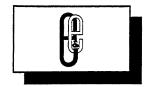
Controls

- Wear sunscreen on all exposed skin areas; and
- Wear safety glasses that block ultraviolet radiation (or sunglasses worn over safety glasses).

5.9.2 Ionizing Radiation Hazards

Ionizing radiation is electromagnetic or particulate radiation with sufficient energy to ionize atoms. Ionizing radiation may be present on some drilling sites and includes:

- Electromagnetic radiation
 - Gamma rays
 - X-rays
- Particulate radiation
 - Alpha
 - Beta
 - Neutrons





Controls

Site personnel can minimize their exposure to external radiation hazards by:

- Limiting exposure time;
- Increasing the distance from the radiation source; and
- Shielding the radiation source.

Some radiation sources can enter the body through inhalation, ingestion, and/or skin contact. Exposure can be controlled through the wearing of personal protective equipment and thorough washing of skin surfaces with soap and water.

5.10 Lightning Hazard

The elevated mast on a drill rig is a potential target of lightning.

Controls

• The SSO will halt drilling operations when electrical storms approach the drilling location.

5.11 Chemical Hazards

Chemical contaminants may be present in the form of gases, vapors, aerosols, fumes, liquids, or solids. Site personnel may be exposed to these contaminants through one or more of the following pathways: inhalation, ingestion, skin, and/or eye contact.

Controls

- Become familiar with the specific drilling operation being used to identify and avoid chemical discharge locations;
- Wear appropriate personal protective equipment;
- · Practice contamination avoidance; and
- Stay upwind during grout mixing (silica inhalation hazard).



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5.12 Biological Hazards

Biological hazards that may be present during drilling operations include poisonous plants, animals, and insects, and infectious agents.

Controls

- Wear insect repellant at sites where biting insects are prevalent;
- Learn to identify poisonous plants that cause dermatitis, such as poison ivy and poison oak;
- Wear impervious personal protective clothing (e.g., saranex coveralls, latex booties, nitrile surgical gloves) if work must be conducted in areas where site personnel will contact poisonous plants; and
- Avoid potential animal nesting areas and animal carcasses.

6. Drilling Methods and Hazards

6.1 Solid Flight and Bucket Augers

Solid-flight augers (also referred to as solid-stem augers, continuous flight augers, and disk augers) use solid-stem auger sections, with the flighting (curved corkscrew-like blades) connected end-to-end to the cutting head (see Figure 1). Soil cuttings are moved upward to the ground surface by the flighting as the auger penetrates into the soil. Samples are typically collected by removing an auger section, attaching a split-spoon or thin-wall sampler to the end of a drill rod, and placing this arrangement into the borehole. Split-spoon samples are collected by using a hammer connected to the drill rod and split-spoon. The hammer is operated by wrapping sections of rope around a rotating cathead hoist (a wide metal cylinder). A disk auger is similar to a solid-flight auger except that it is larger in diameter and the flighting goes around the stem once. Bucket augers have a cutting edge on the bottom. Once the bucket auger fills with soil cuttings, it is brought to the surface to be emptied. Figure 1 shows various types of bucket augers.

Auger drill methods are used in unconsolidated material for sampling subsurface media, installing groundwater monitoring wells, and identifying depth to bedrock.

6.2 Hollow-Stem Auger

A drill rig rotates a hollow-stem auger (see Figure 2) and moves it vertically into the soil. The hollow stem allows use of continuous or intermittent soil sampling techniques. Once the required depth has been reached, screens and casing for monitoring wells can be placed in the



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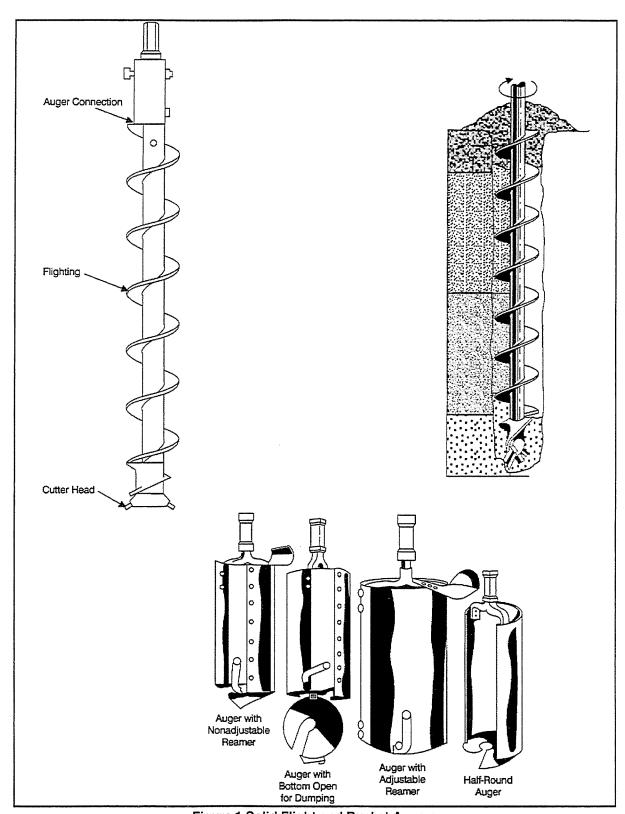


Figure 1 Solid Flight and Bucket Augers



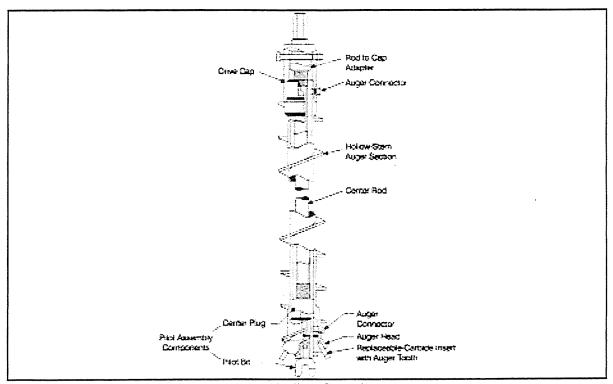


Figure 2 Hollow-Stem Auger

hollow-stem gravel pack and grout is added as the auger is pulled out of the borehole. Hollow-stem auger drilling is a common method of monitoring well installation.

6.2.1 Auger Drilling Hazards

Physical Hazards

Spinning Auger. The spinning auger is not equipped with a metal guard; therefore, it is imperative that personnel use extreme caution when working near spinning augers, as contact with the auger can cause personnel to be pulled into the auger and crushed between the auger and the drill rig. Only approved drillers will remain in proximity to the borehole during drilling, and an approximate 4- by 8-foot "super exclusion area" will be established around the moving auger at all times. The "super exclusion zone" may be established by placing a 4- by 8-foot sheet of plywood over the borehole, or by placing flagging or traffic cones around a 4- by 8-foot perimeter. No personnel, except the driller and the driller's helper, will enter this zone during drilling. The SSO will issue warnings to those personnel not authorized to enter this zone.

Overhead Equipment. If wire line core sampling is conducted, drill steel and sampling gear will be lifted overhead. Site personnel must conduct the necessary equipment inspections to ensure it is in good condition prior to the start of drilling operations. In addition, drillers must



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make sure that proper hoisting procedures are used to reduce the likelihood of dropping drill steel or sampling gear.

Drill Rig Lurching. The drill rig has a tendency to lurch and shake when the auger comes into contact with harder materials. This is especially true when hollow-stem auger drilling methods are utilized. The rig can also lurch seriously in hearing sands. Site personnel should be aware of possible drill rig movement and move away from the rig if lurching or shaking occurs.

Noise. If split-spoon sampling is conducted, a hammer is used to drive the spoon into the soil. The hammer generates a loud noise when it contacts a metal surface. Site personnel are required to wear appropriate hearing protection during hammering operations.

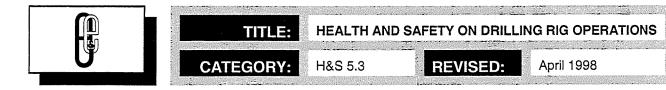
6.3 Open-Hole Rotary Methods

A direct mud rotary drilling system (also direct [liquid] rotary, hydraulic rotary, or reverse [circulation] rotary) is shown in Figure 3. Drilling fluid (mud) is pumped through drill rods to a bit. The mud flows back to the surface through the space between the drill rods and the borehole and is discharged at the surface through a pipe into a tank, tub, pond, or pit. After the cuttings settle, a pump recirculates the liquid back through the drill rods. The mud serves to:

- Cool and lubricate the bit;
- Stabilize the borehole well; and
- Prevent the inflow of fluids from formations.

A shale shaker can collect a sample from the circulated fluid by placing it in the discharge flow before the settling pit. In addition, the drilling fluid flow can be shut off and split-spoon, thin-wall, or consolidated-core samplers can be used to collect a sample by inserting a sampler through the drill rods. Reverse circulation rotary drilling is a variation of mud rotary drilling in that the mud flows from the mud pit down the borehole outside the drill rods, passes up through the bit carrying cuttings into the drill rods, and is then discharged into the mud pit. The equipment used is similar to the direct mud rotary method, except most of the equipment is larger.

Equipment Breaks. A break in support equipment for drill steel could cause equipment to fall and injure site personnel. Equipment inspection is required to ensure it is in good condition prior to the start of drilling operations.



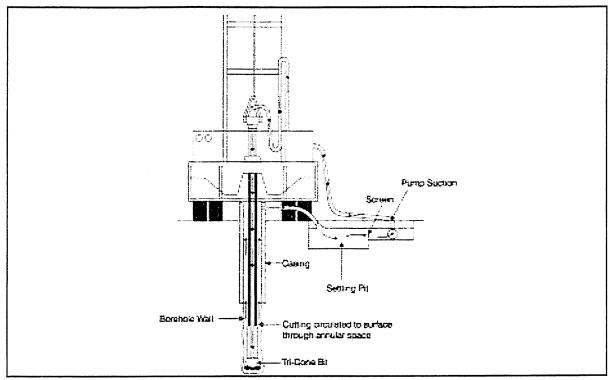


Figure 3 Open-Hole Rotary Method

Slippery Conditions. Because the use of drilling mud will create slippery conditions around the drill rig and support area, mud should be contained to the immediate work area. Slippery spots should be dried with sand/dirt to reduce slipping hazards. Gloves should be changed when they become coated with mud.

6.4 Direct Air Rotary with Rotary Bit/Downhole Hammer

Also called an air rotary with roller-cone (tri-cone) bit, down-the-hole hammer, or air percussion rotary, the rig setup for air rotary with a tri-cone or roller-cone bit is similar to direct mud rotary (see Figure 3), except the method uses air instead of water and drilling mud. The main components of a drill string using a tri-cone bit are illustrated in Figure 4. Compressed air is forced down through the drill rods to cool the bit, and cuttings are carried up the open hole to the surface. A cyclone slows down the air velocity, forcing the cuttings into the container. A roller-cone drill bit is used for hard-to-soft consolidated rock and unconsolidated formations. When a downhole hammer is utilized, it replaces the roller-cone bit (see Figure 4). The hammer produces a pounding action as it rotates. Other features are similar to the rotary bit, except small amounts of surfactant and water are used for dust and bit temperature control.





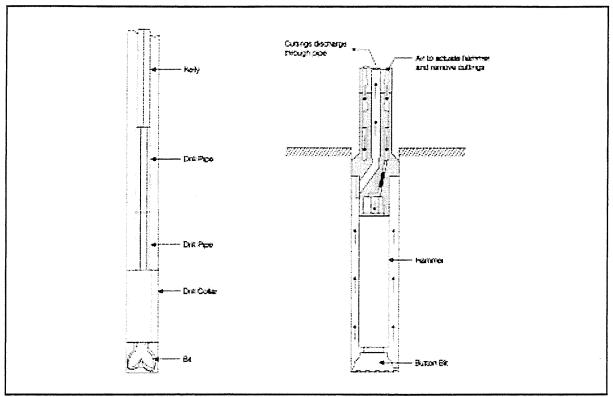


Figure 4 Direct Air Rotary

Physical Hazards

Noise. Excessive noise is generated from the use of air compressors, casing drivers, and downhole hammers. Site personnel are required to wear hearing protection during drilling operations.

Cuttings and Water. Cuttings and water blown from the hole can strike and injure site personnel. Site personnel must stay away from this discharge location and wear appropriate personal protective equipment.

Overhead Equipment. If wire line core sampling is conducted, drill steel and sampling gear will be lifted overhead. Site personnel must conduct the necessary equipment inspections to ensure it is in good condition prior to the start of drilling operations. In addition, drillers must make sure that proper hoisting procedures are followed to reduce the likelihood of falling drill steel or sampling gear.





6.5 Cable Tool

A cable tool drill rig operates by repeatedly lifting and dropping tools attached to a cable into a borehole. Figure 6-5 shows the components of a cable tool rig. This drilling method crushes rock and a spudding beam mixes the crushed particles with water. The water and debris is removed by a bailer or pump. In unconsolidated formations, a casing is driven into the ground. In consolidated formations, drilling is conducted without the use of a casing.

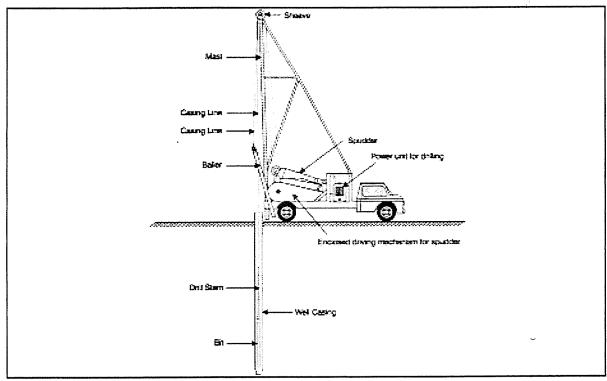


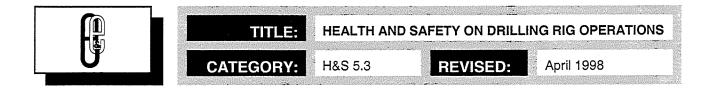
Figure 5 Cable Tool Drill Rig

Physical Hazards

Noise. The spudding beam generates excessive noise. All personnel must wear appropriate hearing protection during drilling operations.

Rig Movement. The drill rig tends to lurch as the drill string is raised and lowered. Site personnel must maintain an adequate distance from the rig during drilling operations.

Overhead Equipment. Drill string and bailers are hoisted during drilling operations and present an overhead hazard to site personnel if a tool falls from a height.



6.6 Casing Advancement: Rotary Drill-Through Methods

6.6.1 Drill-Through Casing Driver and Dual Rotary Method

Casing driver advancement (also referred to as air (mud) rotary drill or downhole hammer with casing drivers, air rotary casing hammer, and air drilling with casing hammer) involves a driver that moves the casing as drilling occurs (see Figure 6) during the use of conventional direct air (mud) or downhole hammer equipment. Drill cuttings move upward in the space between the drill pipe and the casing. The diameter of the casing is slightly larger than the bit so it can be easily removed.

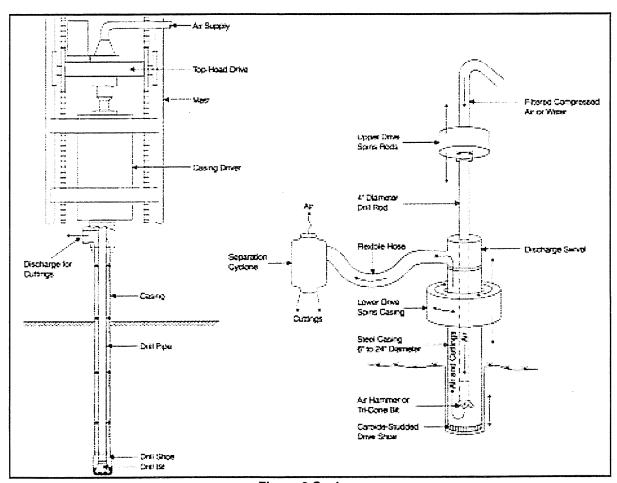


Figure 6 Casings

In dual rotary advancement, the casing is moved by using a rotating steel casing provided with a carbide-studded drive shoe. The carbide ring cuts through the overburden material. Rotary drilling (usually air) takes place at the same time using a downhole hammer or tri-cone bit. Drilling can be conducted either inside or ahead of the casing.





This type of drilling is used to install monitoring wells in unconsolidated formations, where loss of circulation of drilling fluids is a problem, and/or where prevention of cross-contamination of aquifers is important.

6.6.2 Reverse Circulation (Rotary, Percussion Hammer, and Hydraulic Percussion)

The reverse-circulation rotary drilling method can utilize air rotary with a downhole hammer or bit or mud rotary. Two or three casings can be used.

Reverse circulation dual-wall rotary. This method is similar to downhole hammers with a casing driver or air rotary-cone bit, except air is moved down the space between the casing and the drill pipe to the bit, and soil cuttings are pushed to the surface through the drill pipe (see Figure 7).

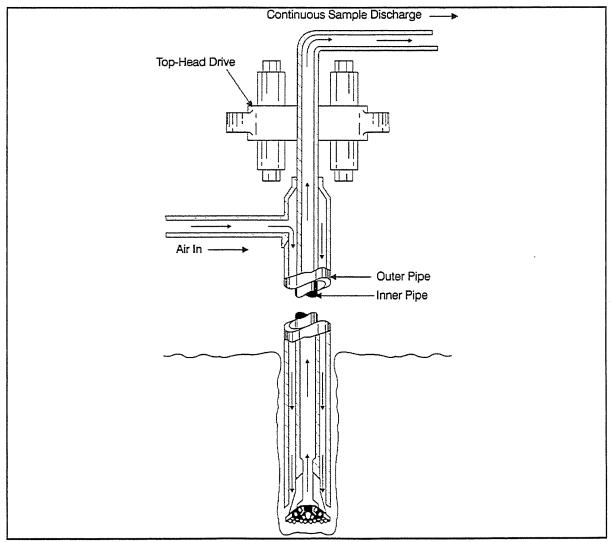


Figure 7 Reverse Circulation Rotary Method





Reverse circulation dual-wall percussion hammer. The percussion hammer operates in a similar manner of reverse circulation as the dual-wall rotary method, except the drive method is different. Either two or three casings are used. Compressed air is moved into the space between the outer and inner pipes, and soil cuttings are discharged from the inner pipe to a cyclone. A percussion hammer on the most of the drill rig strikes an anvil on the top of the drive assembly. Two or three casings are driven, and the bit does not rotate.

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Hydraulic percussion. This method is similar to the jet-percussion method, except a check valve is located between the bit and the lower part of the drill pipe. Water fills the space between the drill rods and well casing and the drill rods are lifted and dropped. A reciprocating motion moves the water and drill cuttings to the surface where they enter a tank. Water is returned to the hole from the tank. Casing is driven as drilling proceeds.

Physical Hazards—Reverse Circulation Dual-Wall Rotary

Noise. Excessive noise is generated from the use of air compressors, casing drivers, and downhole hammers. Site personnel are required to wear hearing protection during drilling operations.

Cuttings. Cuttings and debris discharged from the hole can strike and injure site personnel. Site personnel must stay away from the discharge point and wear appropriate personal protective equipment.

Overhead Equipment. If wire line core sampling is conducted, drill steel and sampling gear will be lifted overhead. Site personnel must conduct the necessary equipment inspections to ensure it is good condition prior to the start of drilling operations. In addition, drillers must make sure that proper hoisting procedures are followed to reduce the likelihood of dropping drill steel or sampling gear.

Physical Hazards—Hydraulic Percussion

Slips/Falls. Site personnel can slip on wet ground around the drill rig or fall into the water tank. Site personnel must keep the drilling location clear of debris and contain spillage prior to and during drilling operation.



Site-specific Quality Assurance Project Plan (QAPP)

Site-specific Quality Assurance Project Plan (QAPP) for the Supplemental Remedial Investigation at the Former Frontier Chemical Waste Process, Inc., Site Site No. 9-32-10 Niagara Falls, New York

July 2001

Prepared for:

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
50 Wolf Road
Albany, New York

NYSDEC Project Manager	Date	E & E Project Manager	Date
NYSDEC OA Officer	Date	E & E QA Officer	———— Date

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ist of Acronyms

CLP Contract Laboratory Program

DUSR Data Usability Summary Report

E & E Ecology and Environment Engineering, P.C.

FSP Field Sampling Plan

MSB Method Spike Blank

MS/MSD Matrix Spike/Matrix Spike Duplicate

NRTMP Niagara River Toxics Management Plan

NYSDEC New York State Department of Environmental Conservation

PCB Polychlorinated Biphenyls

PCDD/PCDF Polychlorinated dibenzo-p-dioxins and dibenzo-furans (dioxins and furans)

QAPP Quality Assurance Project Plan

QA/QC Quality Assurance/Quality Control

SDG Sample Delivery Group

SOW Scope of Work

SVOCs Semivolatile Organics

TAL Target Analyte List

TCL Target Compound List

TCLP Toxicity Characteristic Leaching Procedure

VOCs Volatile Organic Compounds

Date:

July 2001



QAPP Quality Assurance Project Plan

E & E Ecology and Environment Engineering, P.C.

