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Final Site Operations/Quality Assurance Project Plan Remedial Investigation

Fumex Sanitation Site
New Hyde Park, Nassau County, New York
NYSDEC Site #1-30-041
Work Assignment #D002925-13

Prepared for:

New York State
Department Of Environmental Conservation
50 Wolf Road, Albany, New York 12233

Michael Zagata
Commissioner

Division Of Hazardous Waste Remediation

Michael J. O'Toole, Jr., P.E.
Director

Prepared by:

Camp Dresser & McKee
100 Crossways Park West
Woodbury, New York 11797-2012

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SOP/QAPP

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Section 1
Introduction

The Remedial Investigation (RI) for the Fumex Sanitation Site (Fumex) site, located in The Village of New Hyde Park, Nassau County, New York, was authorized by the New York State Department of Environmental Conservation (NYSDEC), Division of Hazardous Waste Remediation, Bureau of Program Management, under the State Superfund Standby Contract (SSSC). The Work Assignment (D002925-13) was assigned to Camp Dresser & McKee (CDM) in a letter received on October 31, 1995.

This site Operations Plan/Quality Assurance Project Plan (SOP/QAPP) has been developed specifically for the Fumex site. The purpose of this document is to outline specific field investigation tasks, sampling, and quality assurance/quality control (QA/QC) procedures to ensure that environmental samples are collected, transported, and analyzed in accordance with applicable, relevant, and appropriate requirements (ARARs). It includes procedures to ensure precision, accuracy, completeness, comparability, and representativeness of analytical data generated as a result of the field activities.

The SOP is the instrument of control for all field activities associated with the site Remedial Investigation (RI). Procedures for the investigation, field sampling, laboratory analysis, quality assurance (QA), quality control (QC), and health and safety information is provided in an integrated format. This document will accompany field personnel, and procedures will be followed as outlined herein.

In the event field conditions change once the RI is underway, this SOP/QAPP will be revised while in the field when necessary by CDM, and as approved by the NYSDEC Project Manager.

(fumex/sec1.sop)

Section 2
Project Description

2.1 General

The following sections provide a general description of the Fumex site.

2.1.1 Site Location, Ownership, and Use

The Fumex site is located at 131 Herricks Road in the Village of New Hyde Park, Nassau County, New York. It encompasses approximately 1 acre of land and includes a one story masonry and metal frame building, with no basement. The site building is bounded to the west by a paved parking lot. Fumex Sanitation has operated a commercial termite extermination facility at this site since 1952 and land use prior to 1952 is unknown by CDM.

The site is bounded on the north by Bedford Avenue, on the south by a parking lot, on the east by Herricks Road, and on the west by residential houses, and Armstrong Road (see Figure 1-1). The area surrounding the site consists of industrialized/commercial properties as well as residential properties south of the site.

In 1992, Fumex Sanitation, Inc. changed its name to S.S. Sanitation, Inc. The sole officer and shareholder is Steven Schwimmer, who has filed for bankruptcy pursuant to Chapter 7 of the bankruptcy code. S.S. Sanitation, Inc. no longer operates at this facility.

2.1.2 Site History

Fumex Sanitation Inc., is a New York Corporation originally formed on December 6, 1948. Fumex has operated a commercial termite extermination business at this site since 1952. In August 1981, a drum of chlordane rinse water stored at this site was knocked over, spilling approximately 30 gallons of the rinse water onto the asphalt parking lot behind Fumex. The material entered two stormwater catch basins on the adjacent road (Bedford Ave.) and a dry well in Fumex's parking lot. Fumex also regularly sprayed their then unpaved parking lot with 1-2% chlordane for insect control from 1952 to 1978.

In 1986, the NYSDECs Region 1 office entered into an order on consent with Fumex to determine the extent of chlordane in the soil and groundwater at the site and evaluate remedial alternatives.

A hydrogeological investigation was conducted in 1986 by Fumex to satisfy the requirements of the Order on Consent. Three monitoring wells were installed at the site, in addition to the two wells that were previously installed. The five wells have been sampled and the results are as follows:

Chlordane Concentrations in Groundwater
(concentrations in ppb)

Monitoring Well	July 1984	Dec. 4, 1986	Dec. 10, 1986
1	39	96	99.7
2	53	40	20.1
3	NS	NS	0.89
4	NS	55	3.6
5	NS	56	16.3

Note: NS = Not Sampled.

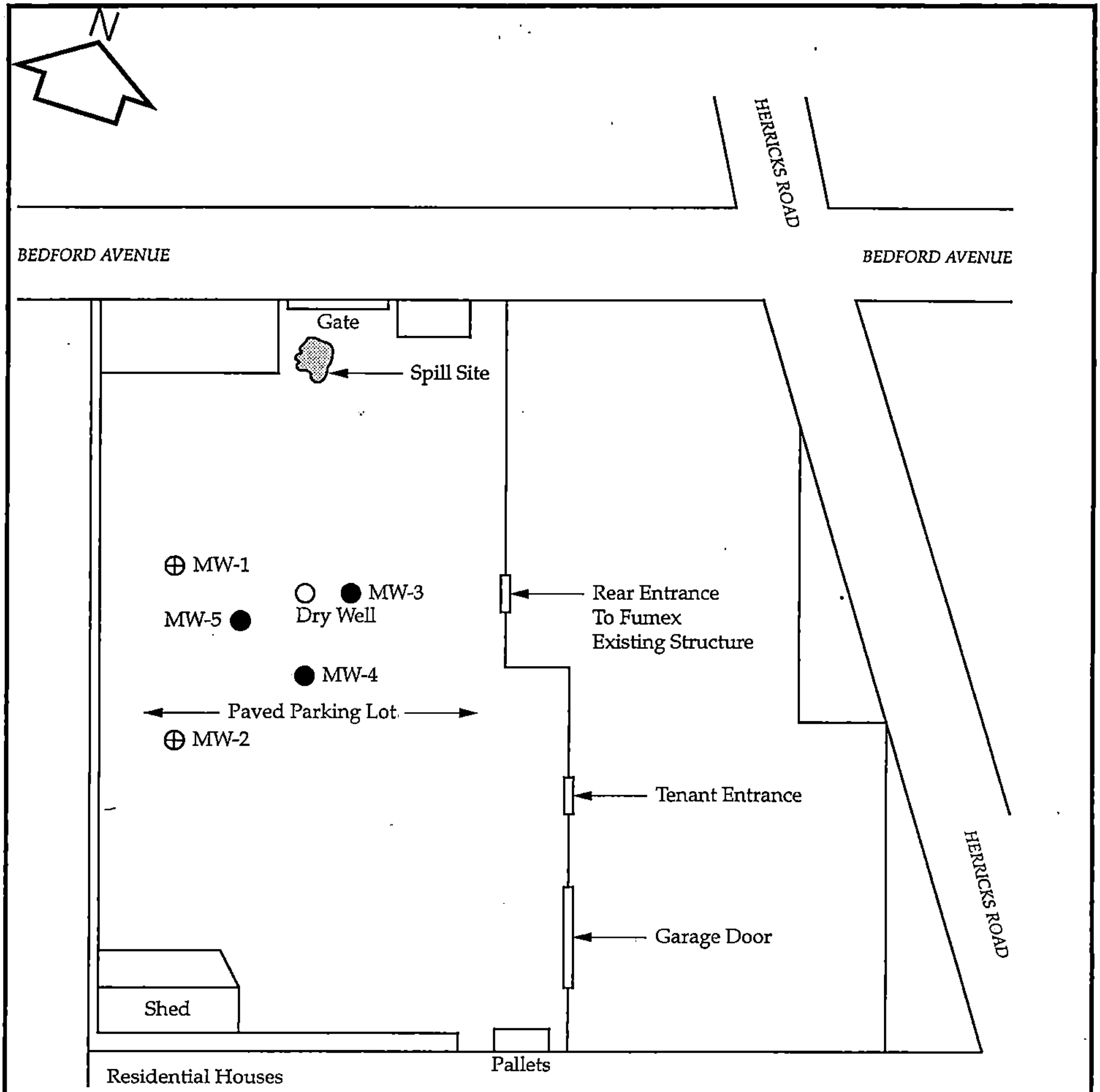
Soil samples were collected during the installation of these monitoring wells. The chlordane concentrations reported in these samples show that the highest concentrations were found in MW-5 and that the concentrations in all wells generally decreased with depth. The results are as follows:

Chlordane Concentrations in Soil (ppb)

Monitoring Well	July 1984	Nov. 1986	Dec. 1986
1	1530 (25 - 27') 105 (35 - 37') 14 (40 - 42')	NS	NS
2	9 (30 - 32')	NS	NS
3	NS	1492 (10 - 12') 96.9 (20 - 22') 308 (30 - 32') 90.3 (40 - 42') 59.4 (50 -52')	480 (45 - 47')
4	NS	417 (10 - 12') 1344 (20 - 22') 700 (30 - 32')	670 (30 - 32')
5	NS	1500 (10 - 12') 1494 (20 - 22') 619 (30 - 32')	1500 (30 - 32') 1400 (45 - 47')

Note : NS = Not Sampled

Based on the results of this investigation, a Phase 1 investigation was conducted in 1989.



LEGEND:
- ○ - Dry Well
- ⊕ - 4" Diameter Monitoring Well
- ● - 2" Diameter Monitoring Well

Not To Scale

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Site Plan

Figure 2-1

In 1989 Fumex was notified of the site's inclusion in the Registry on Inactive Hazardous Waste Disposal Sites in New York State. Steven Schwimmer was notified of his status as a responsible party in 1994. Counsel for Mr. Schwimmer responded that he did not wish to enter into an Order on Consent with the Department to remediate the site.

2.2 Environmental Setting

The following sections provide a description of the environmental setting at the Fumex site.

2.2.1 Site Topography

The Atlantic Coastal Plain physiographic province of North America is located along Long Island. Two lines of hills made of glacial debris exist along the northern and central part of Long Island. The northern moraine is the Harbor Hill moraine and the central moraine is the Ronkonkoma moraine. These moraines converge in western Long Island. The topography between these two moraines is relatively flat and gentle (Lawler, Matusky & Skelly, 1989).

The Fumex site lies on this relatively flat and gentle topography between the two moraines. There is a slight increase in elevation to the east and west of the site (Lawler, Matusky & Skelly, 1989).

2.2.2 Geology

The subsurface conditions beneath the site consist of sediments from the Pleistocene glacial outwash. These sediments consist of stratified sands and gravels which were deposited by the melting glacials of the receding Harbor Hill moraine. These surficial (Pleistocene glacial) sediments are approximately 100-150 thick and are very permeable. Beneath these sediments, till from the Ronkonkoma moraine may be located. This till consists of relatively impermeable clay, sand and boulders (Lawler, Matusky & Skelly, 1989).

Cretaceous sediments are located beneath the Pleistocene glacial outwash sediment. These cretaceous sediments consist of the younger Magothy formation and the older Raritan formation. The Magothy formation is composed of 300 to 400 ft. thick, moderate to highly permeable, fine to medium sand. Coarse sand or sandy clay lenses are also found in the Magothy formation. The Raritan formation includes the Raritan clay and Lloyd sand formations. The Raritan clay is an impermeable clay layer with sand and gravel lenses. The Raritan clay is approximately 100 to 150 ft. thick. The Lloyd sand underlies the other formations and consists of fine to coarse sand and gravel. The Lloyd sand has a moderate permeability and is nearly 150 ft. thick (Lawler, Matusky & Skelly, 1989).

Precambrian crystalline rock, including mica schist, gneiss and granite, is the bedrock which underlies Long Island. The bedrock has minor water-bearing fractures and is relatively impermeable. The bedrock depth is approximately 830 ft. near the Fumex site (Lawler, Matusky & Skelly, 1989).

2.2.3 Hydrogeology

The aquifers of Long Island consist of sediments from the Pleistocene and Late Cretaceous glacial outwash. The Precambrian bedrock is considered the lower limit of the aquifer due to its relative impermeability. There are three water-producing aquifers: (1) the Upper Glacial aquifer, (2) the Magothy formation, and (3) the Lloyd sand of the Raritan formation (Smolensky, 1989).

The Upper Glacial aquifer consists of permeable Pleistocene outwash sands and gravels. It is located at a depth of 47 ft. below land surface and is approximately 45 to 50 ft. above mean sea level. This aquifer is approximately 100 ft. thick. Groundwater flows southwest in the area of the Fumex site. Very small amounts of this aquifer are used for industrial purposes.

The Magothy formation is composed of moderately to highly permeable sands with intermittent clay layers. These clay layers form less permeable areas in the aquifer. The Magothy formation is used as the primary aquifer for public drinking water in Nassau County. The aquifer is approximately 400 ft. thick near the site.

The Lloyd sand of the Raritan formation is located beneath the Magothy aquifer. An impermeable Raritan clay formation divides the Magothy aquifer and the Lloyd sand. The Lloyd sand aquifer is located between 650 to 700 ft. below the surface near the site and is considered a confined aquifer because its water is under artesian conditions. Deep public supply wells are located in this aquifer, within a few miles of the Fumex site (Lawler, Matusky & Skelly, 1989).

Percolation of rainwater through the soil is the primary means of recharge to the aquifers. The Upper Glacial aquifer is replenished directly by water from the surface. The estimated average annual recharge rate is 22 inches per year. The Upper Glacial aquifer and Magothy aquifer are hydraulically connected. The slow, vertical migration of water downward supplies the Magothy aquifer. The Lloyd sand is also supplied by the slow, vertical migration of water, through the Raritan clay.

2.2.4 Surface Water and Drainage

Several sporadic ponds are located within 0.5 miles of the site. These ponds may be used as recharge basins. Hempstead Lake is located approximately 4 miles southeast of the site in Hempstead Lake State Park. Valley Stream is located approximately 5 miles southwest of the site. Valley Stream drains into Jamaica Bay. Site runoff is directed towards the onsite dry well. Runoff from outside the site is most likely directed to the local stormwater collection system (Lawler, Matusky & Skelly, 1989).

2.3 Project Objective

The objective of this Work Assignment, i.e., project, is to complete a RI pursuant to NYSDEC requirements, which includes the following:

- Work plan development (including a SOP/QAPP, HASP, and MBE/WBE Utilization Plan)

- Site characterization (remedial investigation [RI])

This document is the draft SOP/QAPP, which includes a draft site HASP, and draft MBE/WBE Utilization Plan.

The objectives of the RI for the Fumex site are to 1) identify possible contamination source areas 2) define the onsite groundwater contamination 3) identify any receptors, 4) discover if the adjacent properties have been negatively impacted by the contamination and 5) evaluate if a further RI, a feasibility study (FS) and/or IRM will be necessary.

Specifically, the principal elements of the RI for the Fumex site are:

- to characterize the existing concentrations of chlordane in the drywell by collecting sediment samples from the drywell on site.
- to characterize the hydrogeology of the site including the general flow direction(s) of the aquifer, and the hydraulic relationship between the five monitoring wells based on two rounds of synoptic water level measurements.
- to characterize the present concentration of chlordane in the groundwater (if it exists) on site.
- to inventory the extent of potentially affected areas by identifying nearby homes or businesses that may use private water supply wells.
- to develop a working Citizen Participation Plan that describes the site-specific citizen participation activities that will take place to compliment the Remedial Investigation.

(Fumex2/sec2.sop)

Section 3
Project Organization and Responsibility

3.1 Overview

The project management organization for the Fumex site RI is designed to provide a clear delineation of functional responsibility and authority. The organization chart for the project is shown on Figure 3-1.

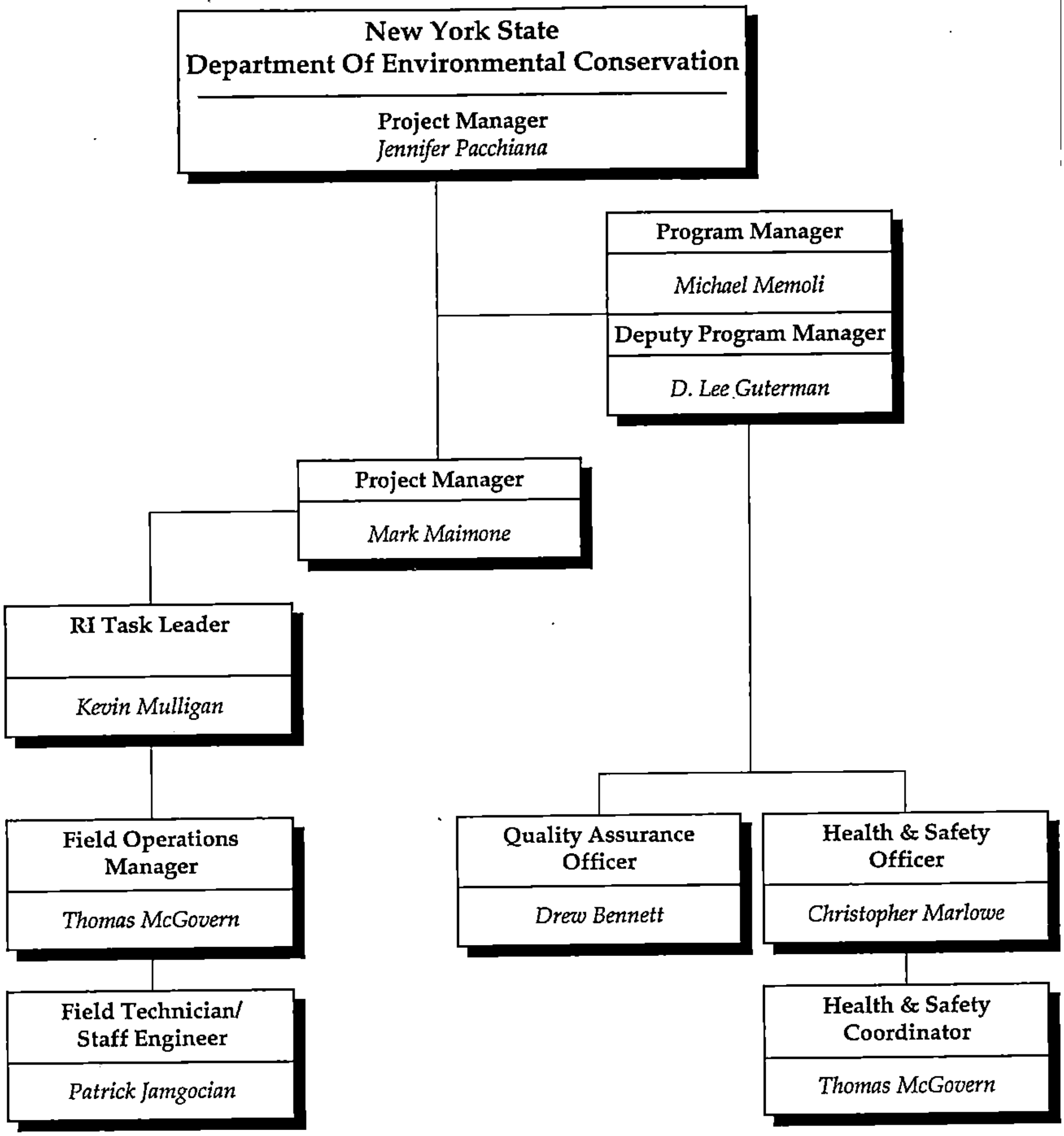
As shown on Figure 3-1, the project will be implemented through the CDM Project Manager, Mark Maimone. In this role, he will communicate directly with the NYSDEC Project Manager, Jennifer Pacchiana. CDM's RI Task Leader will be Kevin Mulligan, the Field Operations Manager will be Tom McGovern, and the Field Technician/Staff Engineer will be Patrick Jamgocian.

For the RI field work, field teams consisting of CDM personnel and subcontractors will be assembled and will be responsible for implementing all aspects of the field work. Project personnel will perform field activities such that sample collection and analysis, as well as data reporting procedures, are performed in accordance with ARARs and the protocols in this SOP/QAPP. Field QA/QC procedures will be implemented and laboratory analysis, data validation, data processing, and data QC activities will be performed as stipulated in this SOP/QAPP. Project personnel will also ensure that health and safety procedures as outlined in the Health and Safety Plan (HASP) are followed (see Appendix B). Curricula vitae of key project personnel are provided in Appendix C.

The primary responsibilities for program management activities rest with the Program Manager (PRM). The Program Manager, Mr. Michael Memoli, will have ultimate contract responsibility for the project, including responsibility for the technical content of all engineering work. Mr. Memoli will direct, review, and approve all project deliverables, schedule staff and resources, resolve scheduling conflicts, and identify and solve potential program problems. He will be directly accountable to NYSDEC's Division of Hazardous Waste Remediation for program execution as well as to CDM's Officer-In-Charge. He has authority to assign staff, negotiate and execute contracts and amendments, and execute subcontracts. The PRM will communicate directly with CDM's Project Manager.

The Deputy Program Manager, Ms. Lee Guterman, will assist the Program Manager in all aspects of program administration. Ms. Guterman will be directly responsible for: 1) continuous contact with NYSDEC technical and contract administration staff, 2) technical, financial and administrative management on individual tasks and the overall program, 3) standardization of procedures, 4) implementation and oversight of cost control procedures for all assigned activities, and 5) implementation and maintenance of a resource and schedule reporting system. Ms. Guterman will be directly accountable to CDM's Program Manager and directly responsible for the performance of the contract on a day to day basis.

The QA Officer, Drew Bennett, will monitor QC activities of program management and technical staff, as well as identify and report needs of corrective action to both the Project Manager and Program Managers.



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Work Assignment Organization Chart

Figure 3-1

He will also conduct an internal review of all project deliverables prepared by CDM.

The Program Health and Safety Officer, Chris Marlowe, will develop the CDM site HASP (see Appendix B) and maintain required health and safety records. Mr. Marlowe will also review subcontractor HASPs, and make recommendations to subcontractors for compliance with Occupational Safety and Health Administration (OSHA) requirements. Mr. Marlowe will also serve as an alternate Health and Safety Site Supervisor/Coordinator.

3.2 Responsibility

The Project Manager, Mark Maimone, will have overall responsibility for the technical and financial aspects of this project. He will assign technical staff, maintain control of the project budget and schedule, prepare monthly progress reports, review and approve project invoices, evaluate the technical quality of project deliverables, and manage subcontractors. He will serve as CDM's point of contact for this project.

The RI Task Leader, Kevin Mulligan, will be responsible for coordinating RI field activities, including media sampling events. Mr. Mulligan will also be responsible for the evaluation and analyis of the data.

As the site Health and Safety Coordinator, Tom McGovern will be responsible for ensuring that the site HASP is consistently implemented during field activities and that a copy of the site-specific HASP and the CDM Health and Safety Manual are maintained at the site at all times. He will also be responsible for upgrading or downgrading personnel protection based on actual site conditions at the time of the investigation. The Coordinator must also present an overview of the HASP to field personnel prior to initiating any field activities. He will contact the CDM Program Health and Safety Officer and Project Manager if any questions or issues arise, during the conductance of field activities, that he cannot answer.

Furthermore, as the Field Operations Manager, Tom McGovern will be responsible for the execution of field activities in accordance with the SOP/QAPP, including well installation (and the coordination of driller activities), boring (logging, water-level measurement, sample collection, sample shipment), and the completion of chain-of-custody forms.

The Field Technician, Patrick Jamgocian, will be responsible for the collection of media samples, the completion of chain-of-custody forms, and the shipment of samples, as well as the monitoring of health and safety conditions at the site in accordance with the site HASP. Mr.Jamgocian will also serve as the project Staff Engineer, assisting the Project Engineer with the development of the site RI.

3.3 Subcontractors

Several tasks will be performed by subcontractors under CDM's supervision, including the following:

Services to be Provided	Firm
Chemical Analytical Laboratory	Energy & Environmental Engineering, Inc. 35 Medford Street Somerville, MA 02143
Data Validator	ChemWorld Environmental 14 Orchard Way North Rockville, MD 20854
Drilling Services	SJB Drilling Services, Inc. Fisher Road East Syracuse, NY 13057
Site Survey	YEC, Inc. 612 Cottage Way Valley Cottage, NY 10989

These subcontractors have been pre-approved by the NYSDEC in the State Superfund Stand-by Contract.

(Fumex/sec3.sop)

Section 4
Schedule

The schedule for this project, in bar chart form, is presented on Figure 4-1. The remedial investigation field work is anticipated to begin in March 1996 and again in the second week in July 1996. Preparation of information to be included in the RI report will begin in March 1996.

Field activity duration (actual field time) is estimated and based on the assumption that no delays are experienced due to force majeure, i.e. inclement weather, site access problems, or for any other reasons beyond the control of CDM.

The schedule is based on a standard laboratory turnaround time of 4 weeks, and a turnaround time for data validation of 3 weeks.

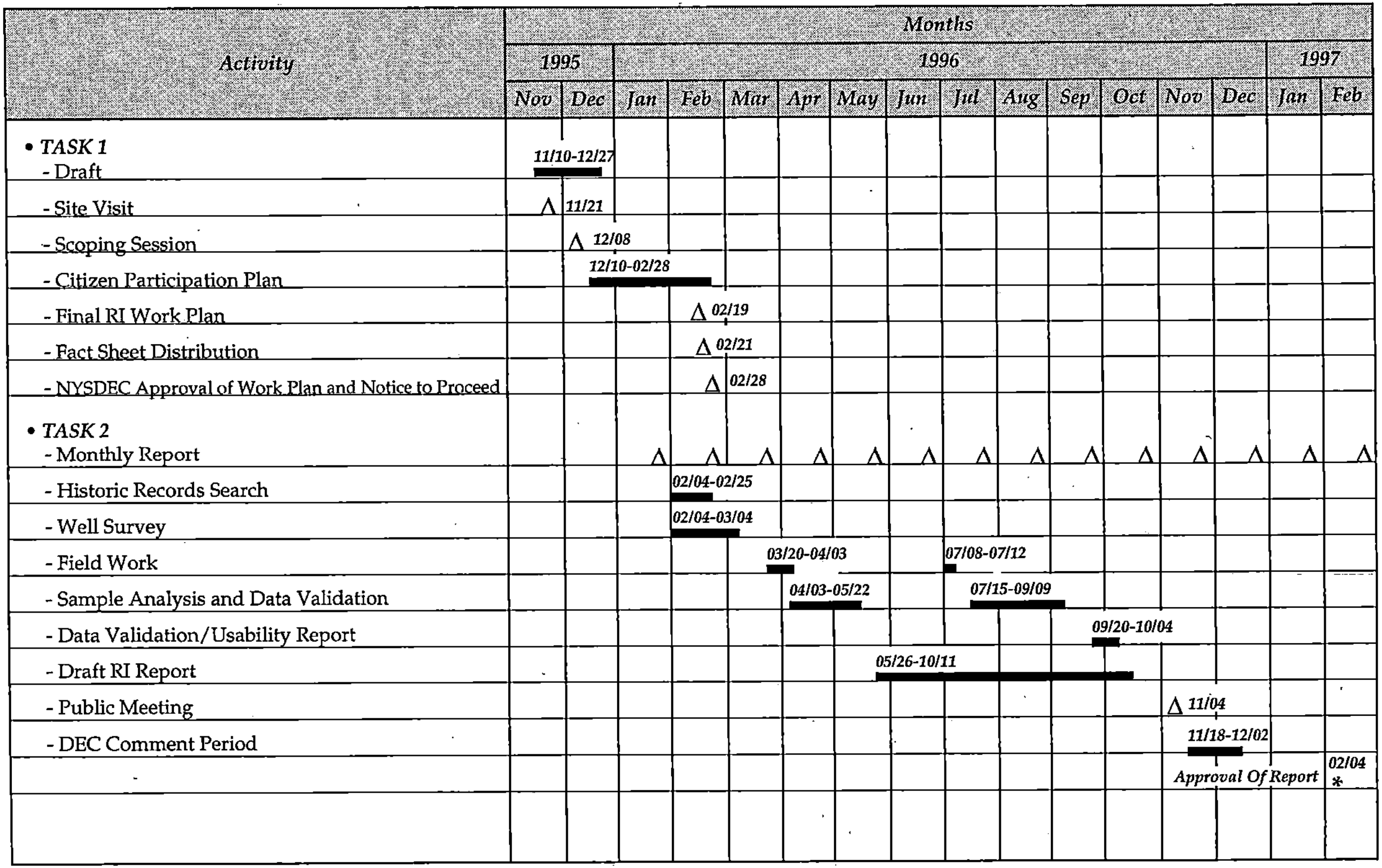
	Milestone	Date
	RI WORK PLAN DEVELOPMENT	
	TASK 1:	
1.	Receipt of Work Assignment	10/31/95
2.	Return of signed copy of Work Assignment (10 days)	11/10/95
3.	Scoping session to review TASK 1 requirements	12/08/95
4.	**RI Work Plan Development (First Draft)**	**12/18/95**
5.	NYSDEC written comments to CDM	01/08/96
6.	**Final RI Work Plan**	**02/14/96**
7.	**Public Information Fact Sheets Distributed** 02/21/96	
8.	NYSDEC Approval of RI/ Work Plan and Notice to Proceed (TASK 2)	02/28/96
	REMEDIAL INVESTIGATION	
	TASK 2:	
9.	**Technical Memorandum to Address Any Outstanding Public Comments and Agency Comments**	**03/13/96**
10.	RI Field Work (2 weeks)	03/20/96 -04/03/96
11.	RI Sample Analysis and Data Validation (7 weeks)	04/03/96 -05/22/96
12.	Second Round Synoptic Groundwater Level Measurements & Monitoring Well Sampling	07/08/96 -07/12/96
13.	RI Sample Analysis and Data Validation	07/15/96 -09/09/96
14.	**Data Validation and Usability Report (2 weeks)**	**09/20/96 - 10/04/96**
15.	**Draft RI Report**	**10/11/96**
16.	**Public Meeting**	**11/04/96**
17.	NYSDEC Written Comments to CDM And Meeting with NYSDEC to discuss RI Report	11/18/96

18.	**Revised Final RI Report**	**12/02/96**
19.	NYSDEC Approval of Final RI Report	01/06/97 -02/4/97

Note: Deliverables and deliverable dates are in bold print.

A bar chart schedule summary by task and subtask is shown on Figure 4-1.

(Fumex/sec4.sop)



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Bar Chart Project Schedule

Figure 4-1

Section 5
Site Logistics

The following describes the logistics for site security and access, a site visit prior to the start of the RI, on-site facilities, and residual disposal.

5.1 Site Security

The 1acre Fumex site is active; it is fenced, however there is no security guard.

5.2 Site Access

The site can be entered from Bedford Avenue. Prior to arrival, CDM will contact Frank Conte of Commercial Drying Technologies to arrange access to the site and permission to use potable water, power and restrooms.

5.3 Initial Site Visit

CDM's Project Manager, and staff, with the NYSDEC Project Manager, conducted a site visit prior to submission of the draft work plan to confirm proposed monitoring well sampling locations, and to examine location access and condition of wells.

5.4 Disposal of Residuals

Residual wastes expected to be generated during the site RI will include sample purging water and equipment decontamination water.

If the onsite drywell is open at the bottom, development and purge water will be returned to the groundwater onsite through the drywell. If the onsite drywell is connected to the municipal stormwater system, only uncontaminated surge water will be disposed into the drywell. Development water will be drummed and an alternate disposal method will be negotiated with NYSDEC.

