URS

PAN-AMERICAN CELEBRATION 1901-2001 BUFFALO, NIAGARA

April 24, 2001

Mr. Gerald Pietrazek, Project Manager
Division of Environmental Remediation, Region 9
New York State Department of Environmental Conservation
270 Michigan Avenue
Buffalo, New York 14203-2999

Re: Voluntary Cleanup Program
Work Plan for the Former Dowell Facility V00410
Responses to NYSDEC Comments of March 29, 2001

Dear Mr. Pietrazek:

On behalf of Dowell, a Division of Schlumberger Technology Corporation, Dowell Schlumberger Incorporated, and the Dow Chemical Company (the Volunteers), URS Corporation (URS) is pleased to submit responses to comments outlined in the New York State Department of Environmental Conservation (NYSDEC) letter of March 29, 2001 on the Work Plan for the above-captioned site. This letter is a supplement to the February 19 and March 6, 2001 submittals, in which, the previous NYSDEC comments were addressed. This letter will serve as the response to comments and should be attached to the existing Work Plan (dated October 2000). This letter format lists the NYSDEC comment, followed by the response to the comment

NYSDEC Comments on February 19, 2001 Responses

#1 No response required

#2 No response required

#3 *With reference to MW-1, it is stated that the TPH at MW-1 is from an upgradient source. Is this certain? There is no proof that the source is from off site. The source could also be from on site. Better definition in this area could be warranted.*

Response

Based on the available data, the levels of TPH detected in the four on site wells (MW-1 to -4) is relatively consistent across the site. The levels detected in MW-1 (upgradient) are essentially the same as in the other three wells. This would strongly suggest that the source is off site. This conclusion would seem to make sense in that there is a railroad right-of-way and active track running along the southern side of the site and the area around MW-1 was never utilized by Dowell for equipment storage or other activities.

If there are potential on site sources, they should be detected during the proposed supplemental investigations outlined in the current Work Plan. Additionally, it was previously proposed to perform full TCL/TAL analysis in MW-1 and MW-3. In response to the NYSDEC's comment, a full TCL/TAL analysis also will be performed on groundwater samples from MW-5 (to be installed). MW-5 is located in the southeastern portion of the site, upgradient of site facilities. TPH also will be added to the analysis for all three wells. This data will be evaluated to determine the distribution of TPH and other contaminants at the site. If TPH levels in the upgradient wells are still comparable to

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levels in the downgradient wells, and no other anomalous levels are detected on site, then the source will be assumed to be off site.

#4 *There does not appear to be information on the outlet for the Former Oil Separator. There is also no analytical information on the former contents of the oil separator. As requested, please place one soil boring just south of the area between the former mud separator and the former oil separator.*

Response

Discussions with Dowell indicate that there was no outlet from the oil separator. When it got full, the contents were pumped and disposed off site. During decommissioning of the mud/oil separators, both containments were found to be intact with no cracks or other evidence of leakage. Following cleaning, both containments were fractured with jackhammers to prevent ponding of rainwater after backfilling, and capped with concrete. There does not appear to be any evidence that either the oil or mud separators were a source of contamination.

However, recognizing that there is no analytical data regarding the contents of either separator and, no borings have been installed in the immediate vicinity, we propose that the location of proposed well MW-8 be shifted so that it is positioned about 5 – 10 feet north of the oil separator (Figure A2-1). Based on groundwater flow directions at the site (i.e. to the northwest), this location will be immediately downgradient of the two separators, and will provide the NYSDEC required information. Additionally, there are borings proposed at the southwest and northwest corners of the Former Chemical Storage Building that will provide data on upgradient and cross gradient conditions, respectively.

NYSDEC Comments on March 6, 2001 Responses

#1 *Since proposed MW-5 will be an upgradient well and potential chemistry in this well would affect the site, it is advised that full TCL/TAL analysis also be performed at this location.*

Response

As indicated in response # 3 above, a full TCL/TAL analysis will be performed in MW-5. Additionally, TPH also will be analyzed.