NYSDEC New York State Department of Environmental Conservation

SOW scope of work

Project Management

This site-specific Quality Assurance Project Plan (QAPP) has been prepared by Ecology and Environment Engineering, P.C. (E & E) for the New York State Department of Environmental Conservation (NYSDEC), under Superfund Standby Contract No. D003493, Work Assignment Number D003493-30. E & E personnel will implement this site-specific QAPP for all activities conducted under the Frontier Chemical Project.

This QAPP has been prepared as part of the Work Plan for the project and is an addendum to master NYSDEC QAPP (E & E 2001). This addendum documents changes, modifications, or new procedures and practices to be used that are applicable to activities anticipated under this investigation. This site-specific QAPP is formatted to address the four major sections listed in the master QAPP: Project Management, Data Generation and Acquisition, Assessment and Oversight, and Data Validation and Usability. The information provided only covers deviations or new procedures for implementing the project. Any subsection that is not changed is not included in this QAPP. General tables with site-specific information have been added to this QAPP for easier review of site-specific requirements.

1.1 Project Organization

The project team for this site is listed below on Table 1B-1.

1.2 Problem Definition/Background

The problem and background for this work assignment are defined in Section 2 of the Work Plan.

1.3 Project Description

The specific scope of work (SOW) for the current activities is defined in the Work Plan Section 3 and includes the following areas:

Date:

July 2001

1. Project Management

Table 1B-1 Project Organization Frontier Chemical Site

Key Team Member	Contact Name
NYSDEC Project Manager	Jeffrey Konsella
NYSDEC QA Officer	Tom Labaren
E & E Project Manager	Gene Florentino
E & E Field Team Leader	Brian Cervi
E & E Project Chemist	Marcia Galloway
Driller	SJB Services, Inc
Field Assistance	Watts Engineers
Survey Services	McIntosh & McIntosh, P.C.
Laboratory	Ecology & Environment's Analytical Services Center and
	Paradigm Analytical Laboratories, Inc.
Data Validator	Chemworld Environmental, Inc.

■ Problem(s) to be resolved;

QA/QC

quality assurance/quality control

NRTMP Niagara River
Toxics Management Plan

- Direct and indirect measurements required;
- Applicable technical or regulatory quality assurance/quality control (QA/QC) standards or criteria;
- Any special resources (e.g., personnel or equipment) needed for the site;
- Scope and schedule of the project deliverables; and
- Any special assessment or oversight procedures necessary to verify site-specific quality objectives are met.

1.4 Quality Objectives and Criteria

General quality objectives and performance criteria for the NYSDEC projects are applicable to this project. In addition to the general quality objectives, E & E also is monitoring for compounds present in the Niagara River Toxics Management Plan (NRTMP). The quality objective is to determine if these compounds are a significant source of the compounds to the river.

1.5 Special Training/Certification

There are no site-specific training requirements for work assignment.

1.6 Documents and Records

Sample identification will be the same as the master QAPP except for groundwater samples collected from existing or replacement



Date:

July 2001

1. Project Management

wells which will be named for the existing monitoring designation. The three-letter code for this site will be FFC. Laboratory report requirements are the same as the master QAPP.

The following records and reports will be produced as part of this project.

- Work Plan,
- Site-specific Health and Safety Plan,
- Site-specific QAPP,
- Field Logbook,
- Geotechnical Logbook,
- Chain-of-custody Form,
- Laboratory Data Package Category B,
- Data Usability Summary Report (DUSR),
- Draft Report, and
- Final Report.

Separate technical reports for the RI and FS will be issued as described in Section 3 of the Work Plan.

DUSR Data Usability Summary Report

Date:

July 2001



Data Generation and Acquisition

This samples and analytical methods planned for this site are provided on Table 3-1 of the Work Plan. The analytical methods are listed on Table 2B-1. Current reporting limits and control limits are provided on Tables 2-2 and 2-3 of the master QAPP except for the NRTMP compounds and dioxin. The proposed reporting limits and control limits for these compounds are provided on Tables 2B-2 and 2B-3.

Table 2B-1 Required Analytical Methods for the Frontier Chemical Site

Method Number	Description
ILM04.0	Contract Laboratory Program (CLP) Tar-
	get Analyte List (TAL) Metals
OLM04.2	CLP Target Compound List (TCL) Vola-
	tile Organic Compounds (VOCs)
OLM04.2	CLP TCL Semivolatile Organics
	(SVOCs)
OLM04.2	CLP TCL Pesticide and Polychlorinated
	Biphenyls (PCB)
OLM04.2	NRTMP Compounds Mirex and
Pest/PCB	Octachlorostyrene
Analysis	
1311, 8260B	TCLP VOCs
1311, 8270C	TCLP SVOCs
1311, 6010B,	TCLP Metals including mercury
7470A /71A	-
ILM04.0	Cyanide
1613B	Polychlorinated dibenzo-p-dioxins and
	dibenzo-furans [dioxins and furans]
	(PCDD/PCDF)]
ASTM D2216	Percent Solids
130.2	Hardness

CLP Contract Laboratory Program

TAL
Target Analyte List

TCL Target Compound List

TCLP Toxicity Characteristic Leaching Procedure

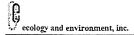
VOCs Volatile Organic Compounds

SVOCs Semivolatile Organic Compounds

PCBs Polychlorinated Biphenyls

PCDD/PCDF Polychlorinated dibenzop-dioxins and dibenzofurans

Date: July 2001



2. Data Generation and Acquisition

Table 2B-2 Method Reporting Limits for Additional Compounds, Frontier Chemical Site

Test Name and Method	Analyte	Matrix	Units	PQL	Guidance Value (1)	Flag ⁽²⁾
PCDD/PCDF by Method 1613B	2378-TCDD	Solid	pg/g	0.5	N/A ⁽³⁾	
PCDD/PCDF by Method 1613B	12378-PeCDD	Solid	pg/g	2.5	N/A ⁽³⁾	
PCDD/PCDF by Method 1613B	123478-HxCDD	Solid	pg/g	2.5	N/A ⁽³⁾	
PCDD/PCDF by Method 1613B	123678-HxCDD	Solid	pg/g	2.5	N/A ⁽³⁾	
PCDD/PCDF by Method 1613B	123789-HxCDD	Solid	pg/g	2.5	N/A ⁽³⁾	
PCDD/PCDF by Method 1613B	1234678-HpCDD	Solid	pg/g	2.5	N/A ⁽³⁾	
PCDD/PCDF by Method 1613B	OCDD	Solid	pg/g	5	N/A ⁽³⁾	
PCDD/PCDF by Method 1613B	2378-TCDF	Solid	pg/g	0.5	N/A ⁽³⁾	
PCDD/PCDF by Method 1613B	12378-PeCDF	Solid	pg/g	2.5	N/A ⁽³⁾	
PCDD/PCDF by Method 1613B	23478-PeCDF	Solid	pg/g	2.5	N/A ⁽³⁾	
PCDD/PCDF by Method 1613B	123478-HxCDF	Solid	pg/g	2.5	N/A ⁽³⁾	
PCDD/PCDF by Method 1613B	123678-HxCDF	Solid	pg/g	2.5	N/A ⁽³⁾	
PCDD/PCDF by Method 1613B	234678-HxCDF	Solid	pg/g	2.5	N/A ⁽³⁾	
PCDD/PCDF by Method 1613B	123789-HxCDF	Solid	pg/g	2.5	N/A ⁽³⁾	
PCDD/PCDF by Method 1613B	1234678-HpCDF	Solid	pg/g	2.5	N/A ⁽³⁾	-
PCDD/PCDF by Method 1613B	1234789-HpCDF	Solid	pg/g	2.5	N/A ⁽³⁾	
PCDD/PCDF by Method 1613B	OCDF	Solid	pg/g	5	$N/A^{(3)}$	
PCDD/PCDF by Method 1613B	2378-TCDD	Water	pg/L	10	NA	
PCDD/PCDF by Method 1613B	12378-PeCDD	Water	pg/L	50	NA	
PCDD/PCDF by Method 1613B	123478-HxCDD	Water	pg/L	50	NA	
PCDD/PCDF by Method 1613B	123678-HxCDD	Water	pg/L	50	NA	
PCDD/PCDF by Method 1613B	123789-HxCDD	Water	pg/L	50	NA	
PCDD/PCDF by Method 1613B	1234678-HpCDD	Water	pg/L	50	NA	
PCDD/PCDF by Method 1613B	OCDD	Water	pg/L	100	NA	
PCDD/PCDF by Method 1613B	2378-TCDF	Water	pg/L	10	NA	
PCDD/PCDF by Method 1613B	12378-PeCDF	Water	pg/L	50	NA	
PCDD/PCDF by Method 1613B	23478-PeCDF	Water	pg/L	50	NA	
PCDD/PCDF by Method 1613B	123478-HxCDF	Water	pg/L	50	NA	
PCDD/PCDF by Method 1613B	123678-HxCDF	Water	pg/L	50	NA	
PCDD/PCDF by Method 1613B	234678-HxCDF	Water	pg/L	50	NA	
PCDD/PCDF by Method 1613B	123789-HxCDF	Water	pg/L	50	NA	
PCDD/PCDF by Method 1613B	1234678-HpCDF	Water	pg/L	50	NA	
PCDD/PCDF by Method 1613B	1234789-HpCDF	Water	pg/L	50	NA	
PCDD/PCDF by Method 1613B	OCDF	Water	pg/L	100	NA	
PCDD/PCDF by Method 1613B	Total PCDD/PCDF	Water	pg/L	5.01 ⁽⁴⁾	0.7 (4)	L

Date:

July 2001

ecology and environment, inc.

2. Data Generation and Acquisition

Table 2B-2 Method Reporting Limits for Additional Compounds, Frontier Chemical Site

Test Name and Method	Analyte	Matrix	Units	PQL	Guidance Value ⁽¹⁾	Flag [®]
CLP Pesticide/PCB by Method OLM04.2	Mirex	Water	μg/L	TBD	0.03	TBD
CLP Pesticide/PCB by Method OLM04.2	Octachlorostyrene	Water	μg/L	TBD	0.2	TBD

- (1) Criteria shown are Class GA groundwater standards and guidance values (water matrix) from the NYSDEC, Division of Water, Technical and Operational Guidance Series 1.1.1, June 1998 and soil cleanup objectives (solid matrix) from NYSDEC Division of Hazardous Waste Remediation Technical and Administrative Guidance Memorandum 4046, January 1994.
- (2) Criteria that are below the reporting limit are flagged "L". The reporting limit does not account for values reported below the reporting and above the method detection limit (MDL). In many cases, the MDL will be below the criteria.
- (3) As per TAGM 4046 total pesticides less than 10 parts per million (i.e., less than 10⁷ pg/g).
- (4) Value is the total of the 2378-TCDD equivalent for each PCDD and PCDF PQL. The 2378-TCDD equivalent for each PCDD and PCDF is calculated by multiplying its PQL by the toxicity equivalency factor (TEF). The TEF values listed in the NYSDEC, Division of Water, Technical and Operational Guidance Series 1.1.1 were used. The criterion listed is for the total of the PCDD and PCDFs as equivalents of 2378-TCDD. For the calculation of the 2378-TCDD equivalent for actual sample results, only the positive results are used.

Key:

 μ g/L = Micrograms per liter.

CLP = Contract Laboratory Program.

N/A = Not available.

NA = Not applicable.

PCDD = Polychlorinated dibenzo-p-dioxins.

PCDF = Polychlorinated dibenzo-p-furans.

pg/kg = Pikograms per kilogram.

pg/L = Pikograms per liter.

PQL = Practical Quantitation Limit.

PCB = Polychlorinated biphenyl.

TBD = To be determined.

Table 2B-3 Method Quality Control Limit Summary for Additional Compounds, Frontier Chemical Site

Analyte	Method	Matrix	Samp	Anal		High Limit
2378-TCDD	1613B	Water/Solid	LCS	A	67	158
12378-PeCDD	1613B	Water/Solid	LCS	A	70	142
123478-HxCDD	1613B	Water/Solid	LCS	A	64	164
123678-HxCDD	1613B	Water/Solid	LCS	A	76	134
123789-HxCDD	1613B	Water/Solid	LCS	A	64	162
1234678-HpCDD	1613B	Water/Solid	LCS	A	70	140
OCDD	1613B	Water/Solid	LCS	A	78	144
2378-TCDF	1613B	Water/Solid	LCS	A	75	158
12378-PeCDF	1613B	Water/Solid	LCS	A	80	134
23478-PeCDF	1613B	Water/Solid	LCS	A	68	160
123478-HxCDF	1613B	Water/Solid	LCS	A	72	134
123678-HxCDF	1613B	Water/Solid	LCS	A	84	130
123789-HxCDF	1613B	Water/Solid	LCS	A	78	130
234678-HxCDF	1613B	Water/Solid	LCS	A	70	156

Date:

July 2001

Cology and environment, inc.

2. Data Generation and Acquisition

Table 2B-3 Method Quality Control Limit Summary for Additional Compounds, Frontier Chemical Site

	iei Glieffilicai Gite	INTERNAL		and the state of the	7 \$ 0.45	a a la la managa a m
			Samp		Low	
Analyte	Method	Matrix	Type			High Limit
1234678-HpCDF	1613B	Water/Solid	LCS	A	82	122
1234789-HpCDF	1613B	Water/Solid	LCS	A	78	138
OCDF	1613B	Water/Solid	LCS	A	63	170
³⁷ Cl-2378-TCDD	1613B	Water/Solid	LCS	S	31	191
2378-TCDD	1613B	Water/Solid	MS	A	70	130
12378-PeCDD	1613B	Water/Solid	MS	A	70	130
123478-HxCDD	1613B	Water/Solid	MS	A	70	130
123678-HxCDD	1613B	Water/Solid	MS	A	70	130
123789-HxCDD	1613B	Water/Solid	MS	A	70	130
1234678-HpCDD	1613B	Water/Solid	MS	A	70	130
OCDD	1613B	Water/Solid	MS	A	70	130
2378-TCDF	1613B	Water/Solid	MS	A	70	130
12378-PeCDF	1613B	Water/Solid	MS	A	70	130
23478-PeCDF	1613B	Water/Solid	MS	A	70	130
123478-HxCDF	1613B	Water/Solid	MS	A	70	130
123678-HxCDF	1613B	Water/Solid	MS	A	70	130
123789-HxCDF	1613B	Water/Solid	MS	A	70	130
234678-HxCDF	1613B	Water/Solid	MS	A	70	130
1234678-HpCDF	1613B	Water/Solid	MS	A	70	130
1234789-HpCDF	1613B	Water/Solid	MS	A	70	130
OCDF	1613B	Water/Solid	MS	Α	70	130
³⁷ Cl-2378-TCDD	1613B	Water/Solid	MS	S	70	130
Mirex	OLM04.2_PPCB	Water	MS	A	TBD	TBD
Octachlorostyrene	OLM04.2_PPCB	Water	MS	A	TBD	TBD

Note: All limits are presented in percent recovery.

Key:

A = Target analyte.

MS = Matrix spike.

S = Surrogate.

LCS = Laboratory Control Sample.

TBD = To be determined.

Date: July 2001

ecology and environment, inc.

2. Data Generation and Acquisition

Project-specific requirements for field QC samples are provided below on Table 2B-4.

Table 2B-4 Field Quality Control Requirements for the Frontier Chemical Site

QC Sample	Description
Field Duplicate	One per matrix per 20 samples for each analysis.
Trip Blank	One per shipment for each cooler in which sam-
	ples for VOC analysis are shipped. Trip blanks
	are analyzed for all VOC methods designated for
	the samples. Trip blanks are shipped for only
	aqueous matrices.
Field Equipment	One per five samples collected with non-
Blank	dedicated equipment (split-spoon sampler).
	Field equipment blanks will be collected for the
	same parameters the samples they represent are
	collected for. Field equipment blank samples
	will be prepared only for the subsurface soil
	samples collected with the split-spoon sampler
	during drilling. All other samples will be col-
	lected with dedicated equipment, therefore, no
	other field equipment blanks are necessary.

The collection of field QC samples is the same as the master QAPP and in accordance with NYSDEC guidelines, with the exception of the rate of collection of field equipment blanks. NYSDEC guidelines specify that field equipment blanks should be collected at the rate of one sample per day, per equipment set. However, because only five samples will be collected with non-dedicated equipment (split-spoon sampler) in a short period of time (three days), only one field equipment blank sample will be collected for this project.

The collection of laboratory QC samples is the same as the master QAPP. Project-specific requirements for laboratory QC samples are provided below on Table 2B-5.

Date:

July 2001

2. Data Generation and Acquisition

Table 2B-5 Laboratory Quality Control Samples for the Frontier Chemical Site

QC Sample	Description
Method Blank	One per matrix per preparation batch for each analysis.
Method Spike Blank (MSB)	One per matrix per preparation batch for each analysis. The MSB must contain all target analytes of concern at the site or as specified by the CLP method.
Surrogate Spikes	All samples analyzed for organic methods.
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One per matrix per Sample Delivery Group (SDG) for each analysis. The spike solution must contain a broad range of the analytes of concern at the site or as specified by the CLP method. The overall frequency of MS/MSD on the project samples must be at least one set per 20 samples.
Matrix Spike/Matrix Duplicate (MS/MD)	One per matrix per SDG for TAL metals and general chemistry methods. The spike solution must contain a broad range of the analytes of concern at the site or as specified by the CLP method. The overall frequency of MS/MSD on the project samples must be at least one set per 20 samples.

Key:

MS/MSB = Matrix spike/matrix spike duplicate.

MSB = Method Spike Blank SDG = Sample Delivery Group

ccology and environment, inc.

Date: July 2001

3

Assessment and Oversight

E & E's assessment and oversight procedures for the project activities are the same as the master QAPP. There are no additional procedures to meet the quality objectives for these work assignment activities.

3.1 Assessment and Response Actions

Planned assessment activities for these work assignment activities are as follows:

Field Audits

No field audits are planned.

Field Inspections

Field inspections will be conducted as needed by the E & E Project Manager, Gene Florentino, P.G.

Laboratory Audits

No laboratory audits are planned.

3.2 Reports to Management

The reports to management are specified the same as master QAPP. No additional reports are required for this project.

ate: July 2001



Data Validation and Usability

For these work assignment activities, E & E will implement the general procedures for data validation and usability described in the master QAPP.

4.1 Data Review, Validation, and Verification Requirements

There are no additional data review criteria for this project.

4.2 Verification and Validation Methods

Data validation requirements are specified the same as master QAPP.

4.3 Reconciliation With User Requirements

The data assessment procedures listed in the master QAPP are applicable to this project. No additional data assessment procedures are needed.



Subconsultant Scope and Quote

Summary of Subconsultant Service Quotations Former Frontier Chemical Waste Process, Inc. Site Niagara Falls, New York

Field assistant and surveying costs were solicited from Watts Engineers, P.C. Below is a summary of the price they quoted to complete PSA field effort.

Subconsultant Firm	Labor Costs	Indirect Costs	Travel and Per Diem	PPE	Suconsultant's Fixed Fee	Total
Watts Engineers	\$7,643.80	\$8,790.37	\$426	\$625	\$2,465.13	\$19,950.30

EXHIBIT 1
Field Assistance
Scope of Work
000699.NV05
Frontier Chemical Site
Niagara Falls, New York
July 16, 2001

Site Description/History

The Frontier Chemical Waste Process, Inc. occupies approximately 9 acres, bordered by Royal Avenue on the south and 47th Street on the east, in Niagara Falls, New York. The Niagara River lies within 1 mile south of this site. The facility treated chemical wastes from 1974 to December 1992 when the facility closed. When operating, the active waste management units treated or stored approximately 25,140 tons of chemical wastes each year. The waste, which came from businesses located in the eastern United States and southeastern Canada, can be classified as RCRA-listed wastes, as well as RCRA-characteristic wastes. Previous groundwater investigations have revealed the following chemicals at the site: monochlorotoluene, methylene chloride, chloroform, dichlorobenzene, tetrachloroethylene and other organic contaminants. Dense Non-Aqueous Phase Liquid (DNAPL) is present at the southern edge of the facility. In 1999, most of the site buildings were demolished with the rubble remaining on site. Ecology and Environment Engineering, P.C. has been assigned the project of conducting a remdial investigation (RI) of the site for the New York State Department of Environmental Conservation (NYSDEC).

Scope of Work (SOW):

There are two elements to this subcontract: Health and Safety plan and field assistance provision at the Frontier Chemical site. Provision of these services is to be inclusive of all necessary labor, travel, per diem, equipment, expendables, and other direct charges to complete Tasks 1 and 2 of this SOW as described below:

Task 1: Health and Safety Plan

The subcontractor shall provide a site-specific health and safety plan (HASP) in accordance with the requirements of 29 Code of Federal Regulations (CFR) 1910.120. The HASP will apply to the field work described in Task 2 below. The subcontractor's HASP will be an original document specific to the site. A HASP fact sheet will be provided to the winning bidder. The HASP will be reviewed by E & E. Modifications may be required if deemed necessary.