(Fumex/sec5.sop)

Section 6
Site Monitoring Network

The following is a detailed description of the RI monitoring network designed to meet the objectives of the project, as described in Section 2.4 of this SOP/QAPP. Field investigations during this initial phase of the site RI will be performed to determine the nature, extent, and source(s) of contamination at the site. Samples collected during the RI will be analyzed for target compound list (TCL) Pesticides.

A summary of the monitoring parameters and frequency of sample collection is provided in Table 6-1. A summary of sample QA/QC parameters is provided in Table 6-2. Sample locations are presented on Figure 6-1.

6.1 Hydrogeologic Characterization

The objective of the site hydrogeologic characterization is to evaluate groundwater quality (nature, extent, and source[s]) and flow at the Fumex site to identify the extent of contamination source areas, and to discover if the adjacent properties have been negatively impacted by the contamination. A second objective is to determine the direction of flow.

6.1.1 Synoptic Water Level Measurements

CDM will collect two rounds of synoptic water level measurements, one immediately prior to the first RI groundwater sampling event and a second coinciding with the beginning of the second round of sampling (at least 3 months following the first round of measurements). Water level measurements will be taken within the monitoring wells (MW-1 - MW-5) to an accuracy of 0.01 ft. Detailed procedures for the measurement of water levels are described in Section 9 of this SOP/QAPP.

6.1.2 Groundwater Sampling

A groundwater sample will be collected from each of the monitoring wells MW-1 through MW-5 (as discussed with the NYSDEC Project Manager). Each sample will be analyzed for TCL Pesticides. Detailed procedures for groundwater sampling are discussed in Section 9 of this SOP/QAPP. The sampling regime will be performed twice at an approximate interval of three months.

6.2 Sediment Characterization

Sediment quality in the drywell at the site will be evaluated. The four collected samples will be analyzed for TCL Pesticides. The drywell location where the proposed sediment sampling will occur is shown on Figures 6-1. Detailed procedures for the sediment sampling are discussed in Section 9 of this SOP/QAPP.

(Fumex/sec6.sop)

TABLE 6-1

MONITORING PARAMETERS AND FREQUENCY OF SAMPLE COLLECTION

SAMPLE LOCATION	SAMPLE TYPE	SAMPLE MATRIX	MONITORING/ ANALYTICAL PARAMETERS	MONITORING/ SAMPLING FREQUENCY
HYDROGEOLOGIC CHARACTERIZATION				
o **Groundwater Sampling**				
- Groundwater Monitoring Well Sampling of 5 Existing Wells	Grab	Aqueous	o TCL Pesticides o Field parameters (a)	1/well (5 wells) (2 rounds = 10 total)
SEDIMENT CHARACTERIZATION				
o **Sediment Sampling**	Split-Spoon	Soil	o TCL Pesticides	4/drywell (4 total)

NOTES:
a) Field parameters consist of measurements made in the field including: pH, dissolved oxygen, temperature, and conductivity.

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TABLE 6-2

SAMPLE PARAMETER TABLE

SAMPLE MATRIX	PARAMETER	NO. OF SAMPLES	QUALITY CONTROL Duplicates TAL/TCL	QUALITY CONTROL Equipment Field Blanks TCL	QUALITY CONTROL Trip Blanks VOA only	ANALYTICAL REFERENCE METHOD	SAMPLE PRESERVATION	HOLDING TIME (a)	CONTAINER
HYDROGEOLOGIC CHARACTERIZATION									
o Groundwater Monitoring									
Well Samples	TCL Pesticides	5	0	0	0	CLP (b)	Cool to 4 C	5 days extraction 40 days analysis	2 x 1l amber
SEDIMENT CHARACTERIZATION									
o Sediment Samples	TCL Pesticides	3	0	1	0	CLP (b)	Cool to 4 C	5 days extraction 40 days analysis	1 x 8 oz glass jar

NOTES:

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a) Unless otherwise noted, all holding times are from Verified Time of Sample Receipt (VTSR) at the laboratory.
b) Analysis will be performed in accordance with NYSDEC ASP 1991 Volume 2 Exhibit D Part III and IV (NYSDEC Method 91-3).

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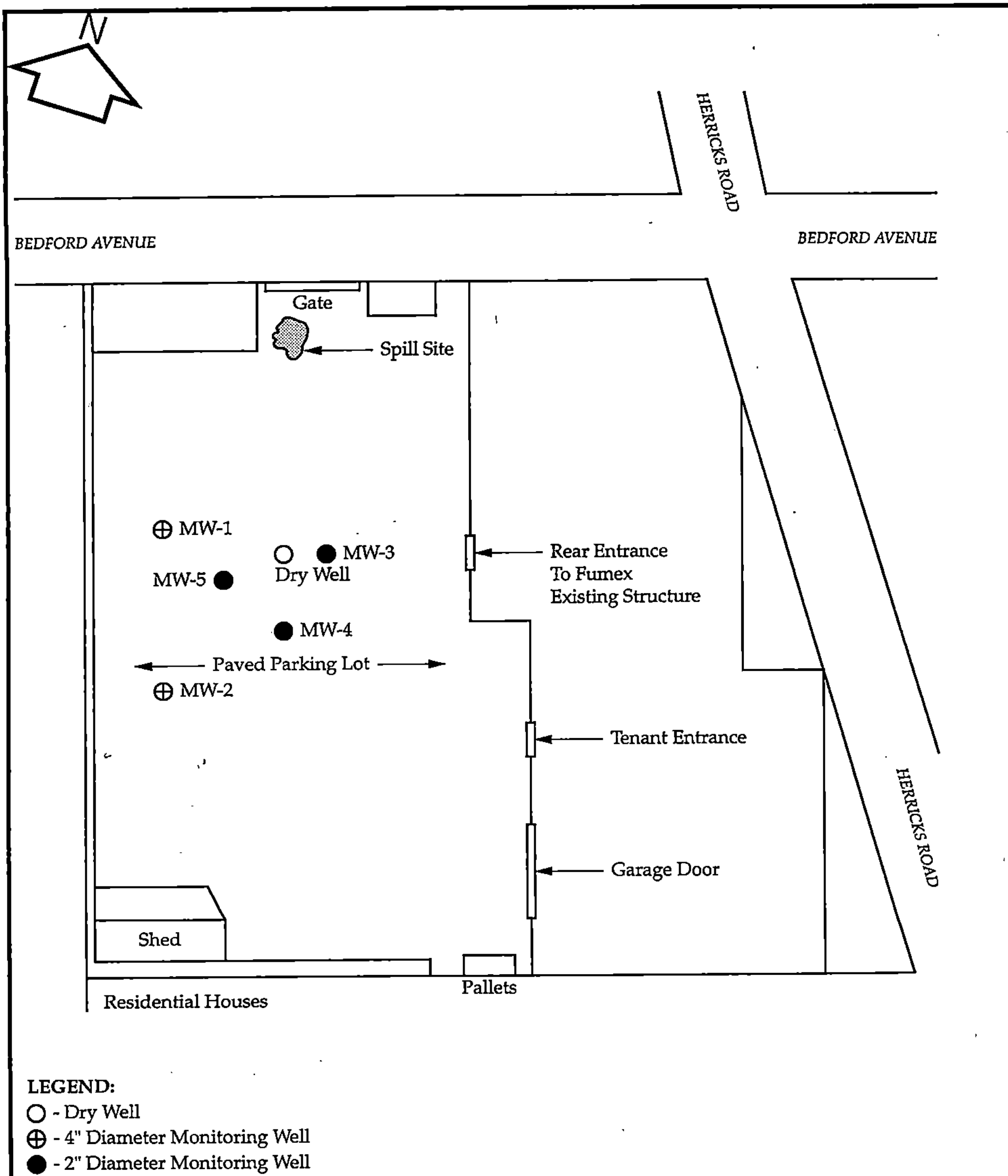

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Site Plan

Figure 6-1

Section 7
Data Quality Requirements and Assessments

The criteria of completeness is a measure of the amount of valid data obtained from the measurement system compared with the amount that was expected under normal conditions. This criteria is expressed as a percentage. One-hundred percent complete data is desired. A goal of 100 percent valid data has been set for the Fumex site RI. The acceptability of less than 100 percent valid data will be evaluated on a case-by-case basis, in conjunction with the NYSDEC Project Manager, as well as in the data usability report.

Samples collected during the field investigation will be analyzed using the 1991 NYSDEC Analytical Services Protocol (ASP) (NYSDEC 1991). The sensitivities required for standard NYSDEC contract laboratory procedure (CLP) analysis methodologies are provided in Table 7-1.

The QA requirements for accuracy, precision, and sensitivity of data analysis will be the responsibility of the contract laboratory. All QA/QC requirements outlined in the NYSDEC ASP NYSDEC 1991) will be followed during the conductance of the Fumex site RI.

[Fumex\sop\sec7.sop]lm

TABLE 7-1

Target Compound List (TCL)
Contract Required Quantitation Limits (CRQL)*

Pesticides/Aroclors	CAS Number	Quantitation Limits* Water ug/L	Soil ug/Kg	On Column ng
alpha-BHC	319-84-6	0.05	1.7	5
beta-BHC	319-85-7	0.05	1.7	5
delta-BHC	319-86-8	0.05	1.7	5
gamma-BHC (Lindane)	58-89-9	0.05	1.7	5
Heptachlor	76-44-8	0.05	1.7	5
Aldrin	309-00-2	0.05	1.7	5
Heptachlor epoxide	1024-57-3	0.05	1.7	5
Endosulfan I	959-98-8	0.05	1.7	5
Dieldrin	60-57-1	0.1	3.3	10
4,4'-DDE	72-55-9	0.1	3.3	10
Endrin	72-20-8	0.1	3.3	10
Endosulfan II	33213-65-9	0.1	3.3	10
4,4'-DDD	72-54-8	0.1	3.3	10
Endosulfan sulfate	1031-07-8	0.1	3.3	10
4,4'-DDT	50-29-3	0.1	3.3	10
Methoxychlor	72-43-5	0.50	17.0	50
Endrin ketone	53494-70-5	0.10	3.3	10
Endrin aldehyde	7421-36-3	0.10	3.3	10
alpha-Chlordane	5103-71-9	0.05	1.7	5
gamma-Chlordane	5103-74-2	0.05	1.7	5
Toxaphene	8001-35-2	5.0	170.0	500
AROCLOR-1016	12674-11-2	1.0	33.0	100
AROCLOR-1221	11104-28-2	1.0	67.0	200
AROCLOR-1232	11141-16-5	1.0	33.0	100
AROCLOR-1242	53469-21-9	1.0	33.0	100
AROCLOR-1248	12672-29-6	1.0	33.0	100
AROCLOR-1254	11097-69-1	1.0	33.0	100
AROCLOR-1260	11096-82-5	1.0	33.0	100

* Quantitation Limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the Laboratory for soil/sediment, calculated on dry weight basis, as required by the Protocol, will be higher.

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Section 8
Quality Assurance Objectives

This section addresses the data quality requirements for the samples to be collected at the Fumex site during groundwater and sediment sampling activities based on the intended use of the data and the data quality objectives.

8.1 QA/QC Requirements

The following sections describe QA/QC requirements for the site RI.

8.1.1 Field Sampling QA/QC Requirements

The following summaries describe the field sampling QA/QC requirements for the collection and analysis of groundwater and sediment samples. Table 8-1 lists the number of QA/QC samples that will be collected for each matrix. Table 8-2 provides a summary of QA/QC sample requirements.

- Equipment field blanks will be used to determine if the equipment decontamination procedures have been sufficient. A field blank will consist of an empty laboratory-cleaned/decontaminated sample container, sent by the laboratory to the field. One field blank will be collected for each type of equipment. In the field, distilled water (blank water provided by the laboratory) will be passed through/over a precleaned decontaminated piece of sampling equipment and placed into an empty field blank container for analysis. Field blanks will be analyzed for TCL Pesticides. Field blanks will not be collected when samples are collected directly into a sample container (i.e., the sample container is used as the collection device). Field blanks will not be collected during groundwater sampling when dedicated, disposable bailers are used.

  Duplicate samples are not required for this project. Since chlordane is not a spike compound, analytical precision can be evaluated from the sample MS/MSD analysis.

- Matrix Spike/Matrix Spike Duplicates (MS/MSDs) will be used to assess laboratory accuracy and precision. For the laboratory to perform a MS/MSD, the laboratory must be supplied with additional sample vials/bottles. MS/MSDs are performed at the same frequency (1 to 20 samples) as duplicates or every 7 calendar days, whichever is more frequent.

  The sample(s) to be used for MS/MSD analysis will be collected at areas of the site where contamination is suspected to be present, and will be clearly identified as a sample for MS/MSD analysis on the sample label and in the sample paperwork.

8.1.2 Field Equipment QA/QC Requirements

The QA/QC requirements for the field measurements of pH and conductivity will be as follows.

- The field measurements of pH will consist of a premeasurement calibration of the pH meter using two standard reference solutions appropriate to the sample pH.

TABLE 8-1

QA/QC SAMPLE TABLE

MATRIX	ANALYTICAL PARAMETER	NUMBER OF SAMPLES	QUALITY CONTROL			MS/MSD	TOTAL NUMBER OF SAMPLES (a)
			DUPLICATES	EQUPMENT FIELD BLANKS	TRIP BLANKS VOA only		
HYDROGEOLOGIC CHARACTERIZATION							
o Groundwater Samples	TCL Pesticides	5	0	0	0	2	7
SEDIMENT CHARACTERIZATION							
o Sediment Samples	TCL Pesticides	4	0	1	0	2	7

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TABLE 8-2

QA/QC SAMPLE PARAMETER TABLE

SAMPLE MATRIX	PARAMETER	NO. OF SAMPLES	ANALYTICAL REFERENCE METHOD	SAMPLE PRESERVATION	HOLDING TIME (a)	CONTAINER
FIELD DUPLICATES						
Hydrogeologic Characterization						
o Groundwater Monitoring Well Samples	TCL Pesticides	No field duplicates will be collected				
Sediment Chracterization						
o Sediment Samples	TCL Pesticides	No field duplicates will be collected				
EQUIPMENT FIELD BLANKS - Aqueous						
Hydrogeologic Characterization						
o Groundwater Monitoring Well Samples	TCL Pesticides	No field blanks will be collected				
Sediment Characterization						
o Sediment Samples	TCL Pesticides	1	CLP (b)	Cool to 4 C	5 days extraction, 40 days analysis	1 x 8oz glass jar
TRIP BLANKS - Aqueous						
Hydrogeologic Characterization						
o Groundwater Monitoring Well Samples	TCL Pesticides	No trip blanks will be collected				
Sediment Characterization						
o Sediment Samples	TCL Pesticides	No trip blanks will be collected				

NOTES: File: XTAB8-2.xls

a) Unless otherwise noted, all holding times are from Verified Time of Sample Receipt (VTSR) at the laboratory 02/13/96

b) Analysis will be performed in accordance with NYSDEC ASP 1991 Volume 2 Exhibit D Part III and IV (NYSDEC Method 91-3).

- For the field conductivity measurements, the QA/QC level of effort will consist of daily calibration of the conductivity meter using known solutions of known conductivity.

8.1.3 Laboratory QA/QC Requirements

The contract laboratory will be required to follow the NYSDEC ASP (NYSDEC 1991). The ASP describes the analytical QA/QC requirements to be performed by the laboratory, as well as the frequency of performance. Corrective action measures are also described in the ASP. The contract laboratory will be required to follow the NYSDEC CLP statements of work in full when performing sample analysis for this site.

8.2 Accuracy and Precision

The accuracy and precision requirements for the laboratory sample analyses will be as specified in the NYSDEC CLP ASP. The quantitation limits for the analytical parameters will also be those specified in the ASP (NYSDEC 1991).

The precision of the field pH and specific conductivity measurements will be +/- 25 percent. Precision for these two parameters will be assessed by the collection and analysis of duplicate samples in the field. If this precision requirement is not met, the pH and/or the conductivity meter will be recalibrated until this precision requirement is met. As appropriate, samples will be recollected and reanalyzed from affected locations.

8.3 Field Investigations

The field investigation program will be conducted at the Fumex site to define the existing environmental conditions and to determine the general extent of affected media attributable to the site. Groundwater and sediment quality will be characterized at and in the vicinity of the site. Collected samples will be analyzed for TCL Pesticides. This SOP/QAPP will be the basis for all field tasks conducted during the Phase I RI and defines the number of samples to be collected, the sample locations, and the analyses to be performed. The following investigations will be conducted:

- Groundwater monitoring well sampling.
- Sediment Sampling

All CDM field instruments used in the field have rigorous maintenance and calibration schedules. Where applicable, the instrumentation is calibrated using standard solutions or standardized techniques. Calibration of field instruments is performed by qualified personnel. A comprehensive test quality assurance manual is maintained that documents instrumentation calibration and maintenance protocols. Operation and maintenance (O&M) equipment manuals will be present at the site.

8.4 Sample Collection

Samples will be collected in laboratory-cleaned bottles with the appropriate preservatives added. The contract laboratory will supply bottles that meet proper QA/QC requirements, as specified in the NYSDEC ASP (NYSDEC 1991).

QA/QC requirements for sample collection activities are described in Section 8.1 of this SOP/QAPP.

8.5 Representativeness and Completeness

The criteria of representativeness is defined by the sampling method used. Blind duplicate samples will be collected as part of the field program to monitor the reproducibility of the sampling technique and to determine field sampling precision.

8.5.1 Representativeness

Samples collected from each medium will provide a "snapshot" of the conditions at the time and place of sampling. Representative samples will be collected as described in Sections 6 and 9 of this SOP/QAPP. Representativeness of the samples is assured by the procedures outlined in section 9 of this SOP/QAPP.

8.5.2 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to occur under normal conditions. Completeness is usually expressed as a percentage. Site access, sampling problems, analytical problems, and the data validation process can all contribute to less data being obtained than originally anticipated. Critical samples are those for which valid data must be obtained to satisfy the objectives of the sampling and analysis task.

Although a goal of 100 percent completeness is always desired, the CLP data has been found to be 80 to 85 percent complete on a nationwide basis (EPA 1986). A goal of 100 percent valid data has been set for the Fumex site. The acceptability of less than 100 percent valid data will be evaluated on a case-by-case basis, in conjuction with the NYSDEC Project Manager, as well as in the data usability report.

8.6 Laboratory Quality Assurance/Quality Control

Analytical QA/QC is developed to ensure the integrity and usefulness of analytical results. The primary QA objective with respect to accuracy, precision, and sensitivity of the analytical data is to achieve the ASP QC acceptance criteria.

The QA requirements for accuracy, precision, and sensitivity of analyses will be the responsibility of the contract laboratory. All QA/QC requirements outlined in the NYSDEC ASP (NYSDEC 1991) will be followed by the contract laboratory.

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Section 9
Sampling Protocol/Field Investigations

The following sections outline the field procedures to be followed when conducting the site RI.

9.1 Mobilization/Field Activities

Prior to initiating any field work, the following preparatory activities will be completed:

- An initial site visit and field activity planning meeting, including a HASP briefing, will be conducted.
- The NYSDEC acquirement of access permission/agreements for specific off-site field activities will be confirmed.
- All sample analyses by the contract laboratory will be scheduled.
- Appropriate sample containers and preservatives for the various sample parameters, as outlined in Section 8 of this SOP/QAPP, will be obtained. Additional containers will be obtained to account for possible breakage. A summary of sample container requirements is provided in Table 9-1.
- Field blank water will be obtained from the contract laboratory.
- Necessary field sampling and monitoring equipment will be obtained. Prior to use, the equipment will be checked to ensure that it is in good working condition, correctly calibrated, and decontaminated.
- All materials necessary for personal protection and decontamination will be obtained.
- The overnight delivery service office nearest the site will be located and its hours of operation, and whether it will provide sample pick-up service, will be noted.
- The local police, hospital, and other local emergency services will be notified as to where, when, and what field activities will be conducted.

9.2 Decontamination Procedures

The following decontamination procedures will be employed for equipment used during the RI.

9.2.1 Personal Protective Equipment

Personal protective equipment (PPE) will be decontaminated as follows:

- Rinse with low phosphate detergent (Alconox).
- If cleaning respirator, spray with manufacturer's sanitizer.
- Rinse with tap water.
- Air dry.

TABLE 9-1

SAMPLE CONTAINER REQUIREMENTS

ANALYSIS	SAMPLE MATRIX	CONTAINER PER SAMPLE	NO. OF SAMPLES	TOTAL NUMBER OF CONTAINERS	TOTAL WITH 10% CONTINGENCY	TYPE OF CONTAINER
HYDROGEOLOGIC CHARACTERIZATION (includes environmental and QA/QC samples)						
o GROUNDWATER SAMPLES						
TCL Pesticides	Aqueous	1	8	8	9	1 l amber
SEDIMENT CHARACTERIZATION (includes environmental and QA/QC samples)						
o SEDIMENT SAMPLES						
TCL Pesticides	Soil	1	6	6	7	8 oz glass jar

Total does not include extra sample containers for laboratory duplicate.

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9.2.2 Field Monitoring Equipment

Field monitoring equipment will be decontaminated in accordance with manufacturer's instructions.

The pH meter, conductivity, and dissolved oxygen (DO) probes cannot be rinsed with solvents. These instruments will be rinsed after each use with deionized/distilled water only.

9.2.3 Well Evacuation Equipment

All tubing and evacuation equipment (such as submersible pumps that are put into the borehole) will be rinsed with soapy (Alconox) water and deionized water before use. If bailers are used to evacuate wells, they will be decontaminated as specified for sampling apparatus.

9.2.4 Drilling Equipment and Other Large Pieces of Equipment

All drilling equipment that comes in contact with soil will be steam cleaned when it arrives on-site and before it leaves the site. This includes drill rods, bits and augers, or any other large piece of equipment. Sampling devices such as split spoons will be cleaned/decontaminated using an Alconox and tap water wash followed by a tap water rinse. Well development equipment will either be steam-cleaned or decontaminated using an Alconox and tap water wash followed by a tap water rinse.

9.2.5 Sampling Apparatus

All sampling apparatus will be properly decontaminated prior to its use in the field to prevent cross-contamination. The equipment will be decontaminated before use in an area designated by the NYSDEC Project Manager. Sampling equipment will be available such that equipment will be dedicated to the designated sampling points.

Specifically, stainless-steel mixing bowls will be decontaminated as follows:

- Rinse with low phosphate detergent (Alconox).
- Rinse with tap water.
- Rinse with distilled/deionized water.

Bailers will be the disposable type (one use only).

Tap water may be used from any municipal water system. The use of an untreated potable water supply is not an acceptable substitute.

Bailer cord will be dedicated to individual wells.

9.3 Subsurface Soil Characterization

The following sections provide a detailed description of subsurface soil sample collection and analysis activities.

9.3.1 Subsurface Soil Sampling

As discussed in Section 6.2 of this SOP/QAPP, split spoon samples will be collected from the dry-well on site. Four samples from the dry-well will be sent to the contract laboratory and analyzed for TCL Pesticides.

9.3.1.1 Preparatory Activities

The following preparatory activities will be conducted prior to the collection of split-spoon samples:

- The NYSDEC acquirement of access permission/agreements for any off-site field activities will be confirmed.
- Support vehicle and sample crew will be mobilized.
- Prior to initiating augering activities, all augers, split spoons, and sampling equipment will be properly decontaminated, as described in Section 9.2. These activities will be performed at an on-site area (located apart from the area at which cleaned equipment is stored) designated by the NYSDEC Project Manager. Throughout and after the cleaning processes, direct contact between the equipment and the ground surfaces will not be permitted and persons handling equipment will have clean hands or clean gloves on their hands.
- After the split spoon samples have been steam-cleaned, they will be scrubbed with liquinox and water and rinsed with distilled/deionized water. The liquinox wash and water rinse will be repeated prior to reuse of the split spoons at a borehole.
- The drywell will be prepared such as clearing/removing surface gravel, vegetation, surface debris, or loose asphalt pavement.

9.3.1.2 Field Equipment

The following field equipment will be required:

- Field logbook.
- 100 foot tape measure.
- Stakes and/or flags.
- Health and safety equipment as required by the HASP (see Appendix B).
- Alconox.
- Deionized/distilled water.
- Buckets and brushes.
- Paper towels and garbage bags.
- Water jugs.
- Camera and film.
- Disposable trowels.
- Polyethylene sheeting.
- Sample containers (provided by contract laboratory), paperwork, and packaging.
- Sampling knives and spatulas.
- Stainless steel mixing bowls.
- Surgical gloves.
- Nitrile gloves.
- Ziplock bags.
- Coolers.
- Vermiculite.
- Plywood work table.
- Duct and strapping tape.
- Clear tape.

- Ice.
- pH paper.
- Clipboard.

9.3.1.3 Procedure

Split spoon samples will be obtained from the top 1-3 feet, from a depth of 10-15 feet, from a depth of 20-25 feet and from a depth of 45-50 feet below the drywell sediment surface, as follows:

- A polyethylene sheet will be placed on the field table. Each collected split spoon will be placed on the polyethylene sheet. A separate polyethylene sheet will be used for each sample.

- The sample will be photographed and the sample number and frame number will be recorded in the field logbook.

- The CDM field engineer will make visual observations, such as:

  - General nature of sample.
  - Wetness or dryness of sample.
  - Visible staining of sample.
  - Approximate percentage of biodegradable organic matter in the sample, and the general nature of this material.

- All field information will be recorded in the field logbook and boring logs.

- All samples for TCL Pesticides will be homogenized before being put into sample containers. The following procedure will be used to homogenize the samples:

  - Any rocks, twigs, leaves, and other debris that are not considered part of the sample will be removed.

  - The soil will be thoroughly mixed in a stainless steel pan/bowl with a pre-cleaned stainless steel spoon, or other pre-cleaned stainless steel utensil.

  - Any sediment in the pan will be scraped from the sides, corners, and bottom of the pan, then rolled to the middle of the pan and initially mixed.

  - The sample will be divided into quarters and each quarter moved to a separate corner of the pan/bowl.

  - Each quarter will be mixed individually, then combined and mixed with the entire sample again.

- The appropriate sample containers will be filled to the rim and closed tightly.

- Sample containers will be placed in a cooler with bagged ice sufficient to cool the samples to 4°C.

9.4 Hydrogeologic Characterization

As discussed in Section 6.2, monitoring wells will be developed on the site, and groundwater samples collected, to characterize the site hydrogeology.

9.4.1 Monitoring Well Development

Each on site monitoring well will be developed as follows:

- The drilling subcontractor will develop each well by surge and block and/or submersible pumping, or any other method acceptable to CDM and the NYSDEC Project Manager. All materials (for example, drop line, and submersible pump) will be cleaned and free of grease, oil and dirt, prior to installation in the well.

9.4.2 Synoptic Water Level Measurements

CDM will collect two rounds (at least 3 months apart to determine seasonal effects) of synoptic water level measurements from the existing on-site monitoring wells. Each round of measurements will be scheduled to coincide with each groundwater sampling event. The measurement of water levels will be within an accuracy of ± 0.01 foot.

9.4.2.1 Field Equipment

The following equipment will be required:

- Field logbook.
- Health and safety equipment as described in Appendix B.
- Alconox.
- Deionized/Distilled water.
- Scrub brush.
- 5-gallon plastic buckets.
- Electric water level indicator.
- Folding engineers ruler.
- Level/transit.
- Tripod.

9.4.2.2 Procedure

Two rounds (at least 3 months apart) of synoptic water level measurements will be taken in each designated monitoring well as follows:

- If the well is locked, the well will be unlocked and the inner cap removed. The well will be allowed to vent briefly.

- The electric water level indicator probe will be lowered until the light and buzzer on the indicator activates (the sensitivity of the instrument will be adjusted to respond when surface water is contacted). The depth to water will be read from the graduated tape when holding the tape against the measuring point (usually a notch or mark at the top of the casing).

9.4.3 Groundwater Sampling

As discussed in Section 6.2.3 of this SOP/QAPP, 5 existing monitoring wells (monitoring wells MW-1 and through MW-5) will be sampled to determine groundwater quality at and in the vicinity of the site. Each sample will be analyzed for TCL Pesticides. Two rounds of groundwater samples will be collected.

Samples will be collected following the evacuation of three to five well casing volumes. Prior to well evacuation, the water level and total depth of the well will be measured, from a common datum, to calculate the correct volume. At the conclusion of the evacuation phase, when pH and conductivity measurements have stabilized, the well will be allowed to recharge to ensure that aquifer water is being collected and that sufficient water is available to collect the proper sample volume. A sample will be collected as soon as recharge is effected. If aquifer yield and well recharge are sufficient, sample collection will be completed within two hours of well evacuation. In the case of a slow recharging well, the sample will be collected as soon as the proper sample volume has recharged to the well. A well must recharge within 24 hours with sufficient volume to collect samples, or the well will be considered dry and will not be sampled.

9.4.3.1 Preparatory Activities

Prior to the collection of groundwater samples, the following preparatory activities will be conducted:

- Dedicated, disposable sampling bailers will be precleaned to meet SOP/QAPP QC requirements.
- All other field equipment that will be used for "contact" purposes will be cleaned on-site prior to sample collection in accordance with the procedures outlined in Section 9.2 of this SOP/QAPP.

9.4.3.2 Field Equipment

The following equipment will be required:

- Field logbook.
- 100 foot tape measure.
- Stakes and/or flags.
- Health and safety equipment as required by the HASP (see Appendix B).
- Alconox.
- Deionized/distilled water.
- Buckets and brushes.
- Paper towels and garbage bags.
- Water jugs.
- Camera and film.
- Disposable trowels.
- Polyethylene sheeting.
- Sample containers (provided by contract laboratory), paperwork, and packaging.
- Sampling knives and spatulas.
- Shovels.
- Stainless steel bowls.
- Surgical gloves.
- Nitrile gloves.
- Ziplock bags.
- Coolers.
- Vermiculite.
- Duct and strapping tape.
- Clear tape.
- Ice.
- pH paper.
- Clipboard.
- Electric water-level indicator.

- Plastic buckets; 1,3 and 5-gallon capacity.
- Peristaltic pump with hose.
- Stainless steel submersible pumps and centrifugal pumps.
- Hose clamps.
- Field measurement instruments for conductivity, pH, temperature, and turbidity.
- 1,400 feet of 3/4-in. and ½-in. diameter ASTM drinking water grade polyethylene hose.
- 3/4-in. and ½-in. gate valves.
- Dedicated, disposable HDPE or teflon bailers..
- Electrical line clamps (stay ties).
- Polypropylene rope.
- Utility knife.
- Decontamination equipment.
- Two 35-gal plastic garbage cans.
- Assorted tape (duct, fiberglass strapping, clear waterprint).