#2 No response required

#3 No response required

#4 No response required

#5 *The requirement for a Qualitative Exposure Assessment is presented in the Voluntary Cleanup Program guidelines. If the results of the proposed investigation confirm contamination above regulatory standards, a Qualitative Exposure Assessment will be required. This would need to address both on-site and off-site public health exposure.*

Response

It is agreed that a Qualitative Exposure Assessment is required by the Voluntary Cleanup Program guidelines. However, the actual need and scope of the assessment can only be determined after the data from the supplemental investigations are obtained and evaluated. Consequently, after the investigations are completed and the data is evaluated, it is suggested that a meeting with the NYSDEC be held to discuss the findings, the relative need for the assessment, and the scope of the assessment, if required.

#6 No response required

#7 No response required

General Comment:

This work plan is being developed to determine the extent of contamination. Contamination may extend off site. Dowell should at this time commit to moving off site, if necessary, to determine total extent of contamination. An iterative approach may be used to initially determine extent on site, however there should be that commitment to move off site if necessary. This issue was discussed at our August 2000 meting.

Response

The Volunteers recognize their responsibility under the Voluntary Cleanup Program to identify the nature and extent of contamination associated with the site. As indicated in response to comment #5 above, the data from the supplemental investigations will be obtained and evaluated and the need for a Qualitative Exposure Assessment determined in conjunction with the Department. Likewise, it is proposed that the need for off site investigations be discussed at the same time. If the data indicates that there is off site migration and/or, the exposure assessment indicates completed pathways, the Volunteers will develop and implement an appropriate off site investigation.

We believe these responses adequately address the NYSDEC's comments so that the Work Plan can be finalized and the field investigations scheduled for June 2001. Should you have any questions or require additional information, please call me at (716) 856-5636.