Task 2: Field Assistance

E & E will be conducting a field investigation which will include the following elements:

TASK	DESCRIPTION	ESTIMATED NO. OF FIELD DAYS
Mobilization/demobilization	Setup and breakdown field trailer and oversee construction and disassembly of decon pads	2
Geoprobe Survey	Profile soils to top of rock (15 feet) at 25 locations and	5

TASK	DESCRIPTION	ESTIMATED NO. OF FIELD DAYS
	collect 1 soil per location; and install and sample piezometers at 12 of the 25 locations	
Monitoring Well Installation and sampling	Install 3 overburden, 3 shallow bedrock, and 5 deep bedrock wells; and sample the 11 new wells and 48 existing wells	
Utility Investigation	Based on background information of utility connections (sewer, water, gas, etc.), use excavator to uncover bedding materials to determine if they are migration pathways	1

E & E will required Watts' assistance on all aspects of the RI field investigation. Watts shall provide one geologist having strong field experience to work under the supervision of the E & E Field Team Leader (FTL). The Watts staff person is expected to serve as a sampler, site safety officer, and general field assistant. Work on site is expected to take 5 weeks and will be conducted 12 hours per day Monday through Friday, excluding weekends and holidays. The Watt staff person is required to be on site from 7:00 am to 7:00 pm each field day, taking a half hour lunch break, unless otherwise directed by the E & E FTL. Due to the need to maintain project continuity, E & E requires that Watts consistently provide the same person at the site each day, unless otherwise agreed by the E & E project manager.

Watts' bid shall include all costs necessary for the workers to perform the above-listed services. This includes, but is not limited to:

- Wages and overhead;
- Travel
- Level D personnel protection (including tyvek suits, disposable surgical gloves; steel-toed work boots, hard hat, and disposable boot covers.
- Level C personal protection for up to five days of field work. This includes all elements of Level D, plus a full-face respirator and replacement cartridges.

Bid items for these categories are included on the bid sheet Exhibit 2. However, it is emphasized that despite the line item listed in the bed sheet, the costs bid shall include all costs for providing the professional services required.

Information Provided for the Subcontractor:

E & E will provide the subcontractor with the following information:

Exhibit 1
Field Assistance Subcontract
Page 3 of 3

• A site workplan which will include background information on the site and history of activities including known or suspected potential hazards on site.

Project Schedule:

The field work is scheduled to be conducted over a 6 week prior beginning on or around September 17, 2001. A specific project schedule will be forwarded to Watts upon finalization of the Work Plan. Following E & E's receipt of NYSDEC's notice to proceed, E & E will modify the project schedule, as necessary.

Exhibit 2 Cost Schedule For Professional Services Frontier Chemical Site Niagara Falls, New York

A. Direct Salary Costs (Costing compliant with NYSDEC Form 2.11(e), Schedule E3.10(a) - 4/19/99)

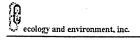
Professional Responsibility Level	Labor Classification	Reim	Avg. bursement Rate	Max. nt Reimbursement Rate		Est. # Hours	Est. Direct Salary Cost (Avg. Reimb. Rate)		
Associate	NSPE VII	S	34.73	s	34.73	Management	10	S	347.30
Sr. Proj. Environ. Scientist	NSPE VI	\$	31.26	\$	31.26			\$	-
Senior Environ. Scientist	NSPE V	\$	29.45	\$	29.45	HASP	10	S	294.50
Project Environ. Scientist	NSPE IV	S	25.90	\$	27.96			S	-
Project Environ. Scientist	NSPE III	\$	21.34	\$	24.31			S	-
Environ. Scientist	NSPE II	S	16.74	\$	19.45	Fieldwork	360	S	7,002.00
Field Technician	NSPE I	S	13.42	\$	15.90			S	-
Total Direct Salary Costs							S	7,643.80	
B. Indirect Costs (115% -	Schedule E3.1	0(g) -	4/19/99)						
Amount budgeted for indir	ect costs is:							S	8,790.37

C. Maximum Reimbursement Rates for Direct Non-Salary Costs

	Item	Maximum Reimbursement		Unit	Number of Units	Total Estimated Cost	
	l Travel	IXCIIIIDUI	Schicht	CIII	OI CHILD	1000112001	THE COURT
	Overnight Expenses	S	55.00	Night	0	S	-
	Dinner Only	\$		Dinner	0	S	-
	Breakfast Only	S	6.00	Breakfast	0	\$	-
	Tolls (30 days - Grand Island)	\$	1.00	Round-Trip	30	\$	30.00
	Mileage (30 days @ 40mi/day)	\$	0.33	Mile (RT)	1200	S	396.00
	Total Travel					\$	426.00
2	2 Supplies						
	Level D Protection	\$	15.00	Day	25	\$	375.00
	Level C Protection	\$	45.00	Day	5	\$	225.00
	Miscellaneous Expenses	\$	25.00	Lump Sum	1	S	25.00
	Total Supplies			-		S	625.00
	Total Travel and Supplies Cost					\$	1,051.00
D. Fixed Fee							
	The Fixed Fee is: 15%					s	2,465.13
	1 HC 1 IACG 1 CC 15. 1370					<u> </u>	2,103.13
		HASP Preparation and Field Work		k	S	19,950.30	



Subcontracted Service Scopes and Quotes



D. Subcontracted Service Scopes and Quotes

Summary of Subcontracted Service Quotations Former Frontier Chemical Waste Process, Inc. Niagara Falls, New York

Drilling Services

Drilling bids were solicited from five firms: American Auger, Geologic NY, Inc. d/b/a North Star, Nothnagle Drilling, Inc., Parratt Wolff, Inc. and SJB Services, Inc.. Below is a comparison of their prices.

Drilling Bids Summary

Drilling Firm	HASP and Decon Pad Assembly and Disassembly	Task 1	Task 2	Task 3	Total Drilling Cost
SJB Services, Inc.	\$350	\$6,341	\$17,027	\$850	\$24,218
Geologic NY, Inc. d/b/a North Star Drilling (WBE)	\$1000	\$5,590	24,569	\$1000	\$31,159
Parratt-Wolff, Inc.	\$400	\$6,382	\$23,356	\$1,500	\$31,338
American Auger (WBE)	\$800	\$11,634	\$23,243	\$1,300	\$36,177
Nothnagle Drilling, Inc.	\$850	\$12,263	\$28,245	\$1,250	\$42,608

SJB Services, Orchard Park, New York quoted the lowest price. They are therefore the selected drilling firm.

Drilling Services Scope of Work

Exhibit 1

Scope of Work For Conduct Field Activities at the Former Frontier Chemical Site Niagara Falls, New York E & E Project Number 000699.NV05.02 July 6, 2001

Site Description

The Frontier Chemical Waste Process, Inc. occupies approximately 9 acres, bordered by Royal Avenue on the south and 47th Street on the east, in Niagara Falls, New York. The Niagara River lies within 1 mile south of this site. The facility treated chemical wastes from 1974 to December 1992 when the facility closed. When operating, the active waste management units treated or stored approximately 25,140 tons of chemical wastes each year. The waste, which came from businesses located in the eastern United States and southeastern Canada, can be classified as RCRA-listed wastes, as well as RCRA-characteristic wastes. Previous groundwater investigations have revealed the following chemicals at the site: monochlorotoluene, methylene chloride, chloroform, dichlorobenzene, tetrachloroethylene and other organic contaminants. Dense Non-Aqueous Phase Liquid (DNAPL) is present at the southern edge of the facility. In 1999, most of the site buildings were demolished with the rubble remaining on site. Ecology and Environment Engineering, P.C. has been assigned the project of conducting a supplemental remedial investigation (SRI) of the site for the New York State Department of Environmental Conservation (NYSDEC).

Site Geology

The site is expected to consist of up to 8 feet of fill consisting of topsoil, clayey silt, silt, sand, and gravel with some cinder blocks, glass, wood, slag, bricks, crushed stone, concrete, asphalt, and white lime residue followed by 5 to 10 feet of glaciolacustrine deposits (interbedded clays, silts and sands) and a basal glacial till (gravel, sand, silt, and clay mix) overlying the top of bedrock. The total thickness of the overburden ranges from 12 to 18 feet, but for costing purposes, it is assumed to be 16-feet thick. There are two water bearing (fractured) zones within the bedrock beneath the site. Groundwater from both zones flow generally in a southeasterly direction. Although the flow is toward the Niagara River, groundwater from the site is intersected by the Falls Street Storm Sewer Tunnel to the south and the New Road Tunnel to the east of the site. All of the dry-weather flow from the Tunnels are diverted to the City of Niagara Falls wastewater treatment plant through the southside interceptor tunnel and is treated before discharge to the River.

Scope of Work

This subcontract consists of three tasks: 1) Geoprobe soil profiling and piezometer installation, 2) monitoring well drilling and installation; and 3) utility investigation.

Subcontractor is responsible for:

- A. Performing the tasks they are awarded as described below.
- B. Providing E & E with a copy of its written site-specific Health and Safety Plan (HASP) for its crew as per federal OSHA laws NO LATER THAN 10 BUSINESS DAYS PRIOR TO BEGINNING FIELD INVESTIGATIONS. E & E WILL NOT SIGN THE SUBCONTRACT AGREEMENT UNTIL A SUITABLE HASP IS RECEIVED.

Subcontractor is responsible for writing their own HASP. A HASP fact sheet will be provided to the winning bidder or bidders. E & E will review the plan, and may ask for modifications if the plan is deemed unsatisfactory. E & E will provide air monitoring during all necessary activities. Details on health and safety requirements are described below.

- C. Mobilizing all necessary equipment and supplies to the job site AT THE BEGINNING OF FIELD ACTIVITIES. Although the site is predominantly level, most of the site buildings were demolished with some of the rubble remaining on site. While ATV equipment is not mandatory, it is highly recommended. It is the subcontractor's responsibility to assess the accessibility of the site and provide the appropriate rigs and vehicles for this SOW.
- D. Assembling and disassembling a decontamination pad to accommodate all applicable equipment. The pad will consist of double-lined plastic sheeting, bermed on all sides, with a sump for water collection and pumping.
- E. Arranging for use of a water source near the site, including obtaining any necessary permission and paying any necessary usage or related fees.
- G. Removing all non-contaminated disposables such as sand bags, cement bags, and solid waste (i.e., plastic sheeting, etc) generated during field operations.
- H. Containerization and transportation (to an on site staging area) investigation-derived waste considered to be potentially contaminated; or spreading of non-contaminated materials near the borehole locations.
- I. The subcontractor is expected to provide the information requested in Exhibit 2 and add appropriate line items in the spaces provided for additional equipment or supplies to complete the task. If the subcontractor has any suggestions or changes to the requested methods the subcontractor may make the changes accordingly.
- J. The subcontractor will be held to this estimate, especially hourly line items and number of days to complete the project, unless there is a change in the project SOW. Any changes in the SOW (such as increased number of Geoprobe borings, wells/piezometers, or upgrading personal protection levels) will not be performed until approved by E & E and E & E's client...
- K. Line items not on this agreement will not be paid without prior approval by E & E. The subcontractor shall only invoice E & E for items in this subcontract that are actually used to complete the tasks described in Exhibits 1 and 2 of this request for bid (RFB).
- L. The subcontractor is subject to liquidated damages in the amount of \$1200/day for each work day over the proposed total number of days indicated in Exhibit 2 by the subcontractor, assuming no changes in the SOW.
- M. All work will be performed during 10-hour workdays on a 5-day work schedule.

The subcontractor shall be on site at the agreed-upon times for each of the tasks listed below. Currently, the field work is expected to be conducted in September 2001.

Utility Clearance

E & E will establish underground utility clearance prior to any subsurface investigation activity.

Task 1: Geoprobe Soil Profiling/Piezometer Installation

The subcontractor is to provide an ATV-mounted Geoprobe to install 25 borings. A continuous soil core sample from grade to the top of bedrock (assumed to be an average of 16 feet below ground surface [bgs]) shall be collected from all Geoprobe borings. The subcontractor is responsible for extracting acetate core sleeves from the core barrel and cutting two slices over their entire length before providing them to the E & E geologist. The subcontractor is to work under the direction of the E & E geologists/field team leader. Based on previous investigations at this site and the nature of the material being excavated, E & E requires the Geoprobe crew to be fully equipped in level D (including tyvek and rubber boots or boot covers) and ready to upgrade to Level C respiratory protection. E & E will perform air monitoring throughout all subsurface investigation activities. If ambient air quality conditions exceed E & E's action levels for Level C protection, the job will be temporarily shut down while the crews obtain Level B respiratory protection. At the discretion of the E & E field team leader, the Geoprobe subcontractor team will be required to return to the site either later in the same day or the following day, equipped to continue Geoprobe activities wearing Level B protection. The subcontractor is required to provide all necessary respiratory protection for its crews. E & E will not provide respiratory protection equipment or supplies to the subcontractor.

Twelve piezometers will be installed onsite. Piezometers will be constructed by installing into each borehole a 5-foot length of 1-inch inner-diameter (ID) PVC screen having .010-slot size. Connected to the screen shall be enough 1-ID schedule 40 PVC riser to stick up 2.5 feet from grade. Threaded to the bottom of the 5-foot screen will be a 1-inch ID PVC end cap. A locking cap is to be installed on each piezometer.

The Geoprobe will undergo an initial decontamination to remove road dirt only. If the Geoprobe exhibits obvious signs of prior use (i.e., caked-on soil) from another site, it will not be allowed on site. It will also undergo decontamination between each borehole and at the end of the Geoprobing activities. Decontamination procedures are described below.

Task 2: Groundwater Monitoring Well Installations

Using a drill rig, the subcontractor is to install three overburden wells to an approximate depth of 16 feet, five shallow bedrock monitoring wells to an approximate depth of 24 feet, and three deeper bedrock monitoring wells to an approximate depth of 32 feet.

Overburden Wells

The overburden wells will be drilled using 4 1/4-inch ID hollow-stem auger to the top of bedrock. Continuous split-spoon sampling from grade to bedrock will only be performed at one of the three well locations. The subcontractor is responsible for opening the split-spoon samplers and, following sampling by the site geologist, deconning them using an alconox and water solution, followed by a tap water rinse, followed by a deionized water spray rinse. E & E will provide the deionized water for the final rinsing. A 10-foot segment of 2-inch ID PVC screen having 0.10-inch slot size will be threaded to 2-inch ID Schedule 40 PVC to a height of 2.5 feet above grade. A threaded PVC cap is to be placed on the bottom of the screen. All PVC connections are to be flush-threaded. A sand pack of Morie #0 sand (or equivalent size) will extend from the bottom of the screen to a height of 2 foot above the screen. It will be followed

by 2-foot thick bentonite seal of pelletized or granular bentonite. A 5% bentonite/cement grout mix will then be installed to grade. Note that the bentonite must be allowed to hydrate at least 30 minutes prior to the installation of the grout mix. Each well will be fitted with a locking steel outer protective casing. Following setting of the grout, a 2-foot diameter concrete antipercolation pad will be constructed around each well.

Shallow Bedrock Wells

The shallow bedrock wells will be telescoping wells due to seal off groundwater in the overburden. The overburden will be drilled using 6 1/4-inch ID hollow-stem augers to the top of bedrock. Spilt spoon sampling will not be required. A 5 7/8-inch roller bit will then be used to drill a 1-foot rock socket. A 4-inch carbon steel casing will then be installed through the overburden and into the rock socket and grouted into place. Following a minimum period of 24 hours, the shallow bedrock wells will be extended five feet below the 4-inch casing by continuous HQ/HX rock coring (to be a total depth of approximately 23 feet bgs). Rock cores will be stored in wooden core boxes provided by the driller. NX/NQ bit may be used, however, the corehole must be reamed with a 3 7/8-inch roller bit. The wells will be completed as open holes in the bedrock. Each well will be fitted with a locking cover and a 2-foot diameter concrete anti-percolation pad.

Deep Bedrock Wells

The deep bedrock wells will be telescoping wells to seal off groundwater in the overburden and shallow bedrock. The overburden will be drilled using 8 1/4-inch ID hollow-stem augers to the top of bedrock. Spilt spoon sampling will not be required. A 7 7/8-inch roller bit will then be used to drill a 1-foot rock socket. A 6-inch carbon steel casing will then be installed through the overburden and into the rock socket and grouted into place. Following a minimum period of 24 hours, drilling will continue using a 5 7/8-inch roller bit to a depth of 27-feet bgs. A 4-inch carbon steel casing will then be installed through the 6-inch casing and into the rock and grouted into place. Following a minimum period of 24 hours, the deep bedrock wells will be extended five feet below the 4-inch casing by continuous HQ/HX rock coring (to a total depth of approximately 32 feet bgs). Rock cores will be stored in wooden core boxes provided by the driller. NX/NQ bit may be used, however, the corehole must be reamed with a 3 7/8-inch roller bit. The wells will be completed as open holes in the bedrock. Each well will be fitted with a locking cover and a 2-foot diameter concrete anti-percolation pad.

The drill rig and all downhole equipment will undergo an initial decontamination to remove road dirt only. If the drill rig exhibits obvious signs of prior use (i.e., caked-on soil) from another site, it will not be allowed on site. All downhole equipment will also undergo decontamination between each borehole. All equipment, including the drill rig, will undergo a final decon prior to departing the site each day (if applicable) and at the conclusion of drilling activities.

Task 3: Utility Investigation

There are at least four utility (storm sewer) connections from the site to the Falls Street Tunnel along Royal Avenue, and there may be other water, sewer, electric, and gas connections from the right-of-ways to the site. The subcontractor is to provide an excavator to excavate these sewer connections or any other utility connections discovered during E & E's record search. The objective of the investigation is to determine if the utility bedding material is acting as a conduit for contaminant migration. Excavated materials will be stockpiled adjacent to each pit until the pit is complete. All excavated materials will be placed back into the test pit from which they were excavated. Each pit will be backfilled immediately following completion of its excavation,

prior to excavation of any additional pits. At no time shall an open test pit ever be left unattended. Following backfilling, the subcontractor is to compact backfilled material by use of the track-hoe. The completed pit shall be graded level with ground surface. All excess soils shall be stockpiled at a common on site location.

Miscellaneous Tasks

Equipment Decontamination

All investigative equipment must be decontaminated with high-pressure steam prior to arrival to the site. All equipment will be decontaminated again upon arrival to the site to remove road dirt only. Also, it is the subcontractor's responsibility to decontaminate all equipment with high-pressure steam prior to leaving the site.

Decontamination of equipment will be performed prior to and after any intrusive event at each location. The subcontractor will construct a decontamination pad, which will consist of wood framing and plastic sheeting, bermed to a minimum height of 6 inches on all sides. It is to include a wastewater collection system. The operator is to provide a high-pressure steam cleaner and metal saw horses or wooden pallets to be used to keep equipment being decontaminated off the decon pad floor. Decontamination will consist of:

- High-pressure steam cleaning;
- Scrubbing with brushes if soil remains on equipment; and
- Steam rinsing.

Only the excavator's bucket needs to be decontaminated before and after each location. The back end of the Geoprobe rig/Drill rig and all associated drilling equipment (including rods, augers, drill bits and any other Geoprobe/Drill equipment) will be decontaminated before and after each location. Once clean, no down-hole equipment may touch the ground prior to use. The equipment must be stored on the associated rig, or on plastic sheeting.

Investigation-Derived Waste (IDW)

Investigation-derived soils and water will be field screened to determine initially whether these wastes are contaminated. If no contamination or contamination of 5 PPM or less on a FID or PID is detected in the soils or water at a particular well/piezometer location, the decontamination water will be discharged to the ground surface and the soil cuttings will be spread on the ground. If contamination is detected above 5 PPM, or other is visual evidence of contamination or strong odors are noted, the decon water and drill water will be placed in a poly tank provided by E & E, and soil cuttings will be placed in 55-gallon drums and labeled accordingly.

The subcontractor will move and store all drummed cuttings to the decon area. For estimation purposes, the subcontractor will assume three soil drums for the Geoprobing, and one soil drum per well (11), and one rock cuttings drum per bedrock well (8). The subcontractor shall only invoice E & E for the number of drums that are actually delivered to the site at the request of E & E.

Health and Safety Requirements

The subcontractor must comply with the following health and safety stipulations:

- The subcontractor will submit to E & E a completed, signed Health and Safety Checklist at the time of bid submittal.
- The subcontractor will submit to E & E a completed, signed Health and Safety Plan (HASP) no later than 10 days prior to commencement of field activities. E & E will not sign the subcontract agreement until a satisfactory plan is received. A HASP fact sheet will be provided to the winning bidder. E & E will review the plan for completeness and may ask for modifications if deemed necessary.
- The subcontractor will designate a responsible person for compliance of their HASP.
- The subcontractor will provide all personal protective equipment (PPE) and upgrades of PPE as specified in the HASP including costs, and the proper disposal of all spent PPE and contaminated debris.

The subcontractor should assume that all work will be performed using a minimum of Level D personal protection (including at a minimum hard hat, safety glasses, neoprene gloves, steel-toed boots, rubber booty covers, and tyvek or saranex). Upgrades may be necessary therefore, level C personal protective equipment must be available on site at all times. If upgrades are required, costs will be implemented as indicated under contingent costs in Exhibit 2.