9.4.3.3 Procedure

Prior to sampling, each well will be purged as follows:

- The static water level will be measured from the top of the inner casing and then the total depth of the well will be measured.
- The casing radius (ft), total casing and screen length (ft), depth of water (ft), height of water column (ft), and volume (gallons) of the well will be calculated.
- Field purging and sampling equipment will be decontaminated in accordance with the procedures outlined in Section 9.2. All decontaminated equipment, as such, will be stored on polyethylene sheeting and will not touch the ground adjacent to the well.
- Riser pipe will be attached to the submersible pump or centrifugal pump and the hose clamp tightened securely.
- When using a submersible pump, the security line will be attached firmly to the pump with a bowline knot. At approximately 10-foot intervals, electrical cables will be attached to the riser pipe with plastic stay ties.
- The pump assembly will be lowered to a depth that results in the pump intake being located no less than one foot above the top of the well screen. As the pump is being lowered into the well, the exterior of the PVC hose and the electrical cable will be rinsed with distilled water. The hose will be wiped with a clean, nondyed, cotton cloth before entering the casing.
- Excess PVC hose will be trimmed such that a gate valve can be attached to regulate the pump discharge if the rated pump capacity exceeds the well yield.
- A spare piece of PVC hose will be attached to the discharge of the gate valve to minimize additional spraying.
- The centrifugal pump will be started.
- Pumping will begin and the time recorded.

- The pH meter, thermometer, and specific conductance meter will be calibrated (daily) before use.

- A minimum of three casing volumes will be pumped from the well. The water level and yield will be periodically checked and recorded, and necessary adjustments made.

- Temperature, pH, and specific conductance of the pump discharge will be monitored and measurements recorded in the field logbook after purging each well volume and after removing three well volumes. After three casing volumes have been purged, evacuation may be stopped if these measurements have stabilized to within ten percent between two successive readings. Otherwise, purging will continue until these measurements have stabilized or a maximum of five well volumes have been removed.

- At the conclusion of well purging activities, the turbidity of the well water will be measured and recorded in the field logbook.

- The pump will be raised while still running until the intake is raised above the water level. The pump will then be turned off and removed from the well. The well will be sampled within three hours of evacuation. If the well sits more than three hours, it will be re-purged.

- A clean pair of surgical gloves will be donned by the.sampler and the decontaminated bailer and check valve removed from the wrapping; the check valve will then be screwed into the bottom of the bailer.

- A line will be securely attached to the bailer with a bowline and enough line given to submerge the bailer. The bailer will be eased into the water column with as little agitation as possible. After filling the bailer, the bailer will be carefully removed from the well in preparation of filling the sample containers.

Groundwater samples will be collected as follows:

- The Teflon-lined cap from an 40-oz. amber bottle will be removed. Contact with the inner surface of the cap will be avoided.

- The bottle will be filled about 80 percent (to the neck) with groundwater.

- The cap will be tightly replaced, a CLP label and tag attached, and the sample bottle placed in a cooler with bagged ice sufficient to cool the media to 4°C.

- Additional bottles will be filled by repeating the first 3 steps above.

- All appropriate data will be recorded in a field log book.

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Section 10
Sample Management

The following describes sample management procedures to be followed during the RI.

10.1 Sample Scheduling

Samples collected from the Fumex site will be analyzed by a NYSDEC Contract Laboratory. A minimum of 3 days lead time will be provided to the laboratory prior to shipping samples. Laboratory personnel will be available to receive Saturday shipments. Arrangements will be made to receive all necessary sample bottles, preservatives, and shipping containers from the laboratory at least 2 days prior to the date of sampling. Sample bottles and shipping papers will be completed, to the extent practicable, prior to initiating the sampling event.

10.2 Sample Bottles

Sample bottles will be provided by the Contract Laboratory. These bottles will be cleaned and prepared by the laboratory in accordance with ASP protocol (NYSDEC 1991). Container preparations will be documented and batches assigned lot numbers to ensure traceability.

10.3 Sample Documentation

Sample documentation will be as follows:

10.3.1 Chain-of-Custody

Each sample submitted for analysis will be properly documented to ensure timely, correct, and complete analyses for all parameters requested and to support use of analytical data in potential enforcement actions.

Chain-of-custody procedures will document the handling of each sample from the time it is collected until it is destroyed. To maintain a record of sample collection, transfer between personnel, shipment, and receipt by the laboratory, a chain-of-custody record will be filled out for all sample types after all sample bottles have been packed for shipment. Each time the samples are transferred to another custodian, signatures of the person relinquishing the sample and receiving the sample, as well as the time and date, will document the transfer. A sample will be considered to be in an individual's custody if the following criteria are met:

- It is in the individual's possession or it is in his/her view after being in their possession;
- It was in an individual's possession and then locked up or transferred to a designated secure area.

Under this definition, the team member actually performing the sampling is personally responsible for the care and custody of the samples collected until they are transferred or dispatched properly. CDM will retain the bottom copy of each chain-of-custody record and the remaining copies will be sent with the samples to the contract laboratory. The contract laboratory will return a completed copy of the chain-of-custody form with the sample analytical results.

10.3.2 Field Logbook

Another element of the documentation process will be the completion of a field logbook by field personnel. The field logbooks will be maintained by the Project Manager and will be stored in the project file. All logbook entries will be made in ink. Erasures will not be permitted. If an incorrect entry is made, the data will be crossed out with a single strike mark and initialed. Military time notations will be used. Pages in the book(s) used during the field work will be numbered consecutively.

At the beginning of each entry the following information will be recorded: the date, start time, weather conditions, all field personnel present, level of personal protection being used on-site, and the signature of the person making the entry. Pages will be initialed by the individual making the entry.

For each sample collected and shipped, the following information will be recorded (at a minimum) in the field logbook:

- Sample number/location.
- A description of the sample location and the sample.
- Field measurements (for example, pH and OVM PID readings).
- Date and time sampled.
- Date shipped.
- Media type.
- Type of analysis to be performed.
- Names of sampling personnel.
- Preservatives added to the sample, if any.
- Airbill number and means of delivery to the contract laboratory.
- General observations.

10.4 Sample Labeling

Each sample will be identified using sample labels provided by CDM (Figure 10-1) or the labels that come with the bottles. These labels may include information such as:

a. Site name and unique sample identification number.
b. Date and time of collection.
c. Preservative.
d. Parameters to be analyzed.

Sample numbers will be cross-referenced on the Chain-of-Custody Records.

10.5 Sample Control

A variety of samples will be collected during the field activities. A coding system will be used to identify each sample taken during the sampling program. This coding system will provide a

SITE NAME	DATE
SAMPLE I.D. #	TIME
ANALYSIS	PRESERVATIVE

CDM

environmental engineers, scientists, planners & management consultants

Fumex Site - New Hyde Park, New York
NYSDEC Site #1-30-041

Sample Label

Figure 10-1

mechanism enabling retrieval of information concerning a particular sample and ensuring that each sample is uniquely identified. A list of the sample identification numbers, locations, dates, and times will be maintained by CDM personnel. Each sample identification number is composed of four parts as described below:

- Site Code - A three-digit designation used to identify the site where the sample is being collected (for example, 897).
- Sample Type - A two- or three-letter designation used to identify the specific medium sampled (for example, ground water monitoring well - GW).
- Sample Location - A two- or three-digit designation used to identify the sample station location. This could include grid location, monitoring well depth, or other designation (for example, MW-1).
- Sequence Number - A three-digit number designation used to identify samples within a sample type. The samples are typically numbered sequentially by sample type (for example, 001, 002).

10.6 Contract Laboratory Sample Information Sheets

Contract laboratory sample information sheets, as shown on Figure 10-2, will be completed by CDM and submitted to the contract laboratory with the sample shipment.

10.7 Shipping Containers

The shipping containers (coolers or shuttles) will be provided by the contract laboratory. These containers, once filled, will be secured with fiber tape, wrapped entirely around the container.

10.8 Custody Seals

Custody seals, provided by the contract laboratory, will be placed across the openings of each cooler at opposite ends, diagonal to one another, signed by the individual relinquishing the samples, and placed across the lid and body of the sample cooler with clear plastic tape.

10.8.1 Packaging

Samples will be packaged for shipment to the contract laboratory as follows:

- The sample will be checked to ensure that it is properly filled; the cap will be securely tightened.
- Sample containers will be enclosed and sealed in a clear plastic bag.
- Freezer packages or ice will be placed in large ziplock plastic bags and the bags placed in a sample cooler so that they are not in direct contact with sample bottles. Sufficient ice will be added to cool the samples to 4°C.

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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

CONTRACT LAB SAMPLE INFORMATION SHEET

Part I

Print legibly

CAUTION (check if applicable)

☐ Lab Personnel are expected to use caution when handling DEC samples, however, please use special precautions when handling this sample since it is believed to contain significant concentrations of hazardous and/or toxic material(s).

Place QA Label Here

CHECK THE BOX PRECEDING THE REQUESTED ANALYTES

PRIORITY POLLUTANTS (Water Part 136)—SPDES

- ☐ 2. 13 PP Metals
- ☐ 4. Acids Base/Neutrals (USEPA 625-GC/MS)
- ☐ 7. Halogenated Volatiles (USEPA 601-GC)
- ☐ 10. pH
- ☐ 13. Settleable Solids
- ☐ 16. Nitrate/Nitrite
- ☐ 19. Oil/Grease
- ☐ 22. Other ______
- ☐ 3. Volatiles—(USEPA 624 GC/MS)
- ☐ 5. Cyanide
- ☐ 8. Aromatic Volatiles (USEPA 602 GC)
- ☐ 11. COD
- ☐ 14. TKN
- ☐ 17. Total Phosphorus
- ☐ 20. TOC
- ☐ 59. PCB's at 0.065 ug/L
- ☐ 62. CBOD
- ☐ 6. Pesticides/PCB's (USEPA 608 GC)
- ☐ 9. BOD
- ☐ 12. TSS
- ☐ 15. Ammonia
- ☐ 18. Reactive Phosphorus
- ☐ 21. Total Phenols
- ☐ 60. PCB's congener method
- ☐ 64. Total Solids
- ☐ 65. Volatiles (USEPA 524.2 GC/MS)

CONTRACT LABORATORY PROTOCOLS

- ☐ 23. (ALL)—Water—Includes 24-28
- ☐ 24. Base/Neutral/Acid (B/N/A)—Water—GC/MS (ASP #89-2)
- ☐ 25. Volatile Organic Analysis VOA—Water—GC/MS (ASP #89-1)
- ☐ 26. Pesticides/PCB's—Water—GC (ASP #89-3)
- ☐ 27. Metals—23 in Water
- ☐ 28. Cyanide—Water
- ☐ 66. Dioxin-Water (ASP #89-4)
- ☐ 35. Other ______
- ☐ 29. (ALL)— Soil/Sediments—Includes 30-34
- ☐ 30. B/N/A—Soils/Sediment—GC/MS (ASP #89-2)
- ☐ 31. VOA—Soils/Sediments—GC/MS (ASP #89-1)
- ☐ 32. Pesticides/PCB's—Soils/Sediment—GC (ASP #89-3)
- ☐ 33. Metals—23 in Soil/Sediment
- ☐ 34. Cyanide—Soils/Sediment
- ☐ 67. Dioxin-Soil/Sediment (ASP #89-4)

HAZARDOUS WASTES/RCRA ANALYSIS SW-846

- ☐ 36. EP Toxicity
- ☐ 39. Corrosivity
- ☐ 42. Pesticides/PCB's (USEPA 8080)
- ☐ 45. Reactivity
- ☐ 48. Other ______
- ☐ 37. EP Toxicity (Metals Only)
- ☐ 40. VOA—(USEPA 8240-GC/MS)
- ☐ 43. TCLP
- ☐ 46. Dioxin (USEPA 8280)
- ☐ 63. Percent Solids
- ☐ 38. Ignitability
- ☐ 41. BNA—(USEPA 8270-GC/MS)
- ☐ 44. TCLP (Metals Only)
- ☐ 47. Appendix IX
- ☐ 68. Metals—17 Hazardous

MUNICIPAL SLUDGE

- ☐ 49. RSGB-01
- ☐ 50. RSSR-01
- ☐ 51. RSOR-01
- ☐ 52. RSRB-01
- ☐ 53. RSRI-01 (EP Toxicity-Metals only + RSRR-01)
- ☐ 54. RSRO-01
- ☐ 55. RSSB-01
- ☐ 56. RSRR-01
- ☐ 57. RSRR-02
- ☐ 58. Other ______

COLLECTED BY:	TELEPHONE NUMBER:	REGION NO:

CONTRACT LAB:	COUNTY:	SAMPLING DATE:	MILITARY TIME:

SAMPLE MATRIX: ☐ Air ☐ Soil/Sediment ☐ Groundwater ☐ Surface Water ☐ Wastewater ☐ Other (Specify) ______

CASE NUMBER	SDG NUMBER	SAMPLE NUMBER	CHECK FOR MS/MD ☐ This Sample	TYPE OF SAMPLE: ☐ Grab ☐ Composite ☐ Term ____ hrs

☐ Check if there will be more samples with this SDG sent in this calendar week

Report via Category B, unless checked ☐

SAMPLING POINT:	Check if field duplicate ☐	Outlet Number	Check if sampling is part of inspection ☐
	SPDES NUMBER/REGISTRY NUMBER		FLOW GPD MGD

- Vermiculite will be packed around sample bottles and ice to avoid sample breakage during transport.

- Chain-of-custody records and other shipping/sample documentation will be completed, including airbill numbers for each shipment of samples using a ball point pen. Documentation will be sealed in a waterproof plastic bag and the bag taped inside the shipping container under the container lid. A return address will be included for the cooler or shuttle.

- The container will be closed and sealed with fiber tape and custody seals in such a manner that the custody seals would be broken if the cooler were opened.

10.8.2 Marking/Labeling

Return address labels will be attached to the inside of the cooler in a clearly visible location. If shipping several coolers or shuttles, an airbill will be completed for each cooler/shuttle, noting the lot and number (i.e., 1 of 3) of each cooler/shuttle and its destination.

For environmental samples:

- The outside of the cooler will be marked "Environmental Samples" if the samples are designated low-level (see Section 10.9). No U.S. Department of Transportation (DOT) marking or labeling is required for low-level samples.

- The appropriate side of the container will be marked "This End Up" and arrows placed accordingly.

For hazardous samples:

- The outside of the cooler will be labeled in accordance with DOT requirements.

10.8.3 Shipping Papers

No DOT shipping papers (i.e., bill of lading) are required for environmental samples. Bills of lading will be required to be completed for hazardous samples.

10.8.4 Transportation

Samples collected at the Fumex site will be shipped by overnight delivery service, but only in "cargo only" aircraft.

10.9 Sample Handling, Packaging, and Shipping

When sent by common carrier, the packaging, labeling and shipping of hazardous wastes and substances is regulated by the DOT under Title 49 Code of Federal Regulations (CFR). Samples obtained at uncontrolled hazardous waste sites are classified according to pollutant concentration. "Low level" samples are generally dilute and are usually collected from areas surrounding a spill or dump site (i.e., off-site samples from soils, river, and lakes). "Medium level" samples are generally collected on-site in areas of moderate dilution by normal environmental processes. "High hazard" samples contain more than 15 percent of any individual chemical contaminant and generally include those samples collected from drums, tanks, lagoons, pits, waste piles, and fresh spills. Medium level and high hazard samples require special handling procedures because of their potential toxicity or hazard.

Groundwater, and sediment samples collected at the Fumex site are anticipated to fall into the low level category.

All samples will be delivered to the analytical laboratory within 24 to 48 hours of collection.

10.10 Laboratory Sample Handling

The following sections describe laboratory sample handling procedures.

10.10.1 Sample Identification

To ensure traceability of samples while in possession of the contract laboratory, a method for sample identification will be developed and documented by the laboratory. Each sample or sample preparation container will be labeled with a unique number identifier. This identifier will be cross-referenced to the CDM sample number. There will be a written description of the method of assigning this identifier and attaching it to the sample container included in the laboratory Standard Operating Procedures (SOPs).

Upon receipt of the samples in custody, the laboratory will inspect the shipping container and sample bottles and will document receiving information as specified in the ASP (NYSDEC 1991). The sample custodian or a designated representative will sign and date all appropriate receiving documents at the time of receipt (i.e., Chain-of-Custody forms, Contract Lab Sample Information Sheets, and airbills). The laboratory will contact CDM directly if documents are absent, if information on receiving documents does not agree, if custody seals are not intact, or if the sample is not in good condition. The laboratory will document resolution of any discrepancies, and this documentation will become a part of the permanent site file.

Once samples have been accepted by the laboratory, checked, and logged in, they will be maintained in accordance with custody and security requirements specified in the ASP (NYSDEC 1991).

10.10.2 Document Control Procedure

The goal of the laboratory document control program is to ensure that all documents for a specified site will be accounted for when the project is completed. Accountable documents used by the contract laboratory will include, but not be limited to, logbooks, Chain-of-Custody records, sample work sheets, bench sheets, and other documents relating to the sample or sample analyses. The document control procedures are established to ensure that laboratory records are assembled and stored for delivery to CDM.

10.10.3 Standard Operating Procedures

The laboratory must have written SOPs for (1) receipt of samples, (2) maintenance of custody, (3) sample storage, (4) tracking the analysis of samples, and (5) assembly of completed data.

An SOP is defined as a written narrative step-by-step description of laboratory operating procedures including examples of laboratory documentation. The SOPs must accurately describe the actual procedures used in the laboratory, and copies of the written SOPs will be available to appropriate laboratory personnel. These procedures are necessary to ensure that analytical data produced under this protocol are acceptable for use in the NYSDEC enforcement case preparation and litigation. The laboratory's SOPs will provide mechanisms and documentation to meet each of the following specifications and will be used by the NYSDEC as the basis for laboratory evidence audits.

The laboratory will have a designated sample custodian responsible for the receipt of samples and have written SOPs describing his/her duties and responsibilities.

The laboratory will have written SOPs for receiving and logging in of the samples. The procedures will include, but not be limited to, documenting the following information:

- Presence or absence of chain-of-custody forms.
- Presence or absence of airbills.
- Presence or absence of NYSDEC contract laboratory sample information sheets.
- Presence or absence of custody seals on shipping and/or sample containers and their condition.
- Presence or absence of sample labels.
- Sample tag identification numbers, if not recorded on the chain-of-custody record(s).
- Condition of the shipping container.
- Condition of the sample bottles.
- Verification of agreement or nonagreement of information on receiving documents.
- Resolution of problems or discrepancies with CDM or the NYSDEC.

The laboratory will have written SOPs for maintenance of the security of samples after log-in and will demonstrate security of the sample storage and laboratory areas. The SOPs will specifically include descriptions of storage areas for CDM samples in the laboratory, and steps taken to prevent sample contamination. The SOPs will include a list of authorized personnel who have access or keys to secure storage areas.

The laboratory will have written SOPs for tracking the work performed on any particular sample. The tracking SOP will include the following:

- A description of the documentation used to record sample receipt, sample storage, sample transfers, sample preparations, and sample analyses.
- A description of the documentation used to record instrument calibration and other QA/QC activities.
- Examples of the document formats and laboratory documentation used in the sample receipt, sample storage, sample transfer, and sample analyses.

The laboratory will have written SOPs for organization and assembly of documents relating to the site, including technical and managerial review. Documents will be filed on a site-specific basis.

(Fumex/sec10.sop)

Section 11
Calibration Procedures and Preventive Maintenance

Each piece of equipment used for measuring, monitoring, or analytical purposes is calibrated and maintained periodically to ensure accuracy within specified limits.

11.1 Calibration Procedures

Calibration and maintenance procedures and frequency for most field equipment conforms with the manufacturer's specifications. The manufacturer's specifications for each piece of equipment are available to CDM personnel.

Equipment used in analysis or sampling has a documented maintenance and/or calibration procedure. These procedures are available to CDM personnel and include:

- Equipment identification.
- Control number.
- Calibration and/or maintenance schedule.
- Equipment necessary to accomplish calibration (when applicable).
- Procedure for calibration and/or maintenance.

Instruments requiring calibration and/or maintenance have a sticker affixed that contains the following information:

- Date of calibration and/or maintenance.
- Next due date for calibration and/or maintenance.
- Initials of personnel performing calibration and/or maintenance.

An equipment log sheet, as well as a calibration worksheet (where applicable), is kept for each piece of equipment whose use affects quality. Equipment log sheets are bound into equipment logbooks and contain:

- Date of calibration and/or maintenance.
- Data pertaining to the calibration and/or maintenance procedure (not contained in specific equipment worksheets).
- Next due date of calibration and/or maintenance.
- Initials of agent performing the calibration and/or maintenance.
- Adjustments made and the accuracy of the equipment prior to and following calibration (where applicable).

- Record of equipment failure or inability to meet specifications (where applicable).

If the calibration schedule is not adequately maintained or if accuracy as reported in the specifications cannot be attained, that instrument is labeled "HOLD" and is unavailable for use until the specifications are attained.

Calibration procedures and frequency of calibration for field equipment is an integral component of each instrument's operating instructions. The relevant calibration procedures for the following are included in Appendix E:

pH/Conductivity Meter
DO Meter

As previously discussed, a CLP laboratory will be subcontracted to analyze the soil, groundwater, surface water, and sediment samples collected during the site RI. It will be the contracted laboratory's responsibility to perform calibration and maintenance for all laboratory analytical equipment at the frequencies mandated in the ASP (NYSDEC 1991).

11.2 Preventive Maintenance

Preventive maintenance activities are as follows.

11.2.1 Master Equipment Control Record

An inventory control system, including equipment and instrumentation utilized for the Fumex site, will be maintained by the equipment manager as the basis for maintenance and calibration control. The inventory control documentation for each item includes:

- Description of item.
- Manufacturer, model number, and serial number.
- Identification number.
- Name, address, and telephone number of company that services item.
- Type of service policy.
- Timing and frequency of routine maintenance, servicing, and calibrations.

11.2.2 General Equipment Maintenance and Repair

Standard procedures for equipment maintenance and repair for instrumentation and equipment are detailed in each manufacturer's specification booklet provided with each instrument sent into the field.

(Fumex/sec11.sop)

Section 12
Data Deliverable Format, Validation, and Reporting

The following sections describe the data deliverable format, validation, and reporting.

12.1 Data Deliverable Format

A hardcopy of the data submitted by the contract laboratory will be accompanied by a 5-1/4 inch floppy diskette, that may be either a double-sided, double density, 360 K-byte or a high capacity 1.2 m-byte diskette. The diskette will be formatted and recorded using the MS/DOS operating system. The diskette(s) will contain information relevant to one and only one sample delivery group, and will accompany the hardcopy package for the sample delivery group submitted to CDM.

Information on the diskette or diskettes will correspond exactly to information submitted in the hardcopy data package and on the hardcopy data package forms. Blank or unused records in either format will not be included on the diskettes.

Each diskette will be identified with an external label containing (in this order) the following information:

- Disk Density.
- File Name(s).
- Laboratory Name.
- Laboratory Code.
- Case Number (where applicable).

Format B (as outlined in the ASP [NYSDEC 1991]) will be provided by the laboratory. This format consists of variable-length ASCII records. All values will be reported in decimal form rather than scientific notation, where appropriate. CDM will be in contact with the contract laboratory to ensure submission of proper format.

Format A is based upon the structure of the hardcopy reporting forms required by the CLP contract. With two exceptions, Form Suffix and Record Type, all fields in the format correspond directly with entries or items on the hardcopy forms. The format and protocol to be followed is specified in Exhibit H, Data Dictionary and Format for Data Deliverables in Computer Readable Format, of the NYSDEC 1991 ASP (NYSDEC 1991).

12.2 Data Validation

The contract laboratory is required to submit the data package to CDM within 30 days of sample receipt. This data will be provided to the data validator; the validator will provide validated data to CDM within 3 weeks of receipt of analytical data.

12.2.1 Completeness

The contract validator will review the data package to determine completeness. A complete data package will consist of the following components:

- All sample chain of custody forms.

- The case narrative(s) including all sample/analysis summary forms, which appear as an addendum to the NYSDEC CLP forms package and will be required for all data submissions regardless of the protocol requested.
- QA/QC summaries including all supporting documentation.
- All relevant calibration data including all supporting documentation.
- Instrument and method performance data.
- Documentation showing the laboratory's ability to attain the contract specific method detection limits for all target analytes in all required matrices.
- All data report forms including examples of the calculations used in determining final concentrations.
- All raw data used in the identification and quantitation of the contract specified target compounds.

All deficiencies in the requirement for completeness will be reported CDM immediately. The laboratory will be contacted by the CDM QA officer and will be given 10 calendar days to produce the documentation necessary to remove the deficiencies.

12.2.2 Compliance

The contract validator will review the submitted data packages to determine compliance with those portions of the workplan that pertain to the production of laboratory data. Compliance is defined by the following criteria:

- The data package is complete as defined in Section 12.2.1 of this SOP/QAPP.
- The data has been produced and reported in a manner consistent with the requirements of this SOP/QAPP and the contract laboratory.
- All protocol required QA/QC criteria have been met.
- All instrument tune and calibration requirements have been met for the time frame during which the analytes were completed.
- All protocol requiring initial and continuing calibration data is present and documented.
- All data reporting forms are complete for all samples submitted. This will include all sample dilution/concentration factors and all premeasurement sample cleanup procedures.
- All problems encountered during the analytical process have been reported in the case narrative along with any and all actions taken by the laboratory to correct these problems.

The data validation task requires that the validator conduct a detailed comparison of the reported data with the raw data submitted as part of the supporting documentation package. It is the responsibility of the validator to determine that the reported data can be completely substantiated by applying protocol defined procedures for the identification and quantitation of the individual analytes. To assist the validator in this determination, the following documents are recommended; however, the EPA Functional Guidelines will be used for format only.

The specific requirements noted in this SOP/QAPP (for example, holding times or special analytical project needs) are prerequisite to those noted in the EPA Functional Guidelines:

- The particular protocol(s) under which the data was generated; for example, NYSDEC CLP; EPA SW-846; EPA Series 500 Protocols.
- Current data validation guidance documents such as:
  - "Functional Guidelines for Evaluating Pesticides/PCBs Analyses" Technical Directive Document No. HG-8410-01 (published by EPA).

The above documents undergo periodic revision; therefore, the most current applicable documents and guidelines will be consulted.

The validator will submit a final report covering the results of the data review process. This report will be submitted to the CDM and NYSDEC Project Manager and will include the following:

- A general assessment of the data package as determined by the criteria discussed in Sections 12.2.1 and 12.2.2 of this SOP/QAPP.
- Detailed descriptions of any and all deviations from the required protocols, including references to the portions of the protocols involved in the alleged deviations.
- Any and all failures in the validator's attempt to reconcile the reported data with the raw data from which it was derived. (Again, specific references will be included). Telephone logs will be included in the data validation report.
  - A detailed assessment by the validator of the degree to which the data has been compromised by any deviations from protocol, QA/QC breakdowns, and/or lack of analytical control that occurred during the analytical process.
- The report will include, as an attachment, a copy of the contract laboratory's case narrative including the NYSDEC required sample and analysis summary sheets.
- The report will include an overall appraisal of the data package.
- The validation report will include a chart presented in a spread sheet format, consisting of the site name, sample numbers, data submitted to laboratory, year of CLP or analytical protocol used, matrix, and the fractions analyzed. Space will be provided for a reference to the NYSDEC CLP when non-compliancy is involved and a column for an explanation of such violation (see Figure 12-1).

12.3 Data Reporting

The diskettes containing the analytical data from the contract laboratory will be loaded directly into a computer spreadsheet.

(Fumex/sec12.sop)

Figure 12-1

COMPLIANCY CHART

GROUP #	DATE	ASP Proto #	Sample No.	Matrix	Pesticide Compliancy	Page # in the CLP	Non-Compliance

File = Xchart12.wk3

Section 13
Quality Assurance Audits

The following describes QA audits to be conducted for the site RI.

13.1 System Audit

A technical system audit or field audit is used to verify that a system of QC measures, procedures, reviews, and approvals were established and used as specified in the SOP/QAPP (for example, procedures for preserving, shipping, documenting, and analyzing the samples) and/or HASP. A technical system audit may be conducted during RI field activities. In addition, the NYSDEC Project Manager will be present to observe the sampling activities performed during these field events.

An internal systems audit is used to check for the use of QC measures and typically includes: interviewing project personnel; determining if deliverables identified in the work plan have been prepared; determining if documents received proper technical and/or QA review; reviewing files for appropriate memos, QC records, or other documentation; and examining the central files to evaluate filing and storage of deliverables. An internal systems audit will be conducted by the CDM QA officer once during the performance of the site RI and once at the completion of the project.

13.2 Performance Audits

Performance audits are quantitative checks on various aspects of project activities and are most appropriate to field measurements and analysis activities. Performance audit techniques include checks on field equipment measurements and the evaluation of laboratory performance with performance evaluation (PE) samples. Except for simple field measurements of pH, temperature, and conductivity, analytical field measurements will not be performed for this assignment. In addition, the calibration and maintenance of these instruments will provide usable data. Therefore, no performance audits of these field measurements will be performed. Performance audits on the laboratory may be performed at the discretion of CDM.

13.3 Laboratory Activities

The selected laboratory for the analysis of the RI environmental samples is a NYS-CLP laboratory. As such, the performance of the laboratory is monitored by the NYSDOH through the use of PE samples and other such criteria. Performance audits of the CLP laboratories are not anticipated to be performed by CDM for this work assignment.

(Fumex/sec13.sop)

Section 14
Corrective Action

14.1 Overview

When a nonconformance or deficiency is identified during a formal or routine QC audit, corrective action will be initiated by the CDM QA officer or the appropriate functionary (such as the laboratory QA manager). The auditor will also be responsible for ensuring that the corrective action has indeed been taken and that it adequately addresses the nonconformance. A Nonconformance Report Form (as shown on Figure 14-1) will be filed for all nonlaboratory-related deficiencies.

The auditor will document the completion of the audit by indicating it on the quality notice form.

14.2 Non-Laboratory Activities

Technical staff will be responsible for reporting suspected technical and QA nonconformances by initiating a nonconformance report. The QA Officer will be responsible for ensuring that corrective actions for nonconformances are implemented by:

- Evaluating reported nonconformances.
- Controlling additional work on nonconforming items.
- Determining disposition or action to be taken.
- Maintaining a log on nonconformances.
- Reviewing nonconformance reports.
- Evaluating disposition or action taken.
- Ensuring that nonconformance reports are included in the final site documentation in document control.

The CDM Project Manager will be responsible for conducting corrective action, as initiated by the CDM QA Officer. The CDM Project Manager will evaluate each nonconformance report and will provide a disposition by checking the appropriate box and describing the action to be taken. The Project Manager will also ensure that no additional work that depends on the nonconforming activity is performed until the nonconformance report is corrected.

(Fumex/sec14.sop)

NONCONFORMANCE REPORT

NONCONFORMANCE REPORT NUMBER:	INITIATING OFFICE:	DATE	☐ TECHNICAL ☐ QUALITY ASSURANCE

NONCONFORMANCE DESCRIPTION (attach additional pages as required):

REPORTED BY (name):	TITLE:	DATE
CONCURRENCE (cognizant manager):		DATE:

RECOMMENDED DISPOSITION (attach additional pages as required): ☐ REPERFORM ☐ REJECT ☐ ACCEPT-AS-IS ☐ OTHER (explain below)

NAME/TITLE.		DATE:
ACTION ASSIGNED TO (name):	TITLE.	DATE:
ACTION TAKEN		
EVALUATED/ACCEPTED BY SITE MANAGER:	DATE:	
CORRECTIVE ACTION REQUIRED:		
CORRECTIVE ACTION DETERMINATION BY (name):	TITLE.	DATE:
QUALITY ASSURANCE CLOSEOUT (name):		DATE.