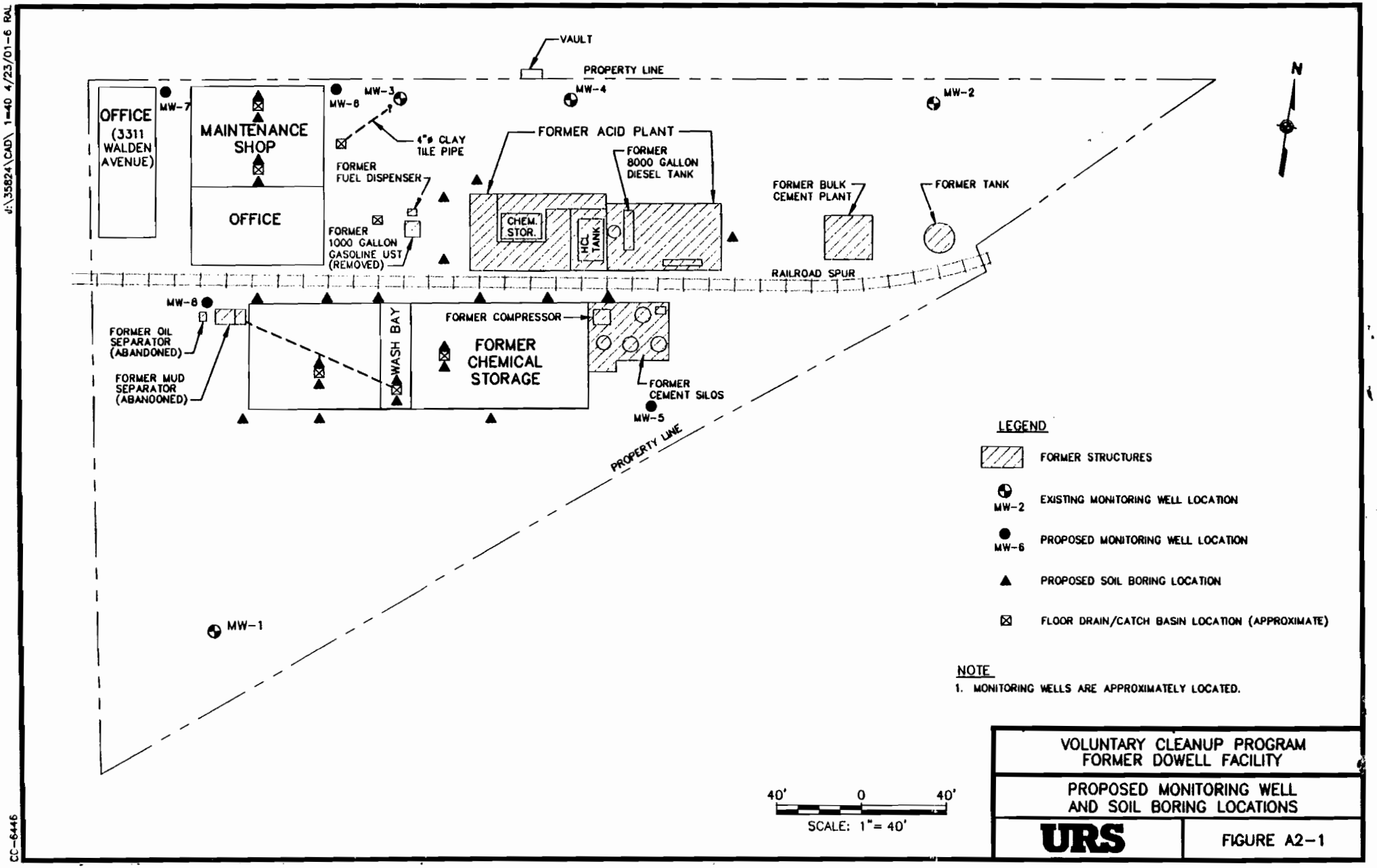
Sincerely,

URS Corporation

Robert R. Henschel, P.G.
Project Manager

Enc.

cc: J. Miller – Schlumberger
D. Simmons – Hancock Estrabrook
A. English – NYSDEC (Albany)
M. Forcucci - NYSDOH
C. Brannan – URS
D. Sheppard – URS
File 05-35842.00 (C-1)


VAULT
PROPERTY LINE
OFFICE (3311 WALDEN AVENUE)
MAINTENANCE SHOP
OFFICE
MW-7
MW-8
MW-3
MW-4
MW-2
4"ø CLAY TILE PIPE
FORMER FUEL DISPENSER
FORMER 1000 GALLON GASOLINE UST (REMOVED)
FORMER ACID PLANT
FORMER 8000 GALLON DIESEL TANK
CHEM. STOR.
HCL TANK
FORMER BULK CEMENT PLANT
FORMER TANK
RAILROAD SPUR
MW-6
FORMER OIL SEPARATOR (ABANDONED)
FORMER MUD SEPARATOR (ABANOONED)
WASH BAY
FORMER COMPRESSOR
FORMER CHEMICAL STORAGE
FORMER CEMENT SILOS
MW-5
PROPERTY LINE
MW-1
N
LEGEND
FORMER STRUCTURES
MW-2 EXISTING MONITORING WELL LOCATION
MW-6 PROPOSED MONITORING WELL LOCATION
PROPOSED SOIL BORING LOCATION
FLOOR DRAIN/CATCH BASIN LOCATION (APPROXIMATE)
NOTE
1. MONITORING WELLS ARE APPROXIMATELY LOCATED.
40' 0 40'
SCALE: 1"= 40'
VOLUNTARY CLEANUP PROGRAM
FORMER DOWELL FACILITY
PROPOSED MONITORING WELL AND SOIL BORING LOCATIONS
URS
FIGURE A2-1
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VOLUNTARY CLEANUP PROGRAM
WORK PLAN

FOR THE

SUPPLEMENTAL INVESTIGATION

FORMER DOWELL FACILITY
3311 WALDEN AVENUE
DEPEW, NEW YORK

FINAL

Prepared for:

VOLUNTEERS
DOWELL, A DIVISION OF SCHLUMBERGER TECHNOLOGY CORPORATION
DOWELL SCHLUMBERGER INCORPORATED
THE DOW CHEMICAL COMPANY

Prepared by:

URS CORPORATION
282 DELAWARE AVENUE
BUFFALO, NEW YORK 14202

JUNE 2001

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FIGURES

TABLES

APPENDICES

A1.0 INTRODUCTION

URS Corporation (URS) has been requested to perform a Supplemental Investigation (SI) for Dowell, a division of the Schlumberger Technology Corporation at the Former Dowell Facility. This SI will be performed under a Voluntary Cleanup Agreement (VCA) between Dowell, a division of Schlumberger Technology Corporation, The Dow Chemical Company, and Dowell Schlumberger Incorporated (the Volunteers) and the New York State Department of Environmental Conservation (NYSDEC).

This SI includes; installation of four monitoring wells, groundwater sampling of eight monitoring wells (4 new wells and 4 existing wells), soil borings/sampling around the perimeter of the former Acid Plant, at sumps located in the former chemical storage building and maintenance shop, and adjacent to the Mud Separator/Oil Separator.

A1.1 Site Description and History

The Former Dowell Facility is located to the east of Buffalo, New York on Walden Avenue in the Village of Depew (Figure A1-1). The site is situated in a mixed residential and industrial/commercial area. Properties surrounding the site include Walden Avenue to the north, a railroad yard to the south, a lumber yard and supply store (84 Lumber) to the east, and an industrial manufacturer to the west. A residential neighborhood is found across Walden Avenue to the north.

The facility is relatively flat-lying and covers approximately 3.5 acres. It is presently inactive and remaining vacant structures on the property include a former office building, a former chemical storage warehouse, and a former operations facility (Figure A1-2). A railroad spur intersects the center of the site from east to west. The property is secured with a locking chain-link fence that surrounds the site.

Former activities at the facility included serving industrial facilities and limited oil-field related projects. Various industrial cleaning and oil-field chemicals were stored onsite and transferred into tank trucks for use at job sites.