Schedule

Field activities are expected to be conducted in consecutive periods using 10-hour workdays on a 5-day work week schedule. Site work will not be conducted on weekends or holidays. Currently, the fieldwork is expected to be conducted in September 2001.

Price Schedule: SJB Services, Inc.

EXHIBIT 2

PRICE SCHEDULE TO CONDUCT FIELD ACTIVITIES AT THE FORMER FRONTIER CHEMICAL SITE

NIAGARA FALLS, NEW YORK E & E PROJECT NO. 000699.NV05.02 July 6, 2001

Subcontractor Name: STB SERVICES, INC.		
Site-Specific Health and Safety Plan for all subcontractor activities	\$	100.00
Decon pad construction/disassembly	\$	250,00
Task 1: Geoprobe Soil Profiling/Piezometer Installation		
Mobilization of all necessary equipment and personnel and initially clean Geoprobe and equipment of road dirt	_	200,00
days of Geoprobe and operator for 25 boreholes and	S S	4250.00
installation of 12 piezometers to an estimated depth of 16	Ð	<u>7000</u>
feet/hole (S <u>&SO</u> /day)		
100 acetate sleeves (assume 4 per hole) (2. /sleeve)	S	200.00
12 hours of decontamination (/hr)	\$	WIDAYRATE
3 open top 55 gallon drums (35./drum)	\$	105.00
2 hours of drum/decon water staging (/hr)	S	W/ DAYTRATE
60 Feet of 1-inch diameter schedule 40 PVC 0.01 slot-screen	S	240.00
(5 ft. pcr piezometer) (4, /ft) 156 Feet of 1-inch diameter schedule 40 PVC riser	•	62400
(approx. 13 ft. per piezometer) (4, /ft)	\$	00720
12 threaded 1-inch end caps (6 /end cap)	\$	47200
12 locking caps with lock (Z5./ea)	\$	300,00
OTHER GEOPROBING COSTS		
(Please specify any additional equipment of supplies which you feel may be required)		
BEATOUTE QUIP (1)	S	
ABANDONIONT (20/BAG	S	******
(S	73411-
Task 1 Total Cost:	2	624100
Task 2: Groundwater Monitoring Well Installations		
Mobilization of all necessary equipment and personnel and		
initially clean drill rig and equipment from road dirt Lump	Sum	\$ 300.00
48 ft of 41/4-inch hollow stem auger drilling (\$ /0.		\$ 480.00
80 ft of 61/4-inch hollow stem auger drilling (\$_14)	_/ft)	\$1120,00
48 ft of 81/4-inch hollow stem auger drilling (\$\int_{18}\)		S <u>864.</u> 00
48 ft of continuous split-spoon sampling (24 samples) (\$ 3.		\$ <u>144.</u> 00
3 ft of 7 7/8-inch roller bit drilling (\$\frac{70}{70}	<u>/</u> [t)	\$ 210.00

Exhibit 2 Frontier Chemical July 6, 2001 Page 2 of 3

flush threaded, PVC screen 24 ft 2-inch I.D., Sch 40 PVC flush-joint well casing 3 PVC slip-on top caps (2-inch) 3 PVC flush threaded end caps (2-inch) (S. 4. /ca) (S. 7. /ft) 3 PVC flush threaded end caps (2-inch) (S. 4. /ca) 3 PVC flush threaded end caps (2-inch) (S. 7. /ft) 3 PVC flush threaded end caps (2-inch) (S. 7. /ft) 3 PVC flush threaded end caps (2-inch) (S. 7. /ft) 3 PVC flush threaded end caps (2-inch) (S. 7. /ft) 3 PVC flush threaded end caps (2-inch) (S. 7. /ft) 3 PVC flush threaded end caps (2-inch) (S. 7. /ft) 3 PVC flush threaded end caps (2-inch) (S. 7. /ft) 5 PVC flush threaded end caps (2-inch) (S. 7. /ft) 5 PVC flush threaded end caps (2-inch) (S. 7. /ft) 5 PVC flush threaded end caps (2-inch) (S. 7. /ft) 5 PVC flush threaded end caps (2-inch) (S. 7. /ft) 5 PVC flush threaded end caps (2-inch) (S. 7. /ft) 5 PVC flush threaded end caps (2-inch) (S. 7. /ft) 5 PVC flush threaded end caps (2-inch) (S. 7. /ft) 5 PVC flush threaded end caps (2-inch) (S. 7. /ft) 5 PVC flush threaded end caps (2-inch) (S. 7. /ft) 5 PVC flush threaded end caps (2-inch) (S. 7. /ft) 5 PVC flush threaded end caps (2-inch) (S. 7. /ft) 5 PVC flush threaded end caps (2-inch) (S. 7. /ft) 5 PVC flush threaded end caps (2-inch) (S. 7. /ft) 5 PVC flush threaded end caps (2-inch) (S. 7. /ft) 5 PVC flush threaded end caps (2-inch) (S. 7. /ft) 5 PVC flush threaded end caps (2-inch) (S. 7. /ft) 5 PVC flush threaded end caps (2-inch) (S. 7. /ft) 5 PVC flush threaded end caps (2-inch) (S. 7. /ft) 5 PVC flush threaded end caps (2-inch) 6 ft bentonite/cement grout (btwn 8-inch hole and 2-inch (S. 7. /ft) 5 PVC flush threaded end caps (2-inch) 6 ft bentonite/cement grout (btwn 8-inch hole and 4-inch (S. 7. /ft) 5 PVC flush 6 ft bentonite/cement grout (btwn 8-inch hole and 4-inch (S. 7. /ft) 5 PVC flush 6 ft bentonite/cement grout (btwn 8-inch hole and 4-inch (S. 7. /ft) 5 PVC flush 6 ft bentonite/cement grout (btwn 8-inch hole and 4-inch (S. 7. /ft) 5 PVC flush	35 ft of 5 7/8-inch roller bit drilling 51 ft 6-inch steel casing grouted in place 186 ft 4-inch steel casing grouted in place 40 ft of HX coring 30 ft of 2-inch I.D., Sch. 40, 0.010 machine slotted,	(\$ <u>25.</u> /ft) (\$ <u>23.</u> /ft) (\$ <u>15.</u> /ft) (\$ <u>35.</u> /ft)	\$ 875,00 \$ <u>1173.00</u> \$ <u>2790.</u> 00 \$ <u>1400.</u> 00
85 ft bentonite/cement grout (btwn 8-inch hole and 4-inch casing) 51 ft bentonite/cement grout (btwn 8-inch hole and 6-inch casing) 81 ft bentonite/cement grout (btwn 8-inch hole and 6-inch casing) 81 ft bentonite/cement grout (btwn 6-inch hole and 4-inch casing) 8 aboveground completions with 4-inch locking caps with locks, 3 red bollards, and concrete drainage pad 3 aboveground completions with 4-inch locking protective steel casing with locks, 3 red bollards, and concrete drainage pad 19 55-gallon drums (including delivery) 4 hours of drum/decon water staging 11 events of decontamination (S 35./ea) OTHER MONITORING WELL COSTS (Please specify any additional equipment of supplies which you feel may be required) Task 2 Total Cost: S 77,027,00 Task 3-2: Utility Investigation Daily rate for excavator, equipment, and operator in level D respiratory protection for 1 day S 550.00	flush threaded, PVC screen 24 ft 2-inch I.D., Sch 40 PVC flush-joint well casing 3 PVC slip-on top caps (2-inch) 3 PVC flush threaded end caps (2-inch) 12 ft 0.10-size sand filter pack 6 ft bentonite pellet seal	(\$ 7. /ft) (\$ 4. /ea) (\$ 4. /cap) (\$ 7. /ft)	\$ 168,00 \$ 12.00 \$ 12.00 \$ 84.00
81 ft bentonite/cement grout (btwn 6-inch hole and 4-inch casing) 81 ft bentonite/cement grout (btwn 6-inch hole and 4-inch casing) 8 aboveground completions with 4-inch locking caps with locks, 3 red bollards, and concrete drainage pad 3 aboveground completions with 4-inch locking protective steel casing with locks, 3 red bollards, and concrete drainage pad 19 55-gallon drums (including delivery) 19 55-gallon drums (including delivery) 10 1 events of drum/decon water staging 11 events of decontamination 12 SYC.ou 13 SYC.ou 14 hours of decontamination 15 SYC.ou 16 SYC.ou 17 SYC.ou 17 SYC.ou 18 SYC.ou 19 SYC.ou 19 SYC.ou 19 SYC.ou 10 SYC.ou 11 events of decontamination 11 events of decontamination 12 SYC.ou 13 SYC.ou 14 SYC.ou 15 SYC.ou 16 SYC.ou 17 SYC.ou 17 SYC.ou 17 SYC.ou 18 SYC.ou 19 SYC.ou 19 SYC.ou 19 SYC.ou 19 SYC.ou 19 SYC.ou 10 SYC.ou 11 events of decontamination 10 SYC.ou 11 events of decontamination 11 events of decontamination 12 SYC.ou 13 SYC.ou 14 SYC.ou 15 SYC.ou 16 SYC.ou 17 SYC.ou 17 SYC.ou 17 SYC.ou 18 SYC.ou 19	casing) 85 ft bentonite/cement grout (btwn 8-inch hole and 4-inch casing)		s 60.00 s 425.00
locks, 3 red bollards, and concrete drainage pad 3 aboveground completions with 4-inch locking protective steel casing with locks, 3 red bollards, and concrete drainage pad (S 350./well) S /050.00 19 55-gallon drums (including delivery) (S 35./ea) S 665.00 4 hours of drum/decon water staging (S 135./hr) S 540.00 11 events of decontamination (S 135./hr) S 7485.00 OTHER MONITORING WELL COSTS (Please specify any additional equipment of supplies which you feel may be required) Task 2 Total Cost: S 77,027,00 Task 3-2: Utility Investigation Daily rate for excavator, equipment, and operator in level D respiratory protection for 1 day S 850.00	casing) 81 ft bentonite/cement grout (btwn 6-inch hole and 4-inch casing)	(\$ 5 . /ft)	\$ 255.a
19 53-gallon drums (including delivery) 4 hours of drum/decon water staging 11 events of decontamination (S135/hr) S740.00 OTHER MONITORING WELL COSTS (Please specify any additional equipment of supplies which you feel may be required) Task 2 Total Cost: Task 3-2: Utility Investigation Daily rate for excavator, equipment, and operator in level D respiratory protection for 1 day S850.00	locks, 3 red bollards, and concrete drainage pad 3 aboveground completions with 4-inch locking protective steel casing with locks, 3 red bollards, and concrete drain	(\$ <u>Z%.</u> /well) ; nage	
(Please specify any additional equipment of supplies which you feel may be required) Task 2 Total Cost: \$ 77,027.00 Task 3-2: Utility Investigation Daily rate for excavator, equipment, and operator in level D respiratory protection for 1 day \$ \$50.00	4 hours of drum/decon water staging	(S <u>35</u> ./ea) (S <u>135</u> ./hr)	S 665.00 S 540.00
Task 2 Total Cost: \$ \(\frac{7}{7,027,00} \) Task 3-2: Utility Investigation Daily rate for excavator, equipment, and operator in level D respiratory protection for 1 day \$\frac{850.00}{5} \]		ired)	
Daily rate for excavator, equipment, and operator in level D respiratory protection for 1 day \$\frac{850.00}{250.00}\$	((\$ \$	
respiratory protection for 1 day \$850.00	Task 3-2: Utility Investigation		
	respiratory protection for 1 day	-	S <u>850.</u> 06

Exhibit 2 Frontier Chemical July 6, 2001 Page 3 of 3

TOTAL NOT TO EXCEED PRICE

s 24,718.00

ALL WORK WILL BE COMPLETED IN 20 DAYS.

Optional Unit costs

Standby time
Upgrade to Level C respiratory protection
S/35. crew/hr
S/5. /hr
Upgrade from Level C to Level B respiratory protection
S/40. /hr
Mobilization of Level B equipment to site:
S/35. crew/hr
S/40. /hr

Price Schedule: Geologic NY, Inc. d/b/a North Star Drilling

FROM : NORTH STAR DRILLING INC

JUL-09-2001 11:40 E AND E BUFFALO

JUL. 17. 2001 4:29PM P 2 PHONE NO. : 607 753 9911 716 684 0844 P.: L 17

EXHIBIT 2 PRICE SCHEDULE TO CONDUCT FIELD ACTIVITIES AT THE FORMER FRONTIER CHEMICAL SITE NIAGARA FALLS, NEW YORK E & E PROJECT NO. 000699.NV05.02 July 6, 2001

Subcontractor Name: GeoLogic NY, Inc. d/b/a North Star	Drill	ing
Site-Specific Health and Safety Plan for all subcontractor activities	\$	500,00
Decon pad construction/disassembly	\$	500.00
Task 1: Geoprobe Soil Profiling/Plezometer Installation Mobilization of all necessary equipment and personnel and		
initially clean Geoprobe and equipment of road dirt 3 days of Geoprobe and operator for 25 boreholes and installation of 12 piezometers to an estimated depth of 16	\$ \$	500.00 3,750.00
100 acetate sleeves (assume 4 per hole) (0, 00 /cleave)	\$	No Charge
12 hours of decontamination (0.00/hr) 3 open top 55 gallon drums (50 /drum) 2 hours of drum/decon water staging (0.00/hr)	\$ \$	<u>Included</u> above
(5 ft. per piezometer) (_5 /ft)	\$ \$	<u>Included</u> above
156 Feet of 1-inch diameter schedule 40 PVC riser (approx. 13 ft. per piezometer) (2.50 /ft) 12 threaded 1-inch end caps (_5_/end cap)	\$	390.00
12 locking caps with lock (15 /ea) 13 Bentonite Seal Borehole (20/50)	\$ \$ \$	60.00 180_00 260.00
OTHER GEOPROBING COSTS (Please specify any additional equipment of supplies which you feel may be required)	}	
	\$ \$ \$	
Task 1 Total Cost:	\$	5,590.00
Task 2: Groundwater Monitoring Well Installations Mobilization of all necessary equipment and personnel and initially clean dell size and a significant and personnel and		
initially clean drill rig and equipment from road dirt 48 ft of 41/4-inch hollow stem auger drilling 80 ft of 61/4-inch hollow stem auger drilling 48 ft of 81/4-inch hollow stem auger drilling 48 ft of continuous split-spoon sampling (24 samples) 3 ft of 7 7/8-inch roller bit drilling (\$\frac{36}{300}\$	_/ft) _/ft) _/ft) _/ft)	\$1.000.00 \$ 576.00 \$1.920.00 \$1.728.00 \$ 480.00 \$ 900.00

JUL. 17. 2001 4:30PM P 3 PHONE NO. : 607 753 9911 716 684 0844 P.: 2 1

Exhibit 2 Frontier Chemical July 6, 2001 Page 2 of 3

35 ft of 5 7/8-inch roller bit drilling 51 ft 6-inch steel casing grouted in place 186 ft 4-inch steel casing grouted in place 40 ft of HX coring 30 ft of 2-inch LD., Sch. 40, 0.010 machine slotted,	(\$_100 _/ft) (\$_25 _/ft) (\$_20 _/ft) (\$_60 _/ft)	\$ <u>1,275</u> .00 \$ <u>3,720.00</u>
flush threaded, PVC screen 24 ft 2-inch I.D., Sch 40 PVC flush-joint well casing 3 PVC slip-on top caps (2-inch) 3 PVC flush threaded end caps (2-inch) 12 ft 0.10-size sand filter pack 6 ft bentonite pellet seal	(\$_20_/ft) (\$_20_/ft) (\$_0_/ea) (\$_0_/cap (\$_0_/ft)	\$Included above
 6 ft bentonite/cement grout (btwn 8-inch hole and 2-inch casing) 85 ft bentonite/cement grout (btwn 8-inch hole and 4-inch casing) 	(\$_0_/ft) (\$_0_/ft)	\$ \$
 51 ft bentonite/cement grout (btwn 8-inch hole and 6-inch casing) 81 ft bentonite/cement grout (btwn 6-inch hole and 4-inch casing) 	(\$_0_/ft)	\$ \$
8 aboveground completions with 4-inch locking caps with locks, 3 red bollards, and concrete drainage pad 3 aboveground completions with 4-inch locking protective steel casing with locks, 3 red bollards, and concrete drainage page 1.	i (\$ <u>300</u> /well e nage) \$ <u>2,400.</u> 00
pad 19 55-gallon drums (including delivery) 4 hours of drum/decon water staging 11 events of decontamination	(\$\frac{400}{50} \text{/well} (\$\frac{50}{50} \text{/ea}) (\$\frac{150}{150} \text{/hr}) (\$\frac{150}{150} \text{/hr})	\$ 1,200.00 \$ 950.00 \$ 600.00 \$ 1,650.00
OTHER MONITORING WELL COSTS (Please specify any additional equipment of supplies which you feel may be requ	ired)	·
(\$ \$ \$ Cost: \$	<u></u>
Task 3-2: Utility investigation		
Daily rate for excavator, equipment, and operator in level D respiratory protection for 1 day	\$ <u>1000</u> /day	\$ <u>1,000,</u> 00

Task 3 Total Cost: \$

<u>1 000</u>00

FROM : NORTH STAR DRILLING INC

JUL-09-2001 11:41 E AND E BUFFALO

JUL.17.2001 4:30PM P (PHONE NO. : 607 753 9911

716 684 Ø844 P.::17

Exhibit 2 Frontier Chemical July 6, 2001 Page 3 of 3

TOTAL NOT TO EXCEED PRICE

s 31,159.00

ALL WORK WILL BE COMPLETED IN 25 DAYS.

Optional Unit costs

Standby time

Upgrade to Level C respiratory protection

Solver

Solve

Price Schedule: Parratt-Wolff, Inc.



July 11, 2001

Mr. Gene Florentino
Ecology & Environment, Inc.
Buffalo Corporate Center
368 Pleasantview Drive
Lancaster, New York 14086

Re-

Former Frontier Chemical Site Niagara Falls, New York Proposal No. 645

Dear Mr. Florentino:

Enclosed is our bid for the above project, all in accordance with your E-mail transmittal, dated July 6, 2000. Please note that our day rate for the probe work includes bentonite backfill of each boring. The day rate also assumes our probe operator will complete at least 7 borings per day and the field staff at E&E will be able to handle this level of productivity.

Thank you for this opportunity to offer our proposal.

Very truly yours,

PARRATT - WOLFF, INC.

Will Mon

William Morrow

WHM

enc:

To: Gene Florentino	Date 7/1/	parratt- wolffine
Ca	# of Pgs.	315/437-1429 FAX 315/437-1770
Dept. 684-8060	From B	W
Fax No. 716 - 684 - 0844	Phone #	Fax #



W. 004

EXHIBIT 2

PRICE SCHEDULE TO CONDUCT FIELD ACTIVITIES AT THE FORMER FRONTIER CHEMICAL SITE

NIAGARA FALLS, NEW YORK E & E PROJECT NO. 000699.NV05.02 July 6, 2001

Subcontractor Name:_Parratt-Wolff		
Site-Specific Health and Safety Plan for all subcontractor activities	\$	\$200
Decon pad construction/disassembly	\$	\$200_
Task 1: Geoprobe Soil Profiling/Piezometer Installation Mobilization of all necessary equipment and personnel and initially clean Geoprobe and equipment of road dirt days of Geoprobe and operator for 25 boreholes and installation of 12 piezometers to an estimated depth of 16	\$ \$	600 4800
feet/hole (\$\frac{12\infty}{day}\) 100 acetate sleeves (assume 4 per hole) (\$\frac{1}{2}\sleeve\) 12 hours of decontamination (\$\frac{NC}{hr}\) 3 open top 55 gallon drums (\$\frac{50}{drum}\) 2 hours of drum/decon water staging (\$\frac{NC}{hr}\) 60 Feet of 1-inch diameter schedule 40 PVC 0.01 slot-screen (5 ft. per piezometer) (\$\frac{3}{ft}\) 156 Feet of 1-inch diameter schedule 40 PVC riser (approx. 13 ft. per piezometer) (\$\frac{2}{ft}\) 12 threaded 1-inch end caps (\$\frac{NC}{end}\$ cap)	\$ \$	150 - 180 - 180
12 locking caps with lock (20 /ea) * Time estimate assumes E:E Can log 100'/d OTHER GEOPROBING COSTS (Please specify any additional equipment of supplies which you feel may be required.)	•	240
Task 1 Total Co	\$ \$ \$ pst: \$	6382
48 ft of 41/4-inch hollow stem auger drilling 80 ft of 61/4-inch hollow stem auger drilling 48 ft of 81/4-inch hollow stem auger drilling 48 ft of continuous split-spoon sampling (24 samples) 3 ft of 7.7% inch pollockied in	ump Sum 12 /ft) 15 /ft) 20 /ft) 10 /ft)	\$ 1200 \$576 \$ 1200 \$ 960 \$ 480 \$ 300

Exhibit 2 Frontier Chemical July 6, 2001 Page 2 of 3

35 ft of 5 7/8-inch roller bit drilling		(\$ 50 /ft)	\$ 1750
51 ft 6-inch steel casing grouted in place		(\$ 30/ft)	\$ /530
186 ft 4-inch steel casing grouted in place		(\$ 25/ft)	8 4650
40 ft of HX coring		(\$ 60 /ft)	\$ 2400
30 ft of 2-inch I.D., Sch. 40, 0.010 machin	ie slotted,		
flush threaded, PVC screen		(\$ 10 /ft)	\$ 300
24 ft 2-inch I.D., Sch 40 PVC flush-joint	well casing	(\$ 10 /ft)	\$ 240
3 PVC slip-on top caps (2-inch)	•	(\$ NC /ea)	\$
3 PVC flush threaded end caps (2-inch)		(\$ NC /cap)	
12 ft 0.10-size sand filter pack		(\$ 10 /ft)	\$ 120
6 ft bentonite pellet seal		(\$ 10/ft)	\$ 60
6 ft bentonite/cement grout (btwn 8-inch	hole and 2-inch		
casing)		(\$_5/ft)	⁸ 30
85 ft bentonite/cement grout (btwn 8-inch	hole and 4-inch		
casing)		(\$_5 _{/ft)}	s 425
51 ft bentonite/cement grout (btwn 8-inch	hole and 6-inch		
casing)		(\$ <u>5</u> /ft)	_{\$} 255
81 ft bentonite/cement grout (btwn 6-inch	hole and 4-inch		_
casing)		(\$ <u></u> 5/ft)	\$ 405
8 aboveground completions with 4-inch l			
locks, 3 red bollards, and concrete drain		(\$ 250 /well)	\$ 5000
3 aboveground completions with 4-inch l			
steel casing with locks, 3 red bollards, a	and concrete drain	nage	
pad		(\$ 300/well)	\$ 900
19 55-gallon drums (including delivery)		(\$ <u>50</u> /ea)	\$ 950
4 hours of drum/decon water staging	٠	(\$ <u>175</u> /hr)	\$ 700
ll events of decontamination		(\$ <u>175</u> /hr)	\$ 1925
			
OTHER MONITORING WELL COSTS			
(Please specify any additional equipment of supplies which	you feel may be requ	uired)	
(/)		•	
		S	
		\$	
	Task 2 Total C		23356
Task 3-2: Utility Investigation			
Daily rate for excavator, equipment, and or			
respiratory protection for 1 day		\$ 1500/day	\$ 1200
	Task 3 Total C	Coet: S	1500
	I ask y I Uldi (,∪ 51. ♀	

Exhibit 2 Frontier Chemical July 6, 2001 Page 3 of 3

TOTAL NOT TO EXCEED PRICE

s <u>31638</u>

ALL WORK WILL BE COMPLETED IN 18 DAYS.