Section 15
Reports

Prior to submission of the RI Report, a Data Usability Report will be prepared and provided following receipt of the data validation report. This report will address the inclusion of non-compliant data and discuss the need for additional sampling due to rejected data or data anomalies.

CDM will prepare a RI Report for the NYSDEC incorporating pertinent field and laboratory data collected during the RI. This report will include the following:

- objectives of the site RI.
- site description, including the environmental setting of the site.
- maps of the site.
- hydrogeologic conditions.
- characterization of groundwater, and sediment quality at the site.
- supporting data such as existing well logs and laboratory results.
- conclusions and recommendations for any second phase RI activities or response actions, if deemed necessary.

Seven copies of the draft RI report will be submitted to NYSDEC for review. Seven copies of the final RI report, revised to incorporate NYSDEC comments, will also be submitted to the NYSDEC.

(Fumex/sec15.sop)

Section 16
References

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(Fumex\SOP\sec16)

APPENDIX A

EXISTING MONITORING WELL LOGS

CONSULTING GROUND WATER GEOLOGISTS
ROUX ASSOCIATES INC

WELL LOG

Project: Fumex 03107
Client: Same
Page 1 of 2
Logged By: Paul Supple
Owner:
Well No.: MW-3
Loc.:
M.P. Elevation: 94.84
Drilling Started: 11/25/86 Ended: 11/25/86
Driller: Testwell Craig
Type Of Rig: Hollow Stem Auger

WELL DATA

Hole Diam. (in.): 6
Final Depth (ft.): 55
Casing Diam. (in.): 2
Casing Length (ft.): 45
Screen Setting (ft.): 45-55
Screen Slot & Type: .020 PVC
Well Status: Monitoring

G W READINGS(1)

Date	DTW MP(2)	Elev. W.T.
12/3/86	46.34	48.53
12/10/86	45.72	49.12

SAMPLER

Type: Split-spoon
Hammer: 140 lb.
Fall: 30 in.

DEVELOPMENT

15 gallons sand bailer

Elev. (1)	Sample No.	Rec.	Depth	Blows 6	Strata Change & Gen. Desc.	Depth (ft.)	SAMPLE DESCRIPTION
	1	.5	.5' – 2.0'	2,5,8			.3' black top Light brown medium to coarse sand; dry; .2' fine gravel layer at center of core.
	2	1.7	5' – 7'	40,20,57,61		5	Brown and tan alternating layers of medium to coarse sand and gravel; dry.
	3	1.8	10' – 12'	10,21,29,29		10	Brown and tan medium to coarse sand, some gravel; dry; occasional orange laminations. (Lab sample)
	4	1.5	15' – 17'	7,14,20,27		15	Tan fine to coarse sand, trace fine gravel; dry; lower .2' orange-brown medium sand, trace fine gravel.
	5	1.5	20' – 22'	7,19,26,31		20	Light brown medium to coarse sand, some gravel; dry; occasional orange colored layers. (Lab sample)
	6	.5	25' – 27'	13,14,26,34		25	Light brown fine to medium sand, little gravel; dry; some orange laminations; pulverize quartz cobble at tip.
	7	1.5'	30' – 32'	16,29,29,29		30	Orange-brown fine to medium sand and gravel; dry. (Lab sample)

REMARKS: (1) In feet relative to a common datum

CONSULTING GROUND WATER GEOLOGISTS
ROUX ASSOCIATES INC

WELL LOG

Project: See page one
Client:
Page 2 of 2
Logged By:
Owner:
Well No. MW-3
Loc.:
M.P. Elevation:
Drilling Started: Ended:
Driller:
Type Of Rig:

WELL DATA
Hole Diam. (in.):
Final Depth (ft.):
Casing Diam. (in.):
Casing Length (ft.):
Screen Setting (ft.):
Screen Slot & Type:
Well Status:

G W READINGS(1)

Date	DTW MP (2)	Elev. W.T.

SAMPLER
Type:
Hammer: lb.
Fall: in.

DEVELOPMENT

Elev. (1)	Sample No.	Rec.	Depth	Blows 6	Strata Change & Gen. Desc.	Depth (ft.)	SAMPLE DESCRIPTION
	8	1'	35' - 37'	6,16,25,26		35	Alternating layers of tan, orange and brown fine to coarse sand, some fine gravel; dry.
	9	1'	40' - 42'	2,9,17,17		40	Buff well sorted medium sand, little fine gravel; dry; occasional orange lamination. (lab sample)
	10	1.5	45' - 47'	2,14,19,20		45	Same as above, lower .2' wet.
	11	2'	50' - 52'	13,16,25,29		50	Brown medium sand, some fine gravel; wet. (Lab sample)
	12	NR	55' - 57'	100/.2'		55	
	13	1.5'	60' - 62'	7,12,27,28		60	Brown well sorted medium to coarse sand, trace fine gravel; wet. B.O.B. 62'

)NSULTING GROUND WATER GEOLOGISTS
OUX ASSOCIATES INC

WELL LOG

ject: Fumex 03107
ient: Same
ige: 1 Of 2
ogged By: Paul Supple
wner:
ell No.: MW-4
ic.:
P. Elevation: 94.76
illing Started: 11/25/86 Ended:
iller: Testwell Craig
pe Of Rig: Hollow Stem Auger

WELL DATA

Hole Diam. (in.): 6
Final Depth (ft.): 55
Casing Diam. (in.): 2
Casing Length (ft.): 45
Screen Setting (ft.): 45-55
Screen Slot & Type: .020 PVC
Well Status: Monitoring

G W READINGS(1)

Date	DTW MP(2)	Elev. W.T.
12/2/86	46.19	48.57
12/10/86	45.73	49.03

SAMPLER

Type: Split-spoon
Hammer: 140 lb.
Fall: 30 in.

DEVELOPMENT

15 gallons sand bailer

Elev. (1)	SAMPLE No.	Rec.	Depth	Blows 6	Strata Change & Gen. Desc.	Depth (ft.)	SAMPLE DESCRIPTION
	1	.5'	.5' - 2'	5,7,11			.3' Black top Upper .2' brown gravel and fine to coarse sand; dry. Lower .3' brown silt, trace of embedded fine gravel; moist.
	2	1.3	5' - 7'	7,21,49,52		5	Tan fine to medium well sorted quartz sand, trace fine gravel; dry; becoming more gravelly in lower .3'.
	3	1.8	10' - 12'	12,33,45,39		10	Light brown medium to coarse sand and fine gravel; dry. (Lab sample)
	4	1.2	15' - 17'	9,8,31,38		15	0-.7' Same as above .7-1.2' Alternating layers of tan, orange-brown, and dark brown medium sand; dry.
	5	1.5	20' - 22'	7,23,29,35		20	Tan and orange brown medium to coarse sand, some gravel; dry. (Lab sample)
	6	1.5	25' - 27'	6,14,25,29		25	Orange-brown medium to coarse sand, some fine gravel; dry, occasional red lamination.
	7	1.5	30' - 32'	9,16,20,24		30	Same as above (Lab sample)

EMARKS: (1) In feet relative to a common datum

CONSULTING GROUND WATER GEOLOGISTS
ROUX ASSOCIATES INC

WELL LOG

Project: See page One
Client:
Page 2 Of 2
Logged By:
Owner:
Well No. MW-4
Loc.:
M.P. Elevation:
Drilling Started: Ended:
Driller:
Type Of Rig:

WELL DATA
Hole Diam. (in.):
Final Depth (ft.):
Casing Diam. (in.):
Casing Length (ft.):
Screen Setting (ft.):
Screen Slot & Type:
Well Status:

G W READINGS (1)

Date	DTW MP (2)	Elev. W.T.

SAMPLER
Type:
Hammer: lb.
Fall: in.

DEVELOPMENT

Elev. (1)	Sample No.	Rec.	Depth	Blows 6	Strata Change & Gen. Desc.	Depth (ft.)	SAMPLE DESCRIPTION
	8	1'	35' - 37'	5,17,26,26		35	Orange-brown and tan medium to coarse sand and gravel; dry.
	9	1.5'	40' - 42'	1,10,13,16		40	Tan well sorted medium sand; dry; occasional thin layers of orange-brown medium sand.
	10	1.5'	45' - 47'	7,13,23,20		45	Same as above.
	11	1.5'	50' - 52'	9,18,15,32		50	Light brown well sorted fine to medium sand, trace fine gravel; wet.
	12	.5'	55' - 57'	36,36,52,46		55	Brown fine to medium sand, and gravel; wet; tight.
							B.O.B. 57'

REMARKS: (1) in feet relative to a common datum

CONSULTING GROUND WATER GEOLOGISTS
ROUX ASSOCIATES INC

WELL LOG

Project: Fumex 03107
Client: Same
Page 1 Of 2
Logged By: Paul Supple
Owner:
Well No.: MW-5
Loc.:
M.P. Elevation: 94.80
Drilling Started: 12/1/86 Ended: 12/1/86
Driller: Testwell Craig
Type Of Rig: Hollow Stem Auger

WELL DATA

Hole Diam. (in.): 6
Final Depth (ft.): 55
Casing Diam. (in.): 2
Casing Length (ft.): 45
Screen Setting (ft.): 45-55
Screen Slot & Type: .020 PVC
Well Status: Monitoring

G W READINGS (1)

Date	DTW MP (2)	Elev. W.T.
12/2/86	46.29	48.51
12/10/86	45.72	49.08

SAMPLER

Type: Split-spoon
Hammer: 140 lb.
Fall: 30 in.

DEVELOPMENT

15 gallons sand bailer

Elev. (1)	SAMPLE No.	Rec.	Depth	Blows 6	Strata Change & Gen. Desc.	Depth (ft.)	SAMPLE DESCRIPTION
	1	.5	.5' - 2'	6,7,7			.3 black top Brown medium to coarse sand, trace gravel; dry.
	2	2'	5' - 7'	29,39,100/.5'		5	Brown medium to coarse sand and gravel; upper 1.7' wet, comact in places
	3	1.2'	10' - 12'	18,38,49,54		10	Light brown medium to coarse sand and gravel; dry. (Lab sample)
	4	1.5'	15' - 17'	5,25,40,37		15	Upper .3' same as above 1' layer dark brown well sorted medium sand; dry. Orange-brown coarse sand and gravel in tip.
	5	1.5'	20' - 22'	12,21,31,40		20	Orange-brown medium sand, little gravel, occasional ½-inch red-brown layers; dry. (Lab sample)
	6	1.3'	25' - 27'	9,22,19,20		25	Orange-brown medium to coarse sand, little gravel; dry.
	7	1.2'	30' - 32'	11,21,28,29		30	Tan medium to coarse sand and gravel; dry. (Lab sample)

REMARKS: (1) In feet relative to a common datum
(2) from top of PVC casing

ONSULTING GROUND WATER GEOLOGISTS
OUX ASSOCIATES INC

WELL LOG

Project: Fumex 03107
Client: See page One
Page: 2 Of 2
Logged By:
Owner:
Well No.: MW-5
Loc.:
M.P. Elevation:
Drilling Started: Ended:
Driller:
Type Of Rig:

WELL DATA
Hole Diam. (in.):
Final Depth (ft.):
Casing Diam. (in.):
Casing Length (ft.):
Screen Setting (ft.):
Screen Slot & Type:
Well Status:

G W READINGS(1)

Date	DTW MP(2)	Elev. W.T.

SAMPLER
Type:
Hammer: lb.
Fall: in.

DEVELOPMENT

Elev. (1)	Sample No.	Rec.	Depth	Blows 6	Strata Change & Gen. Desc.	Depth (ft.)	SAMPLE DESCRIPTION
	8	1.5'	35' - 37'	7,18,24,24		35	Alternating layers of light brown and orange-brown fine to coarse sand and gravel; dry.
	9	1.0'	40' - 42'	10,14,20,25		40	Tan medium well sorted sand; dry; some orange and dark brown laminations.
	10	1.5'	45' - 47'	4,10,21,16		45	Same as above Wet at tip of spoon.
	11	2'	50 52	8,17,26,26		50	Brown fine to coarse sand, some fine gravel; wet.
	12	1'	55 - 57	27,78,55,100		55	Brown fine to coarse gravel and coarse sand, trace silt; wet.
						60	

REMARKS: (1) In feet relative to a common datum
(2) from top of PVC casing

APPENDIX B

HEALTH AND SAFETY PLAN

HEALTH AND SAFETY PLAN FORM

CDM Health and Safety Program

This document is for the exclusive use of CDM and its subcontractors

CAMP DRESSER & McKEE INC.

PROJECT DOCUMENT #: ______

PROJECT NAME: Fumex

JOBSITE ADDRESS: 131 Herricks Road, New Hyde Park, NY 11040

PROJECT #: 0897-30-TK1-WKPN

REGION: ______

CLIENT: NYSDEC

CLIENT CONTACT: Jennifer Pacchiana

CLIENT CONTACT PHONE #: (518) 457-3395

( ) AMENDMENT TO EXISTING APPROVED H&SP?

(X) H&SP AMENDMENT NUMBER? NA

( ) DATE EXISTING H&SP WAS APPROVED? NA

OBJECTIVES OF FIELD WORK ***(e.g. collect surface soil samples)*****:**

1) Collect sediment samples from drywell
2) Groundwater sampling of existing monitoring wells. Groundwater elevation monitoring of existing wells.
3) If necessary, replace existing well covers on three monitoring wells

TYPE: *Check as many as applicable*

Active	(✓)	Landfill	( )	Unknown	( )
Inactive	( )	Uncontrolled	( )	Military	( )
Secure	( )	Industrial	(✓)	Other *(specify)*	
Unsecure	(✓)	Recovery	( )		
Enclosed space	( )	Well Field	( )		

All requirements described in the CDM Health and Safety Assurance Manual for Hazardous Waste Operations are incorporated in this health and safety plan by reference.

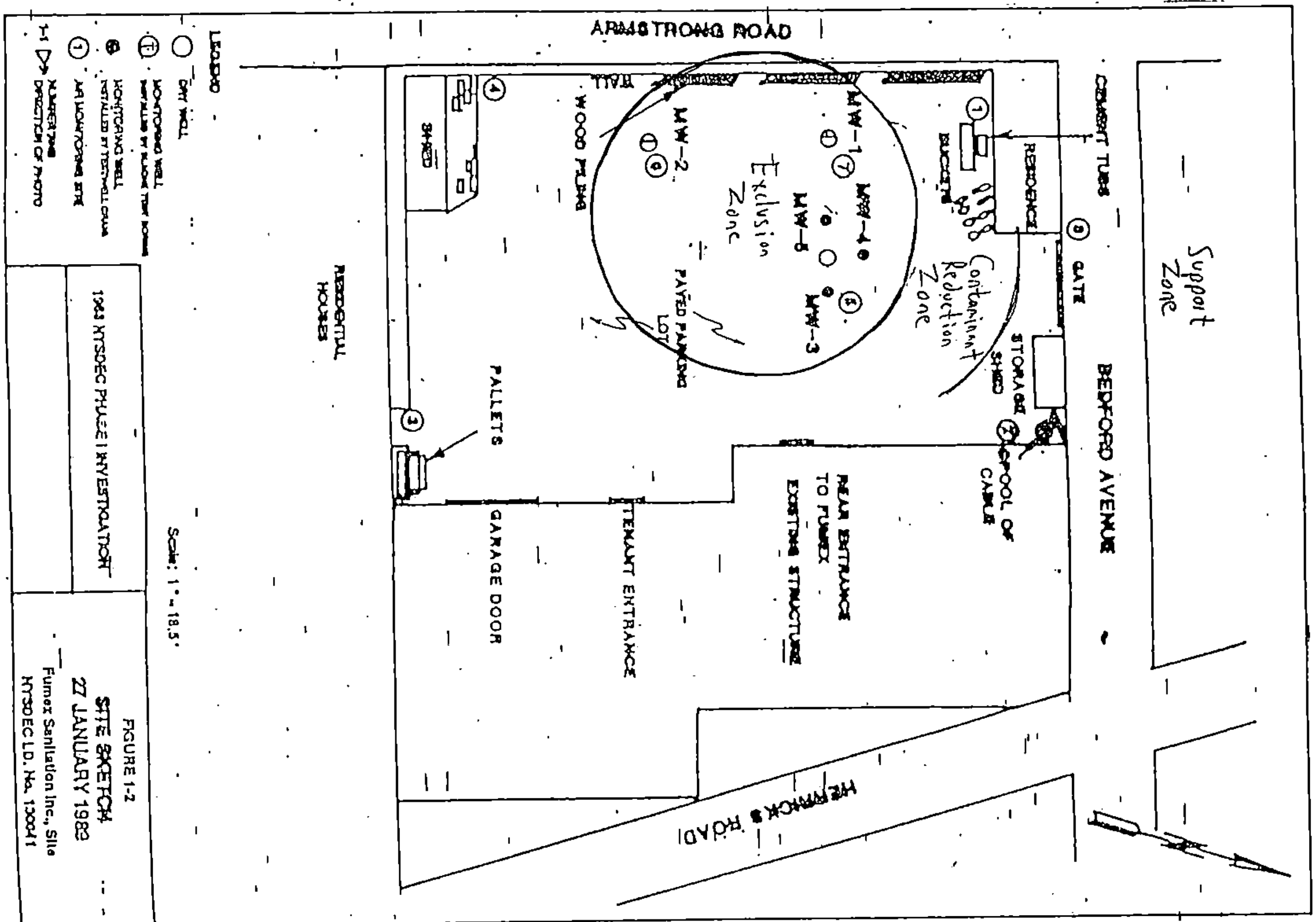
SITE DESCRIPTION AND FEATURES: *Include principal operations and unusual features (containers, buildings, dikes, power lines, hills, slopes, rivers, etc.)*

Fumex site is approximately 1 acre in size and is located in a densely populated area. Commercial and industrial buildings are located in the vicinity of the site, and residences exist behind the commercial buildings. Fumex operated a commercial termite extermination business at the site since 1952. In 1981, a drum of chlordane rinse water was knocked over, spilling <30 gallons onto the asphalt parking lot at the site. The material entered two stormwater catchbasins on Bedford Avenue and a drywell on-site. Fumex also regularly sprayed their then unpaved lot with 1-2% chlordane for insect control from 1952 to 1978. Subsequent sampling efforts have identified chlordane in the soil and groundwater at the site. The current tenant operates a structural drying business. In all, five monitoring wells have been installed at the site to characterize the migration of the chlordane.

SURROUNDING POPULATION: (✓) Residential (✓) Industrial (✓) Commercial ( ) Rural ( ) Urban OTHER:

Revised: June 15, 1993

THIS PAGE RESERVED FOR SITE MAP *(Show exclusion, contamination reduction, and support zones. Indicate evacuation and reassembly points.)*



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HISTORY: *Summarize conditions that relate to hazard. Include citizen complaints, spills, previous investigations or agency actions, known injuries, etc.*

Three sampling events occurred at the site from 1984 to 1986. The highest concentration of chlordane from the monitoring wells was 99.7 ppb from MW1 on December 10, 1986. Soil samples were collected during the installation of the monitoring wells. The highest level of chlordane was 1530 ppb from MW1. The highest chlordane concentrations were found at the top of the monitoring wells and the chlordane concentrations generally decreased with depth.

WASTE TYPES: (✓) Liquid ( ) Solid ( ) Sludge ( ) Gas ( ) Unknown ( ) Other *specify:*

WASTE CHARACTERISTICS: *Check as many as applicable.*

( ) Corrosive	( ) Flammable	( ) Radioactive
(✓) Toxic	( ) Volatile	( ) Reactive
( ) Inert Gas	( ) Unknown	( ) Other *specify:*

WORK ZONES: *Describe the Exclusion, Contamination Reduction, and Support Zones in terms on-site personnel will recognize*

The exclusion zone will be immediately around the monitoring wells and drywell where the sampling will occur. The contaminant reduction zone is located between the exclusion zone and the entrance gate. Support zones are located outside the gate, on the opposite side of Bedford Avenue.

HAZARDS OF CONCERN:

(✓) Heat Stress *attach guidelines*	( ) Noise
(✓) Cold Stress *attach guidelines*	( ) Inorganic Chemicals
( ) Explosive/Flammable	(✓) Organic Chemicals (Organic, Pesticides)
( ) Oxygen Deficient	(✓) Motorized Traffic
( ) Radiological	(✓) Heavy Machinery
( ) Biological	(✓) Slips, Trips, & Falls
( ) Other - *specify*	

FACILITY'S PAST & PRESENT DISPOSAL METHODS AND PRACTICES:

Fumex operated a termite extermination business since 1952. In 1981, a drum of chlordane rinse water was knocked over, spilling <30 gallons of rinse water onto the asphalt parking lot behind the site. The material entered two stormwater catchbasins on Bedford Avenue and a drywell at the site. Fumex also regularly sprayed their then unpaved parking lot with 1-2% chlordane for insect control. Subsequent sampling efforts have identified chlordane in the soil and groundwater at the site. Fumex no longer occupies the site building. The current tenant operates a structural drying business.

HEALTH AND SAFETY PLAN FORM

CDM Health and Safety Program

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HAZARDOUS MATERIAL SUMMARY: *Circle waste type and estimate amounts if possible:*

CHEMICALS: Amount/Units:	SOLIDS: Amount/Units:	SLUDGES: Amount/Units:	SOLVENTS: Amount/Units:	OILS: Amount/Units:	OTHER: Amount/Units:
Acids	Flyash	Paints	Halogenated (chloro, bromo) Solvents	Oily Wastes	Laboratory
Pickling Liquors	Mine or Mill Tailings	Pigments	Hydrocarbons	Gasoline	Pharmaceutical
Caustics	Asbestos	Metals Sludges	Alcohols	Diesel Oil	Hospital
(Pesticides) Chlordane	Ferrous Smelter	POTW Sludge	Ketones	Lubricants	Radiological
Dyes / Inks	Non-Ferrous Smelter	Aluminum	Esters	PCBs	Municipal
Cyanides	Metals	Distillation Bottoms	Ethers	Polynuclear Aromatics	Construction
Phenols	Other *specify:*	Other *specify:*	Other *specify:*	Other *specify:*	Munitions
Halogens					Other *specify:*
Dioxins					
Other *specify:*					

OVERALL HAZARD EVALUATION: ( ) High (X) Medium ( ) Low ( ) Unknown *(Where tasks have different hazards, evaluate each)*

JUSTIFICATION: Contaminants were once present at high concentrations, though concentrations are expected to be lower today.

FIRE/EXPLOSION POTENTIAL: ( ) High ( ) Medium (X) Low ( ) Unknown

BACKGROUND REVIEW: (X) COMPLETE ( ) INCOMPLETE

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KNOWN CONTAMINANTS	HIGHEST OBSERVED CONCENTRATION *(specify units and media)*	PEL/TLV *ppm or mg/m3 (specify)*	IDLH *ppm or mg/m3 (specify)*	WARNING CONCENTRATION *(in ppm)*	SYMPTOMS & EFFECTS OF ACUTE EXPOSURE	PHOTO IONIZATION POTENTIAL
Chlordane	1530 ppb (T)	0.5 mg/m²	500 mg/m³	no odor	Blurred vision, delirium, twitches stomach pain, diarrhea	NA

NA = Not Available   NE = None Established   U = Unknown

Attach, to this plan, an MSDS for each chemical you will use at the site.

S = Soil   SW = Surface Water   T = Tailings   W = Waste   TK = Tanks   SD = Sediment
A = Air   GW = Groundwater   S L = Sludge   D = Drums   L = Lagoon   OFF = Off-site

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HEALTH AND SAFETY PLAN FORM

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PROJECT DOCUMENT #: ____

TASK DESCRIPTION/SPECIFIC TECHNIQUE/SITE LOCATION (attach additional sheets as necessary)	TYPE	Primary	Contingency	HAZARD & SCHEDULE
1 Collect sediment samples from drywell	(Intrusive) / Non-Intrusive	A B C (D)	A B ~~C~~ D / (Exit Area)	HI (Med) Low / Spring '96
2 Collect groundwater samples and monitor groundwater elevation of existing wells.	(Intrusive) / Non-Intrusive	A B C (D)	A B ~~C~~ D / (Exit Area)	HI (Med) Low / Spring '96
3 Replace existing well covers, if necessary Top 6"-12" may require repair/replacement.	Intrusive / (Non-Intrusive)	A B C (D)	A B ~~C~~ D / (Exit Area)	HI Med (Low) / Spring 96
4	Intrusive / Non-Intrusive	A B C D	A B C D / Exit Area	HI Med Low
5	Intrusive / Non-Intrusive	A B C D	A B C D / Exit Area	HI Med Low
6	Intrusive / Non-Intrusive	A B C D	A B C D / Exit Area	HI Med Low

PERSONNEL AND RESPONSIBLITIES

NAME	FIRM/DIVISION	CDM HEALTH CLEARANCE	RESPONSIBILITIES	On site?
Kevin Mulligan	CDM/NYC		Project or Task Manager	NO ~~1-2-3-4~~
Tom McGovern	CDM/WBY	D-T / D-S	Site Health and Safety Coordinator	(1-2-3)-4
Patrick Jamgocian	CDM/WBY	D-T / D-S	Alternate Site H & S Coordinator	(1-2-3)-4
				1-2-3-4
				1-2-3-4
				1-2-3-4

HEALTH AND SAFETY PLAN FORM

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PROJECT DOCUMENT #: ______

PROTECTIVE EQUIPMENT: *Specify by task. Indicate type and/or material, as necessary. Group tasks if possible. Use copies of this sheet if needed.*

BLOCK A

TASKS: (1 - 2 - 3) 4 - 5 - 6 - 7 - 8 - 9 - 10
LEVEL: A-B-C-(D)-Modified
(✓) Primary ( ) Contingency

Respiratory: (✓) Not needed
( ) SCBA, Airline: ______
( ) APR: ______
( ) Cartridge: ______
( ) Escape Mask: ______
( ) Other: ______

Head and Eye: (✓) Not needed
( ) Safety Glasses: ______
( ) Face Shield: ______
( ) Goggles: ______
( ) Hard Hat: ______
( ) Other: ______

Boots: ( ) Not Needed
(✓) Steel-Toe (✓) Steel Shank
( ) Rubber (✓) Leather
( ) Overboots: ______

Prot. Clothing ( ) Not needed
( ) Encapsulated Suit: ______
( ) Splash Suit: ______
( ) Apron: ______
(✓) Tyvek Coverall or
( ) Saranex Coverall
(✓) Cloth Coverall: ______
( ) Other: ______

Gloves: ( ) Not Needed
(✓) Undergloves: Surgical
(✓) Gloves: Cotton
( ) Overgloves: ______

Other: *Specify below:*
( ) Tick Spray
( ) Flotation Device
( ) Hearing Protection
( ) Sun Screen

BLOCK B

TASKS: (1 - 2 - 3) 4 - 5 - 6 - 7 - 8 - 9 - 10
LEVEL: A-B-(C)-D-Modified
( ) Primary (✓) Contingency

Respiratory: ( ) Not needed
( ) SCBA, Airline: ______
(✓) APR: ______
(✓) Cartridge: ______
( ) Escape Mask: ______
( ) Other: ______

Head and Eye: ( ) N...
( ) Safety Glas...
( ) Face Sh...
( ) Go...

...eded
(✓) Steel Shank
...ber (✓) Leather
...Overboots: ______

Prot. Cl... ...eded
...overall
...Coverall: ______
...ther: ______

Gloves: ( ) Not Needed
(✓) Undergloves: Surgical
(✓) Gloves: Nitrile
( ) Overgloves: ______

Other: *Specify below*
( ) Tick spray
( ) Flotation Device
( ) Hearing Protection
( ) Sun Screen

SITE EXIT

BLOCK C

TASKS: 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10
LEVEL: A-B-C-D-Modified
( ) Primary ( ) Contingency

Respiratory: ( ) Not needed
( ) SCBA, Airline: ______
( ) APR: ______
( ) Cartridge: ______
( ) Escape Mask: ______
( ) Other: ______

Head and Eye: ( ) Not needed
( ) Safety Glasses: ______
( ) Face Shield: ______
( ) Goggles: ______
( ) Hard Hat: ______
( ) Other: ______

Boots: ( ) Not Needed
( ) Steel-Toe ( ) Steel Shank
( ) Rubber ( ) Leather
( ) Overboots: ______

Prot. Clothing ( ) Not needed
( ) Encapsulated Suit: ______
( ) Splash Suit: ______
( ) Apron: ______
( ) Tyvek Coverall
( ) Saranex Coverall
( ) Cloth Coverall: ______
( ) Other: ______

Gloves: ( ) Not Needed
( ) Undergloves: ______
( ) Gloves: ______
( ) Overgloves: ______

Other: *Specify below*
( ) Tick Spray
( ) Flotation Device
( ) Hearing Protection
( ) Sun Screen

BLOCK D

TASKS: 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10
LEVEL: A-B-C-D-Modified
( ) Primary ( ) Contingency

Respiratory: ( ) Not needed
( ) SCBA, Airline: ______
( ) APR: ______
( ) Cartridge: ______
( ) Escape Mask: ______
( ) Other: ______

Head and Eye: ( ) Not needed
( ) Safety Glasses: ______
( ) Face Shield: ______
( ) Goggles: ______
( ) Hard Hat: ______
( ) Other: ______

Boots: ( ) Not Needed
( ) Steel-Toe ( ) Steel Shank
( ) Rubber ( ) Leather
( ) Overboots: ______

Prot. Clothing ( ) Not needed
( ) Encapsulated Suit: ______
( ) Splash Suit: ______
( ) Apron: ______
( ) Tyvek Coverall
( ) Saranex Coverall
( ) Cloth Coverall: ______
( ) Other: ______

Gloves: ( ) Not Needed
( ) Undergloves: ______
( ) Gloves: ______
( ) Overgloves: ______

Other: *Specify below*
( ) Tick spray
( ) Flotation Device
( ) Hearing Protection
( ) Sun Screen

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HEALTH AND SAFETY PLAN FORM

CDM Health and Safety Program

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PROJECT DOCUMENT #: ______________

MONITORING EQUIPMENT: *Specify by task. Indicate type as necessary. Attach additional sheets if needed.*

INSTRUMENT	TASK	ACTION GUIDELINES		COMMENTS *(How and when will you use the monitor?)*
Combustible Gas Indicator	1-2-3-4-5-6 7-8-9-10	0-10%LEL 10-25%LEL >25%LEL 21.0% O_2 <21.0% O_2 <19.5% O_2	*No explosion hazard.* *Potential explosion hazard; notify SHSC.* *Explosion hazard; interupt task/evacuate* *Oxygen normal.* *Oxygen Deficient; notify SHSC.* *Interrupt task/evacuate*	( ) Not Needed
Radiation Survey Meter	1-2-3-4-5-6 7-8-9-10	3 x Background: >2mR/hr:	*Notify HSM.* *Establish REZ.*	( ) Not Needed
Photoionization Detector _______ eV Lamp Type__________	1-2-3-4-5-6 7-8-9-10	*Specify:*		( ) Not Needed
Flame Ionization Detector Type__________	1-2-3-4-5-6 7-8-9-10	*Specify:*		( ) Not Needed
Detector Tubes/ Monitox Type__________ Type__________	1-2-3-4-5-6 7-8-9-10	*Specify:*		( ) Not Needed
Respirable Dust Monitor Type__________ Type__________	1-2-3-4-5-6 7-8-9-10	*Specify:* If team sees visible concentrations of dust in air, or dry, windy conditions that produce dusts, they will leave the area.		( ) Not Needed
Other *Specify:*	1-2-3-4-5-6 7-8-9-10	If team notices unusual odors, or irritation of the eye or throat, they will leave the area		

HEALTH AND SAFETY PLAN FORM

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PROJECT DOCUMENT #: ____________

DECONTAMINATION PROCEDURES

ATTACH SITE MAP INDICATING EXCLUSION, DECONTAMINATION, AND SUPPORT ZONES AS PAGE TWO

Personnel Decontamination

Summarize below or attach diagram;

CDM personnel will remove their protective clothing in the following order:

- equipment drop
- hard hat removal
- boot cover removal (if worn)
- coverall (if worn) removal
- respirator (if worn) removal
- inner glove removal
- hand and face wash

( ) Not needed

Sampling Equipment Decontamination

Summarize below or attach diagram;

Sampling equipment will be decontaminated by:

- gross mechanical removal of dirt
- wiping with disposable towels
- detergent in water wash
- tap water rinse
- DI water rinse
- air dry

( ) Not needed

Heavy Equipment Decontamination

Summarize below or attach diagram;

Drilling contractors will be responsible to decontaminate their equipment for the well cover replacement task before they leave the site

( ) Not needed

Containment and Disposal Method (Personnel)

Disposable protective equipment will be placed in 55-gallon drum for later disposal

Containment and Disposal Method (Sampling Equipment)

Sampling equipment cleaning solutions will be allowed to seep back into the soils at the site.