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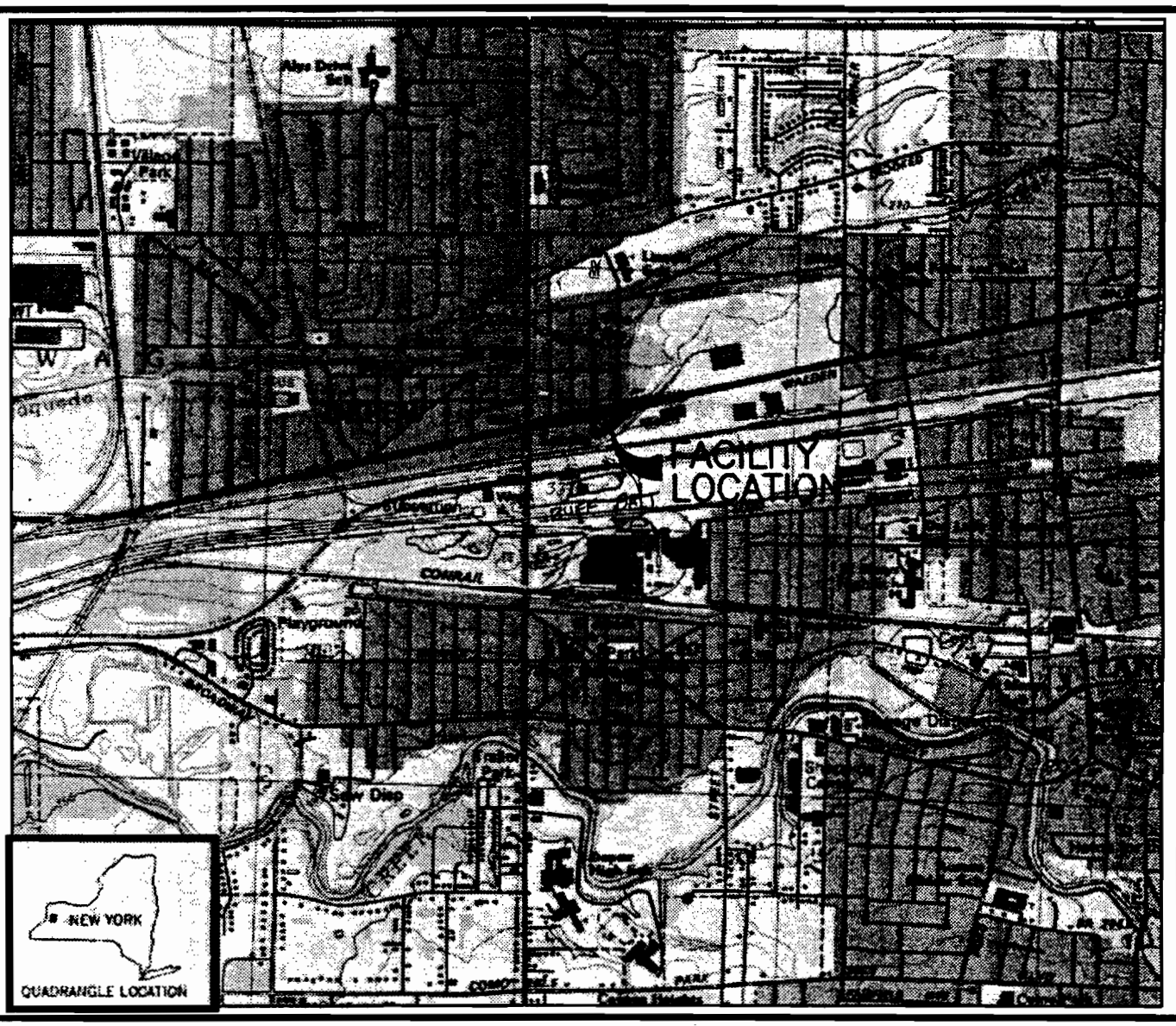

REFERENCE:
BASE MAP IS A PORTION OF THE U.S.G.S. 7.5 x 15 MINUTE TOPOGRAPHIC SERIES LANCASTER, NY QUADRANGLE. DATED: 1982. SCALE: 1" = 2000', CONTOUR INTERVAL IS 2 METERS.

2000' 0 2000'

SCALE: 1"= 2000'

VOLUNTARY CLEANUP PROGRAM – FORMER DOWELL FACILITY

URS

SITE LOCATION MAP

FIGURE A1-1

AC-15630

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PROPERTY LINE

OFFICE (3311 WALDEN AVENUE)

OFFICE

FORMER FUEL DISPENSER

FORMER 1000 GALLON GASOLINE UST (REMOVED)

FORMER ACID PLANT

FORMER 8000 GALLON DIESEL TANK

CHEM. STOR.

HCL TANK

FORMER BULK CEMENT PLANT

FORMER TANK

RAILROAD SPUR

FORMER OIL SEPARATOR (ABANDONED)

FORMER MUD SEPARATOR (ABANDONED)

WASH BAY

FORMER COMPRESSOR

FORMER CHEMICAL STORAGE

FORMER CEMENT SILOS

PROPERTY LINE

N

LEGEND

FORMER STRUCTURES

40' 0 40'

SCALE: 1"= 40'

VOLUNTARY CLEANUP PROGRAM
FORMER DOWELL FACILITY

SITE PLAN

URS

FIGURE A1-2

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A1.2 Regional Geology/Hydrogeology

The Former Dowell Facility rests on a regional glacial till deposit. The till is typically comprised of unsorted clay, silt, fine sand, and fine to coarse gravel that exhibits low permeability. Underlying the till is the Marcellus and Skaneateles Shale formations (Geraghty & Miller, 1990). These rock formations are present throughout the southern half of the Erie-Niagara Basin and locally contain thin interbedded limestones. The overlying till ranges in thickness from 2 to 200 feet within the basin and is approximately 30 feet thick beneath the site. The Shale formations typically produce small quantities of groundwater ranging from 10 to 15 gallons per minute. The overlying till is an insignificant source of groundwater.