Optional Unit costs

Standby time	\$ Zoocrew/hr
Upgrade to Level C respiratory protection	\$ <u>60</u> /hr
Upgrade from Level C to Level B respiratory protection	\$ <u>150/hr</u>
Mobilization of Level B equipment to site:	\$1200

Price Schedule: American Auger and Ditching Co.

JUL-09-2001 13:50

E AND E BUFFALO

716 684 0644 F.10/13

EXHIBIT 2 PRICE SCHEDULE TO CONDUCT FIELD ACTIVITIES AT THE FORMER FRONTIER CHEMICAL SITE NIAGARA FALLS, NEW YORK E & E PROJECT NO. 000699.NV05.02 July 6, 2001

HMERICAN AUGER & Ditchino Co. 300 in and Safety Plan for all subcontractor activities Site-Speci! 500 Decon pad construction/disassembly Task 1: Geoprobe Soil Profiling/Plezometer Installation Mobilization of all necessary equipment and personnel and 1700 initially clean Geoprobe and equipment of road dirt 000 5 days of Geoprobe and operator for 25 boreholes and installation of 12 piezometers to an estimated depth of 16 feet/hole (\$1000/day) 12 hours of decontamination (100 /hr) \$ 3 open top 55 gallon drums (_75_/drum) 2 hours of drum/decon water staging (100/hr) 60 Feet of 1-inch diameter schedule 40 PVC 0.01 slot-screen (5 ft. per piezometer) (_6_/ft) \$ 156 Feet of 1-inch diameter schedule 40 PVC riser (approx. 13 ft. per piezometer) (_4__/ft) \$ 12 threaded 1-inch end caps (______/end cap) 12 locking caps with lock (_______/ea) OTHER GEOPROBING COSTS (Please specify any additional equipment of supplies which you feel may be required) Task 1 Total Cost: Task 2: Groundwater Monitoring Well Installations Mobilization of all necessary equipment and personnel and initially clean drill rig and equipment from road dirt Lump Sum 48 ft of 41/4-inch hollow stem auger drilling (\$_14./ft) (**\$_**1**7**_/ft) 80 ft of 61/4-inch hollow stem auger drilling 48 ft of 81/4-inch hollow stem auger drilling (\$_19_tA) 48 ft of continuous split-spoon sampling (24 samples) (\$12/ft)3 ft of 7 7/8-inch roller bit drilling (\$_28_/ft)

	EXTRA PAGE	. 001
grouted in place	(\$ 2.0 /ft) (\$ 55 /ft)	\$ <u>3</u> 720. \$ 22 00
. 40, 0.010 machine slotted,		
screen	(\$/ft)	\$ 180
) PVC flush-joint well casing	(\$_4_ft)	\$ 96
s (2-inch)	(\$_7_/ea)	\$_21
end caps (2-inch)	(\$ 7 /cap)	\$ 11
er pack	(\$_10_/ft)	\$ 120
al	(\$_15_/ft)	\$_90_
grout (btwn 8-inch hole and 2-inch	(\$ <u>f</u>](fi)	s <u>48</u>
grout (btwn 8-inch hole and 4-inch	(\$ <u>8</u> /ft)	s 680
grout (btwn 8-inch hole and 6-inch	(\$_8_/ft)	\$ 408
grout (btwn 6-inch hole and 4-inch	(\$_ 8 _/ft)	\$ 648
etions with 4-inch locking caps with	1	1510
i, and concrete drainage pad	(\$ <u>195</u> /well)	\$ 1360
etions with 4-inch locking protective		
ks, 3 red bollards, and concrete drain	inage (\$ <u>.195</u> /woll)	· L86
: 	(\$_117/Well) (\$_50/ea)	\$ 950
cluding delivery)	(\$ 100/hr)	\$ 400
i water staging nation	(\$_100_/hr)	\$ 1100
intion	(V	·
LL COSTS ment of supplies which you feel may be req	uired)	
2/150	\$	1500
2 5)	\$	950
	\$	72743
Task 2 Total	Cost: 5	7277 ·
tion		
or, equipment, and operator in level I	\$ <i>/32</i> 2/day	e 1300 .
for 1 day	<u></u>	\$ 1300. 1300.
Task 3 Total	Cost: \$	1000,

American Auger_
JUL-09-2001 13:51 E AND E BUFFALD

PAGE 1 of 1 Ath: Gene Florentino

Exhibit 2 Frontier Chemical July 6, 2001 Page 3 of 3

EST. TOTAL NOT TO EXCEED PRICE

s 36977

ALL WORK WILL BE COMPLETED IN 17 DAYS.

Optional Unit costs

Standby time

Upgrade to Level C respiratory protection

4_18_1

Upgrade from Level C to Level B respiratory protection

\$ 280/hr

\$ 125.crew/hr

Mobilization of Level B equipment to site:

\$<u>0</u>

JUL 17 '01 15:07

PAGE.01

Price Schedule: Nothnagle Drilling, Inc.

PHONE NO. : 716 538 2357

Jul. 10 2001 01:55PM P2 716 684 0944 P.11/17

EXHIBIT 2 PRICE SCHEDULE TO CONDUCT FIELD ACTIVITIES AT THE FORMER FRONTIER CHEMICAL SITE NIAGARA FALLS, NEW YORK E & E PROJECT NO. 000699.NV05.02 July 6, 2001

Subcontractor Name: NOTHNAGLE DRILLING, INC.		
Site-Specific Health and Safety Plan for all subcontractor activities	\$	450.00
Decon pad construction/disassembly	\$	400.00
Task 1: Geoprobe Soil Profiling/Plezometer Installation Mobilization of all necessary equipment and personnel and initially clean Geoprobe and equipment of road dirt	\$ \$	450.00 8,050.00
feet/hole (\$1150/day) 100 acetate sleeves (assume 4 per hole) (3.00 /sleeve) 12 hours of decontamination (100.00/hr) 3 open top 55 gallon drums (45.00 /drum) 2 hours of drum/decon water staging (150.00/hr) 60 Feet of 1-inch diameter schedule 40 PVC 0.01 slot-screen (5 ft. per piezometer) (8.00 /ft) 156 Feet of 1-inch diameter schedule 40 PVC riser (approx. 13 ft. per piezometer) (5.00 /ft)	\$ \$ \$ \$ \$ \$ \$	300.00 1,200.00 135.00 300.00 480.00
12 threaded 1-inch end caps (5.00 /end cap) 12 locking caps with lock (25.00/ea)	\$ \$	<u>60.00</u> _300.00
OTHER GEOPROBING COSTS (Please specify any additional equipment of supplies which you feel may be required) Bentonite Backfill (1.09/ft	3 S S S	208.00 12,263.00
48 ft of 41/4-inch hollow stem auger drilling (\$ 14. 80 ft of 61/4-inch hollow stem auger drilling (\$ 16.		\$ 650.00 \$ 672.00 \$ 1.280.00 \$ 2.112.00 \$ 336.00 \$ 450.00

PHONE NO. : 716 538 2357

Jul. 10 2001 01:56PM P3 716 584 0844 P.12/17

Exhibit 2 Frontier Chemical July 6, 2001 Page 2 of 3

35 ft of 5 7/8-inch roller bit drilling	(\$40.00/ft)	6 3 (00 00
SI ft 6-inch steel casing grouted in place	(\$24.00/ft)	\$ <u>1,400.</u> 00 \$ <u>1,224.</u> 00
186 ft 4-inch steel casing grouted in place	(\$28.00/ft)	\$ 5,208.00
40 ft of HX caring	(\$ <u>54.00</u> /ft)	\$ 2,160.00
30 ft of 2-inch I.D., Sch. 40, 0.010 machine slotted.	(3 <u>24.00</u> /11)	32,100.00
flush threaded, PVC screen	(\$21.00/ft)	s 630,00
24 ft 2-inch I.D., Sch 40 PVC flush-joint well casing	(\$17.00/ft)	
3 PVC slip-on top caps (2-inch)	(\$ <u>1</u> /.\omega/it) (\$ <u>1</u> _\omega_ea)	\$ <u>408</u> .00
3 PVC flush threaded end caps (2-inch)	$($\underline{5}.\underline{\otimes})$ /cap)	\$ <u>3.</u> 00 \$ <u>15.00</u>
12 ft 0.10-size sand filter pack	(\$10.00/ft)	\$120.00 \$120.00
6 ît bentonite pellet seal	(\$25_00/ft)	<u>s_150.00</u>
6 ft bentonite/cement grout (btwn 8-inch hole and 2-inch	(UZINAL) IV	<u> </u>
casing)	(\$ <u>8.00_</u> /ft)	\$48. 00
85 ft bentonite/cement grout (btwn 8-inch hole and 4-inch	(4 <u>0-14</u> /14)	3 40.00
casing)	(\$6.00_/ft)	\$_510.0 0
51 ft bentonite/cement grout (btwn 8-inch hole and 6-inch	(30.00_)10)	<u> </u>
casing)	(\$ <u>5.00</u> /ft)	\$ _255.00
81 ft bentonite/cement grout (btwn 6-inch hole and 4-inch	(42:33-1.1)	<u> </u>
casing)	(\$4.00_/ft)	\$_324.00
8 aboveground completions with 4-inch locking caps with	(7-1230-101)	V
locks, 3 red bollards, and concrete drainage pad		<u>\$_5,200</u> .00
3 aboveground completions with 4-inch locking protective	(425515)0.17	<u> </u>
steel casing with locks, 3 red bollards, and concrete drain	nage	
pad	(\$ 750.00 well)	\$ 2.250.00
19 55-gallon drums (including delivery)	(\$60.00/ea)	\$ 1,140.00
4 hours of drum/decon water staging	(\$150.00hr)	S 600.00
11 events of decontamination	(\$100.07hr)	\$ 1.100.00
	,	
OTHER MONITORING WELL COSTS		
(Please specify any additional equipment of supplies which you feel may be requ	ired)	
(/)	•	
	\$ \$	***************************************
	\$	
Task 2 Total (Cost: §	<u>28,245</u> .00
Task 3-2: Utility Investigation		
a m. mants and conferent		
Daily rate for excavator, equipment, and operator in level D		
		\$ <u>1.250</u> .00
	•	-
Task 3 Total C	Cost: §	<u>1,250</u> .00

NOTHNAGLE DRILLING, INC.

FROM: NOTHNAGLE JUL-U6-2881 16:37 PHONE NO. : 716 538 2357 E AND E BUFFALO Jul. 10 2001 01:56PM P4 716 684 0844 P.13/17

Exhibit 2 Frontier Chemical July 6, 2001 Page 3 of 3

TOTAL NOT TO EXCEED PRICE

\$ 4<u>2.608.0</u>0

ALL WORK WILL BE COMPLETED IN 30 DAYS.

Optional Unit costs

Standby time

\$150.00crew/hr

Upgrade to Level C respiratory protection

\$<u>35.00</u>/hr

Upgrade from Level C to Level B respiratory protection

\$_70_00/hr

Mobilization of Level B equipment to site:

\$<u>450.0</u>0

NOTHNAGLE DRILLING, INC.

Summary of Subcontracted Service Quotations Former Frontier Chemical Waste Process, Inc. Niagara Falls, New York

Survey Services

Survey services bids were solicited from four firms: LaFave, White, and McGivern, L.S., P.C., Lu Engineers, McIntosh & McIntosh, P.C., and Wendel Duchscherer. Below is a comparison of their prices.

Surveying Bids Summary

Surveying Firm	Total Surveying Costs
McIntosh & McIntosh, P.C	\$7,725
Wendel Duchscherer	\$8,430.00
Lu Engineers (WBE)	\$8,678.01
LaFave, White, and McGivern, L.S.	No bid

McIntosh & McIntosh, P.C, Lockport, New York quoted the lowest price. They are therefore the selected surveying firm.

Survey Services Scope of Work

EXHIBIT 1

Piezometer and Monitoring Well Surveying and Grid Installation Scope of Work 000699.NV05 Frontier Chemical Site Niagara Falls, New York July 6, 2001

Site Description/History

The Frontier Chemical Waste Process, Inc. occupies approximately 9 acres, bordered by Royal Avenue on the south and 47th Street on the east, in Niagara Falls, New York. The Niagara River lies within 1 mile south of this site. The facility treated chemical wastes from 1974 to December 1992 when the facility closed. When operating, the active waste management units treated or stored approximately 25,140 tons of chemical wastes each year. The waste, which came from businesses located in the eastern United States and southeastern Canada, can be classified as RCRA-listed wastes, as well as RCRA-characteristic wastes. Previous groundwater investigations have revealed the following chemicals at the site: monochlorotoluene, methylene chloride, chloroform, dichlorobenzene, tetrachloroethylene and other organic contaminants. Dense Non-Aqueous Phase Liquid (DNAPL) is present at the southern edge of the facility. In 1999, most of the site buildings were demolished with the rubble remaining on site. Ecology and Environment Engineering, P.C. has been assigned the project of conducting a remedial investigation (RI) of the site for the New York State Department of Environmental Conservation (NYSDEC).

Scope of Work (SOW):

There are two elements to this subcontract: surveying and grid installation at the Frontier Chemical site. Provision of these services is to be inclusive of all necessary labor, travel, per diem, equipment, expendables, and other direct charges to complete Tasks 1, 2, and 3 of this SOW as described below:

Task 1: Health and Safety Plan

The subcontractor shall provide a site-specific health and safety plan (HASP) in accordance with the requirements of 29 Code of Federal Regulations (CFR) 1910.120. The HASP will apply to both the grid installation described in Task 2, and the survey work described in Task 3, below. The subcontractor's HASP will be an original document specific to the site. A HASP fact sheet will be provided to the winning bidder. The HASP will be reviewed by E & E. Modifications may be required if deemed necessary.

Task 2: Grid Installation

The initial surveying services will include the establishment of a grid across the site marked with spray paint (concrete surfaces) or wood laths (off concrete surfaces) at 100-foot centers. The site is approximately 800 feet long, and 700 feet wide (see site sketch). Most of the site's buildings have been knocked down and the debris has been piled in the center of the site. E & E expects the debris to be removed and the site open by the beginning of fieldwork. Horizontal locations for each staked location shall be recorded. There are approximately 48 total grid locations.

Task 3: On-Site Surveying

Surveying services shall include the establishment of horizontal and vertical position of the 48 grid locations. Surveying services shall also include the establishment of horizontal position of the well casings of 80 groundwater wells, as well as the vertical elevation of the ground surface and inner casing at 60 of the wells. The surveying services shall also include the establishment of horizontal position of 25 Geoprobe borehole locations, 12 of which will be piezometers and also require vertical position. Each piezometer will be equipped with a locking cap. Lastly, the surveying services shall also include the establishment of horizontal and vertical position for up to 10 sewer shafts. The survey team will be provided a set of keys to access each well or piezometer prior to surveying activities.

The surveyor will be required to create a site base map based on the survey data and tax map data and provide this map in both hard copy and electronic format to E & E.

Survey Description

Surveying will be undertaken to establish the following:

- Vertical Control Elevations, to the nearest 0.01 foot, will be established for the ground surface at each well/piezometer. Elevations will be determined relative to a National Geodetic Survey (NGS) station monument or New York State (NYS)-approved monument. A reference to an existing NGS or NYS monument likely exists from previous surveying efforts conducted at the site. If a monument does not exist within close proximity to the site such that it can not be referenced within one day's effort, a reference elevation will be assigned to a site benchmark installed at the site by the subcontractor.
- Horizontal Control each 100-foot spaced grid node will be located according to Suburban Class standards. Coordinates are to be given in the State Plane Coordinate System. If horizontal control is not available, local control shall be established using the site benchmark installed at the site by the subcontractor.
- Horizontal position of the fixed features including, but not limited to, the onsite building's corners, grassed areas, and boarder fence locations.

All field work is expected to be performed in Level D personal protection by personnel with 24-hour basic health and safety training.

The subcontractor will provide a professional land survey licensed in the State of New York to establish the locations of the above-mentioned features. Angular and orientation standards for Suburban Class surveying are required to generate quality mapping data.

The subcontractor will record all field work in a clear, legible, and complete manner. The field record will contain a complete description of the nature and location of both new and any existing control points used. The record will include a sketch of the point locations and the monument witness points. The subcontractor will provide to E & E a copy of the field survey book at the completion of all survey work. The book will contain all field notes, notations, and

descriptions, used and compiled during the field survey. Legible photo copies will be accepted. Electronic notebook data to field data is also acceptable as a supplement.

In addition, E & E may request that the surveyor gather additional information on the physical/natural features of the site including, but not limited to, vegetative cover (light brush, grass) at the time of the survey. These will not be surveyed but will be noted in general nature only and obtained for the sole purpose of providing a more illustrative site map.

General Requirements

The surveyor's map is to be prepared as a CADD drawing using Autocad LT 97 or AutoCAD Release 14 format. Copies of all site maps must be supplied as Autocad drawings on paper and on 1.44 megabyte, 3½ inch, high density disks.

The following are the minimal acceptable cartographic specifications:

- Map Border and neat line
- Title box in lower right corner listing contractor's name as surveyor, and E & E's name as Project Engineer
- Legend
- Map Symbols (The attached set of standard map symbols must be used in preparation of all site maps. Additional symbols may be chosen by the subcontractor for items not included on the attached list.)
- North Arrow (North according to the State Plane Coordinate system will be aligned to the vertical dimension of the sheet. True north should be approximately aligned with the vertical.)
- Coordinate Reference Points (Latitude and longitude coordinates for a central point in the site are to be given on the site location map figure. In order to incorporate electronic map data into the GIS, at least two reference State Plane coordinate points must be given within the bounds of the site map, if possible.)
- Bar Scale (A bar scale is required and should be suitable to depict significant features of the site. The bar scale must be designed so that it can be used with an engineers scale. This limits ground units per map unit to multiples of ten, i.e., 1 inch = 20 feet, 1 inch = 30 feet, 1 inch = 40 feet, 1 inch = 50 feet, 1 inch = 100 feet.)
- Surveyed Site Map (Pertinent surveyed features and data will be incorporated into the site map as described above. The surveyed site map made by a licensed professional land surveyor will be included as a plate in a pocket of the draft and final reports. An electronic survey map is not required for the report.)

Deliverables:

The subcontractor will provide the following deliverables WITHIN 10 DAYS FOLLOWING THE FIELD WORK:

- Draft and final site survey map physical features consistent with the above SOW.
- One Copy of detailed survey field notes.
- A 3.5-inch disk containing the electronic file(s) of the site survey map for further E & E development.

Information Provided for the Subcontractor:

E & E will provide the subcontractor with the following information:

• Background information on the site and history of activities including known or suspected potential hazards on site;

E & E may accompany the surveyor on site to conduct a preliminary walkover of the site prior to the start of surveying field activities.