Containment and Disposal Method (Heavy Equipment)

Disposal of the decontamination cleaning solutions will be the responsibility of the contractors.

Revised : June 15, 1993

HEALTH AND SAFETY PLAN FORM

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PROJECT DOCUMENT #: ____________

EMERGENCY CONTACTS

Water Supply	
Site Telephone	
EPA Release Report #:	1-800/424-8802
CDM 24-Hour Emergency #:	1-800/SKY-PAGE 31821#
Facility Management	
Other *(specify)*	
CHEMTREC Emergency #:	1-800/424-9300

CONTINGENCY PLANS: *Summarize below*

The designated evacuation route shall be through the front gate onto Bedford Avenue. The project team shall reassemble across Bedford Avenue and will not return to the site until the conditions have been reassessed.

Contractor will inspect its equipment and certify its suitability for the project to the CDM site health and safety coordinator. If work team observes hazards for which they are not prepared, they will withdraw from the area and call the health and safety manager. Employees will cease work during thunder storms. Personnel may choose to wear more protective clothing than that directed by this plan.

HEALTH AND SAFETY PLAN APPROVALS

Prepared by ____________ Date ____________

SHSC Signature [signature] Date Nov 29, 1995

HSM Signature Chris Marlowe Date Dec 4, 1995

EMERGENCY CONTACTS	NAME	PHONE
Health and Safety Manager	Chris Marlowe	908-225-7000
Project Manager	Kevin Mulligan	212-505-8400
Site Safety Coordinator	Tom McGovern	516-496-8400
Client Contact	Jennifer Pacchiana	518-457-3395
Other *(specify)*	NYSDEC (alternate)	518-457-1708
Environmental Agency		
State Spill Number		
Fire Department	New Hyde Park Fire Calls	516-742-3300
Police Department	Nassau County Headquarters	516-535-7000
State Police		516-756-3300
Health Department	Nassau County Health Dept	516-535-3410
Poison Control Center	Nassau County Poison Control	516-542-2323
Occupational Physician	David Barnes	1-800/229-3674

MEDICAL EMERGENCY

Hospital Name: Winthrop University Hospital Phone: 516-663-0333

Hospital Address: 259 First St. Mineola NY 11501

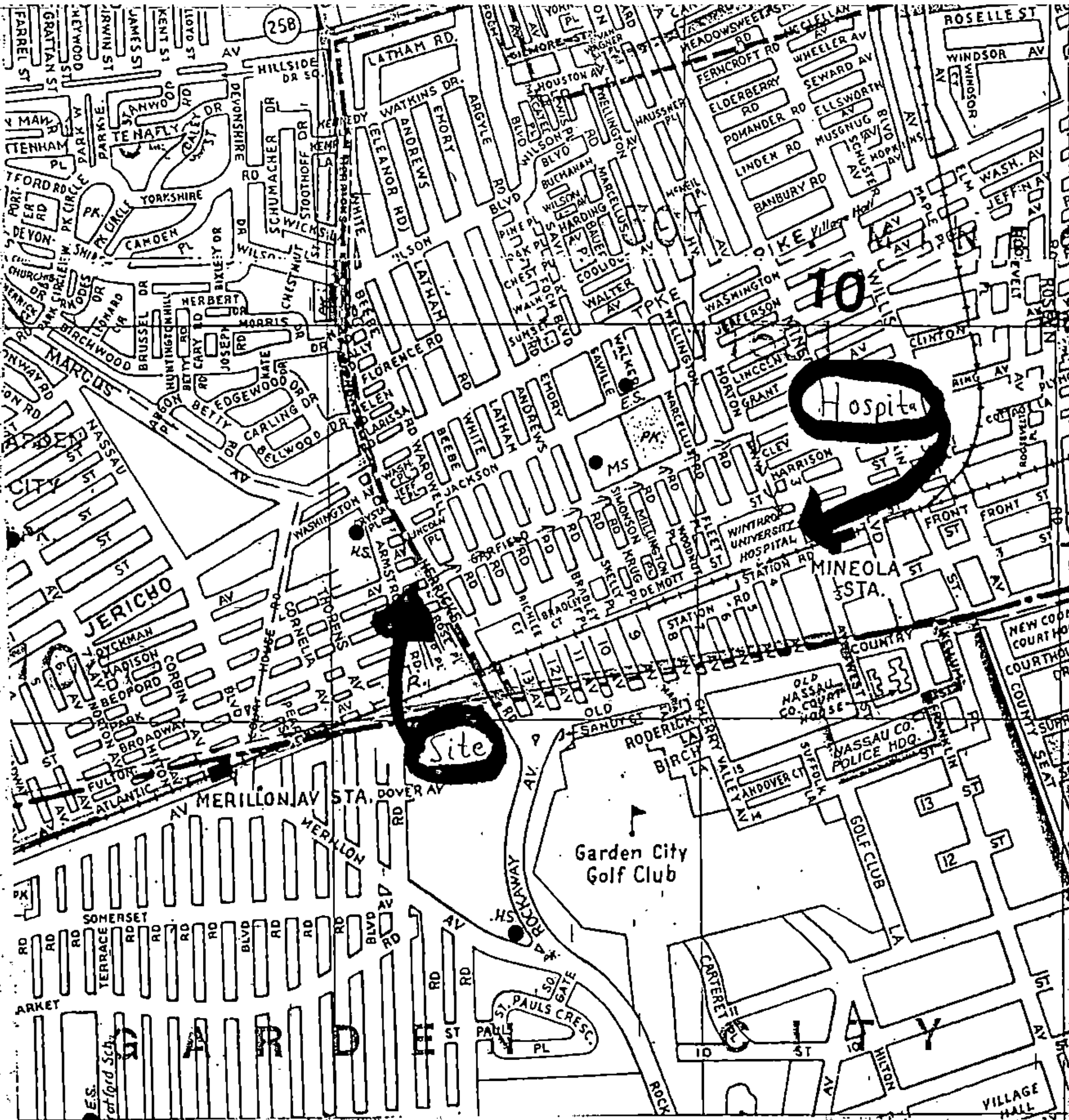
Name of Contact at Hospital: Phone:

Name of 24-Hour Ambulance: Through 911

Route to Hospital: Cross Herricks Rd to Garfield Rd. Proceed on Garfield Rd and make a right on Horton Highway. Winthrop University Hospital is down one block on Horton Highway.

Distance to hospital 1/2 mile

Attach map with route to hospital


Site
Hospital
10
WINTHROP UNIVERSITY HOSPITAL
MINEOLA STA.
MERILLON AV STA.
Garden City Golf Club
NASSAU CO. POLICE HDQ.
OLD NASSAU CO. COURT HOUSE
NEW COURT HOUSE
COUNTY SEAT
JERICHO
MARCUS
NASSAU
ROCKAWAY AV.
VILLAGE HALL
GARDEN CITY
ST. PAULS CRESC.
Village Hall
ROSELLE ST
WINDSOR AV
LATHAM RD.
HILLSIDE AV
TENAFLY
YORKSHIRE
CAMDEN
BIRCHWOOD
EDGEWOOD DR
BELLWOOD DR
WASHINGTON
JACKSON
GARFIELD
STATION RD
COUNTRY
FRONT ST
HARRISON
GRANT
LINCOLN
JEFFERSON
CLINTON
DE MOTT
ATLANTIC
FULTON
BROADWAY
BEDFORD
MADISON
DYCKMAN
SOMERSET
TERRACE
DOVER AV
ANDOVER CT
SUFFOLK
GOLF CLUB LA
CARTERET PL
HILTON
CHERRY VALLEY AV
RODERICK
BIRCH LA
SANDY CT
MERILLON

APPENDIX C

CURRICULA VITAE OF KEY PROJECT PERSONNEL

MICHAEL A. MEMOLI, P.E.

Senior Vice President/Partner
Camp Dresser & McKee

Summary

Mr. Memoli has more than 22 years of experience in wastewater, water, solid waste, and hazardous waste projects, and has provided project management for many of them. He has prepared reports and design plans, and coordinated various environmental projects. He is currently managing the design of the upgrade and expansion of the wastewater treatment plant for the City of Waterbury, Connecticut, and the design of the Fireman's Training Center groundwater pump and treat facility for Nassau County, New York. As a Senior Area Officer, he directs the activities of teams of engineers and technical specialists.

Experience

Mr. Memoli was project manager for the preparation of a draft environmental impact statement (DEIS) for the construction of the proposed Roosevelt Field/Clinton Road-Stewart Avenue bypass. The DEIS included field sampling of soil and groundwater and addressed the impact that potential soil contamination at this site may have on constructing the roadway.

For the remedial investigation at the Port Washington landfill on Long Island, Mr. Memoli served as a technical adviser. This project included the development of new, innovative technology for air sampling of volatile organic compounds. Field activities included sampling soil, groundwater, air, and subsurface vapors.

For the design and regulatory issues associated with the remediation of the LiPari landfill, the number 1 hazardous waste site in New Jersey on the EPA's National Priority List, Mr. Memoli served as a technical adviser. The remedial facilities included a flushing system consisting of injection and recovery wells, along with a groundwater treatment facility consisting of metals removal, air stripping and carbon adsorption.

For the New York State Department of Environmental Conservation (NYSDEC), Mr. Memoli serves as the program manager for all work assignments performed by CDM under the State Superfund contract. This work included the preparation of RI/FSs of two upstate sites, PSA at seven sites across the state, and construction oversight for soil removal at an upstate site.

Mr. Memoli is serving as client officer and project manager on the Fireman's Training Center remedial design project for Nassau County.

The project included the piloting of an innovative biological fluidized bed system for insitu biological degradation of vadose zone soil contamination; the development of site-wide groundwater model; and the preparation of design documents for multi-prime construction of a groundwater recovery/treatment/recharge system.

Mr. Memoli was the project manager for a hazardous waste site reclamation project at the Rockville Centre, New York, transit facility. This remediation project involved sampling and analysis of oil-contaminated materials, ambient air quality monitoring, and resident engineering services.

Mr. Memoli was project manager on the Mitchel Field project that involved a site investigation to determine the extent of contamination at the former Purex Corporation site on Long Island. This project for the Nassau County Department of Public Works also involved the preparation of a remedial action plan and a conceptual design for a soil decontamination system and ground water remediation. He provided technical support work related to the groundwater remediation facility at the site. He is also providing technical support during cleanup by the responsible party.

He was project manager for design of a VOC removal facility at the Town of Vestal water supply well 1-1 in New York and was a key participant for the soil flushing and groundwater treatment facility, consisting of air-stripping and carbon adsorption, at the LiPari landfill in New Jersey, both EPA Superfund projects.

Mr. Memoli was project manager for design of water mains to provide a safe water supply to residences near the Krysowaty Farm and Bridgeport hazardous waste sites in New Jersey, under CDM's REM II Superfund contract with the EPA.

Education

M.S. - Sanitary Engineering, Polytechnic Institute of New York, 1977
B.S. - Civil Engineering, SUNY at Buffalo, 1972
A.A.S. - Engineering Science, SUNY at Farmingdale, 1970

Registration

Professional Engineer: New York (1977), New Jersey, Connecticut, and Pennsylvania

Memberships

American Water Works Association
New York Water Environment Association
Long Island Water Conference
Chi Epsilon Civil Engineering Honor Society

Publications

"The Value of Vapor Extraction," written with Peter Gerbasi. Water Environment and Technology, March 1994.

"Application of Innovative Technology at Bay Park Plant, Nassau County," written with F. Flood and S. Fangman. 54th Annual Conference, New York Water Pollution Control Association, January 1982.

"Procedures for Performance Testing Belt Filter Presses," written with H. Heller. 53rd Annual Conference, New York Water Pollution Control Association, January 1981.

"Impact of Filter Press Dewatering on Nassau County Composting." Proceeding of the National Conference on Municipal and Industrial Sludge Composting, November 14-16, 1980.

(nc11/memoli)

D. LEE GUTERMAN

Principal Scientist
Camp Dresser & McKee

Summary

As Principal Scientist, Mrs. Guterman's expertise is in the area of marine and freshwater biology. With more than 12 years of progressively responsible managerial and technical experience in environmental planning and analyses, she has designed complex sampling programs and developed detailed laboratory specifications for sample analyses. In addition, Mrs. Guterman has prepared work plans and procedures manuals for field operations, performed environmental sampling, compiled and evaluated analytical data, and produced numerous remedial investigation (RI) reports and feasibility studies (FS). Furthermore, she has extensive experience in all phases of hazardous waste remediation.

Experience

Mrs. Guterman has 12 years of progressively responsible managerial and technical experience in hazardous waste work. Her responsibilities include planning and execution of hazardous waste site remedial investigations and feasibility studies, implementation of health and safety protocol, environmental sampling program design, and data evaluation and interpretation.

Mrs. Guterman is a team leader for the hazardous waste group in CDM's New York City office. She is experienced in technical and financial management, planning and execution of remedial investigations (RIs), development and evaluation of potential remedial alternatives, and recommendation of preferred remediation options. She has served as site manager on several REM II and TES III hazardous waste sites, including Waldick Aerospace (New Jersey), the Sarney property and Vestal sites (New York), and the Upjohn site (Puerto Rico).

Mrs. Guterman has planned and executed a NYSDEC remedial investigation (RI) of the Pfohl Brothers landfill in Cheektowaga, Erie County, New York. The site is a 150-acre inactive landfill that has received both industrial and hazardous wastes. As RI project manager, she is responsible for the overall technical and financial management of the project, including the supervision of RI planning documents, initial site characterization, and subcontractor specifications. She is also responsible for execution of field activities and preparation of the final RI and FS report.

Mrs. Guterman's role as the CLP (Contract Laboratory Program) authorized requester under the EPA Superfund contract has familiarized her with all phases of laboratory analysis, quality assurance/quality control requirements, and analytic methodologies. Because of this expertise, Mrs. Guterman maintains a key role in sample analyses as well as data management and interpretation.

As site manager of the Waldick Aerospace project, an EPA Superfund site in Monmouth County, New Jersey, Mrs. Guterman completed an RI/FS study to address both soil and ground water contamination. Her successful completion of this project was recognized by EPA with a performance rating denoting "expectations exceeded."

As site manager of the Upjohn Manufacturing Facility site in Barceloneta, Puerto Rico, Mrs. Guterman completed a supplemental RI/FS to address ground water contamination. Successful completion of the project was also recognized by EPA with an "outstanding" performance rating.

Mrs. Guterman prepared a scope of work and budget estimate for completing a remedial investigation/feasibility study of the Roosevelt Field site in Nassau County, New York. The primary focus of this investigation was to address ground water contamination at the site and to develop potential remedial alternatives for effectively containing the contaminant plume.

Mrs. Guterman has received advanced training in field monitoring equipment and is skilled in the use of all field equipment. She is certified to perform remedial investigations and to administer first aid. On hazardous waste field investigations at the LiPari and Waldick Aerospace sites in New Jersey and at the Robintec site in New York, her responsibilities have included supervision of a boring program; collection of soil, ground water, and surface water samples; design and implementation of a sampling program for contaminated buildings, and technical oversight of geophysical and soil gas surveys. She has participated in various RIs as site health and safety supervisor, sample manager, QA/QC officer, and technical coordinator.

Mrs. Guterman was involved in developing an artificial intelligence system that assisted EPA in making decisions concerning the remedial assignment budgets and schedules used to develop the Superfund Comprehensive Action Plan (SCAP) by providing site-specific SCAP quality schedule and cost estimates for the RI/FS stages of a remedial assignment.

Mrs. Guterman completed an environmental information document for cleanup operations at Lone Pine landfill in Freehold, New Jersey. This work has required a comprehensive review of existing environmental conditions in the vicinity of the landfill and critical environmental issues associated with various cleanup alternatives. The assessment also includes an examination of local, State, and Federal regulations and review procedures applicable to the cleanup operation.

Mrs. Guterman has performed initial site characterization studies at hazardous waste sites, prepared health and safety plans for all onsite personnel, and developed sampling programs to determine the nature and extent of offsite contamination. She played a major role in implementing a document control system for the purpose of tracking all job-related documentation and facilitating the exchange of information between REM II personnel.

Mrs. Guterman prepared the first site-specific health and safety plan for a Superfund site—LiPari Landfill in Gloucester County, New Jersey—under the REM II contract. She was health and safety coordinator for all such projects within EPA Region II. Mrs. Guterman completed the U.S. Environmental Protection Agency (EPA) training course and has been certified to perform remedial investigations at hazardous waste sites. She has participated in the EPA public relations training seminar and assisted in coordinating communications between the REM II team and EPA public communications specialist.

As the Contract Laboratory Program (CLP) Coordinator, Mrs. Guterman is thoroughly familiar with all phases of laboratory analysis, quality assurance/quality control requirements, and analytic methodologies. She has extensive experience in data management and interpretation. Enrolled in CDM's health and safety program, Mrs. Guterman completed the 40-hour health and safety training course. Further, she received special instruction and certification in the use of advanced field monitoring equipment.

Mrs. Guterman played a key role in developing the expert system used by EPA in estimating RI/FS costs and schedule. She provided assistance in developing cost estimates in support of the $168,000 ARCS contract.

Education

B.A. - Biology, Rhode Island College, 1976
M.S. - Marine and Environmental Science, Long Island University, 1980

Seminar

Zebra Mussels: The Great Lakes Experience, University of Guelph, Guelph, Ontario, February 1990

Societies

Water Environment Federation
Marine Science Association
International Oceanographic Society

(nc1 1/guterman)

MARK MAIMONE, P.E.
Environmental Engineer
Camp Dresser & McKee

Summary

Mr. Maimone has experience in several aspects of water resource management, including hydrology, stormwater run-off, water quality, wetlands remediation, and mathematical modeling. He has been responsible for the development, calibration, and validation of groundwater flow and salt water intrusion models. He has directed numerous hazardous waste site investigations, feasibility studies, and remedial design of soil and water contamination, and was responsible for developing a stream and wetland mitigation program. He has extensive experience in data base design and data management for water resource planning, and is an experienced air dispersion modeler.

Experience

Mr. Maimone directed the preliminary and final design of a groundwater treatment system at the Fireman's Training Center in Nassau County, New York. He was responsible for the field sampling program, and directed pilot studies of a bioventing system for soil remediation, and a fluidized bed bio-reactor for the destruction of BTEX and acetone in groundwater. The design involved a 2-mgd treatment system for contaminated groundwater, including metals removal, bioreactor, and air stripping towers, with recharge of the aquifer system via injection wells and a recharge basin.

Mr. Maimone developed a contaminant transport model for the Purex site on Long Island. The model was used to help define the extent of shallow and deep groundwater contamination, analyze the site for the presence of DNAPL contamination, and to help redesign the extraction system.

Mr. Maimone developed a groundwater model for the design of a groundwater extraction system for the Fireman's Training Center site in Nassau County, New York. The model was critical in reducing the court-mandated, 12-well extraction system down to seven wells, saving the county money in both capital and operation costs.

Mr. Maimone developed a groundwater and contaminant transport model for the East Northport Landfill in Suffolk County, New York. The model simulated groundwater flow and leachate plume development in the complex, ice-imported stratigraphy of the North Shore of Long Island. The model was critical to the remedial investigation plume definition, and the design of extraction options during the feasibility study at this New York State Superfund site.

Mr. Maimone developed a groundwater model for the EPA Superfund site at the Waldick Aerospace facility in New Jersey. The model was instrumental in defining the extent of groundwater contamination, and in designing a cost-effective extraction and treatment system.

Mr. Maimone directed the evaluation and selection of a soil remediation technology at a hazardous waste site on Long Island. The technologies included excavation, removal, and soil solidification. After selecting excavation as the most efficient alternative, Mr. Maimone directed the design and implementation of site remediation, leading to the application for site delisting.

Mr. Maimone performed lumped parameter modeling analysis of water quality data at the Purex hazardous waste site on Long Island. The analysis was designed to estimate the duration of cleanup of soils and groundwater in the source area of the site. The results are being used to redesign the existing pump and treat system. Mr. Maimone also developed and utilized a 3-D contaminant transport model for the Purex site. The model was used to estimate the duration of cleanup of the plume using pump and treat technology. The model is presently being used to redesign and expand the current plume recovery system.

Mr. Maimone was responsible for recommending soil stabilization and fixation methods for heavy metal contaminated soils at a former industrial site on Long Island.

Mr. Maimone was field engineer for the investigation of soil contamination at a road re-alignment project in Glen Cove, New York. Soil borings were taken in an area of fill material. The material was analyzed, the results reviewed by the NYSDEC, and the project modified to the satisfaction of the regulatory agencies.

Mr. Maimone participated in the initial investigation of groundwater and soil contamination at the Fireman's Training Center in Nassau County, New York. For this groundwater system investigation, he was responsible for planning the drilling program and siting of monitoring wells. He helped supervise the collection and analysis of soil and water quality samples at the site.

Education

M.S. - Environmental/Regional Planning, University of Technology, Delft, The Netherlands 1984
B.S. - Civil Engineering, University of Technology, Delft, The Netherlands, 1982
B.A. - Cum Laude with honors, Brandeis University, 1974

Registration

Professional Engineer: New York (1989)
European Engineer, EEC, 1993

Societies

Association of Groundwater Scientists and Engineers
National Water Well Association
American Society of Civil Engineers
Royal Dutch Society of Engineers

Honors

Watson Fellowship for Independent Study, 1974

Publications

APPEARING IN DUTCH

"Environmentalists Up in Arms about Federal Land Sale," Technisch Weekblad voor Ingenieurs, a national magazine of the Royal Dutch Society of Engineers. July 17, 1982, No. 20/21. (Land use practices in the USA).

"The Introduction of the Two-stage University Program Disturbs the Educational Balance," Technisch Weekblad voor Ingenieurs, a national magazine of the Royal Dutch Society of Engineers. July 31, 1982, No. 22/23.

"Two-stage University Program no Remedy for Delays in Graduating," Technisch Weekblad voor Ingenieurs, a national magazine of the Royal Dutch Society of Engineers. August 27, 1982, No. 26. (The above two articles dealt with engineering education reform at the university level.)

"USA Wastewater Treatment Program Both Naive and Optimistic," Technisch Weekblad voor Ingenieurs, a national magazine of the Royal Dutch Society of Engineers. September 24, 1982, No. 30. (An article about U.S. efforts at waste water treatment.)

"Making More of the Bijlmer," Inter-University study group for planning, published in January 1984. (Urban renewal plan for an Amsterdam housing project.)

"The Future Availability of Surface Mining Resources" (Toekomstige Beschikbaarheid van Oppervlaktedelfstoffen). Written with S. J. Bennema and P. Ike. TH Delft, Department of Civil Engineering, report to the National Department of Transportation and Pubic Works, June 1985, ISSN-0169-4499, Delft, The Netherlands.

Technology Assessment: A Review (TA: een verkenning), P.O.O. memorandum, 1985 - 1, ISSN-0169-4499, Delft, The Netherlands.

APPEARING IN ENGLISH

"Managing Municipal Solid Wastes: A Method of Planning and an Evaluation of Treatment Systems," Publikatiereeks Civiele Planologie, No. 10, University of Technology, Delft, November 1984.

"Using Multi-Criteria Evaluation in Developing Solid Waste Plans", in Evaluation of Complex Policy Problems, A. Faludi and H. Voogal (eds), Delftsche Uitgeversmaatschappij, Delft, September 1985.

"An Application of Multi-criteria Evaluation in Assessing Municipal Solid Waste Treatment Disposal Systems," in Waste Management and Research, The Journal of the International Solid Wastes and Public Cleansing Association (ISQA), 3, London, September 1985.

"Developing a Data Base for Use in Groundwater Management", in Journal of Water Resources Planning and Management, ASCE, Vol. 115, No. 1, ISSN 0733-9496, January 1989.

"Geophysical Surveys for Mapping Boundaries of Fresh Water and Salty Waters in Southern Nassau County, Long Island, New York." Written with D. Keil, R. Lahti, and P. Hoekstra. In Proceedings of the 3rd National Outdoor Action Conference on Aquifer Restoration, Groundwater Monitoring and Geophysical Methods, NWWA, Ohio, May 1989, pp. 965-77.

"Analysis of Groundwater Quality: A Data Base Application for the Nassau County Water Management Plan." Written with L. van der Tak. In Proceedings of the 17th Annual National Conference, Water Resources Planning and Management Division of the American Society of Civil Engineers, ASCE, New York, April 1990, pp. 749-58.

"Using Regional Groundwater Model in Water Resource Planning," in Journal of Water Resources Planning and Management, ASCE, Vol. 117, No. 4, ISSN 0733-9496, July 1991, pp. 448-59.

"Development of a PC-Based Three-Dimensional Groundwater Model for Nassau County, New York." Written with M.A. Taylor and R. Fitzgerald. In Proceedings: Computers in the Water Industry, AWWA, Houston, Texas, April 14-19, 1991, ISBN-D-89867-581-2, pp. 597-616.

"Salt Water Intrusion Modeling of Nassau County, Long Island Aquifers." Written with R. Fitzgerald. In Proceedings of 5th International Conference on the Use of Models, International Groundwater Modeling Center and Association of Groundwater Scientists and Engineers, Dallas, Texas, February 1992, pp. 511-521.

"Sophisticated Computer Tools for Water Management," written with B. Harley. Prepared for presentation at the ASCE International Symposium on Engineering Hydrology, San Francisco, CA, July 1993.

"Computer Modeling and Surface Geophysics Help Analyze Saltwater Intrusion of Long Island Aquifer," Presented at the National Groundwater Association: Focus on Eastern Regional Groundwater Issues Conference, Burlington, Vermont, September 1993.

"Assessing Nassau County's Water Conservation Program," written with M. Labiak, ASCE Journal of Water Resource Planning and Management, Vol. 120, No. 1, January/February 1994, pp. 90-100.

"A Linear Regression Analysis of Nassau County's Water Conservation Program," co-author M. Labiak, AWWA Conference Proceedings, June 1994, New York.

"Computer-Assisted Environmental Planning for Groundwater Management," in Issues in Environmental Planning," ed. H.Voogd, European Research in Regional Science, Vol. 4, Pion Lmtd., London, pp.100-113.

(nc11/maimone)

DREW B. BENNETT

Senior Environmental Scientist
Camp Dresser & McKee

Summary

Mr. Bennett has 12 years of experience in hydrology, water resources management, contamination remediation, environmental management, and air toxics. He has conducted numerous studies relating to groundwater supply development, urban hydrology, remedial action designs for both groundwater and soil cleanups, natural systems for wastewater treatment, non-point source impacts on estuaries, and groundwater/surface water interactions. He has also provided environmental management support for large industrial facilities, and is experienced in industrial air pollution source sampling and analysis.

Experience

As project manager and senior scientist for the Brookfield Avenue landfill remediation project on Staten Island, New York, Mr. Bennett is directing a team of engineers and scientists in the RI/FS, risk assessment and remedial design for this 200-acre inactive hazardous waste site owned by NYCDEP. The remedial investigation phase of the project involves intensive, state-of-the art investigations of air impacts, gas production, solid waste hot spots and groundwater/surface water impacts. He is working closely with NYSDEC, the community, and a Scientific Advisory Committee to address significant public concerns and maximize State EQBA funding for the project. The project is following a presumptive approach of remediating "hot spots" and containment via capping, landfill gas and leachate control.

Mr. Bennett was assistant project manager for a critical path soil remediation plan and remedial action for a private client developing an industrial site on Long Island, New York. The site contained 18 underground storage tanks (USTs) and 45,000 cubic yards of soil mixed with refuse incinerator ash. He directed the preparation of a feasibility study, remediation plan, risk assessment, bid documents, and remediation contractor oversight during the reclamation of the site for future industrial use.

Mr. Bennett was the project hydrologist for the design of a groundwater remediation system for the Waldwick Aerospace site in Monmouth County, New Jersey. He assisted in the development of a three-dimensional groundwater model to aid field hydrogeologic investigations, defined required extraction rates to capture the solvent plume prior to discharge to a nearby stream, evaluated the impact of pumping on nearby riparian wetlands, and developed mitigation measures. He worked closely with CDM's wetland scientists and EPA's Biological Technical Assistance Group in resolving wetland impact issues.

Mr. Bennett is the senior scientist for the design and operation of remedial systems for contaminated soil and groundwater at the SMS Instruments Superfund site in Deer Park, New York. For the soil remediation system, Mr. Bennett prepared a treatability study that evaluated various forms of soil vapor extraction (SVE) technology to effectively remove volatile and semi-volatile soil contaminants. Based on this study, Mr. Bennett prepared performance-based specifications for bidding the construction and operation of an SVE system. The SVE system successfully achieved NYSDEC/EPA derived soil cleanup criteria. For the design of the groundwater pump and treat system, Mr. Bennett was responsible for the groundwater pump tests and the groundwater extraction and recharge well system. He currently monitors and evaluates the performance of the 100-gpm system and recommends operational changes as necessary.

For an industrial client's site on Long Island, Mr. Bennett directed an air sparging/soil venting pilot study involving groundwater highly contaminated with gasoline and a residual saturation zone below the water table. The objective of the pilot study was to cost-effectively remediate hot spots as a source control. In addition to optimizing extraction and injection rates, Mr. Bennett evaluated the soil stripping and biodegradation treatment mechanisms associated with sparging. The process was selected for full-scale design and implementation over a 30-acre site.

For the John F. Kennedy Space Center in Florida, Mr. Bennett participated in the preparation of a RCRA Facility Investigation and the closure of two 150,000-gallon holding lagoons in compliance with RCRA regulations. He was responsible for the delineation of contaminants and for preparation of detailed closure plans and groundwater monitoring plans. He also assisted in preparing the RCRA Part B application.