Project Schedule:

The subcontract work is to be performed as follows: Field activities will begin with grid installation in September 2001. The surveying by will be scheduled after the field work is completed, expected in October 2001. A specific project schedule will be forwarded to the subcontractor upon finalization of the Work Plan. Following E & E's receipt of NYSDEC's notice to proceed, E & E will modify the project schedule, as necessary.

Note that a completed health and safety checklist form must accompany the bid to be considered valid. Upon award of work, a site-specific health and safety plan shall be provided to E & E within 10 business days.

Price Schedule: MacIntosh & Macintosh, P.C.

McINTOSH & McINTOSH, P.C.

CONSULTING ENGINEERS, LAND SURVEYORS, PLANNERS

NEW YORK • MAINE • PENNSYLVANIA • VERMONT • CONNECTICUT
NEW HAMPSHIRE • KENTUCKY • OHIO • SOUTH CAROLINA • ARIZONA
NORTH CAROLINA • WEST VIRGINIA • RHODE ISLAND

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Principal Office: 429 Pine Street, P.O. Box 490 Lockport, New York 14095 716 - 433-2535 BUF=ALO, N.Y.

716 - 433-2535 716 - 434-9138

MOTHINGH

625-8360

FAX # 716-433-2627

July 11, 2001

Mr. Gene Florentino
Ecology and Environment, Inc.
368 Pleasantview Drive
Lancaster, NY 14086

Re:

Surveying Services for former

Frontier Chemical Waste Process, Inc.

Royal Avenue and 47th Street

Niagara Falls, NY

Dear Mr. Florentino:

Pursuant to your request for proposal dated July 6, 2001 for surveying services at the above mentioned site, we at McIntosh & McIntosh are pleased to submit the following proposal:

Scope of Services

Task No. 1 - Health and Safety Plan

We would prepare a site-specific Health and Safety Plan in accordance with the fact sheet provided at award of project.

Our cost for the above described surveying services would be a lump sum fee of \$700.00.

Task No. 2 - Grid Installation

We would provide field stakeout of approximately 48 grid stations across the project area located at 100 foot centers. Spray paint will be used to mark centers on concrete or asphalt surfaces and a wood lath on ground surfaces.

Our cost for the above described surveying services would be a lump sum fee of \$1,225.00.

Task No. 3 - On-Site Surveying

- A) Vertical Control We would provide a benchmark at the project site based upon a referenced datum.
- B) Horizontal Control We would provide 2 intervisible points at the project site relative to the New York State Plane Coordinate SystemWest Zone NAD 83/HARN.

Mr. Florentino July 11, 2001 Page 2

Based upon the above described horizontal and vertical control datums, we would provide the following:

- Horizontal and vertical positions of the 48 grid locations as described in Task No. 2
- Horizontal positions for 80 groundwater well casings
- Vertical elevations for the ground surface and inner casing of 60 wells
- Field stakeout of 25 geoprobe borehole locations (Horizontal positions to be provided by E & E)
- Field stakeout for 10 sewer shafts

After completion of all field work, a site base map will be prepared depicting survey data on top of a tax map base. The drafting for the project will be completed in an AutoCAD format.

Our cost for the above described surveying services would be a lump sum fee of \$5,800.00.

Cost Summary

Task No. 1 - Health & Safety Plan	\$ 700
Task No. 2 - Grid Installation	\$1,225
Task No. 3 - On-Site Surveying	\$5,800
Total	\$7,725

This proposal is valid for sixty days from the above date unless extended by mutual consent. All invoices are subject to a 1.5 percent per month service charge after thirty days from the date of invoice.

We appreciate the opportunity to submit this proposal. If you have any questions or require any additional information, please do not hesitate to contact me.

Yours truly,

John E. McIntosh III, L.S. Director of Operations

JEMIII:dt

Agreed to this ______day of ______2001.

By_____ECOLOGY & ENVIRONMENT, INC.

C:/WPWIN60/PROPOSAL/SURVEY01/ECOLOGY,WPD

Price Schedule: Wendel Duchscherer



July 12, 2001

Mr. Gene Florentino
Ecology and Environment, Inc.
368 Pleasantview Drive
Lancaster, New York 14086

SUBJECT:

FORMER FRONTIER CHEMICAL WASTE PROCESS, INC. SITE

NIAGARA FALLS, NEW YORK

SURVEYING SERVICES

E & E PROJECT NO.: 000699.NV05

Dear Mr. Florentino:

Wendel Duchscherer Survey is pleased to provide you with the attached proposal to supply the required surveying services at the above noted site.

Our fee estimate is based on the scope of services as outlined in your correspondence of July 10, 2001. The following assumptions have been made in developing our fee estimate:

- The building rubble will be removed from the site prior to beginning the surveying task.
- Suitable vertical control exists on the site.
- Site access will be readily available to us.
- Site orientation meeting and time required to obtain necessary security clearance have not been included in this proposal.

As discussed on the phone on July 11, 2001 we will provide you the additional required data if we are awarded this project.

We have been providing site remediation and landfill control services to a variety of clients since 1985 and have gained significant experience in this field. Our field crews have received 40-hours of health and safety training in accordance with OSHA 29 CFR 1910.120 along with annual 8-hour refresher training and each undergoes an annual physical examination.

Thank you for the opportunity to provide this information. We look forward to hearing from you in the near future and to our successful completion of this assignment.

Sincerely,

WENDEL DUCHSCHERER SURVEY

Peter J. Welsby, PLS

Principal



EXHIBIT 2 Price Schedule 000699.NV05 Frontier Chemical Site Niagara Falls, New York July 6, 2001

Item	Cost
Task 1: Site Health and Safety Plan	\$695.00
Task 2: Grid Installation	<u>\$1625.00</u>
Task 3: Boring/Well/Sewer Survey	<u>\$4220.00</u>
Task 4: Mapping	<u>\$1890.00</u>

Total \$8,430.00

To tie horizontal site control into NAD'83 an additional \$350.00 will be required.

Price Schedule: Lu Engineers, L.S., P.C.



Office (716) 377-1450 Fax (716) 377-1266 e-mail: luengrs@luengineers.com

	4X		COV
DATE	- July 11, 2001	PROJECT NO.:	
THIS I	FACSIMILE MESSAGE FOR THE A	TTENTION OF.	
NAME	Jene Florentino		
FIIM:	Ecology and Environm	ant	
FAX N	0.: 684-0844		
FROM:	Bob Elliott		
SUIJE	CT: Proposal - Frontier	C1	
REGUL	AR COPY WILL OR WILL NO	OT BE SENT.	eet): <u>8</u>
REGUL	AR COPY WILL OR WILL NO	OT BE SENT.	EET): 8
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JUL 11 '01 14:24

Cost-Plus-Fixed Fee Subcontractors

Frontier Chemical Site Niagara Falls, NY

09-Jul-01 P01-143

I. NAME OF

SUBCONTRACTOR

SERVICES TO BE PERFORMED

SUBCONTRACT PRICE

S

Lu Engineers

Surveying and Mapping

8,687.01

A.Direct Salary Costs

Professional Responsibility Level Task 1 - HASP	Labor Classification	Rei	Avg. imbursement Rate	Rei	Max. Imbursement Rate	Est. # Hours		Est. ect Salary Cost g. Reimb. Rate)
Mgt Engineer	NSPE VIII	\$	47.35	S	49.17	1	\$	47.25
Sr. Engineer	NSPE III	s	24.52	S	26.22	2	\$	47.35 49.04
Engineer	NSPE II	\$	19.65	S	22.40	8	S	157.20
Task 2 - Grid In	stallation			•		•	9	0 ش. / د ا
Mgt. Engineer	NSPE VIII	\$	47.35	S	49.17	1	\$	47.35
Sr. Engineer	NSPE III	S	24,52	S	26.22	23	S	563.96
Technician	NSPE I	\$	16.33	2	18.35	30	\$	489.90
Task 3 - On-Site	Surveying			•		50	J	467.70
Mgt. Engineer	NSPE VIII	\$	47.35	S	49.17	0	\$	_
Sr. Engineer	NSPE III	S	24.52	S	26.22	36	S	882.72
Engineer	NSPE I	\$	16.33	\$	22.40	45	\$	734.85
Total	Direct Salary C	osts					\$	2,972.37
B. Indirect Costs								

Amount budgeted for indirect costs is:

\$ 3,774.91

C. Maximum Reimbursement Rates for Direct Non-Salary Costs

Item	М	ax. Reimb.	Unit	# Units		Total Est.
		Rate				Cost
l Travel						
Overnight Expenses	\$	85.00	Night	0	\$	
Dinner Only	\$		Dinner	0	S	_
Breakfast Only	\$	6.00	Breakfast	0	Š	-
Mileage	\$	0.30	Mile	950	-	285.00
Total Travel				0	S	285.00
2 Supplies				•	•	200.00
Postage	\$	15.00	Lump Sum	0	S	_
Level D Protection	\$	15.00		10	-	150.00
Level C Protection	\$	50.00	=	0	\$	150:00
Total Station w/Tripod	\$	146.00	Day	5	\$	730.00
Miscellaneous Expenses	\$		Lump Sum	1	Š	100.00
Reproduction	\$		Each Copy	0	\$	
Total Supplies				·	\$	980.00
Total Travel and Supplies Cost					\$	1,265.00
e						
The Fixed Fee is:					\$	674.73

D. Fixed Fee

Price Schedule: LaFave, White, and McGivern, L.S.

SUBCONTRACTOR'S BID RESPONSE FORM

TO:	Mr. Andy Baily LaFave, White & McG 105 Main Street P.O. Box347 Boonville, New York	
Re:	Site Name: Site Location: Services Needed: Client: E & E Project No.:	Frontier Chemical Site Niagara Falls, NY Site Survey New York State DEC 000699.NV05
DATE:	July 6, 2001	
IN ORDER I PLEASE CO	FOR US TO MAINTA MPLETE THE FOLL Gene Florentino Ecology and Enviror 368 Pleasantview Dr Lancaster, NY 1408	rive
·	Bid enclosed.	
	No bid due to	the following:
Please main	Pri	our bidder's list. nature: Andrew A Bailey inted: Anorem R. Bailey e: Survey Manc. Date: July 9, 2001

Summary of Subcontracted Service Quotations Former Frontier Chemical Waste Process, Inc. Niagara Falls, New York

Data Usability Summary Report (DUSR) Preparation

DUSR preparation bids were solicited from three firms: CRA Services, Chemworld Environmental, Inc., and Data Validation Services, Inc.. Below is a comparison of their prices.

DUSR Preparation Bids Summary

DUSR Preparation Firm	Total DUSR Preparation Cost
Chemworld Environmental, Inc. (WBE)	\$7,810
CRA Services	\$7,888
Data Validation Services, Inc (WBE)	\$8,405

Chemworld Environmental (WBE) quoted the lowest price. They are therefore the selected DUSR preparation firm. Note that the price quotes were adjusted because the total number of project samples was revised after the bids were received.

Data Usability Summary Report (DUSR) Preparation Scope of Work

EXHIBIT 1 SCOPE OF WORK FOR DATA VALIDATION SERVICES FRONTIER CHEMICAL SITE RI July 6, 2001

Introduction

Ecology and Environment Engineering, P.C. (E & E), under contract with the New York State Department of Environmental Conservation (NYSDEC) is conducting a remedial investigation at the Frontier Chemical Site located in Niagara Falls, Niagara County, New York. E & E's assignment involves collection and analysis of environmental media samples. Following analysis, samples are to be reviewed by a third party and data usability summary reports (DUSRs) are to be prepared.

Scope of Work

E & E will provide analytical data packages and supporting sample information such as sample numbers of duplicate samples, trip blanks, rinsate blanks, and matrix spike/matrix spike duplicates (MS/MSDs). The subcontractor is to review the data and prepare DUSRs for all data generated from the analysis of environmental media samples. Environmental media may include soil and water. The analyses will include all analyses listed in the table in Exhibit 2.

All DUSRs are to be prepared as per NYSDEC protocol. DUSR preparation will be performed at the unit rates listed in Exhibit 2 of this agreement.

Schedule

E & E is to receive a written DUSR within 30 days following subcontractor's receipt of data from E & E. Project field work is tentatively scheduled to start in September, 2001. Data are expected to be submitted for DUSR preparation in November, 2001. Subcontractor will be informed of the firm project schedule when it is established.

Price Schedule: Chemworld Environmental Inc.

Exhibit 2 Subcontractor's Price Schedule For Data Usability Summary Report (DUSR) Preparation Frontier Chemical Site Niagara Falls, New York 13~Jul-01

			Expected	DUSR	Extended
			Number of	Preparation	Cost
Matrix	Analysis	Method	samples	Unit Cost	
Solid	TCL Volatile Organics	OLM04.2	42	\$ 15	\$ 630
	TCL Semivolatiles	OLM04.2	42	\$ 17	\$ 714
	TCL Pesticide/PCBs	OLM04.2	42	\$ 14	\$ 588
	TAL Inorganics (Metals)	ILM04.0	42	P 15	\$ 630
	Cyanide	ILM04.0	42	\$ 2	\$ 84
	% Solids		2842	\$ 0	\$ O
	TCLP Volatiles		3	\$ 14	\$ 42
	TLCP Semivolatiles	·	- 3	\$ 14	¥ 42
	TCLP Metals		3	\$ 14	F 42
	TCLP Extraction		3	\$ 0	Ý G
•	TLC Pest/PCBs		3	4 12	936
	Dioxins		7	\$ 30	\$ 210
Water	TCL Volatile Organics	OLM04.2	125112	\$ 15	\$ 1,785 -105
	TCL Semivolatiles	OLM04.2	57.58	¥ 17	\$ 969 +17
	TCL Pesticide/PCBs	OLM04.2	5858	\$ 14	\$ 924 -112
	TAL Inorganics (Metals)	ILM04.0	5758	4 15	\$ 855 +15
	Cyanide	ILM04.0	F 58.	\$ 2	\$ 114 +2
	Hardness	130.2	57 58	\$ 1	\$ 57 +1
	Dioxins		9	4 30	\$ 270
Total Not-t	o-Exceed Price	\$ 799	2.00	\$ 0:00	

Chemworld Environmental, Inc.

7/18/2001

TOTAL FOR DUSR

SUSR \$ 7,992.00 -182 7,810 GF Total

Price Schedule: CRA Services



2055 Niagara Falls Blvd., Suite #3 Niagara Falls, New York 14304

Telephone: (716) 297-6150 Fax: (716) 297-2265

www.CRAworld.com

				TRA	ME	MITT	TAL	
DATE:	July 1	2, 2001				RENCE N		400002
To:	Cono	Florentir			PRO	ECT NAM	ΛE:	Frontier Chemical Site
10.					~··			
			rironment, Inc	•	······································			
			ew Drive		-			
	Lancas	ster, NY	14086					
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Copy to: Completed	by: _D	enise R.	Tuhovak [Please Print]			Signed:		lenise R. Tuhovak

Filing: Correspondence File



Exhibit 2 Subcontractor's Price Schedule For Data Usability Summary Report (DUSR) Preparation Frontier Chemical Site Niagara Falls, New York 6-Jul-01

Matrix	Analysis	Method	Expected Number of samples	DUSH Preparation Unit Cost	
Solid	TCL Volatile Organics	OLM04.2	42	550	
	TCL Semivolatiles	OLM04.2	42	575	ł
	TCL Pesticide/PCBs	OLM04.2	42	.550	
	TAL Inorganics (Metals)	ILM04.0	42	500	1
	Cyanide	ILM04.0	42	210	l ,
	% Solids	S.	4542	90	-6
	TCLP Volatiles		3	150	
	TLCP Semivolatiles		3	160	
	TCLP Metals		3	140	1
	TCLP Extraction		3	0	1
	TLC Pest/PCBs		3	150	j
**	Dioxins		7	340]
Water	TCL Volatile Organics	OLM04.2	125 112	1550	1-91
	TCL Semivolatiles	OLM04.2	5758	800]+14
	TCL Pesticide/PCBs	OLM04.2	6858	850] -10
	TAL Inorganics (Metals)	ILM04.0	57 5X	700	1+12
	Cyanide	ILM04.0	57 58	300	1+5
	Hardness	130.2	57 58	100	12
	Dioxins		9	340	1

Adj.

\$ 7,888 S

CRA

Price Schedule: Data Validation Services, Inc.

5182514428

Data Validation Services

Cobble Creek Road P. O. Box 208 North Creek, NY 12853 Phone (518) 251-4429 Facsimile (518) 251-4428

July 12, 2001

Gene Florentino Ecology & Environment, Inc. 368 Pleaseant View Dr. Lancaster, NY 14086

Cost estimate for DUSR review of NYSDEC Frontier Chemical Site data RE:

Dear Mr. Florentino:

Thank you for contacting me regarding the review of data pertaining to the NYSDEC site noted above. I have reviewed the request for quotation, and am providing the following quotation. Costs are provided for generation of a Data Usability Summary Report (DUSR), similar to those provided by this firm to yours for previous NYSDEC projects.

For DUSR generation, the data packages provided will be reviewed for quality control parameters (including, but not limited to, custody documentation, holding times, surrogate and matrix spike recoveries, LCS recoveries, duplicate correlation, calibration standard/blank performance, instrument performance, blank contamination, matrix interferences, method compliance, etc). This review will be performed from the summary forms available in the data package. In addition, critical elements of the raw sample data (i.e. quant reports and chromatograms, etc) will be randomly reviewed. Full validation to verify summary page values and QC reported results from the raw data will not be performed at this time. The USEPA national and regional validation guidelines/procedures will be used to determine the applicable qualifications the data. Those qualifications which impact signficantly on the usability of the sample results are cited within the report. The DUSR will then be generated, incorporating all sampling activities at the site, as a narrative discussion organized by sample type and analytical fraction. At a minimum, all issues noted in your proposal, and in the NYSDEC DUSR description (Rev. 09/97) will be discussed in the DUSR. Please note that any discussion indicating steps to be taken to fill in data gaps must be generated with coordination with your firm.

The DUSR unit costs on the attached cost schedule (your Exhibit 2) include review of data packages (as noted above), generation of the DUSR, and associated communications. For this scope of work, billable units include field samples, duplicates and matrix spikes/duplicates. Field/trip blanks. Also attached are the required subcontractor forms.

Please review my resume, forwarded previously. Data Validation Services is certified by New York State as a Woman-Owned Business Enterprise. Please do not hesitate to contact me if you desire additional information, or have questions regarding this proposal. I look forward to possibly working with your firm on this project.

Very truly yours,

Exhibit 2 Subcontractor's Price Schedule For Data Usability Summary Report (DUSR) Preparation Frontler Chemical Site Niagara Falls, New York 6-Jul-01

100

Matrix	Analysis	Method	Expected Number of samples	DUSH Preparation Unit Cost	EXTENDED COST	
Solid	TCL Volatile Organics	OLM04.2	42	a 15	\$ 630	_
	TCL Semivolatiles	OLM04.2	42	15	6.30	
	TCL Pesticide/PCBs	OLM04.2	42	20	840	
	TAL Inorganics (Metals)	ILM04.0	42	15	630	
	Cyanide	ILM04.0	42	3	126	
	% Solids		4842			
	TCLP Voiatiles		3	10	30	
	TLCP Semivolatiles		3	12	36	
	TCLP Metals		3	10	30	
	TCLP Extraction		3			
	TLC Pest/PCBs	ŀ	3	18	45	
	Dioxins		7	30	210	
Water	TCL Volatile Organics	OLM04,2	1112		1785	-
	TCL Semivolatiles.	QLM04.2	258	15	855	+
	TCL Pesticide/PCBs	OLM04.2	\$8.58	20	1320	•
	TAL Inorganics (Metals)	1LM04.0	5758	15	855	+
	Cyanide	ILM04.0	5/58	3	171	4
	Hardness	130.2	5758	3 .	171	•
	Dioxins		9	30	270	+

Summary of Subcontracted Service Quotations Former Frontier Chemical Waste Process, Inc. Niagara Falls, New York

Dioxin and Furans Analysis

Dioxin and Furans lab analysis bids were solicited from seven New York State certified firms: Paradigm Analytical Laboratories, Inc., Phillip Analytical Services, Triangle Laboratories, Inc., Pace Analytical Services, Severn Trent Services, Camin Cargo Control, and Lionville Laboratory, Inc.. Below is a comparison of their prices.

Dioxin and Furans Lab Bid Summary

Laboratory	Total Dioxin and Furans Cost (4 soils, 6 waters, and QC samples)
Paradigm Analytical Laboratories, Inc.	\$9,450
Phillip Analytical Services Corp.	\$10,200
Triangle Laboratories, Inc.	\$10,400
Pace Analytical Services	\$12,320
Severn Trent Services	\$14,400
Camin Cargo Control	Does not perform dioxin analyses
Lionville Laboratory, Inc.	Does not perform dioxin analyses

Paradigm Analytical Laboratories, Inc. quoted the lowest price. They are therefore the selected Dioxin and Furans analysis firm. Note: The actual numbers of soil and water samples (4 and 6, respectively) were reversed in the scope of work sent to the labs. Therefore, price quotes with different unit rates for soil and water had to be adjusted to the proper number of samples.

Dioxin and Furans Analysis Scope of Work

EXHIBIT 1 SCOPE OF WORK FOR DIOXIN AND FURANS ANALYSIS FRONTIER CHEMICAL SITE SRI July 19, 2001

Ecology and Environment (E & E) Inc. has been awarded a job that requires the monitoring for compounds present in the Niagara River Toxics Management Plan (NRTMP) including Dioxins and Furans by Method 1613B. This RFP is being issued for subcontractor services.

The Scope of Work (SOW) is as follows:

Analysis of approximately 4 water samples and 6 soil samples for Dioxins and Furans by Method 1613B according to NYSDEC Analytical Services Protocol (ASP) June 2000 requirements. Samples are expected to be collected during Fall 2001. The laboratory also will be required to analyze a matrix spike/matrix spike duplicate (MS/MSD) and matrix spike blank (MSB) for each matrix. If these samples are chargeable that needs to be indicated in the total samples in the quotation. The scheduled and scope is subject to workplan approval by NYSDEC. There is no guaranteed quantity of samples to be delivered. The field schedule is also subject to change.

DATA DELIVERABLE: Full CLP like data package consistent with NYSDEC ASP June 2000 Level B requirements.

ELECTRONIC DATA DELIVERABLE (EDD): One EDD is required consistent with the E&E corporate standard EDD (format attached).

SPECIAL REQUIREMENTS: The NYSDEC requires that dioxin samples be extracted within 5 DAYS OF SAMPLE COLLECTION for waters and 30 days for soils. The laboratory should be familiar with NYSDEC requirements and adhere to them in the performance of this work. Failure to do so will result in non-payment for sample analysis, and will subject the subcontractor laboratory to complete liability for any and all costs associated with re-sampling.

CERTIFICATION REQUIREMENTS: The laboratory must be NYSDOH ELAP certified in order to perform this work.

TURNAROUND TIME: The data package and EDDs are due to E&E within 25 days of sample receipt.

LABORATORY QC SAMPLES: Your unit price must indicate whether the rate includes charges for all laboratory QA/QC, as well as MS/MSD or the total number of samples adjusted accordingly.

All work will be performed under the terms of your current Laboratory Services Agreement with E&E. If you currently do not have an LSA in place, the terms and conditions can be sent to you. A finalized subcontract agreement must be in force prior to the start of any work.

The following should be returned as a response to this RFP:

- (1) A unit cost that includes all of the elements of the SOW. All sampling containers, packing material, preservatives, use of coolers, and their shipment to the field must also be included
- (2) A listing of the analytes/isomers that are included in the unit price supplied, along with your current MDLs and PQLs and laboratory QC limits.

Your proposal must be valid for a minimum of 120 days. The unit prices must be valid for one year from the date of award.

Price Schedule: Paradigm Analytical Laboratories, Inc.

----Original Message----

From:

Matt Burns [SMTP:mattburns@earthlink.net]

Sent:

Monday, July 23, 2001 1:53 PM

To:

Galloway, Marcia

Subject:

Re: FW: RFD for Dioxin for Paradigm Analytical

Yes Marcia. It will be the same price, water or soil.

"Galloway, Marcia" wrote:

> Matt

>

- > Please verify that is the same price for water and soils because I had my
- > totals wrong. Also please indicate whether the matrix spike blank is
- > included in the unit rate. We need a formal quote quickly because they need
- > to be sent to the state.

>

- >> -----Original Message-----
- >> From: Matt Burns [SMTP:mattburns@earthlink.net]
- >> Sent: Monday, July 23, 2001 1:14 PM
- >> To: Galloway, Marcia
- >> Cc: Chris Cornwell Paradigm Analytical Labs; Mark Randall
- >> Subject: Re: FW: RFD for Dioxin for Paradigm Analytical

>>

- >> Hi Marcia,
- >> Thank you for including us in you bid request. We are very interested in
- >> working with you on this project.
- >> We would like to submit a price of \$ 675 per sample. This price includes
- >> the EDD and a turnaround time of 21 calendar days. We do charge for
- >> MS/MSDs trip, equipment, and field blanks. However, our prices include
- >> shipping charges, sample bottles, chain of custodies and labels.
- >> I will send over a formal quote which addresses all of this information
- >> and will be good for 120 days.
- >> Again, we thank you for including Paradigm in your invitation to bid on
- >> this project.
- >> Sincerely,

>>

- >> Matt Burns
- >> Paradigm Analytical Laboratories, Inc
- >> Wilmington, NC

Price Schedule: Phillip Analytical Services Corp.

To:

Ecology and Environment Inc

Attention:

Ms. Marcia Galloway

Address:

368 Pleasant View Drive

LANCASTER, NEW YORK

14086

Tel Number:

(716) 684-8060

Fax Number:

(716) 684-0844

Project

Former Frontier Chemical Waste Process

Parameters	Cost Per Sample	Number of Samples	Extended Cost
Water Analysis Dioxins and Furans by 1613B	\$720.00	6	\$4,320.00
Soil Analysis Dioxins and Furans by 1613B	\$740.00	8	\$5,920.00

Total

Prices Quoted in US Funds

\$10,240.00

Ogote No.:

0107016

Issue Date:

23-Jul-01

Valid Until:

21-Sep-01

Quoted By:

Turn-around/Surcharge

- 1. Turn-around time will be approximately 25 working days following date of sample receipt.
- 2. Turn-around time of 2-3 days is available on the inorganic parameters at a premium of 50%. The Organic parameters are available at 3-5 days for 50% premium.

Sample Logistics

- 3. Unit prices include sample bottles, labels, coolers, and e-mail of final report.
- 4. Samples will be stored in the lab for up to 2 months following testing. They will be properly disposed thereafter or returned to chent if determined to be hazardous.

General

5. The attached PASC Terms and Conditions apply.

This material is submitted in confidence for the purposes of evaluation. It is not to be communicated, displicated or distributed in whole or in part without the expressed written consent of PASC.

Actual Samples: 6 soil 3 \$ 10, 200 GF

Price Schedule: Triangle Laboratories, Inc.

Quotation Triangle Laboratories, Inc.

To: Marcia Galloway

Re: Quotation: 0100001358

This quotation is provided to acknowledge receipt of your request for bid and provide you with information about your requested sample analysis. Please review this information. If you have any questions, please phone your Triangle Laboratories Customer Services Representative and refer to the TLI Quotation number above. Unless instructed otherwise, we will use these addresses and phone numbers.

Billing Address: (FAE04)
Ecology and Environment
Attn: Accounts Payable
4493 Walden Avenue
Lancaster, NY 14086

Analytical Services Center 4493 Walden Avenue Lancaster, NY 14086 USA

Telephone Numbers:

Phone: 716-684-8060 Fax: 716-684-0844

Please send this form with your samples.

Ship Samples to:
Triangle Laboratories, Inc.
Attn: Sample Custodian
801 Capitola Drive
Durham, NC 27713
USA

Our quotation is based on your sample(s) as follows:

Quote Made On: ()7/

07/19/01

Valid Through:

09/30/02

Purchase Order #:

Your Project ID:

Dioxin Analysis/Niagara Falls

Analysis Description and Sample Size	Quantity	Matrix	Unit Price *	Expanded Price *
M1613B Tetra-Octa PCDD/F's (1) Expected: 09/30/01 Turn Around Time: 18 days 4 Samples + MS/MSD + blank Report Level III: Summary Package; Sample and Calibration Raw Data	7	Water	650.00	4,550.00
Method 1613B (t-o) (2) Expected: 09/30/01 Turn Around Time: 18 days 6 Samples+ MS/MSD + blank Report Level III: Summary Package; Sample and Calibration Raw Data	9	Soil	650.00	5,850.00

TOTAL PRICE:

\$10,400.00

Actual Samples = 7 soil and 9 water - no change to total Cost of

Printed: 16:33 07/19/01

Page: 2 of 5

Price Schedule: PACE Analytical Services

July 23, 2001

Lea Angelaki Ecology and Environment 368 Pleasant View Drive Lancaster, NY 14086

Dear Ms. Angelaki:

Pace Analytical Services, Inc. is pleased to submit the following quotation to provide analytical support to Ecology and Environment. The scope of our services will be the determination of PCDD/PCDF levels in 4 water and 6 soil samples using a modified version of USEPA Method 1613 for high resolution analyses.

The cost for the analyses will be \$880.00 per sample for the PCDD/PCDF determination using USEPA Methods 1613 with a twenty-five turnaround time. Project specific QC will be run on these samples, however, matrix spike samples will be billable at the above listed price. This price also includes a CLP like data package and an electronic data deliverable (EDD).

In order to meet NYSDEC requirements, Pace Analytical must receive the samples with at least half of the hold time remaining. Therefore, water samples should be received within two days and soil samples should be received within 15 days.

The extracts will be retained for 30 days from the analysis dates. After that time, they will be disposed of at the discretion of Pace Analytical personnel. Raw sample data will be stored on magnetic media for a period of one year. Hardcopy data generated during the program will be archived for three years.

Pace Analytical Services, Inc. appreciates the opportunity to provide this quotation. If you have any questions concerning this quotation please contact me at 612.607.6383. You can also reach me by e-mail at Scott.Unze@pacelabs.com.

Sincerely,

Scott C. Unze Project Manager, Dioxins From:

Chuck Sueper [SMTP:Chuck.Sueper@pacelabs.com]

Sent:

Monday, July 23, 2001 4:19 PM LAngelaki@ene.com; Scott Unze

To: Cc:

Michael King

Subject:

RE: RFP for Dioxin for Pace Analytical Services

Please note that the MS/MSD price is a unit price for the MS/MSD pair, not per sample. That is, soil MS/MSD price will be \$880.00 per pair and water MS/MSD will be \$880.00 per pair.

Chuck Sueper Pace Analytical Services (612) 607 6387

Therefore, 6 soils + 8 waters = 14 samples x \$880 = \$12,320

Price Schedule: Severn Trent Services

Severn Trent Laboratories, Inc. 880 Riverside Parkway West Sacramento, CA 95605

Tel Fax 916 374-4408 916 372-7768 Trent Temperly
Dioxin/Furan Specialist
Tel 317 885-3933
Fax 317 885-3934



PRICE QUOTATION

Requested By:

Marcia Meredith Galloway

Prepared For:

Ecology & Environment, Inc.

Buffalo Corp. Center 368 Pleasant View Dr.

Lancaster, NY 14086

Phone: Fax: 716-684-8060 716-684-0844 Quote Number:

Prepared By:

Date:

Project/Site Name: Sales Contact:

Est Start Date:

Project Duration:

Program:

Fall 2001 NYSDEC

e&e72301

23-Jul-01

NYSDEC

Trent Temperly

Trent Temperly

<u>Method</u>	<u>Description</u>	<u>Matrix</u>	<u>TAT</u>	Number of <u>Samples</u>	Unit <u>Price</u>	Extended <u>Price</u>
1613B	PCDD/PCDF	soil	25-day	ó	\$900	\$5,400
	MS/MSD		25-day	2	\$900	\$1,800
1613B	PCDD/PCDF	water	25-day	4	\$1,125	\$4,500
	MS/MSD		25-day	2	\$1,125	\$2,250

Total = \$13,950

Project Specifications:

All MS/MSD QC samples are billed at the unit rates above. Project consistent with NYSDEC requirements including samples being extracted within 5 days of sample collection for waters and 30 days for soils, Full data package consistent with NYSDEC ASP June 2000 Level B requirements. STL NY DOH certification # 107407.

Client Services

Sample Containers/Coolers Incl Shipment

Sample Disposal

<u>Charae</u>

Included

Included

Client Options

Electronic Data Deliverables (E&E Standard EDD)

Validatable Data Package

2%

Included & Rquested

Terms Effective:

120-days

Notes:

(1) This quotation is based solely upon STL's standard product (routine STL QA/QC, detection limits, deliverables and standard turnaround times) and noted exceptions herein. The discounts incorporated into the pricing are based upon the sample quantity, test method, and schedule quoted. Any deviations may impact pricing and/or the acceptance of work. Final acceptance of this work is contingent upon a mutually agreed Sample Delivery Schedule. All sales are subject to STL Standard Terms and Conditions, unless alternate terms are agreed to in writing.

STL requires 7-10 days notice prior to shipment for XAD traps.

should be 6 soil 8 water Therefore Total cost is \$ 14,400

GF

Price Schedule: Camin Cargo Control

CONTACT REPORT							
	Telephone < X > Conference < > Other < >						
CONTACT:							
FIRM/AGENCY:	Camin Cargo Control						
ADDRESS:	230 Marion Ave., Linden, New Jersey						
PHONE/FAX:	908-862-1809						
TO:	File						
FROM:	Lea Angelaki						
DATE:	07/19/01						
SUBJECT:	Dioxin Analysis						
CC:							

CONTACT:

This laboratory does not do dioxin analysis.

Price Schedule: Lionville Laboratory, Inc.

From:

Haslett, Mark [SMTP:haslettm@lionvillelab.com]

Sent:

Thursday, July 19, 2001 5:04 PM

To:

Angelaki, Lea

Subject:

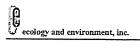
RE: RFP for Dioxin for Lionville Laboratory, Inc.

I have talked to the laboratory about the attached request and have determined that LvLI does not run the requested method for dioxin/furans. However, and you may have this information, Mr. Larry Bailey (NYSDEC) @ 518.402.8167 may have some ideas or contacts with laboratories that would run the high resolution method you are requesting.

I hope this helps Mark



Product Quotes



E. Product Quotes

Product Quotes Former Frontier Chemical Waste Process, Inc. Site Niagara Falls, New York

Electrical hook-up and inspection for trailer

Vendor	Location	Amount
McGill Electric, Inc.	Niagara Falls, New York	\$1,270
Fredrock Electric, Inc.	Niagara Falls, New York	\$1,275
M & M Electric Co.	Niagara Falls, New York	\$2,400
Ferguson Electric Construction	Niagara Falls, New York	\$3,000
Gaines Electric Contractors	Niagara Falls, New York	No Bid
Hves Electrical Contractors	Niagara Falls, New York	No Bid (Only large commercial projects)
Roman Electric	Niagara Falls, New York	No Bid

Electrical Hook-up and Inspection for Trailer Price Quotes



ART McGILL ELECTRIC

P.O. BOX 794 924 NIAGARA AVE. NIAGARA FALLS, N.Y. 14302 PHONE: 716-284-8120

ECOLOGY AND ENVIRONMENT 4626 ROYAL AVE. NIAGARA FALLS, N.Y. 14303

ATTN: GENE FLORENTINO

PROPOSAL

DATE

ESTIMATE NO.

7/18/2001

3977

JOB NAME

TEMPORARY SERVICE

JOB LOCATION

4626 ROYAL AVE.

DESCRIPTION

PROVIDE LABOR AND MATERIAL TO INSTALL TEMPORARY SERVICE AS DIRECTED AND AS FOLLOWS:

- THINSTALL SERVICE ON EXISTING POLE ON EAST SIDE OF SITE NEXT TO FENCE. GUY BACK POLE AS REQUIRED BY NIAGARA MOHAWK POWER CO.
- 2. PROVIDE PANEL, WIRE METERING AS REQUIRED. GROUND SERVICE AS REQUIRED.
- 3. PROVIDE BREAKER AND WIRE TO CONNECT CONSTRUCTION TRAILER ADJACENT TO EXISTING POLIC
- 4. INSTALL (1) GFI RECEPTACLE IN WEATHER PROOF BOX AND COVER AS REQUIRED.
- SCITY OF NIAGARA FALLS PERMIT AND INSPECTION FEE INCLUDED.
- 6. NEW YORK STATE SALES TAX INCLUDED.

PLEASE NOTE: THE EXISTING POLE IS ON THE 47TH STREET SIDE OF THE SITE, NEAR THE NORTH (END. IT COULD BE FED FROM NIAGARA MOHAWK POWER CO. POLE #38 THAT IS ON 47TH STREET.

SIGNATURE (Skerler Rett Self)

AUTHORIZED SIGNATURE

ACCEPTANCE OF ESTIMATE- THE UNDERSIGNED AGREES TO THE ABOVE PRICE, TERMS AND CONDITIONS.

SIGNATURE	 	 ٠.				
DATE						

	CONTACT REPORT
	Telephone < X > Conference < > Other < >
CONTACT:	Dan
FIRM/AGENCY:	Fredrock Electric, Inc.
ADDRESS:	1860 Linwood Ave., Niagara Fall, New York
PHONE/FAX:	716-282-7313
TO:	File
FROM:	Lea Angelaki
DATE:	07/13/01
SUBJECT:	Electrical Hook-up for Trailer
CC:	

I spoke with a representative from Fredrock Electric, Inc. to obtain quotes for electrical hook-up for the trailer for the Frontier Chemical Site. The representative called me back on 7/17/01 and quoted me a price of \$1,275 for the installation of the meter pole, wiring to the trailer, the inspection, and the disconnection (when needed).

M&M ELECTRIC CONST. CO., INC.

9155 Porter Road NIAGARA FALLS, NY 14304

PHONE (716) 297-7060 FAX (716) 297-7063

Web Site: www.mmelectricconstco.com E-Mail: MMElecConstCoInc@aol.com

PROPOSAL

Page 1 of 2

DATE: July 18, 2001

FOR: Temporary Power

TO: Frontier Chemical 4626 Royal Avenue Niagara Falls, NY 14303 Attention: Gene Florentino

Ph 684-8060 F 684-0844

Proposal #: E01-466

This proposal is for electrical labor and materials for the above address as per the following.

Install 1, 100A, single phase, 120/240V temporary meter pole service for trailer.

Service to include:

- 1 35' wood pole with back guy
- service entrance cable
- 1 meter channel
- 1 100A disconnect
- 2 8' ground rod and ground loop

Up to 10' of underground conduit and wire

trench up to 10' and rough backfill with spoils

E01-466 Page 2 of 2

Connect to existing panel in temporary trailer, (supplied by others) No black top patching included in the proposal No Niagara Mohawk Power Co. connection and usage charges included in this proposal

Total Cost: \$2,400.00** **TERMS: 50% deposit down and 50% due upon completion** Date Authorized Signature Tim Simoneit, Estimator

Acceptance Signature The above prices, specifications, and conditions are satisfactory and are hereby accepted. You are authorized to do the work as specified. Payment will be made as outlined above.

All material is guaranteed to be as specified. All work to be completed in a substantial workmanlike manner according to specifications submitted, per standard practices. Any alteration or deviation from above specifications involving extra costs will be executed only upon written orders, and will become an extra charge over and above the estimate. All agreements contingent upon strikes, accidents or delays beyond our control. Owner to carry fire, tornado, and other necessary insurance. Our workers are fully covered by Workman's Compensation Insurance.

Ferguson Electric Construction Company

2701 Lockport Road Niagara Falls, New York 14305 Phone: 716 • 285-2516 Fax: 716 • 285-7206



Fax

To:	Gene	From: Donald V. Freedman, P.E.
Fax:	684-0844	Pages: 1
Phone	: 684-8060	Date: July 20, 2001
Re:	Royal & 47th	CC:
⊠ Urg	ent 🛛 For Review	As Requested Please Reply Please Recycle

Gene.

As requested, we are pleased to provide this proposal for the electrical connection of one construction trailer at Royal & 47^{th} Street. We have included the electrical wiring for a 100a, 120/240v, single phase service to the trailer's circuit breaker panel. Any Niagara Mohawk charges or fees and all energy use charges shall be paid by others.

Our budget price for this work is Three Thousand Dollars...(\$3,000)...based on straight time labor and includes no sales or use taxes.

Disconnection of the trailer is also included at the completion of the job.

Thank you for the opportunity to provide this proposal. We are looking forward to working with you on this project. Please do not hesitate to call if you have any questions or to schedule this work.

	CONTACT REPORT
	Telephone < X > Conference < > Other < >
CONTACT:	
FIRM/AGENCY:	Gaines Electrical Contractors
ADDRESS:	4701 Military Rd., Niagara Fall, New York
PHONE/FAX:	716-297-1739
то:	File
FROM:	Lea Angelaki
DATE:	07/13/01
SUBJECT:	Electrical Hook-up for Trailer
CC:	

I spoke with a representative from Gaines Electrical Contractors to obtain quotes for electrical hook-up for the trailer for the Frontier Chemical Site. the representative did not call back with a price quote.

	CONTACT REPORT
	Telephone < X > Conference < > Other < >
CONTACT:	
FIRM/AGENCY:	Hves Electrical, Inc.
ADDRESS:	6680 Mooradian Dr., Niagara Fall, New York
PHONE/FAX:	716-283-3679
то:	File
FROM:	Lea Angelaki
DATE:	07/13/01
SUBJECT:	Electrical Hook-up for Trailer
CC:	

I spoke with a representative from Hves Electrical, Inc. to obtain quotes for electrical hook-up for the trailer for the Frontier Chemical Site. The representative informed me that they do not do residential (small-sacel) type work any more.