Mr. Bennett provided consulting, construction, and operation services for a 75-gpm groundwater pump and treat project to remediate an off-site plume and control a DNAPL source. In addition to the groundwater extraction-recharge design, he provided construction management and system startup services.

As part of a remedial investigation of gasoline-contaminated groundwater at a large petrochemical distributor on Long Island, Mr. Bennett was the task manager for a soils vapor contamination monitoring program designed to monitor and evaluate the potential of trace gasoline vapors in residential home basements. Working closely with regulatory agencies and the local health department, Mr. Bennett developed a standardized monitoring program. He was also responsible for air emission stack testing of a number of sources associated with remedial activities.

For EPA, Mr. Bennett provided technical review of a RCRA Part B permit application for a petrochemical complex undergoing decommissioning in Puerto Rico. The application included four SWMU groups totaling 32 individual units. Active units included two aeration basins receiving wastewater produced by corrective actions and an industrial landfill which continues to receive hazardous wastes from the decommissioning process.

As a senior technical specialist, Mr. Bennett is assisting EPA in reviewing and guiding remedial designs and actions for the Tutu Wellfield Superfund site in St. Thomas, USVI.

Mr. Bennett developed and calibrated three-dimensional groundwater flow and contaminant transport models for the Brookhaven National Laboratory's remediation program for Operable Units 1, 4, 5 and 6. Multiple source areas were addressed, including two landfills, waste pits, hazardous waste storage facilities, STP effluent recharge areas, and experimental agricultural fields. Model applications were used to identify source areas, guide field investigations, remedial alternative evaluations, and remedial designs. Mr. Bennett completed the engineering evaluation/cost analysis phase, and was responsible for pump testing, integrating operable units, and design of the groundwater extraction and recharge systems.

Education

M.S. - Environmental Engineering Sciences, University of Florida, 1989
B.S. - Hydrology, University of New Hampshire, 1982

Registration

Professional Hydrologist (Groundwater), (94-HGW-1070)

Honors

NASA Graduate Assistantship
1991 Kenneth Allen Memorial Award from NYWPCA for the paper "Retrofitting for Watershed Drainage"

Memberships

Water Environment Federation
Long Island Water Conference
American Institute of Hydrology

Courses

"Design and Execution of Programs for Monitoring Groundwater Contamination," National Water Well Association, 1982.

"Field Operation of Basic Drilling Equipment," National Water Well Association, 1982.

"Hydraulics of Flow and Contaminant Processes in Groundwater," Holcomb Research Institute, Butler University, 1983.

"Pollution of Groundwater: Chemical Processes," Holcomb Research Institute, Butler University, 1983.

"Fundamental Concepts in Modeling Fluid Flow and Solute Transport," Princeton University, 1984.

Publications

"Sparging Targets Submerged Residual Saturation Contamination," written with N. Clarke and L. Buchanan. Presented at the 66th New York Water Environment Federation Association Annual Meeting, New York, New York, February 2, 1994.

"Georgica Pond Water Management Issues," presented at the Conference on Geology of Long Island and Metropolitan New York, SUNY Stony Brook, April 23, 1994

"Groundwater Management for the South Fork of Long Island, New York: A Case Study." Presented to the Group for the South Fork, Inc. Undergraduate Project, University of New Hampshire, 1982.

"Ambient Groundwater Monitoring System for the John F. Kennedy Space Center, Florida," written with E. E. Clark, S. Brown, and M. Busacca. In Proceedings of the Symposium on Monitoring, Modeling, and Mediating Water Quality. AWRA Technical Publishing Series 87-2, 1987.

"The Modified Reverse-Circulation Air Rotary Drilling Technique for Development of Observation and Monitoring Wells at Groundwater Contamination Sites," written with M. Busacca, and E. E. Clark. Groundwater Contamination Field Methods, ASTM STP 963, A. I. Johnson and G. Collins, Editors. Philadelphia, Pennsylvania: American Society for Testing and Materials, 1988.

"Water Resources Analysis of a Multiobjective Drainage Network in the Indian River Lagoon Basin." Florida Water Resources Research Center Publication No. 108. University of Florida, Gainesville, Florida, 1989.

"Retrofitting for Watershed Stormwater Control in the Indian River Lagoon Basin," written with J. P. Heaney. Presented at the Water Environment Federation 63rd Annual Conference and Exposition. Washington, D.C., October 7-11, 1990.

"Retrofitting Watershed Drainage in the Indian River Lagoon Basin," written with J. P. Heaney and C. R. Hinkle. Presented at the EPA/NOAA 1st Annual National Estuary Program Science Symposium. Sarasota, Florida, February 25-27, 1991.

"Retrofitting for Watershed Drainage," written with J. P. Heaney. Water Environment and Technology, Vol. 3, No. 9, September 1991.

"Application of Groundwater Modeling to Sampling Strategy, Identification of Multiple Sources and Identification of Potential Public Receptors at Brookhaven National Laboratory," written with H. Moe, M.A. Taylor, J. Brower, and M. Hauptmann. Presented at the USDOE Environmental Restoration '95 Symposium. Denver, Colorado, August 1995.

(nc11/bennett)

CHRISTOPHER S.E. MARLOWE, CIH, CSP

Industrial Hygienist
Camp Dresser & McKee

Summary

Mr. Marlowe is a certified industrial hygienist who specializes in environmental remediation, health and safety, toxicology, health physics, chemical emergency response, liability reduction, disposal technologies, accident investigation, workforce training, workers' compensation cases, and industrial chemistry.

Experience

Mr. Marlowe oversees CDM's health and safety program in the mid-Atlantic and western area states. He reviews hundreds of safety plans per year and personally trains most of CDM's field personnel in site safety. Mr. Marlowe oversees medical monitoring, workers' compensation, emergency medical care, hazardous site safety, exposure monitoring, and accident prevention. Additional responsibilities include oversight of sample chemical exposures of CDM and client employees.

Mr. Marlowe also serves as an industrial hygiene and toxicology consultant and lecturer. He has developed emergency response plans and hazardous waste training programs for industrial and engineering clients, and designed air monitoring protocols and safety plans for radon exposure situations.

He was Health and Safety Manager for an engineering firm that assessed hazardous waste sites, developed innovative technologies, and performed remediation using those technologies. He has worked on the EPA's TAT, EERU, ARCS, ERCS, UST, SITE, TES, and REM contracts. He was an emergency response chemist on EPA's Technical Assistance Team project. As an OSHA industrial hygienist, he performed hundreds of workplace inspections in a variety of industries.

He has participated in, or supported, environmental investigations at the Paducah Gas Diffusion Plant, Savannah River plant, Maxey Flats, Oak Ridge NL, Sandia NL, Rocky Mountain Arsenal, Lawrence Livermore Labs, Montclair Radon, and US Radium sites. For each of these projects he provided the analysis and approval of site-specific health & safety plans.

He is currently revising and developing and updated corporate and program health & safety assurance manuals. He has designed and presented health and safety training programs for hazardous waste site workers and managers. He provides the technical support for corporate health and safety efforts and serves as the assistant to the Corporate Health and Safety Officer.

Prior to joining CDM, Mr. Marlowe served as manager of safety and health for the wholly-owned hazardous materials subsidiary of Foster Wheeler Corporation. He provided oversight of medical monitoring, workers' compensation, emergency medical care, laboratory operations, hazardous site safety, exposure monitoring, and accident prevention. He wrote the corporate safety manual, work plans, and business proposals. In addition, Mr. Marlowe worked for five years for OSHA, where he was responsible for reviewing processes for potential hazards, evaluating exposure quantitatively, and developing control techniques. Other duties involved explaining OSHA policy to the public, advising employers on the most cost-effective ways to comply with standards, and supervising other industrial hygienists.

Education

B.S. - Chemistry, Rutgers University, 1976
M.S. - Environmental Engineering, New Jersey Institute of Technology, 1984

OSHA Training Institute

-Basic Industrial Hygiene
-Intermediate Industrial Hygiene
-Advanced Industrial Hygiene
-Industrial Safety Hazardous Materials
-Acoustics and Audiometry
-Industry Ventilation
Argonne National Laboratory
-Ionizing Radiation Control
NIOSH UOSHERC - New York
-Respirator Course
Center for Continuing Studies
-Occupational Health Engineering
U.S. Environmental Protection Agency
-Hazardous Material Incident Response Operations

Registration

Certified Industrial Hygienist (CIH), Comprehensive, #2258, 1982
CIH, Hazardous Materials Response and Remediation Specialty, 1993
Certified Safety Professional, Comprehensive, #7215, 1983
Qualified Environmental Professional, #12930065 - 1993
Certified Hazardous Materials Manager, #4511, 1993
Certified Occupational Hearing Conservationist, #5072, 1979 - 1985
Certified Professional Chemist, 1984 - 1990

Societies

American Chemical Society, Division of Chemical Health and Safety, Chairman, 1986 - 87
American Industrial Hygiene Association, IH Management Technical Commit-

tee, Program Chairman, 1988 - 89
American Industrial Hygiene Association, Hazardous Waste Technical Committee, Member - Program Subcommittee
American Conference of Governmental Industrial Hygienists, Member

Publications/ Presentations

"Material Substitution for Hazard Control." Presented at the American Chemical Society Meeting, Atlanta, GA, March 1981.

"OSHA Regulation of Laboratory Waste." American Chemical Society Meeting, Las Vegas, NV, March 1982.

"OSHA in the Laboratory." CHEMTECH, August 1984.

"Biochemists Wear Wrong Gloves," CHAS Notes, October 1984.

"Chemical Accidents: How Do You Prevent Them?" Presented at the American Chemical Society Meeting, Philadelphia, PA, August 1984.

"Chemical Accidents: Who's to Blame?" Presented at the American Industrial Hygiene Conference, Las Vegas, NV, May 1985.

"OSHA Hazardous Waste Operations Standard - Industry Perspective." Presented at the Central States Haz Mat Conference, March 1988.

"Establishing Exposure Guidelines for Hazardous Waste Operations." Presented at the HMCRI Superfund 1988 Conference, Washington, DC.

"How to Perform an Industrial Hygiene Survey at a Hazardous Waste Site," with Martin Mathamel. Presented at the HMCRI Superfund 1988 Conference, Washington, DC.

"Complying with the OSHA Hazardous Waste Operations Standard." Presented at the 1989 New Mexico Air and Waste Management Conference, Albuquerque, NM, November 1989.

(nc11/marlowe)

KEVIN C. MULLIGAN, P.E.

Environmental Engineer
Camp Dresser & McKee

Summary

Mr. Mulligan is an environmental engineer with project experience in water treatment plant design, wastewater, and water resources for municipal, private sector, and industrial clients. He also has extensive experienced in the field of computer modeling for CSOs, surface waters, distribution and collection systems, and groundwater systems.

Experience

Mr. Mulligan managed the technical analysis for the East Windsor Water and Sewer Facilities Master Plan. This study incorporated the use of the CDM "INFRAWORKS" software to analyze facility needs for both the water distribution and sewer collection systems. He applied the water and sewer system analytical modules of Infraworks to simulate the operation of the two networks. The water system analysis used the Kentucky Pipe model, producing maps with pressure contours highlighting deficient areas. Mr. Mulligan was also responsible for devising a methodology for assessing developers the cost associated with new growth.

Mr. Mulligan prepared the Geographic Information System (GIS) tasks for the Linden-Roselle Wastewater Management Plan. Land use and environmental features were mapped as overlays toward the determination of future facility needs and locations. The GIS task also identified environmentally sensitive areas where future development (and new wastewater facilities) would be restricted.

For the Elizabethtown Water Company in New Jersey, Mr. Mulligan was involved in the design of a new 40-mgd water treatment plant. He was responsible for the design and layout of the rapid mix basins, the flocculation basins, and the sedimentation basins, as well as the preparation of equipment specifications.

For the New York City water treatment alternatives project, Mr. Mulligan was responsible for evaluating the current chemical treatment regime for each of New York City's reservoirs. This involved evaluating the environmental impact from the use of chlorine, alum and/or copper sulfate currently used for treatment of the City's water supply system. He was responsible for selecting possible chemical, mechanical, biological and watershed management alternatives to the current treatment practices, and for assessing the environmental, regulatory and administrative impacts of the current regime. In addition, he was responsible for projecting the expected frequency, duration and dosages of chemical treatment with and without the institution of watershed management regulations. He was also responsible for modelling the water quality and environmental impacts of chemical treatment for each reservoir.

For an alternative water supply study in Glassboro, New Jersey, Mr. Mulligan modeled the network of groundwater systems in the region. The model was employed to calculate the dependable yields of each aquifer. He also analyzed the water supply, storage, and distribution system and made recommendations for system revisions to meet future water demands. In addition, Mr. Mulligan prepared preliminary cost estimates for system improvements, including the costs of additional production wells.

As project engineer for a proposed water main extension for West Donegal Township, Pennsylvania, Mr. Mulligan conducted a hydraulic analysis of the proposed piping system and then prepared a preliminary cost estimate for the extension.

For the Aluminum Company of America, Mr. Mulligan worked on the design of a secure landfill for hazardous onsite materials. Engineering services for this project included:

- Civil site layout
- Soil erosion and sediment control plan
- Hydraulic analysis of leachate production and migration
- Design of a leachate collection and treatment facility

Mr. Mulligan completed all calculations necessary for the civil site layout of the landfill. He performed all calculations to determine the amount of runoff generated by storm events of varying occurrence and subsequently designed and routed grassed waterways and detention ponds for the facility. He completed a hydraulic analysis of the amount of leachate generated using the Hydrologic Evaluation of Landfill Performance (HELP) model. Several design scenarios consisting of different layer depths and arrangements were analyzed. From this analysis, a design of the most suitable landfill configuration was implemented. Calculations to determine proper sizing of storm runoff pipes within the landfill were completed to determine the proper layout of these pipes within the landfill. He also prepared and completed the design of the leachate pumping facilities for the landfill.

Mr. Mulligan assisted in the investigation and design of radon remediation systems in radon-contaminated homes at the Montclair and Glen Ridge, New Jersey radon sites. He also prepared the cost estimate for rail transport of all contaminated soil excavated from the sites to a landfill site in Utah.

Education

M.S. - Environmental Engineering, Manhattan College, 1988
B.S. - Civil Engineering, Manhattan College, 1986

Registration

Professional Engineer: New York (1994)

Memberships

American Water Works Association
Water Environment Federation
National Ground Water Water Association

(nc11/mulligan)

THOMAS McGOVERN

Civil Engineer
Camp Dresser & McKee

Summary

Mr. McGovern is a civil engineer with experience in operations and maintenance, troubleshooting, sample collection, and monitoring of industrial and municipal facilities.

Experience

Mr. McGovern is a civil engineer with experience in operations and maintenance, troubleshooting, sample collection, and monitoring of industrial and municipal facilities.

For Westchester County, New York, Mr. McGovern was involved in the preparation of a supplemental environmental impact statement (SEIS). His responsibilities included review of technical material concerning proposed beneficial reuse alternatives using the SEVAR sludge drying process. Mr. McGovern's assignment focused on developing various descriptive sections for the SEIS including those pertaining to process design and end product; process operating experience; safety, site location, permitting, architecture, scheduling; and evaluations of economic, public utility, and odor impacts on the surrounding community.

Mr. McGovern performed work on a feasibility study for a landfill on Long Island, New York. Tables were completed to meet New York State TAGM requirements, cost estimates were prepared, and the effects of the proposed alternatives on the surrounding area were analyzed. The alternatives focused on the containment, collection, treatment, and discharge of the landfill leachate.

For a confidential industrial client's vapor extraction treatment facility, on Long Island, New York, Mr. McGovern is involved in the daily operation and maintenance of the facility. His responsibilities include system troubleshooting, monitoring standard gases for the total hydrocarbon analyzer, intermittent plant checks, and monthly safety system checks. Mr. McGovern is also responsible for the operations of an air stripping facility. He collects biweekly samples, tracks monthly expenditures and takes daily readings of the facility. Mr. McGovern also coordinates a weekly monitoring schedule of shallow subsurface wells. Constituent concentrations are tested using an organic vapor analyzer. Mr. McGovern also serves as liaison to the laboratory and certifying officials. In addition, he was responsible for measuring over 150 monitoring wells for groundwater table elevation and product thickness.

Education

B.S. - Civil Engineering, University of Hartford, 1990

Registration

Engineer-In-Training, Connecticut (1990)

Societies

Tau Beta Pi Association, Connecticut Gamma Chapter
Sigma Xi, The Scientific Research Society
American Society of Civil Engineers
Water Environment Federation

(nc11/mcgovern)

RAFFI PATRICK JAMGOCIAN

Environmental Engineer
Camp Dresser & McKee

Summary

Mr. Jamgocian is an environmental engineer with experience in conducting quality assurance/quality control (QA/QC) investigations, cost worth analyses, and field sampling at hazardous waste sites. He has developed and implemented computer programs for use in engineering applications such as data analysis and problem solving.

Experience

For the remedial investigation/feasibility study (RI/FS) of a Staten Island landfill, Mr. Jamgocian validated and organized contaminant data in soil, groundwater, surface water and air samples. He was also involved in determining potential "hot spots" of illegal dumping based on levels of hazardous and conventional pollutants.

At the Broome County Nanticoke landfill, Mr. Jamgocian conducted landfill gas sampling and ran a CDM model to predict the volume of landfill gas generation for the next 50 years. The model's output was used to identify several alternatives for the beneficial use of the landfill gas. Mr. Jamgocian evaluated the impact of the 1990 Clean Air Act amendment on the existing passive vent system, as well as on the possible alternatives.

Mr. Jamgocian drafted the operations and maintenance manual for a 350 gpm groundwater treatment facility at the site of a million gallon gasoline spill on Long Island, NY. He performed various field measurements to monitor the success of remediation, and created and maintains a database of O&M costs vs. lbs. removed.

For the Allegheny County Sanitary Authority's (ALCOSAN) wastewater treatment plant in Pittsburgh, Pennsylvania, Mr. Jamgocian investigated cover alternatives for the facility's 12 secondary clarifiers. The alternatives were evaluated based upon economic and non-economic criteria. Mr. Jamgocian's recommendation of aluminum flat covers was approved by the client.

Mr. Jamgocian conducted a test program for the reduction of NOx emissions at a Manhattan power plant and prepared documents and drawings in fulfillment of state permitting requirements.

As a research assistant at the City University of London, Mr. Jamgocian investigated the self-purification capabilities of natural streams.

For the NYCDEP, Mr. Jamgocian created a database and supervised a WBE firm in the data entry of chemical additions to New York City's drinking water reservoirs.

Mr. Jamgocian served as a painting inspector during the expansion of a 140-mgd wastewater treatment plant in Middlesex County, New Jersey.

For the Baldwin Area Sewer Study (Long Island, NY) Mr. Jamgocian maintained a database of sewer and manhole inspection records.

Education

M.E. - Environmental Engineering, The Cooper Union, 1995
B.E. - Civil Engineering, The Cooper Union, 1994

Registrations

Engineer in Training: New York, 1994

Training

40-hour OSHA Hazardous Waste Training, 1995
8-hour Health and Safety Supervisor's Training, 1995

Affiliations

Water Environment Association

Honors

American Society of Civil Engineers - Robert Ridgway Award
Tau Beta Pi - National Engineering Honor Society
Society of American Military Engineers Award
Graduate Fellowship - The Cooper Union

Publications

"In Situ Bioremediation of Gasoline Contaminated Soil" Poster Presentation, proceedings from the Air and Waste Management Association's 41st annual conference, Atlantic City, NJ, September 1995

APPENDIX D

ASTM GUIDELINES FOR SUBSURFACE SOIL SAMPLE COLLECTION

Designation: D 1586 – 84

Standard Method for Penetration Test and Split-Barrel Sampling of Soils[1]

This standard is issued under the fixed designation D 1586; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This method has been approved for use by agencies of the Department of Defense and for listing in the DOD Index of Specifications and Standards.

1. Scope

1.1 This method describes the procedure, generally known as the Standard Penetration Test (SPT), for driving a split-barrel sampler to obtain a representative soil sample and a measure of the resistance of the soil to penetration of the sampler.

1.2 *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems associated with its use. It is the responsibility of whoever uses this standard to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* For a specific precautionary statement, see 5.4.1.

1.3 The values stated in inch-pound units are to be regarded as the standard.

2. Referenced Documents

2.1 *ASTM Standards:*

D 2487 Test Method for Classification of Soils for Engineering Purposes[2]

D 2488 Practice for Description and Identification of Soils (Visual-Manual Procedure)[2]

D 4220 Practices for Preserving and Transporting Soil Samples[2]

3. Descriptions of Terms Specific to This Standard

3.1 *anvil*—that portion of the drive-weight assembly which the hammer strikes and through which the hammer energy passes into the drill rods.

3.2 *cathead*—the rotating drum or windlass in the rope-cathead lift system around which the operator wraps a rope to lift and drop the hammer by successively tightening and loosening the rope turns around the drum.

3.3 *drill rods*—rods used to transmit downward force and torque to the drill bit while drilling a borehole.

3.4 *drive-weight assembly*—a device consisting of the hammer, hammer fall guide, the anvil, and any hammer drop system.

3.5 *hammer*—that portion of the drive-weight assembly consisting of the 140 ± 2 lb (63.5 ± 1 kg) impact weight which is successively lifted and dropped to provide the energy that accomplishes the sampling and penetration.

3.6 *hammer drop system*—that portion of the drive-weight assembly by which the operator accomplishes the lifting and dropping of the hammer to produce the blow.

3.7 *hammer fall guide*—that part of the drive-weight assembly used to guide the fall of the hammer.

3.8 *N-value*—the blowcount representation of the penetration resistance of the soil. The *N*-value, reported in blows per foot, equals the sum of the number of blows required to drive the sampler over the depth interval of 6 to 18 in. (150 to 450 mm) (see 7.3).

3.9 ΔN—the number of blows obtained from each of the 6-in. (150-mm) intervals of sampler penetration (see 7.3).

3.10 *number of rope turns*—the total contact angle between the rope and the cathead at the beginning of the operator's rope slackening to drop the hammer, divided by 360° (see Fig. 1).

3.11 *sampling rods*—rods that connect the drive-weight assembly to the sampler. Drill rods are often used for this purpose.

3.12 *SPT*—abbreviation for Standard Penetration Test, a term by which engineers commonly refer to this method.

4. Significance and Use

4.1 This method provides a soil sample for identification purposes and for laboratory tests appropriate for soil obtained from a sampler that may produce large shear strain disturbance in the sample.

4.2 This method is used extensively in a great variety of geotechnical exploration projects. Many local correlations and widely published correlations which relate SPT blowcount, or *N*-value, and the engineering behavior of earthworks and foundations are available.

5. Apparatus

5.1 *Drilling Equipment*—Any drilling equipment that provides at the time of sampling a suitably clean open hole before insertion of the sampler and ensures that the penetration test is performed on undisturbed soil shall be acceptable. The following pieces of equipment have proven to be suitable for advancing a borehole in some subsurface conditions.

5.1.1 *Drag, Chopping, and Fishtail Bits,* less than 6.5 in. (162 mm) and greater than 2.2 in. (56 mm) in diameter may be used in conjuction with open-hole rotary drilling or casing-advancement drilling methods. To avoid disturbance of the underlying soil, bottom discharge bits are not permitted; only side discharge bits are permitted.

5.1.2 *Roller-Cone Bits,* less than 6.5 in. (162 mm) and

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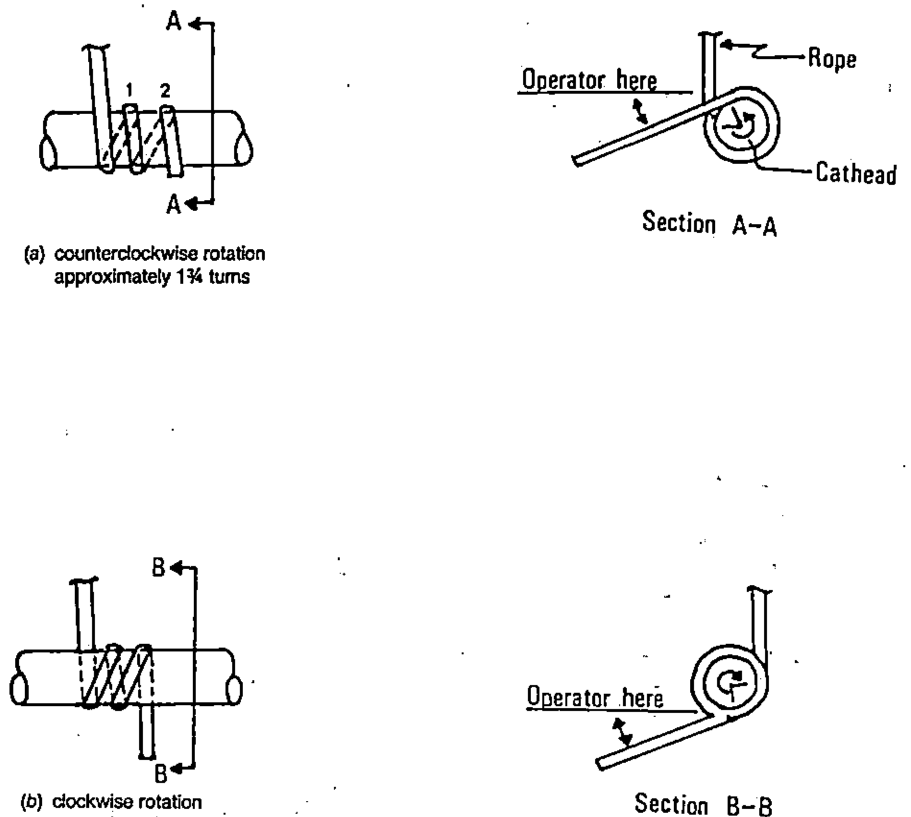
[1] This method is under the jurisdiction of ASTM Committee D-18 on Soil and Rock and is the direct responsibility of Subcommittee D18.02 on Sampling and Related Field Testing for Soil Investigations.

Current edition approved Sept. 11, 1984. Published November 1984. Originally published as D 1586 – 58 T. Last previous edition D 1586 – 67 (1974).

[2] *Annual Book of ASTM Standards,* Vol 04.08.



(*a*) counterclockwise rotation approximately 1¾ turns

(*b*) clockwise rotation approximately 2¼ turns

FIG. 1 Definitions of the Number of Rope Turns and the Angle for (*a*) Counterclockwise Rotation and (*b*) Clockwise Rotation of the Cathead

greater than 2.2 in. (56 mm) in diameter may be used in conjunction with open-hole rotary drilling or casing-advancement drilling methods if the drilling fluid discharge is deflected.

5.1.3 *Hollow-Stem Continuous Flight Augers,* with or without a center bit assembly, may be used to drill the boring. The inside diameter of the hollow-stem augers shall be less than 6.5 in. (162 mm) and greater than 2.2 in. (56 mm).

5.1.4 *Solid, Continuous Flight, Bucket and Hand Augers,* less than 6.5 in. (162 mm) and greater than 2.2 in. (56 mm) in diameter may be used if the soil on the side of the boring does not cave onto the sampler or sampling rods during sampling.

5.2 *Sampling Rods*—Flush-joint steel drill rods shall be used to connect the split-barrel sampler to the drive-weight assembly. The sampling rod shall have a stiffness (moment of inertia) equal to or greater than that of parallel wall "A" rod (a steel rod which has an outside diameter of 1⅝ in. (41.2 mm) and an inside diameter of 1⅛ in. (28.5 mm).

NOTE 1—Recent research and comparative testing indicates the type rod used, with stiffness ranging from "A" size rod to "N" size rod, will usually have a negligible effect on the *N*-values to depths of at least 100 ft (30 m).

5.3 *Split-Barrel Sampler*—The sampler shall be constructed with the dimensions indicated in Fig. 2. The driving shoe shall be of hardened steel and shall be replaced or repaired when it becomes dented or distorted. The use of liners to produce a constant inside diameter of 1⅜ in. (35 mm) is permitted, but shall be noted on the penetration record if used. The use of a sample retainer basket is permitted, and should also be noted on the penetration record if used.

NOTE 2—Both theory and available test data suggest that *N*-values may increase between 10 to 30 % when liners are used.

5.4 *Drive-Weight Assembly:*

5.4.1 *Hammer and Anvil*—The hammer shall weigh 140 ± 2 lb (63.5 ± 1 kg) and shall be a solid rigid metallic mass. The hammer shall strike the anvil and make steel on steel contact when it is dropped. A hammer fall guide permitting a free fall shall be used. Hammers used with the cathead and rope method shall have an unimpeded overlift capacity of at least 4 in. (100 mm). For safety reasons, the use of a hammer assembly with an internal anvil is encouraged.

NOTE 3—It is suggested that the hammer fall guide be permanently marked to enable the operator or inspector to judge the hammer drop height.

5.4.2 *Hammer Drop System*—Rope-cathead, trip, semi-automatic, or automatic hammer drop systems may be used, providing the lifting apparatus will not cause penetration of the sampler while re-engaging and lifting the hammer.

5.5 *Accessory Equipment*—Accessories such as labels, sample containers, data sheets, and groundwater level measuring devices shall be provided in accordance with the requirements of the project and other ASTM standards.

6. Drilling Procedure

6.1 The boring shall be advanced incrementally to permit intermittent or continuous sampling. Test intervals and lo-

(0.15 m) of penetration or fraction thereof. The first 6 in. onsidered to be a seating drive. The sum of the number lows required for the second and third 6 in. of penetration ermed the "standard penetration resistance," or the "N-1e." If the sampler is driven less than 18 in. (0.45 m), as nitted in 7.2.1, 7.2.2, or 7.2.3, the number of blows per 1 complete 6-in. (0.15-m) increment and per each partial ement shall be recorded on the boring log. For partial ements, the depth of penetration shall be reported to the rest 1 in. (25 mm), in addition to the number of blows. If sampler advances below the bottom of the boring under static weight of the drill rods or the weight of the drill s plus the static weight of the hammer, this information uld be noted on the boring log.

.4 The raising and dropping of the 140-lb (63.5-kg) ham- shall be accomplished using either of the following two hods:

.4.1 By using a trip, automatic, or semi-automatic ham- drop system which lifts the 140-lb (63.5-kg) hammer and ws it to drop 30 ± 1.0 in. (0.76 m ± 25 mm) unimpeded.

.4.2 By using a cathead to pull a rope attached to the 1mer. When the cathead and rope method is used the em and operation shall conform to the following:

.4.2.1 The cathead shall be essentially free of rust, oil, or se and have a diameter in the range of 6 to 10 in. (150 to mm).

.4.2.2 The cathead should be operated at a minimum ed of rotation of 100 RPM, or the approximate speed of ition shall be reported on the boring log.

.4.2.3 No more than 2¼ rope turns on the cathead may used during the performance of the penetration test, as wn in Fig. 1.

OTE 4—The operator should generally use either 1¾ or 2¼ rope s, depending upon whether or not the rope comes off the top (1¾ s) or the bottom (2¼ turns) of the cathead. It is generally known accepted that 2¾ or more rope turns considerably impedes the fall e hammer and should not be used to perform the test. The cathead should be maintained in a relatively dry, clean, and unfrayed lition.

.4.2.4 For each hammer blow, a 30-in. (0.76-m) lift and p shall be employed by the operator. The operation of ling and throwing the rope shall be performed rhythmi- y without holding the rope at the top of the stroke.