	CONTACT REPORT
	Telephone < X > Conference < > Other < >
CONTACT:	Jim
FIRM/AGENCY:	Roman Electric
ADDRESS:	1925 Pine Ave., Niagara Fall, New York
PHONE/FAX:	716-694-6863
TO:	File
FROM:	Lea Angelaki
DATE:	07/13/01
SUBJECT:	Electrical Hook-up for Trailer
CC:	

I spoke with a representative from Roman Electric to obtain quotes for electrical hook-up for the trailer for the Frontier Chemical Site. The representative did not call back with a price.

Product Quotes Former Frontier Chemical Waste Process, Inc. Site Niagara Falls, New York

Trailer Delivery, Set up, and Monthly Rental

Vendor	Location	Deliver and Set-up	Monthly Charge	Total Cost for 2 months
GE Capital Modular Space	Syracuse, New York	\$575	\$182.00	\$939
RESUN Leasing, Inc.	Syracuse, New York	\$807	\$124	\$1,055
Zappia Enterprises, Inc.	Buffalo, New York		None available	

Trailer Delivery, Set up, and Monthly Rental Price Quotes



GE Capital Modular Space

Quotation

Quote No.:

345751

Quote Expires:

09/09/2001

Date:

07/11/2001

Page No.:

1

145 Canada Drive East Syracuse NY 13057

BRANCH OFFICE: SYRACUSE

JOE MUSCOLINO

Contact: Phone:

315-431-0001

1-800-523-7918

Fax:

315-431-0011

ECOLOGY & ENVIRONMENTAL

Customer

Deliver To

TBA

Niagara Falls NY

Attn: Lea Angelaki

368 PLEASANT VIEW DR

LANCASTER NY 14086-1397 Phone:

716-684-8060

Fax:

716-684-0844

Our Business Is Helping You Solve Your Space Needs

One Stop Shopping: Steps, Furniture, Ramps, Security Screens, Waiver

* Local Sales and Service Support

* Calendar Month Billing * National 24 hour Sales and Service Center * No Automatic Cleaning Charges

AMOUNT LINE DESCRIPTION 001 | Lease Class: STRV Unit: 173908 Unit Width = 8', Unit Length = 28' 152.00 per month STORAGE VAN 2 months 220, 00 one time BUILDING DELIVERY 85.00 one time BLOCK AND LEVEL (Qty: 1 at \$85.00) **BUILDING RETURN*** 220.00 one time 50.00 lone time UNBLOCK* (Qty: 1 at \$50.00) TOTAL ONE TIME CHARGES 575.00 OPTIONAL EQUIPMENT 30.00 per month Option 1: STEPS (Qty: 1 at \$30.03)

[&]quot;" Billed at Termination



Date:

7/11/2001

RESUN LEASING, INC.

5858 E. Molloy Rd., Suite 171

P.O. Box 224

Syracuse, NY 13211

(315) 454-8261

(315) 454-8120 Fax

CUSTOMER:

Ecology Environment

SITE LOCATION:

Niagara Falls

CONTACT:

Lea Angelaki

SITE ADDRESS:

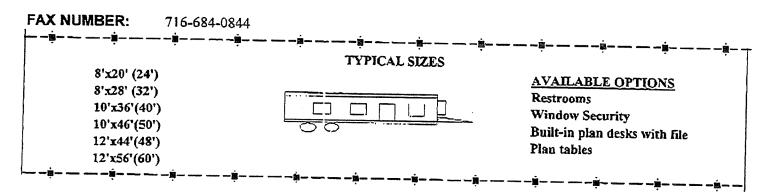
ADDRESS:

SITE CONTACT:

PHONE #:

716-684-2622

SITE PHONE NUMBER:



BUILDING SIZE:

8'x32'

Box

LEASE: 6 Mo

SALE:

MONTHLY RENTAL:

\$99,00

DATE REQUIRED:

PURCHASE PRICE:

OPTIONS

Delivery: \$319.00

OSHA Approved Steps:

\$25.00 ea/mo

Block & Level:

\$99.00 \$70.00

Tiedowns:

Dismantle: Return Delivery:

\$319.00

Skirting Ramping:

Liability Insurance:

\$35.00 per mo

Pricing is good for 30 Days

Salesperson:

Laura Moyer

Territory Manager

Pricing does not include unknown circumstances i.e., driver wait time, special pilots or permits, customer readiness or site preparedness. Pricing is not based on prevailing wage/union pricing. Customer must inform

	CONTACT REPORT
	Telephone < X > Conference < > Other < >
CONTACT:	
FIRM/AGENCY:	Zappia Enterprises, Inc.
ADDRESS:	173 Dingens Buffalo, New York
PHONE/FAX:	716-822-6850
TO:	File
FROM:	Gene Florentino
DATE:	07/18/01
SUBJECT:	Trailer Rental
CC:	

I spoke with a representative from Zappia Enterprises, Inc. to obtain quotes for trailer rental for the Frontier Royal Chemical Site. There are no 30-foot trailers available at this time.

Items for Which Fewer Than Three Quotations Were Obtained Former Frontier Chemical Waste Process, Inc. Site Niagara Falls, New York

			Reason for Fewer
Vendor	Amount	Item/Service	Quotations
Clearwater Engineering, Inc.	\$357.48 plus shipping and packaging fees	Weighted Polyethylene Bailers 1.6" x 36" (24/case)	< \$1,000
Response Rentals	\$125 plus \$8.75 tax	1 L Hydrogen tank	< \$1,000
Modern Portable Toilets	\$139.10 (including 7% tax)	Cleaning, Delivery and Pick- up	< \$1,000
Environmental Rental	\$231 (1 month rental including shipping)	pH/Conductivity/Temperature Meter Rental	< \$1,000
CT Farm and Country	\$972 (\$450 per tank plus 8% tax)	Two 1,500-gallon Poly Tanks	< \$1,000
Galloway Technical Services	\$150	Poly tank Delivery	< \$1,000
Niagara Mohawk	\$678	Electrical Service Connection	N/A

Clearwater Engineering, Inc Weighted Polyethylene Bailer Price Quote EFFECTIVE MARCH 1, 2001

*

CLEARWATER ENGINEERING, INC.

PRICE SHEET

TANLUC	ERIES POLY BAILERS (1.6" O.D. X 12", 36", 42" & 48	MERICILIS	& VOC DE	<u> </u>	<u>anna an an</u>	nesaliti ka su u di Maseri Dist
IANIIS	ERIES FOLI DAILEN				0.7042	
I	200104	UNITS	1 TO 4	5 TO 8	9 TO 12	13+
RODUCT	PRODUCT	PER CASE	CASES	CASES	CASES	CASES
CODE	DESCRIPTION					6411.116
1		24	\$ 74.88	<u>\$ 70.92</u>		CALL US
111-24	1.5" O.D. X 12" LENGTH (NON-WEIGHT)	24	\$ 103.99	\$ 98.47	\$ 92.88	CALLU
121-24	1.6" O.D. X 12" LENGTH (WEIGHTED)				i	
		24	\$ 89.99	\$ 85.20		CALL US
113-24	1.6" O.D. X 36" LENGTH (NON-WEIGHT)		\$ 119.16	\$ 112.75	\$ 106.32	CALLUS
123-24	1.6" O.D. X 36" LENGTH (WEIGHTED)	+ = - C			1	· (
		24	\$ 93.24	\$ 88.27	\$ 83.28	CALL US
114-24	1.6" O.D. X 42" LENGTH (NON-WEIGHT)		S 122.40		\$ 109.20	CALL US
	1.6" O.D. X 42" LENGTH (WEIGHTED)	4				
124-24			s 99.72	\$ 94.39	\$ 89.04	CALL U
445.04	1.6" O.D. X 48" LENGTH (NON-WEIGHT)	24				CALL US
	1.6" O.D. X 48" LENGTH (WEIGHTED)	24	s 128.88			
125-24	1.5 O.D. A 40 LL11011.		44.05	\$ 11.45	\$ 10.95	CALL US
	TITAN II POLY VOC EMPTYING DEVICE (NON-WEIGHT)	24	\$ 11.95			CALL U
	TITAN II POLY VOC EMPTYING DEVICE (WEIGHTED)	24	\$ 11.95	3-11-2		
101-24	TITAN II POLY VOC EMPTTANO DE LA			to the second se		The Control of the Control
	L STYLE POLY BAILERS (1.6" O.D. X 12", 36" 42" & 4	18" LENGTHS	s) & VOC D	EVICES:		
RIGINAL	L STYLE POLY BAILERS (1.6 O.D. X 12 . 30 42 G				1	4
		1	<u> </u>	5 TO 8	9 TO 12	13+
	PRODUCT	UNITS	1 TO 4		CASES	CASES
RODUCT	DESCRIPTION	PER CASE	CASES	CASES		
CODE	DESCRIPTION.				6 60 60	CALL US
	THE CUT	24	\$ 68.35			CALL U
111-24	1.6" O.D. X 12" LENGTH (NON-WEIGHT)	24	\$ 92.10			CALL UN
121-24	4 CT OD Y 42" I FNGTH (LIGHT WEIGHT)	24	\$ 106.48	\$ 96.79		CALL US
131-24	A CROD Y 42" I ENGTH (TOP HEAVYWEIGHT)	24	\$ 106.48	\$ 96.79	\$ 93.93	CALL US
141-24	1.6" O.D. X 12" LENGTH (BOTTOM HEAVYWEIGHT)					
		24	\$ 71.66	\$ 65.15		CALL U.
113-24	1.6" O.D. X 36" LENGTH (NON-WEIGHT)	24	\$ 109.89	\$ 99.90	\$ 96.90	CALL US
123-24	IA 6" O.D. Y 36" I FNGTH (LIGHTWEIGHT)		\$ 125.96	\$ 115.43	\$ 111.99	CALL US
133-24	A ST O.D. Y 36" I FNGTH (TOP HEAVYWEIGHT)	24	\$ 125.96	The state of the s	\$ 111.99	CALL US
	1.5" O.D. X 35" LENGTH (BOTTOM HEAVYWEIGHT)	24	3 123.50			
1143-24	1.0 0.0. 2.00		S 72.39	\$ 65.81	\$ 63.83	CALL US
	1.6" O.D. X 42" LENGTH (NON-WEIGHT)	24				CALLUS
	1.6" O.D. X 42" LENGTH (LIGHTWEIGHT)	24	\$ 110.99			
1124-24	1.6" O.D. X 42" LENGTH (TOP HEAVYWEIGHT)	24	\$ 128.35			CALL U
1134-24	1.6" O.D. X 42" LENGTH (BOTTOM HEAVYWEIGHT)	24	\$ 128.35			CALL US
1144-24	1.6" O.D. X 42" LENGTH (INTERFACE BAILER)	24	\$ 150.66	3 140.37	-	
1184-24	1.6" O.D. X 42 CENGTH (III) 2.7.0			94 70	\$ 79.34	CALL US
	LENGTH (NON WEIGHT)	24	\$ 89.84			CALL U
1115-24	1.6" O.D. X 48" LENGTH (NON-WEIGHT)	24	\$ 121.74			CALL US
1125-24	1.6" O.D. X 48" LENGTH (LIGHTWEIGHT)	24	\$ 136.25			CALL US
1135-24	1.6" O.D. X 48" LENGTH (TOP HEAVYWEIGHT)	24	\$ 136.25	\$ 123.86	120.15	
1145-24	1.6" O.D. X 48" LENGTH (BOTTOM HEAVYWEIGHT)					CALLU
		24	\$ 11.95	\$ 11.45	\$ 10.95	LALLU
1100-24	ORIGINAL STYLE POLY VOC EMPTYING DEVICE					
		TO ENGREUS.				S. I.
DICINIA	AL STYLE POLY BAILERS (.41" O.D. & .75" O.D. X 42	LENGIOL.	<u> </u>	and the same bear and the		
REIN		1				
		UNITS	1 TO 4	5 TO 8	9 TO 12	CASES
RODUCT	PRODUCT	PER CASE	CASES	CASES	CASES	LASES
CODE	DESCRIPTION					
_===		24	\$ 124.5	5 S 120.6		
1314-24	.41" O.D. X 42" LENGTH (NON-WEIGHT)	24	\$ 145.2	4 S 134.9	3 \$ 130.94	
1334-24	TAND D V 42" I ENGTH (TOP HEAVI WEIGH!)				3 \$ 130.94	CALLU
1344-24	.41" O.D. X 42" LENGTH (BOTTOM HEAVYWEIGHT)	24	\$ 145.2			
1200-50			\$ 117.7	7 S 110.8	99.90	CALLU
4044.54	.75" O.D. X 42" LENGTH (NON-WEIGHT)	24				CALLU
1214-24	TOP HEAVY WEIGHT	24	\$ 141.6			
1234-24	.75" O.D. X 42" LENGTH (BOTTOM HEAVYWEIGHT)	24	\$ 141.6	2 2 133.7		+
1244-24	.13 V.J. A 92 Land		_			1
					-	+
						+
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CT Farm and Country Poly Tank Price Quote

	CONTACT REPORT
	Telephone < X > Conference < > Other < >
CONTACT:	
FIRM/AGENCY:	CT Farm & Country
ADDRESS:	6017 South Transit Road, Lockport, New York
PHONE/FAX:	716-434 9520
то:	File
FROM:	Lea Angelaki
DATE:	07/13/01
SUBJECT:	Quote for Poly Tanks
CC:	

I spoke with a representative from CT Farm & Country to obtain quotes for purchase of 1,000 and 1,500 gallon-size poly tanks to be used at The Royal Frontier Chemical Site. The representative quoted me a price of \$430.00 for the 1,000 gallon-size poly tank and \$450.00 for the 1,500 gallon-size poly tank. This firm does not deliver the poly tanks. The quoted price does not include the sales tax (8%).

Galloway Technical Services Delivery of Poly Tanks Price Quote

Delivery of two 1,500 gallon poly tanks to the site located in Niagara Falls, New York (Royal Avenue). Galloway Technical Services will pick the tanks from CT Farm and Country located in Lockport, New York location. E & E will purchase the tanks from CT Farm and Country.

The quote includes all fees associated with the pick up of the tanks from Lockport and delivery to the Niagara Falls site.

5726 Tonawanda Creek Road, Lockport, New York, 14094 (716) 625-6895, Fax: (716) 625-4304 email: GTSINC@Adelphia.net



July 15, 2001

Mr. Gene Florentino

Ecology & Environment, Inc.
368 Pleasantview Drive

Lancaster, New York 14086

RE: PROVIDING TWO 1,500 GALLON ABOVEGROUND POLY STORAGE TANKS FOR YOUR PROJECT IN NIAGARA FALLS, NEW YORK.

Dear Mr. Florentino:

Galloway Technical Services, Inc. is pleased to submit the following quotation to deliver two (2) 1,500 gallon aboveground poly storage tanks for your project located in Niagara Falls, New York .

SCOPE OF WORK:

Based on the following options selected, Galloway Technical Services, Inc. will provide all necessary labor, materials and equipment to perform the following scope of work:

• Pick-up two (2) 1,500 gallon aboveground storage tanks as purchased by Ecology & Environment, Inc. from Central Tractor in Lockport, New York and deliver it to E&E's project site in Niagara Falls, New York.

COST FOR THIS SERVICE:

Galloway Technical Services, Inc. will provide the aforementioned services based on the following price schedule:

Delivery to site\$ 150.00

All work performed by Galloway Technical Services, Inc. will conform to all local, state, and federal regulations.

This quotation is valid for 30 days from the above date and is subject to verification thereafter. Pricing **does not** include any applicable federal and state taxes, which are considered as separate items and the responsibility of the client. Standard payment terms

are full payment upon completion of delivery (net 15 days) unless other arrangements are made with Galloway Technical Services, Inc. in writing. Service charges may be imposed at 1.5 percent per month on all past due balances. The customer will be responsible for all costs of collection, including, but not limited to, reasonable attorney's fees, court costs, and collection service fees.

The customer agrees to indemnify, exonerate, and hold Galloway Technical Services harmless against loss, damage, or expense, by reasons of suits, claims, demands, judgements, and causes of action for personal injury, death, or property damage rising out of or in any way in consequence of the performance of all work undertaken by Galloway Technical Services except that in no instance shall the customer be held responsible for any liability claim of demand or cause of action attributable solely to the negligence of Galloway Technical Services.

Thank you for the opportunity to prepare this cost proposal for your review and consideration. Should you have any questions or require further information, please do not hesitate to contact me personally at (716) 615-6895 any time of the day or week.

not hesitate to contact me personally at (716) 615-6895 any time of the day or week.

Very truly yours,

GALLOWAY TECHNICAL SERVICES, INC.

William A. Galloway

President

2107. WAG. 2098

If you are in agreement with this proposal, please sign below and fax to us at (716) 625-4304. Please return a completed copy with original signatures for our files to: Galloway Technical Services, Inc., 5726 Tonawanda Creek Road, Lockport, New York 14094.

This proposal is understood and accepted:

Date

Typed/Printed Name

Modern Potable Toilet Price Quote

	CONTACT REPORT			
	Telephone < X > Conference < > Other < >			
CONTACT:	Pete			
FIRM/AGENCY:	Modern Portable Toilets			
ADDRESS:	4746 Model City Road, P.O. Box 209, Model City, NY 14107-0209			
PHONE/FAX:	716-754-8226			
TO:	File			
FROM:	Lea Angelaki			
DATE:	07/11/01			
SUBJECT:	Quote for 2 month rental of Portable Toilet			
CC:				

I spoke with a representative from Modern Portable Toilets to obtain a quote for a 2-month rental of a portable toilet to be used at The Royal Frontier Chemical Site. The representative quoted me a price of \$65.00 per month (including cleaning, delivery and pick-up) plus tax (7%).

Response Rentals 1 L Hydrogen Tank Price Quote

(716)424-2042 rax Your contact: Jeffrey Brei

Calibration Gas Price List

ATTN- JOHN MCKEISON

Reactive G tive Januar	y 1, 1999	Response h	Balance	17 L	103L	550L
Part No	Target Gas	Concentration	Air		\$125.00	
151	Benzene	100ppm	Air		\$125.00	
154	Benzene	1,000ppm				
120	Carbon Dioxide	300ppm	N2		\$125.00	
170	Carbon Dioxide	300ppm	Air		\$125.00	
1701	Carbon Dioxide	1000ppm	Air		\$125.00	
1711	Carbon Dioxide	1000ppm	N2	\$45.00	\$125.00	
171	Carbon Dioxide	2.5%	N2	\$45.00	\$125.00	
175	Carbon Dioxide	8%	N2		\$125.00	
176	Carbon Dioxide	15%	N2		\$125.00	
177	Carbon Dioxide					
	Carbon Monoxide	25ppm	Air	\$45.00	\$125.00	
182	Carbon Monoxide	35ppm	Air	\$45.00	\$125.00	
1821	Carbon Monoxide	50ppm	Air	\$45.00	\$125.00	
183	Carbon Monoxide	100ppm	Air	\$45.00	\$125.00	
184	Carbon Monoxide	200ppm	N2	\$45.00	\$125.00	
185	Carbon Monoxide	250ppm	Air	\$45.00	\$125.00	
186	Carbon Monoxide	500ppm	Air	\$45.00	\$125.00	
188		500ppm	N2	\$45.00	\$125.00	
1881	Carbon Monoxide	Jooppin				
		50ppm	Air	\$45.00	\$125.00	
27	Hexane	100ppm	Air	\$45.00	\$125.00	
271	Hexane	500ppm	Air	\$45.00	\$125.00	
272	Hexane_	3000ppm	Air	\$45.00	\$125.00	
275	Hexane .					
30	Hydrogen	2% (50% LEL)	Air	\$45.00	\$125.00	
29 295	Hydrogen	Research Grade				\$155.0
473	rrydrogen					
255	Helium					\$ 155.0
433	Menmi		-			
33	Isobutylene	10ppm	Air	\$45.00	\$125.00	
	Isobutylene	100ppm	Air	\$45.00	\$125.00	
331	Isobatylene					
	Methane	10ppm	Air	\$45.00	\$125.00	
35		50ppm	Air	\$45.00	\$125.00	
351	Methane	100ppm	Air	\$45.00	\$125.00	
352	Methane	500ppm	Air	\$45.00	\$125.00	
353	Methane	1000ppm	Air	\$45.00	\$125.00	
354	Methane	5000ppm	Air	\$45.00	\$125.00	
355	Methane	1% (20%LEL)	Air	\$45.00	\$125.00	
356	Methane Methane	10.000ppm	Air		\$125.00	

Environmental Rental pH/Conductivity/Temperature Meter Price Quote

CONTACT REPORT	
Telephone < X > Conference < > Other < >	
CONTACT:	Mike
FIRM/AGENCY:	Environmental Rental
ADDRESS:	New York
PHONE/FAX:	1-800-446-8736
то:	File
FROM:	Gene Florentino
DATE:	07/13/01
SUBJECT:	HYDAC pH/Cond/Temp meter Rental
CC:	

I spoke with Mike, a representative from Environmental Rental, to obtain quotes for rental of a HYDAC 910 pH/Cond/Temp meter to be used at the Royal Frontier Chemical Site. The representative quoted me a price of \$155 monthly rental, \$65 weekly rental (or better). He said that he will beat competitors prices by 10%. The quoted price does not include shipping charges.

Niagara Mohawk Electrical Service Connection Price Quote