.5 Bring the sampler to the surface and open. Record the ent recovery or the length of sample recovered. Describe soil samples recovered as to composition, color, stratifi- on, and condition, then place one or more representative tions of the sample into sealable moisture-proof containers s) without ramming or distorting any apparent stratifica- 1. Seal each container to prevent evaporation of soil mois- . Affix labels to the containers bearing job designation, ing number, sample depth, and the blow count per 6-in. 5-m) increment. Protect the samples against extreme perature changes. If there is a soil change within the sampler, make a jar for each stratum and note its location in the sampler barrel.

8. Report

8.1 Drilling information shall be recorded in the field and shall include the following:

8.1.1 Name and location of job,

8.1.2 Names of crew,

8.1.3 Type and make of drilling machine,

8.1.4 Weather conditions,

8.1.5 Date and time of start and finish of boring,

8.1.6 Boring number and location (station and coordinates, if available and applicable),

8.1.7 Surface elevation, if available,

8.1.8 Method of advancing and cleaning the boring,

8.1.9 Method of keeping boring open,

8.1.10 Depth of water surface and drilling depth at the time of a noted loss of drilling fluid, and time and date when reading or notation was made,

8.1.11 Location of strata changes,

8.1.12 Size of casing, depth of cased portion of boring,

8.1.13 Equipment and method of driving sampler,

8.1.14 Type sampler and length and inside diameter of barrel (note use of liners),

8.1.15 Size, type, and section length of the sampling rods, and

8.1.16 Remarks.

8.2 Data obtained for each sample shall be recorded in the field and shall include the following:

8.2.1 Sample depth and, if utilized, the sample number,

8.2.2 Description of soil,

8.2.3 Strata changes within sample,

8.2.4 Sampler penetration and recovery lengths, and

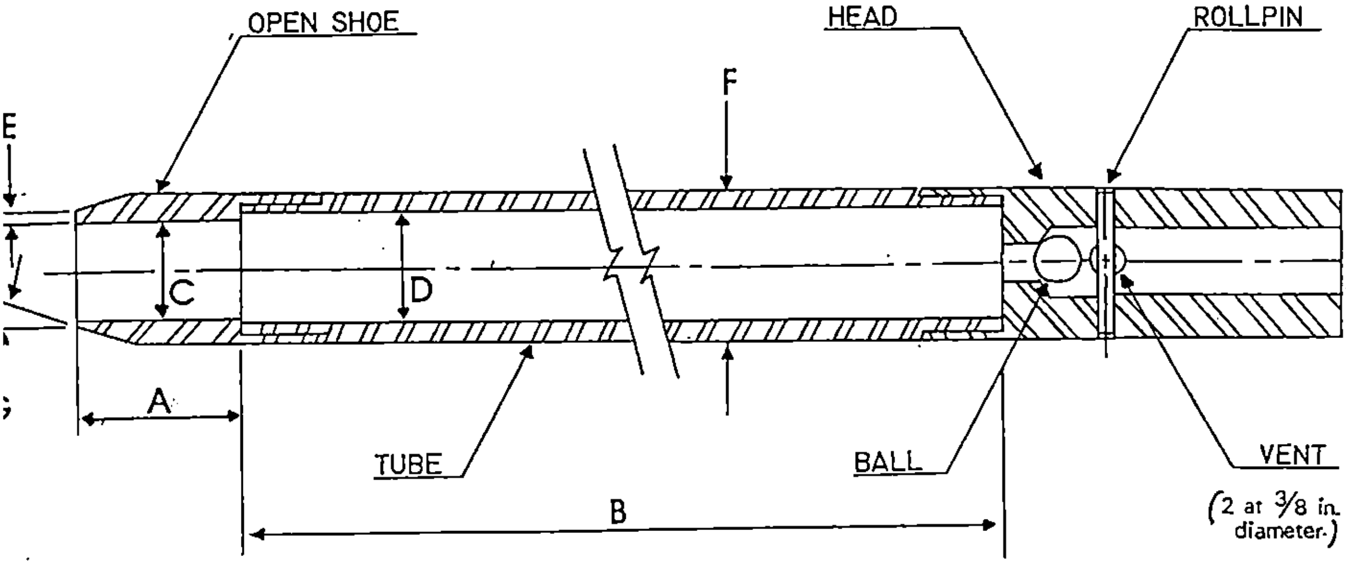
8.2.5 Number of blows per 6-in. (0.15-m) or partial increment.

9. Precision and Bias

9.1 Variations in N-values of 100 % or more have been observed when using different standard penetration test apparatus and drillers for adjacent borings in the same soil formation. Current opinion, based on field experience, indicates that when using the same apparatus and driller, N-values in the same soil can be reproduced with a coefficient of variation of about 10 %.

9.2 The use of faulty equipment, such as an extremely massive or damaged anvil, a rusty cathead, a low speed cathead, an old, oily rope, or massive or poorly lubricated rope sheaves can significantly contribute to differences in N-values obtained between operator-drill rig systems.

9.3 The variability in N-values produced by different drill rigs and operators may be reduced by measuring that part of the hammer energy delivered into the drill rods from the sampler and adjusting N on the basis of comparative energies. A method for energy measurement and N-value adjustment is currently under development.



= 1.0 to 2.0 in. (25 to 50 mm)
= 18.0 to 30.0 in. (0.457 to 0.762 m)
= 1.375 ± 0.005 in. (34.93 ± 0.13 mm)
= 1.50 ± 0.05 − 0.00 in. (38.1 ± 1.3 − 0.0 mm)
= 0.10 ± 0.02 in. (2.54 ± 0.25 mm)
= 2.00 ± 0.05 − 0.00 in. (50.8 ± 1.3 − 0.0 mm)
= 16.0° to 23.0°

The 1½ in. (38 mm) inside diameter split barrel may be used with a 16-gage wall thickness split liner. The penetrating end of the drive shoe may be slightly rounded. ıtal or plastic retainers may be used to retain soil samples.

FIG. 2 Split-Barrel Sampler

ıtions are normally stipulated by the project engineer or ;ologist. Typically, the intervals selected are 5 ft (1.5 mm) · less in homogeneous strata with test and sampling locations every change of strata.

6.2 Any drilling procedure that provides a suitably clean ıd stable hole before insertion of the sampler and assures ıat the penetration test is performed on essentially undis-ırbed soil shall be acceptable. Each of the following proce-ıres have proven to be acceptable for some subsurface ›nditions. The subsurface conditions anticipated should be ›nsidered when selecting the drilling method to be used.

6.2.1 Open-hole rotary drilling method.

6.2.2 Continuous flight hollow-stem auger method.

6.2.3 Wash boring method.

6.2.4 Continuous flight solid auger method.

6.3 Several drilling methods produce unacceptable bor-ıgs. The process of jetting through an open tube sampler ıd then sampling when the desired depth is reached shall ot be permitted. The continuous flight solid auger method ıall not be used for advancing the boring below a water table r below the upper confining bed of a confined non-cohesive ratum that is under artesian pressure. Casing may not be dvanced below the sampling elevation prior to sampling. dvancing a boring with bottom discharge bits is not permis-ble. It is not permissible to advance the boring for subse-uent insertion of the sampler solely by means of previous ımpling with the SPT sampler.

6.4 The drilling fluid level within the boring or hollow-tem augers shall be maintained at or above the in situ roundwater level at all times during drilling, removal of drill ɔds, and sampling.

7. Sampling and Testing Procedure

7.1 After the boring has been advanced to the desired sampling elevation and excessive cuttings have been removed, prepare for the test with the following sequence of operations.

7.1.1 Attach the split-barrel sampler to the sampling rods and lower into the borehole. Do not allow the sampler to drop onto the soil to be sampled.

7.1.2 Position the hammer above and attach the anvil to the top of the sampling rods. This may be done before the sampling rods and sampler are lowered into the borehole.

7.1.3 Rest the dead weight of the sampler, rods, anvil, and drive weight on the bottom of the boring and apply a seating blow. If excessive cuttings are encountered at the bottom of the boring, remove the sampler and sampling rods from the boring and remove the cuttings.

7.1.4 Mark the drill rods in three successive 6-in. (0.15-m) increments so that the advance of the sampler under the impact of the hammer can be easily observed for each 6-in. (0.15-m) increment.

7.2 Drive the sampler with blows from the 140-lb (63.5-kg) hammer and count the number of blows applied in each 6-in. (0.15-m) increment until one of the following occurs:

7.2.1 A total of 50 blows have been applied during any one of the three 6-in. (0.15-m) increments described in 7.1.4.

7.2.2 A total of 100 blows have been applied.

7.2.3 There is no observed advance of the sampler during the application of 10 successive blows of the hammer.

7.2.4 The sampler is advanced the complete 18 in. (0.45 m) without the limiting blow counts occurring as described in 7.2.1, 7.2.2, or 7.2.3.

7.3 Record the number of blows required to effect each 6

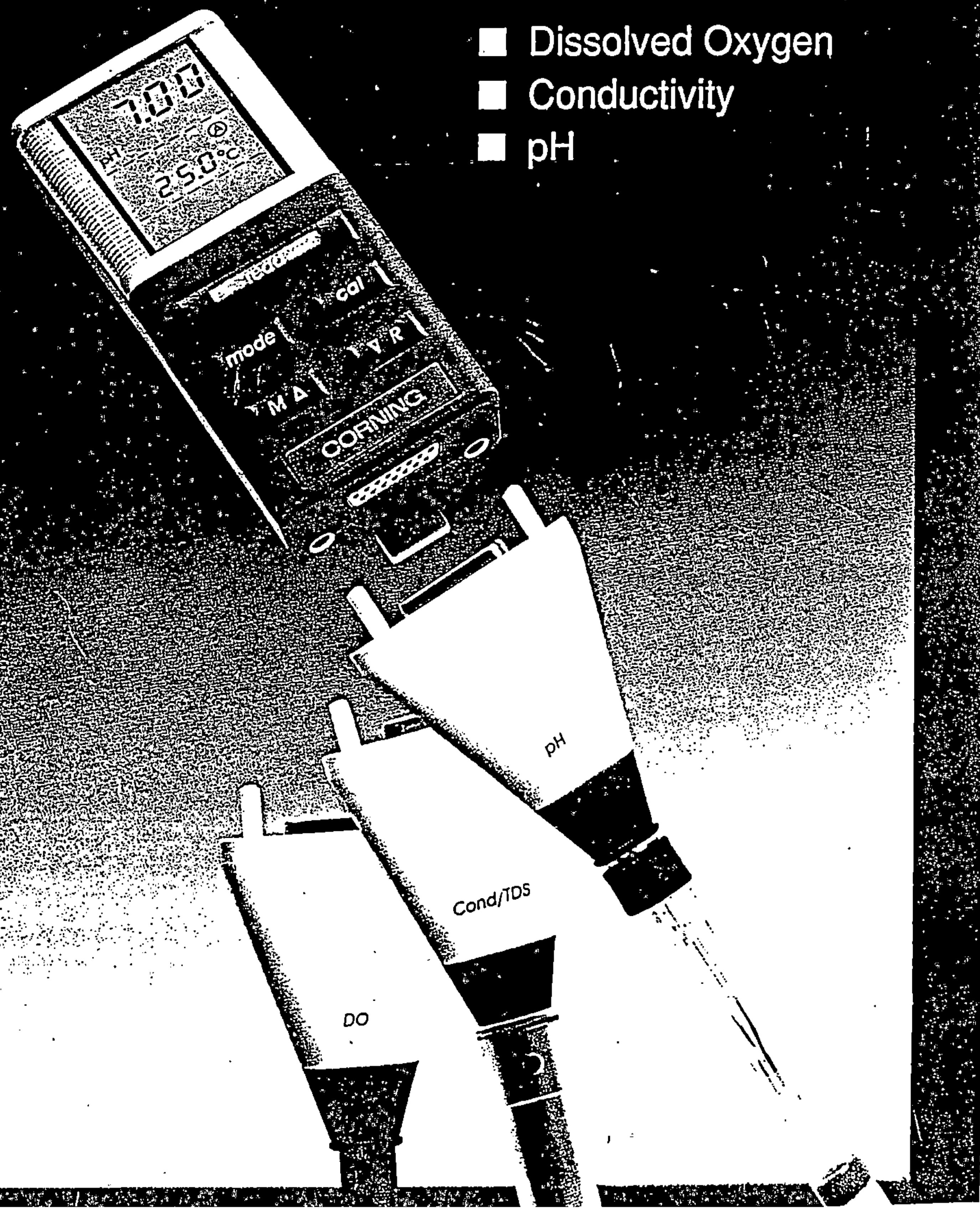
APPENDIX E

CALIBRATION PROCEDURES FOR FIELD INSTRUMENTS

a guide to

Electrochemistry

- Dissolved Oxygen
- Conductivity
- pH



MEASUREMENT OF DISSOLVED OXYGEN USING CHECKMATE DO SET

Equipment

1. Checkmate DO Set
2. Zero oxygen solution

Setting Up DO Sensor

The sensor is shipped dry and must be filled before use.

1. Unscrew the membrane cap from sensor and fill using DO electrolyte.
2. Tap membrane cap gently to remove air bubbles.Gently screw cap onto probe body allowing surplus electrolyte to run out. (Caution: Do not overtighten)
3. Fit sensor to meter module.
4. Allow 30 minutes for polarisation of electrode.

Calibration

For greater accuracy, calibrate the meter daily.

1. Remove wetting cap from tip of sensor. Switch on meter.
2. For first calibration point, place sensor in zero oxygen solution. Allow sufficient time for sensor to stabilise.

   Move the sensor in a gentle circular motion.

   Make sure sensor is immersed to a depth of 40mm to cover the temperature sensing element.

   Press [CAL]. CAL 1 is displayed on meter and after endpointing, the display automatically updates to zero.
3. For second calibration point, hold sensor in air. Press [CAL]. CAL 2 is displayed. After endpointing, the display automatically updates to 100% O_2.
4. To adjust oxygen calibration for salinity and barometric pressure, press [MODE]. In mg/L O_2 mode, press [CAL] and 100 is displayed. Use ▼ and ▲ on the keypad to adjust the display according to the salinity and barometric pressure tables contained on the operating instruction leaflet.

Measuring Sample

Place sensor in sample. After following the immersion, stirring and stabilisation steps referred to during calibration, press [READ] to obtain sample result.

Memory Feature

If the result is to be stored in one of five memory allocations, press [M] on keypad.

(N.B. A flashing M on display indicates that memory is full)

To recall sample result, press [R] and the last saved measurement is displayed. Press [R] again to recall other results. (These are indicated by MR1 - 5 on the display.)

MEASUREMENT OF CONDUCTIVITY USING CHECKMATE CONDUCTIVITY SET

Equipment

1. Checkmate Conductivity/TDS Set
2. Standard Solution (12.88ms or 1413us)

Calibration of System

1. Fit sensor to meter module, ensuring outer sheath is in place.
2. Switch on meter module.
3. The first calibration point is set by holding the sensor in the air and pressing [CAL]. CAL 1 will show on display and system will automatically endpoint to zero.
4. For the second calibration point, immerse the sensor in the standard solution, ensuring solution is above cell chamber rings and below vent hole. Ensure there are no bubbles in cell chamber.

   Press [CAL]. CAL 2 will show on display and meter module will auto-range to the correct standard value and automatically endpoint. (N.B. The system must be allowed to reach temperature equilibrium in the solution before measurement is made.)
5. Wash the probe thoroughly with distilled water to prevent carryover to sample solution.

Measurement of Sample

By following the guidelines used in the calibration procedure, immerse sensor in sample solution. Allow the system to equilibrate for 30 seconds. Press [READ] and the result in milli or microsiemens will be displayed.

For TDS readout, press [MODE] button on keypad.

MEASUREMENT OF pH USING CHECKMATE pH SET

Equipment

1. Checkmate pH Set
2. Buffer solutions (pH 7, pH 4 or pH 10)
3. Distilled water

Calibration

For greater accuracy, calibrate the meter daily.

1. Fit sensor to meter module.
   Remove wetting cap.
   Switch on meter.
2. For first calibration point, place sensor in pH 7 buffer solution.
   Press CAL . CAL 1 is displayed, and after endpointing, the display automatically updates to pH 7.
3. Remove sensor from pH 7 solution. Wash with distilled water. Blot glass bulb gently with lint free tissue.
   Place in pH 4 or 10 buffer
4. Press CAL . CAL 2 is displayed, and after endpointing, the display automatically updates to pH 4 or 10.

The meter is now calibrated.

Measuring Sample

1. Remove sensor from the second calibrant.3
2. Wash as before with distilled water.
3. Place sensor in sample solution and press READ to obtain sample result

SUMMARY OF OPERATING INSTRUCTIONS

1. **CALIBRATION**
   - A. Switch instrument to OFF and adjust meter mechanical zero.
   - B. Switch to RED LINE and adjust.
   - C. Prepare probe for operation, plug into instrument, wait up to 15 minutes for probe to stabilize. Probe can be located in calibration chamber (see instruction manual) or ambient air.
   - D. Switch to ZERO and adjust.
   - E. Adjust SALINITY knob to FRESH.
   - F. Switch to TEMP and read.
   - G. Use probe temperature and true local atmospheric pressure (or feet above sea level) to determine correct calibration values from Table I and II. (See pages 13 and 14).

     EXAMPLE: Probe temperature = 21°C; Altitude = 1000 feet. From Table I the calibration value for 21°C is 8.9 mg/l. From Table II the altitude factor for 1000 feet is approximately .96. The correct calibration value is:

     8.9 mg/l X .96 factor = 8.54 mg/l
   - H. Switch to desired dissolved oxygen range 0-5, 0-10, or 0-20 and with calibrate control adjust meter to correct calibration value determined in Step G.

     NOTE: It is desirable to calibrate probe in a high humidity environment. See instruction manual for more detail on calibration and other instrument and probe characteristics.

2. **MEASUREMENT**
   - A. Adjust the SALINITY knob to the salinity of the sample.
   - B. Place the probe and stirrer in the sample and switch the STIRRER control to ON.
   - C. When the meter has stabilized switch to the appropriate range and read D.O.
   - D. We recommend the instrument be left on between measurements to avoid necessity for repolarizing the probe.

3. **GENERAL CARE**
   - A. Replace the instrument batteries when unable to adjust to red line. Use (2) Eveready No. 935 "C" size or equivalent.
   - B. In the BATT CHECK position the voltage of the stirrer batteries is displayed on the red 0-10 scale. Do not discharge below 6.0 Volts. Recharge for 14-16 hrs. with YSI No. 5728 charger.
   - C. Membrane will last indefinitely, depending on usage. Average replacement is 2-4 weeks. Probe should be stored in humid environment to prevent drying out.
   - D. Calibrate daily.

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Table II shows the correction factor that should be used to correct the calibra
tion value for the effects of atmospheric pressure or altitude Find true at
mospheric pressure in the left hand column and read across to the right hand
column to determine the correction factor (Note that "true" atmospheric
préssure is as read on a barometer Weather Bureau reporting of atmospheric
pressure is corrected to seal level) If atmospheric pressure is unknown, the local
altitude may be substituted Select the altitude in the center column and read
across to the right hand column for the correction factor

Table II — Altitude Correction Factor

Atmospheric Pressure mmHg	or	Equivalent Altitude Ft.	=	Correction Factor
775		540		1 02
760		0		1 00
746		542		.98
730		1094		96
714		1688		94
699		2274		.92
684		2864		.90
669		3466		88
654		4082		86
638		4756		84
623		5403		82
608		6065		80
593		6744		78
578		7440		.76
562		8204		74
547		8939		.72
532		9694		.70
517		10472		68
502		11273		.66

Source: Derived from 15th Edition "Standard Materials for the Examination of Water and Wastewater."

VI. HIGH SENSITIVITY MEMBRANE

Use of high sensitivity .0005" membranes (YSI 5776) in place of standard
.001" membranes (YSI 5775) when measurements are to be made consistently
at low temperatures (less than 15°C) Calibration and readings will be made just
as if the standard YSI 5775 membrane was being used
The YSI 5776 High Sensitivity Membrane can also be used in certain
situations to increase sensitivity at temperatures above 15°C The ranges thus
become 0-2 5, 0-5 and 0-10 mg/l When calibration with high sensitivity mem-
branes is attempted at temperatures greater than 15°C the selector switch must
be set to 0-20 mg/l Multiply the calculated calibration value by 2 For example
at 21°C and 1000 ft altitude the calibration value would be 8 6 x 2 or 17 2
Remember the 0-5, 0 10 and 0-20 mg/l ranges are now 0 2 5, 0 5 and 0 10
mg/l, and all mg/l readings must be divided by 2 for a final reading When
operation in this manner accuracy will be degraded slightly

VII RECORDER OUTPUT

Output at full scale is 114 to 136 mV

Use a 50K or higher input impedance recorder and operate it with the terminals ungrounded

Many recorders have an adjustable full scale sensitivity feature When using
this type, use the 100 mV range and adjust the full scale (span, range control,
sensitivity, etc) control to give full scale chart deflection with full scale oxygen
meter deflection Refer to the recorder instructions For recorders without this
feature, a simple driver network as shown below can be constructed This is
adequate to adjust the signal for full scale chart and meter deflection on the 100
mV fixed range recorders

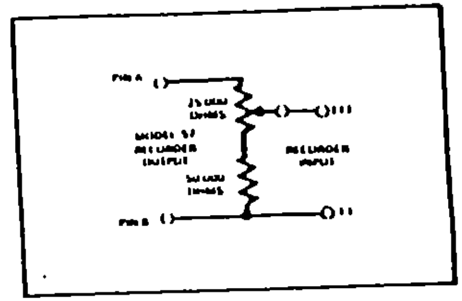


FIGURE 9

Recorder Output Plug

The YSI Model 57 is supplied with the necessary parts to construct a waterproof recorder plug for the YSI Model 57 Dissolved Oxygen Meter The cable and potting materials are not included (See Figure 10).

General purpose epoxy potting materials of medium viscosity and moderate cure rate are recommended The two tube kits available in hardware stores are satisfactory

1 Prepare the cable end by stripping back 3/16" (5MM) of insulation Tin the ends with rosin core solder If polarity is important pin "A" is the (+) terminal
2. Disassemble the connector pieces and slide the mold, ring, extension, and coupling nut over the cable Solder the leads to the appropriate connector pins with rosin core solder
3 Check all connections The two leads should show electrical continuity to the pins and should not contact the body or each other
4. Re-assemble the pieces and hold the connector upright Pour the epoxy mix into the plastic mold until full Refill as the epoxy settles
5. After the epoxy cures the plastic mold may be removed with pliers or knife.

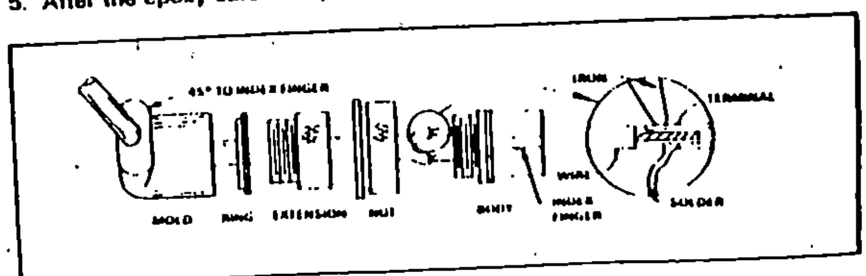


FIGURE 10

The YSI 5075A Calibration Chamber is an accessory that helps obtain optimum calibration in the field and is also a useful tool for measuring at shallow depths (less than 4').

As shown in Figure (A), it consists of a 4-1/2 foot stainless steel tube (1) attached to the calibration chamber (2), the measuring ring (3), and two stoppers (4) and (5).

For calibration, insert the solid stopper (4) in the bottom of the calibration chamber (2). Push the oxygen probe (6) through the hollow stopper (5) as shown in Figure (B). Place the probe in the measuring ring, Figure (C), and immerse the probe in the sample to be measured for five minutes to thermally equilibrate the probe. Quickly transfer the probe to the calibration chamber (5) draining excess water from the chamber and shaking any excess droplets from the probe membrane. For maximum accuracy, wet the inside of the calibration chamber with fresh water. This creates a 100% relative humidity environment for calibration. Place the chamber in the sample for an additional five minutes for final thermal equilibrium. Calibrate the probe as described in the air-calibration procedure. Keep the handle above water at all times.

After calibration, return the probe to the measurement ring for shallow measurements. Move the probe up and down, or horizontally, approximately one foot a second while measuring. In rapidly flowing streams (greater than 5'/second) install the probe in the measuring ring with the pressure compensating diaphragm towards the chamber

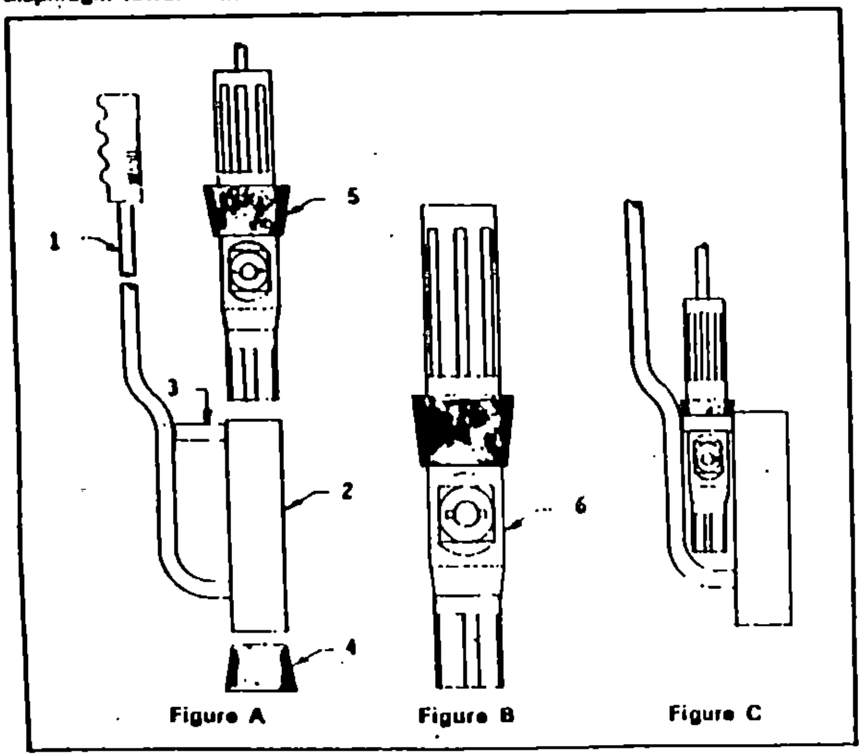


FIGURE 8

probe in the sample to be measured and provide stirring

1 Stirring for the 5739 Probe can best be accomplished with a YSI submersible stirrer. Turn the STIRRER knob ON If the submersible stirrer is not used, provide manual stirring by raising and lowering the probe about 1 ft per second If the 5075A Calibration Chamber is used, the entire chamber may be moved up and down in the water at about 1 ft per second
2 The YSI 5720A has a built in power driven stirrer
3 With the YSI 5750 sample stirring must be accomplished by other means such as with the use of a magnetic stirring bar
4 Adjust the SALINITY knob to the salinity of the sample
5 Allow sufficient time for probe to stabilize to sample temperature and dissolved oxygen Read dissolved oxygen

V Calibration Tables

Table I shows the amount of oxygen in mg/l that is dissolved in air saturated fresh water at sea level (760 mmHg atmospheric pressure) as temperature varies from 0° to 45°C

Table I — Solubility of Oxygen in Fresh Water

Temperature °C	mg/l Dissolved Oxygen	Temperature °C	mg/l Dissolved Oxygen
0	14.60	23	8.56
1	14.19	24	8.40
2	13.81	25	8.24
3	13.44	26	8.09
4	13.09	27	7.95
5	12.75	28	7.81
6	12.43	29	7.67
7	12.12	30	7.54
8	11.83	31	7.41
9	11.55	32	7.28
10	11.27	33	7.16
11	11.01	34	7.05
12	10.76	35	6.93
13	10.52	36	6.82
14	10.29	37	6.71
15	10.07	38	6.61
16	9.85	39	6.51
17	9.65	40	6.41
18	9.45	41	6.31
19	9.26	42	6.22
20	9.07	43	6.13
21	8.90	44	6.04
22	8.72	45	5.95

Source Derived from 15th Edition "Standard Methods for the Examination of Water and Wastewater"

APPENDIX F

DRILLING SERVICES BID SUMMARIES

CDM Camp Dresser & McKee

environmental services

100 Crossways Park West
Woodbury, New York 11797
Tel: 516 496-8400 Fax: 516 496-8864

December 22, 1995

Ms. Jennifer Pacchiana, Project Manager
New York State Department of Environmental Conservation
50 Wolf Road
Albany, New York 12233-7010

Re: State Superfund Standby Contract
Fumex Sanitation Site, Site # 1-30-041
WA #: D002925-13

Dear Ms. Pacchiana:

CDM has put together a bid package for drilling services at the Fumex Sanitation site. The four standby drillers that CDM uses for all DEC work were contacted and asked to bid on the work. The following pages contain the entire package sent to each drilling company. In addition, the proposals from each drilling company are included.

It is CDM's position that the contract to perform the work assignment detailed in the scope of services should be awarded to SJB Services. SJB provided the most competitive bid of $5791.00. The proposed cost for all of the drilling subcontractors were as follows:

SJB Services:	$5,791.00
Summitt Drilling Co:	$8,890.00
Parratt Wolff Inc:	$9,030.00
American Auger:	$14,390.00

Should you have any questions please feel free to call.

Very truly yours,

CAMP DRESSER & McKEE

M. Maimone

Mark Maimone,
Project Manager

cc: K. Mulligan, CDM w/attachments.
(Fumex/letter)

Section 1
Introduction

The Remedial Investigation (RI) Work Assignment (D002925-13) for the Fumex Sanitation Site (Fumex), located in the Village of New Hyde Park, Nassau County, New York, was authorized by the New York State Department of Environmental Conservation (NYSDEC), under the State Superfund Standby Contract (SSSC). The Work Assignment, and NYSDEC authorization for the expenditure of work plan development cost funds, was assigned to Camp Dresser & McKee (CDM) in a letter received on October 31, 1995 (NYSDEC 1995).

This document is the Fumex site RI draft work plan, the first deliverable to the NYSDEC under the work assignment (NYSDEC 1995). Corresponding documents under separate cover are the Fumex site RI draft Site Operations Plan/Quality Assurance Project Plan (SOP/QAPP) (CDM 1995), which includes a draft site Health and Safety Plan (HASP), and draft Minority Owned Business Enterprise/Woman Owned Business Enterprise (MBE/WBE) Utilization Plan (CDM 1995).

1.1 Site Background and History

The following sections provide a description of the Fumex site.

1.1.1 Site Location, Ownership, and Use

The Fumex site is located at 131 Herricks Road in the Village of New Hyde Park, Nassau County, New York. It encompasses approximately 1 acre of land and includes a one story masonry and metal frame building, with no basement. The site building is bounded to the west by a paved parking lot. Fumex Sanitation has operated a commercial termite extermination facility at this site since 1952 and land use prior to 1952 is unknown by CDM.

The site is bounded on the north by Bedford Avenue, on the south by residential homes on the east by Herricks Road, and on the west by residential houses and Armstrong Road (see Figure 1-1). The area surrounding the site consists of industrialized/commercial properties as well as residential properties south of the site..

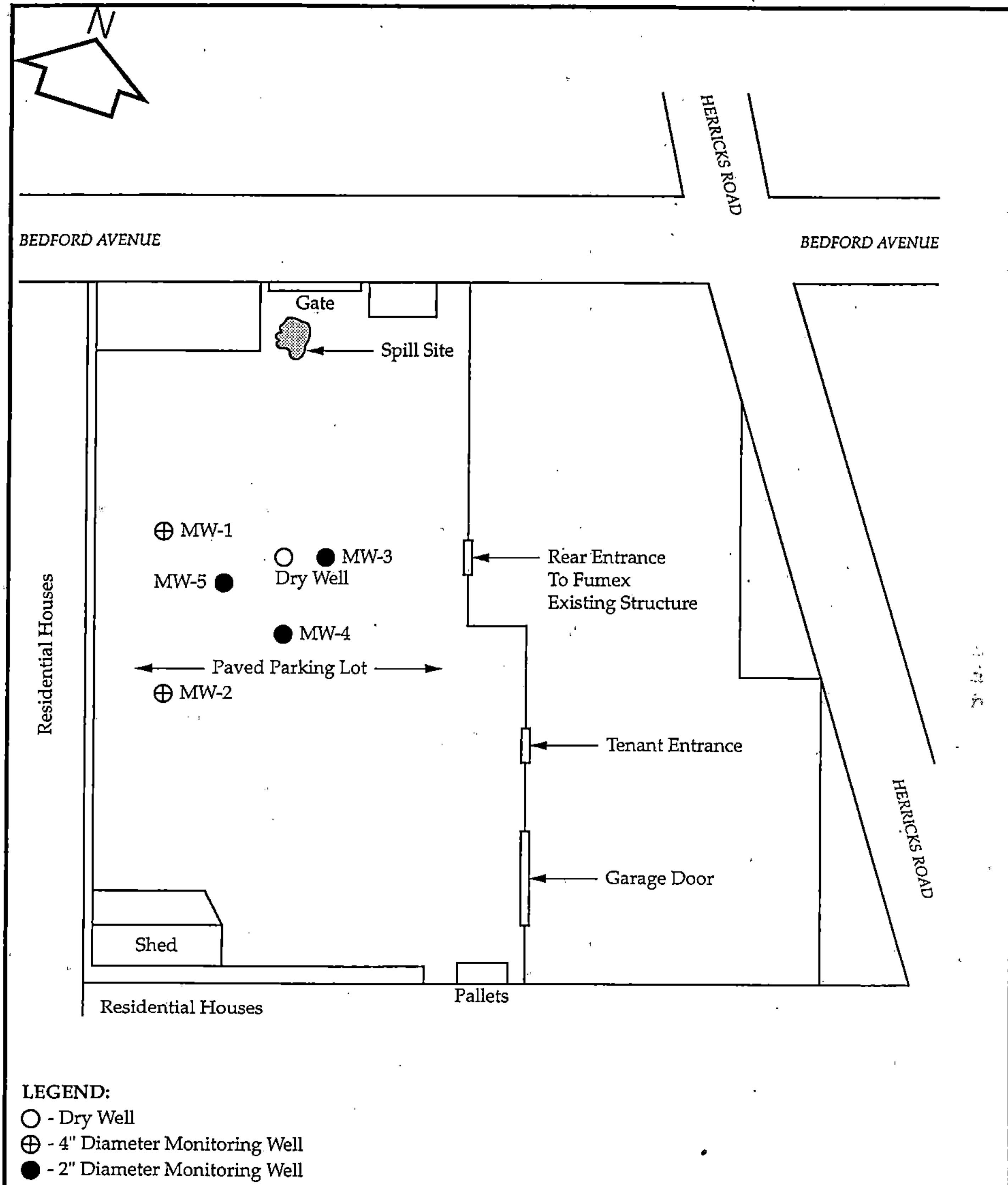
Fumex was owned by Steven Schwimmer until it changed names to S.S. Sanitation Inc. It no longer operates at this facility and is proceeding with filing for bankruptcy.

1.1.2 Site History

Fumex Sanitation Inc., is a New York Corporation originally formed on December 6, 1948. Fumex has operated a commercial termite extermination business at this site since 1952. In August 1981, a drum of chlordane rinse water stored at this site was knocked over, spilling approximately 30 gallons of the rinse water onto the asphalt parking lot behind Fumex. The material entered two stormwater catch basins on the adjacent road (Bedford Ave.) and a dry well in Fumex's parking lot.

Fumex also regularly sprayed their then unpaved parking lot with 1-2% chlordane for insect control from 1952 to 1978.

In 1986, the NYSDECs Region 1 office entered into an order on consent with Fumex to determine the extent of chlordane in the soil and groundwater at the site and evaluate remedial alternatives.



Not To Scale

CDM

environmental engineers, scientists, planners & management consultants

Fumex Site - New Hyde Park, New York
NYSDEC Site #1-30-041

Site Plan

A hydrogeological investigation was conducted in 1986 by Fumex to satisfy the requirements of the Order on Consent. Three monitoring wells were installed at the site, in addition to the two wells that were previously installed. The five wells have been sampled and the results are as follows:

Chlordane Concentrations in Groundwater
(concentrations in ppb)

Monitoring Well	July 1984	Dec. 4, 1986	Dec. 10, 1986
1	39	96	99.7
2	53	40	20.1
3	NS	NS	0.89
4	NS	55	3.6
5	NS	56	16.3

Soil samples were collected during the installation of these monitoring wells. The chlordane concentrations reported in these samples show that the highest concentrations were found in MW-5 and that the concentrations in all wells generally decreased with depth. The results are as follows:

Chlordane Concentrations in Soil (ppb)

Monitoring Well	July 1984	Nov. 1986	Dec. 1986
1	1530 (25 - 27') 105 (35 - 37') 14 (40 - 42')	NS	NS
2	9 (30 - 32')	NS	NS
3	NS	1492 (10 - 12') 96.9 (20 - 22') 308 (30 - 32') 90.3 (40 - 42') 59.4 (50 -52')	480 (45 - 47')
4	NS	417 (10 - 12')	670 (30 - 32')

Monitoring Well	July 1984	Nov. 1986	Dec. 1986
4 (cont'd)	NS	1344 (20 - 22') 700 (30 - 32')	
5	NS	1500 (10 - 12') 1494 (20 - 22') 619 (30 - 32')	1500 (30 - 32') 1400 (45 - 47')

Based on the results of this investigation, a Phase 1 investigation was conducted in 1989. In 1989 Fumex was notified of the site's inclusion in the Registry on Inactive Hazardous Wastes Disposal Sites in New York State. Steven Schwimmer was notified of his status as a responsible party in 1994. Counsel for Mr. Schwimmer responded that he did not wish to enter into an Order on Consent with the Department to remediate the site.

1.2 Environmental Setting

The following sections provide a description of the environmental setting at the Fumex site.

1.2.1 Site Topography

The Atlantic Coastal Plain physiographic province of North America is located along Long Island. Two lines of hills made of glacial debris exist along the northern and central part of Long Island. The northern moraine is the Harbor Hill moraine and the central moraine is the Ronkonkoma moraine. These moraines converge in western Long Island. The topography between these two moraines is relatively flat and gentle (Lawler, Matusky & Skelly, 1989).

The Fumex site lies on this relatively flat and gentle topography between the two moraines. There is a slight increase in elevation to the east and west of the site (Lawler, Matusky & Skelly, 1989).

1.2.2 Geology

The subsurface conditions beneath the site consist of sediments from the Pleistocene glacial outwash. These sediments consist of stratified sands and gravels which were deposited by the melting glacials of the receding Harbor Hill moraine. These sediments are located at a depth of 100 to 150 feet and are very permeable. Beneath these sediments, till from the Ronkonkoma moraine may be located. This till consists of relatively impermeable clay, sand and boulders (Lawler, Matusky & Skelly, 1989).

Cretaceous sediments are located beneath the Pleistocene glacial outwash sediment. These cretaceous sediments consist of the younger Magothy formation and the older Raritan formation. The Magothy formation is composed of 300 to 400 ft. thick, moderate to highly permeable, fine to medium sand. Coarse sand or sandy clay lenses are also found in the Magothy formation. The Raritan formation includes the Raritan clay and Lloyd sand formations. The Raritan clay is an impermeable clay layer with sand and gravel lenses. The Raritan clay is approximately 100 to 150 ft. thick. The Lloyd sand underlies the other formations and consists of fine to coarse sand and gravel. The Lloyd sand has a moderate permeability and is nearly 150 ft. thick (Lawler, Matusky & Skelly, 1989).

Precambrian crystalline rock, including mica schist, gneiss and granite, is the bedrock which underlies Long Island. The bedrock has minor water-bearing fractures and is relatively impermeable. The bedrock depth is approximately 830 ft. near the Fumex site (Lawler, Matusky & Skelly, 1989).

1.2.3 Hydrogeology

The groundwater of Long Island consists of sediments from the Pleistocene and Late Cretaceous glacial outwash. The Precambrian bedrock is considered the lower limit of the aquifer due to its relative impermeability. There are three water-producing aquifers: (1) the Upper Glacial aquifer, (2) the Magothy formation, and (3) the Lloyd sand of the Raritan formation (Lawler, Matusky & Skelly, 1989).

The Upper Glacial aquifer consists of permeable Pleistocene outwash sands and gravels. It is located at a depth of 47 ft. below land surface and is approximately 45 to 50 ft. above mean sea level. This aquifer is approximately 100 ft. thick. Groundwater flows southwest in the area of the Fumex site. Very small amounts of this aquifer are used for industrial purposes (Lawler, Matusky & Skelly, 1989).

The Magothy formation is composed of moderately to highly permeable sands with intermittent clay layers. These clay layers form less permeable areas in the aquifer. The Magothy formation is used as the primary aquifer for public drinking water in Nassau County. The aquifer is approximately 400 ft. thick (Lawler, Matusky & Skelly, 1989).

The Lloyd sand of the Raritan formation is located beneath the Magothy aquifer. An impermeable Raritan clay formation divides the Magothy aquifer and the Lloyd sand. The Lloyd sand aquifer is located between 650 to 700 ft. below the surface near the site and is considered a confined aquifer because its water is under artesian conditions. Deep public supply wells are located in this aquifer, within a few miles of the Fumex site (Lawler, Matusky & Skelly, 1989).

Percolation of rainwater through the soil is the primary means of recharge to the aquifers. The Upper Glacial aquifer is replenished directly by water from the surface. The Upper Glacial aquifer and Magothy aquifer are hydraulically connected. The slow, vertical migration of water downward supplies the Magothy aquifer. The Lloyd sand is also supplied by the slow, vertical migration of water, through the Raritan clay (Lawler, Matusky & Skelly, 1989).

1.2.4 Surface Water and Drainage

Several sporadic ponds are located within 0.5 miles of the site. These ponds may be used as recharge basins. Hempstead Lake is located approximately 4 miles southeast of the site in Hempstead Lake State Park. Valley Stream is located approximately 5 miles southwest of the site. Valley Stream drains into Jamaica Bay. Site runoff is directed towards the onsite dry well. Runoff from outside the site is most likely directed to the local stormwater collection system (Lawler, Matusky & Skelly, 1989).

1.3 Project Objective

The objective of this Work Assignment, i.e., project, is to complete a RI pursuant to NYSDEC requirements, which includes the following:

- Work plan development (including a SOP/QAPP, HASP, and MBE/WBE Utilization Plan)
- Site characterization (remedial investigation [RI])

This document is the draft RI work plan deliverable. Corresponding documents (draft SOP/QAPP, which includes a draft site HASP, and draft MBE/WBE Utilization Plan are submitted to the NYSDEC concurrently under separate cover.

The objectives of the RI for the Fumex site are to 1) identify possible contamination source areas 2) define the groundwater contamination 3) identify any receptors, 4) discover if the adjacent properties have been negatively impacted by the contamination and 5) evaluate if a further RI, a feasibility study (FS) and/or IRM will be necessary.

Specifically, the principal elements of the RI for the Fumex site are:

- to characterize the existing concentrations of chlordane in the drywell by collecting sediment samples from the drywell on site.

- to characterize the hydrogeology of the site including the general flow direction(s) of the aquifer, and the hydraulic relationship between the five monitoring wells based on two rounds of synoptic water level measurements.

- to characterize the present concentration of chlordane in the groundwater (if it exists) on site.

- to inventory the extent of potentially affected areas by identifying nearby homes or businesses that may use private water supply wells.

2.0 Scope of Services:

The Fumex Site has 5 monitoring wells (three 2-in and two 4-in) and a dry well. All work is to be performed in the order listed below:

- From the drywell, three 2-inch diameter split spoon samples should be obtained from the following elevations:

  0 - 4 ft. of sediment,
  20 - 25 ft. of sediment,
  and 45 - 50 ft. of sediment.

  The augering should be performed using a 4.25-inch ID hollow stem auger. The split spoon samples should be obtained using pre-cleaned split-spoon samplers.

- The monitoring wells will need to be repaired and/or rehabilitated. The two 4-inch ID wells will require the repair/replacement of the top 12 inches of PVC casing. This part of the casing is exposed and should not require excavation.

- All wells will require the installation of protective casings (flush mounted) with locking cover, drain hole and concrete apron.

- All 5 wells will require redevelopment. The well development method will be the pump and surge method (with surge block).

CDM Camp Dresser & McKee

AMP DRESSER & McKEE
00 Crossways Park West - 4th Floor/Suite: #415
Voodbury, New York 11797-2012
elephone Number: (516) 496-8400
'oice Mail Number: (516) 496-2055
AX Number: (516) 496-8864

o: SJB Drilling
Stan Blas 716 821-0163
rom: Kevin Mulligan

Date: 12-18-95
Job No.
Work Group No.

Jumber of pages transmitted including this sheet

facsimile transmission

Stan,
Please review site history description and scope of services enclosed on the attached pages.

Please submit costs for mobilization and repair costs for two 4" PVC casings

I need to respond to DEC by tomorrow afternoon.

Very Truly Yours
Kevin Mulligan

environmental engineers, scientists, planners & management consultants CDM

SJB Services
Bid Summary

Item No.	Description	Unit Cost	Each or #	Total ($)
-	Mobilization	Lump Sum	1	
1	Personal Protection Equipment	$0/ppd	3 days/2 people	$0.00
3	Hollow Stem Augering (4.25" ID)	$10/l.f.	50 ft.	$500.00
161	Steam Cleaner	$60/day	1 day	$60.00
47	Split Spoon Sampling (2.00" ID)	$7	3	$21.00
130	Flush-mount 4.00" ID Protector with locking cover, drain hole and concrete apron	$130	5	$650.00
142	Well Development Pump & Surge Method (w/ surge block)	$140/hr.	5 wells @ 4 hrs. ea.	$2,800.00
	Repair/replace PVC riser for 4" wells. Top 6"-12" of PVC casing broken. Needs to be replaced or repaired.	$ ______ /hr.	2 wells @ 2 hrs. ea.	

Sub-Total = $4,031.00

TOTAL = ____________

Note: All work is to be performed using Level D protection.

CDM Camp Dresser & McKee

CAMP DRESSER & McKEE
00 Crossways Park West - 4th Floor/Suite: #415
Woodbury, New York 11797-2012
Telephone Number: (516) 496-8400
Voice Mail Number: (516) 496-2055
FAX Number: (516) 496-8864

To: Victor Evangelist - Summitt
fax 216-848-1850

Date: 12-18-95

Job No.

From: Kevin Mulligan

Work Group No.

Number of pages transmitted including this sheet

Victor,

Please review site history description and scope of services enclosed on the attached pages.

Please submit costs for mobilization and repair costs for two 4" PVC casings

I need to send to NYSDEC by Tuesday afternoon.

Very Truly Yours

Kevin Mulligan

facsimile transmission

environmental engineers, scientists, planners & management consultants **CDM**

Summmitt Services

Bid Summary

Item No.	Description	Unit Cost	Each or #	Total ($)
-	Mobilization	Lump Sum	1	
1	Personal Protection Equipment	$0/ppd	3 days/2 people	$0.00
3	Hollow Stem Augering (4.25" ID)	$8/l.f.	50 ft.	$400.00
161	Steam Cleaner	$95/day	1 day	$95.00
47	Split Spoon Sampling (2.00" ID)	$15	3	$45.00
130	Flush-mount 4.00" ID Protector with locking cover, drain hole and concrete apron	$110	5	$550.00
142	Well Development Pump & Surge method (w/ surge block)	$115/hr.	5 wells @ 4 hrs. ea.	$2,300.00
	Repair/replace PVC riser for 4" wells. Top 6"-12" of PVC casing broken. Needs to be replaced or repaired.	$ ______ /hr.	2 wells @ 2 hrs. ea.	

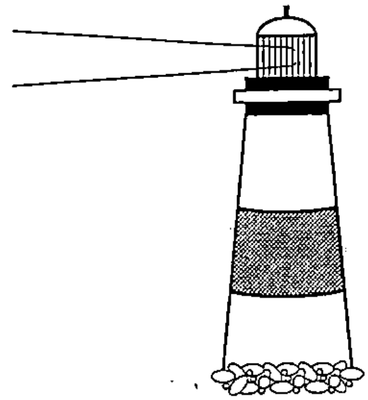
Sub-Total = $3,390.00

TOTAL = ____________

Note: All work is to be performed using Level D protection.

CDM Camp Dresser & McKee

:AMP DRESSER & McKEE
)0 Crossways Park West - 4th Floor/Suite: #415
'oodbury, New York 11797-2012
:lephone Number: (516) 496-8400
oice Mail Number: (516) 496-2055
AX Number: (516) 496-8864



): American Auger
Judy Bayer 315 623 7189
'rom: Kevin Mulligan

Date: 12-18-95
Job No.
Work Group No.

'umber of pages transmitted including this sheet

Judy,

Please review site history description and scope of services enclosed on the attached pages.

Please submit costs for mobilization and repair costs for two 4" PVC casings.

I need to send this information to the NYSDEC by tomorrow afternoon.

Very Truly Yours
Kevin Mulligan

facsimile transmission

environmental engineers, scientists, planners & management consultants **CDM**

American Auger

Bid Summary

Item No.	Description	Unit Cost	Each or #	Total ($)
-	Mobilization	Lump Sum	1	
1	Personal Protection Equipment	$45/ppd	3 days/2 people	$270.00
3	Hollow Stem Augering (4.25" ID)	$13/l.f.	50 ft.	$650.00
161	Steam Cleaner	$75/day	1 day	$75.00
47	Split Spoon Sampling (2.00" ID)	$15	3	$45.00
130	Flush-mount 4.00" ID Protector with locking cover, drain hole and concrete apron	$150	5	$750.00
142	Well Development Pump & Surge Method (w/ surge block)	$90/hr.	5 wells @ 4 hrs. ea.	$1,800.00
	Repair/replace PVC riser for 4" wells. Top 6"-12" of PVC casing broken. Needs to be replaced or repaired.	$ _____ /hr.	2 wells @ 2 hrs. ea.	

Sub-Total = $3,590.00

TOTAL = ____________

Note: All work is to be performed using Level D protection.

CDM Camp Dresser & McKee

:AMP DRESSER & McKEE
)0 Crossways Park West - 4th Floor/Suite: #415
/oodbury, New York 11797-2012
elephone Number: (516) 496-8400
oice Mail Number: (516) 496-2055
AX Number: (516) 496-8864

o: Mike Ellingworth
Parratt Wolff 315-437-1770 Fax
rom: Kevin Mulligan

Date: Dec 18, 1995
Job No.
Work Group No.

lumber of pages transmitted including this sheet 9

Mike,

Please read scope of services and site description narrative. I need to respond to NYSDEC with costs for the drilling services required at the Fumex site.

Please fill in costs for mobilization and the repair to the PVC casing of the two 4" wells.

Pls. submit no later than noon ~~the~~ ~~tomorrow~~

Very Truly Yours
Kevin. Mulligan

facsimile transmission

Parratt Wolff Inc.
Bid Summary

Item No.	Description	Unit Cost	Each or #	Total ($)
-	Mobilization	Lump Sum	1	
1	Personal Protection Equipment	$30/ppd	3 days/2 people	$180.00
3	Hollow Stem Augering (4.25" ID)	$11.50/l.f.	50 ft.	$575.00
161	Steam Cleaner	$30/day	1 day	$30.00
47	Split Spoon Sampling (2.00" ID)	$15	3	$45.00
130	Flush-mount 4.00" ID Protector with locking cover, drain hole and concrete apron	$140	5	$700.00
142	Well Development Pump & Surge Method (w/ surge block)	$45/hr.	5 wells @ 4 hrs. ea.	$900.00
	Repair/replace PVC riser for 4" wells. Top 6"-12" of PVC casing broken. Needs to be replaced or repaired.	$ ______ /hr.	2 wells @ 2 hrs. ea.	

Sub-Total = $2,430.00

TOTAL = ____________

Note: All work is to be performed using Level D protection.

SJB SERVICES, INC.

Contract Drilling and Testing

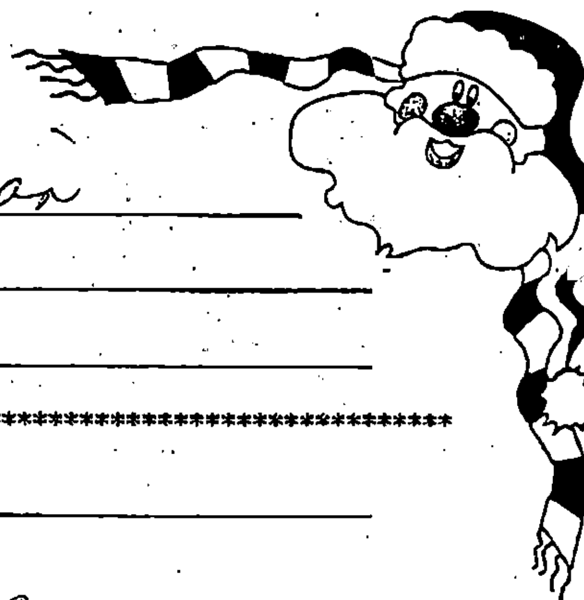
1951-1 Hamburg Turnpike
Buffalo, NY 14218
Phone: (716) 821-5911
Fax: (716) 821-0163

55 Oliver Street
Cohoes, New York 12047
Phone: (518) 238-1145
Fax: (518) 238-1249

P.O. Box 416 • 208 Le Fevre Road
Stockertown, PA 18083
Phone: (610) 746-2670
Fax: (610) 746-2669

TOLL FREE: 1-800-821-5911

FAX TRANSMITTAL



DATE: 12/19/95

PLEASE DELIVER TO THE FOLLOWING:

NAME: Kevin Mulligan

FIRM: Camp Dresser

FAX NO: 212-505-8816

****

FROM: Stan Blas
BUFFALO OFFICE

TOTAL NUMBER OF PAGES TO FOLLOW: 3

//

COMMENTS:

[ ] ORIGINAL WILL NOT FOLLOW

[X] ORIGINAL WILL FOLLOW BY:
[X] REGULAR MAIL
[ ] OVERNIGHT COURIER
[ ] OTHER

//

NOTE: IF YOU DO NOT RECEIVE ALL THE PAGES OR IF THE QUALITY IS NOT SUITABLE, PLEASE CALL (716) 821-5911 AS SOON AS POSSIBLE.

SJB SERVICES, INC.

Contract Drilling and Testing

1951-1 Hamburg Turnpike
Buffalo, NY 14218
Phone: (716) 821-5911
Fax: (716) 821-0163

55 Oliver Street
Cohoes, New York 12047
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P.O. Box 416 • 208 Le Fevre Road
Stockertown, PA 18083
Phone: (610) 746-2670
Fax: (610) 746-2669

TOLL FREE: 1-800-821-5911

December 19, 1995

Camp Dresser & McKee
100 Crossways Park West - 4th Floor/ Suite 415
Woodbury, New York 11797-2012

Attention: Kevin Mulligan
(516)496-8400 / Fax:(516)496-2055

Reference: **Drilling Services - Fumex Sanitation Site**
Village of Hyde Park
Nassau County, New York
Proposal No. ALD-1058

Dear Kevin,

Pursuant to our telephone conversation and your fax transmittal of December 18, 1995, we are hereby submitting our completed bid summary for the work at the New Hyde Park site in Long Island, New York.

It is my understanding that the scope of work will be as follows:

- Obtain three (3) split spoon samples from inside of a dry well.
- Install five (5) flush mount casings.
- Develop and purge five (5) wells.
- Repair or replace PVC riser on two (2) wells.

I have completed your cost summary as requested, with the rate for Mobilization/Demobilization and the well repair time added to the total.

We are in a position to begin work within five (5) days after receiving notification to proceed. We can begin the field work anytime during the weeks of December 26, 1995 or January 2, 1996.

Please sign below as your formal acceptance / authorization to proceed with this work.

We appreciate the opportunity to submit our proposal and we look forward to working with your firm on this project. If you should have any questions or wish to discuss our proposal further, please do not hesitate to call our office at any time.

Sincerely,
SJB SERVICES, INC.

Stanley J. Blas
President

cla/Attachment

PROPOSAL ACCEPTED BY: ______________________________

DATE ACCEPTED: ______________________________

SJB Services
Bid Summary

Item No.	Description	Unit Cost	Each or #	Total ($)
-	Mobilization	Lump Sum	1	$1,200.00
1	Personal Protection Equipment	$0/ppd	3 days/2 people	$0.00
3	Hollow Stem Augering (4.25" ID)	$10/l.f.	50 ft.	$500.00
161	Steam Cleaner	$60/day	1 day	$60.00
47	Split Spoon Sampling (2.00" ID)	$7	3	$21.00
130	Flush-mount 4.00" ID Protector with locking cover, drain hole and concrete apron	$130	5	$650.00
142	Well Development Pump & Surge Method (w/ surge block)	$140/hr.	5 wells @ 4 hrs. ea.	$2,800.00
	Repair/replace PVC riser for 4" wells. Top 6"-12" of PVC casing broken. Needs to be replaced or repaired.	$ 140. /hr.	2 wells @ 2 hrs. ea. 4 hrs.	$560.00

Sub-Total = $4,031.00

TOTAL = $5,791.00

Note: All work is to be performed using Level D protection.

The contract award has been increased to $5,798 as a result of the NYSDOH request for an additional split spoon sample.. See schedule 2.11f for final cost.

Facsimile Transmission

Parratt - Wolff, Inc.

Deliver To: Kevin Mulligan
Company: CDM
Fax No.: (516) 496-8864 Phone: (516) 496-8400

Sent By: Bill Morrow
Parratt - Wolff, Inc.
Fisher Road
East Syracuse, New York 13057
Phone: (315) 437-1429
(800) 782-7260
Fax: (315) 437-1770

Date: 12/19/95

Number of Pages (including this one): 2

Message:

Re: Site Inv.
Fumex Sanitation Site
New Hyde Park, NY

Kevin-

Enclosed is our bid for the above project. As you would expect, our mobilization / demobilization is very high in proportion to the Work Scope. If you have any questions- please contact me.

Have a nice Holiday Season-

Bill Morrow

SUMMIT
DRILLING CO., INC.
P.O. Box 1322 Akron, Ohio 44309-1322
Phone (216) 848-1100 • 800-775-5537 • FAX (216) 848-1850

IMPORTANT FAX INFORMATION
PLEASE DELIVER TO DESIGNATED PERSON IMMEDIATELY

DATE: 12/18/95 TIME: 7:10 P.M.

TO: KEVIN MULLIGAN

COMPANY: CDM

FAX NO: (212) 505-8816 PAGES INCLUDING COVER: 2

FROM: UIC EVANGELIST

MESSAGE:

☐ HARDCOPY TO FOLLOW

PROPRIETARY INFORMATION NOTICE

Summitt Services
Bid Summary

Item No.	Description	Unit Cost	Each or #	Total ($)
-	Mobilization	Lump Sum	1	4,900.00
1	Personal Protection Equipment	$0/ppd	3 days/2 people	$0.00
3	Hollow Stem Augering (4.25" ID)	$8/l.f.	50 ft.	$400.00
161	Steam Cleaner	$95/day	1 day	$95.00
47	Split Spoon Sampling (2.00" ID)	$15	3	$45.00
130	Flush-mount 4.00" ID Protector with locking cover, drain hole and concrete apron	$110	5	$550.00
142	Well Development Pump & Surge method (w/ surge block)	$115/hr.	5 wells @ 4 hrs. ea.	$2,300.00
	Repair/replace PVC riser for 4" wells. Top 6"-12" of PVC casing broken. Needs to be replaced or repaired.	$ 150.00/hr.	2 wells @ 2 hrs. ea.	600.00

Sub-Total – $3,390.00

TOTAL = $8,890.00

Note: All work is to be performed using Level D protection.

Parratt Wolff Inc.
Bid Summary

Item No.	Description	Unit Cost	Each or #	Total ($)
-	Mobilization	Lump Sum	1	6000.00
1	Personal Protection Equipment	$30/ppd	3 days/2 people	$180.00
3	Hollow Stem Augering (4.25" ID)	$11.50/l.f.	50 ft.	$575.00
161	Steam Cleaner	$30/day	1 day	$30.00
47	Split Spoon Sampling (2.00" ID)	$15	3	$45.00
130	Flush-mount 4.00" ID Protector with locking cover, drain hole and concrete apron	$140	5	$700.00
142	Well Development Pump & Surge Method (w/ surge block)	$45/hr.	5 wells @ 4 hrs. ea.	$900.00
	Repair/replace PVC riser for 4" wells. Top 6"-12" of PVC casing broken. Needs to be replaced or repaired.	$ 150.00 /hr.	2 wells @ 2 hrs. ea.	600.00

Sub-Total = $2,430.00

TOTAL = 9030.00

Note: All work is to be performed using Level D protection.

American Auger
Bid Summary

Item No.	Description	Unit Cost	Each or #	Total ($)
-	Mobilization	Lump Sum	1	10,000.
1	Personal Protection Equipment	$45/ppd	3 days/2 people	$270.00
3	Hollow Stem Augering (4.25" ID)	$13/l.f.	50 ft.	$650.00
161	Steam Cleaner	$75/day	1 day	$75.00
47	Split Spoon Sampling (2.00" ID)	$15	3	$45.00
130	Flush-mount 4.00" ID Protector with locking cover, drain hole and concrete apron	$150	5	$750.00
142	Well Development Pump & Surge Method (w/ surge block)	$90/hr.	5 wells @ 4 hrs. ea.	$1,800.00
	Repair/replace PVC riser for 4" wells. Top 6"-12" of PVC casing broken. Needs to be replaced or repaired.	$ 200. /hr.	2 wells @ 2 hrs. ea.	800.

Sub-Total = $3,590.00

TOTAL = 14,390.

Note: All work is to be performed using Level D protection.

12-19-95

Post-It™ brand fax transmittal memo 7671	# of pages ▸ 1
To Kevin Mulligan	From Judy Kaye
Co. CDM	Co. American Auger
Dept.	Phone # 315 623-7496
Fax # 516 496-8864	Fax # 7189