A1.3 Previous Investigations

Previous investigations at the facility have included environmental-related projects. In September 1989, Geraghty & Miller (G&M) completed a tank removal project. This project involved the removal of one 1,000-gallon underground storage tank (UST) and its associated fuel dispenser, and one 8,000-gallon aboveground storage tank (AST). Both tanks were used for fuel storage. During this project, residual hydrocarbons were detected in fill materials surrounding the UST and beneath its dispenser. The contaminated fill material was excavated and transported offsite for disposal. There was no apparent evidence of residual hydrocarbons in the native soils surrounding the tank excavation and beneath the dispenser area. G & M installed a monitoring well in the UST excavation to allow for the future collection of groundwater samples.

In May 1990, G & M performed a site investigation at the Former Dowell Facility. The objective of this investigation was to determine the presence of chemical constituents in site soils and groundwater. The investigation results revealed that low-level concentrations of volatile organic compounds (VOCs) were present in shallow water within fill materials beneath the northeast corner of the site, and in the north-central portion of the site, adjacent to a former transfer and chemical storage tank area. The shallow saturated zone occurred between the depths of 0.5 feet and 2.0 feet below grade. This zone was characterized to be a thin discontinuous perched groundwater lens.

In January 1992, G & M performed a physical/chemical evaluation of the groundwater at the former UST location. No visible hydrocarbons (sheen) were present and no VOCs or total petroleum hydrocarbons (TPH) were detected in the groundwater sample.

From September 1996 to March 1997, Radian International LLC (Radian) installed four monitoring wells (MW-1, MW-2, MW-3 and MW-4) at the site, conducted two rounds of groundwater sampling, and decommissioned the mud separator (Figure A1-3). Groundwater samples were analyzed for VOCs, Resource Conservation and Recovery Act (RCRA) metals, TPH and ethylene glycol (antifreeze). MW-3 showed detected concentrations of 1,1-dichloroethene (DCE), 1,1-dichloroethane (DCA), and 1,1,1-trichloroethane (TCA) at levels which exceed the maximum concentration levels (MCL's). TPH and ethylene glycol was detected in each of the four monitoring wells, but were attributed to an upgradient source. Lead was present in MW-2 and MW-4 at concentrations which exceeded their MCLs.

In November 1997, Radian performed a supplemental investigation which consisted of advancing three soil borings around MW-3 and five soil borings around the perimeter of the former Acid Plant (Figure A1-3). Groundwater samples were also collected from the existing monitoring wells. Soil samples were collected from each boring (SB-01, SB-02, and SB-03) around MW-3 for VOC analysis. Analytical results from soil samples collected at SB-01 (4' to 6') and SB-03 (16' to 18') showed no VOC detections greater than the MCL's. SB-02 (6' to 8') exhibited a concentration of DCE greater than its MCL. Soil samples were also collected from various intervals at the five borings (SB-04, SB-05, SB-06, SB-07, and SB-08) around the former Acid Plant. Analytical results from soil samples collected at SB-06 (10' - 12' and 14' - 16') and SB-08 (2' - 4' and 6' - 8') showed no VOC detections greater than the MCL's. TCE was detected at SB-04 (8' - 10') and at SB-05 (6' - 8') at concentrations greater than its MCL. DCE was detected at SB-05 (6' - 8') and at SB-07 (8' - 10') at concentrations greater than its MCL. TCE (8' to 10' and 18' to 20') and DCA (8' to 10') were also present at SB-07 at concentrations greater than their MCLs. Groundwater sample results showed no VOC detected at concentrations which exceeded MCL's at MW-1, MW-2 and MW-4. DCA was present in MW-3 at a concentration which exceeded its MCL.

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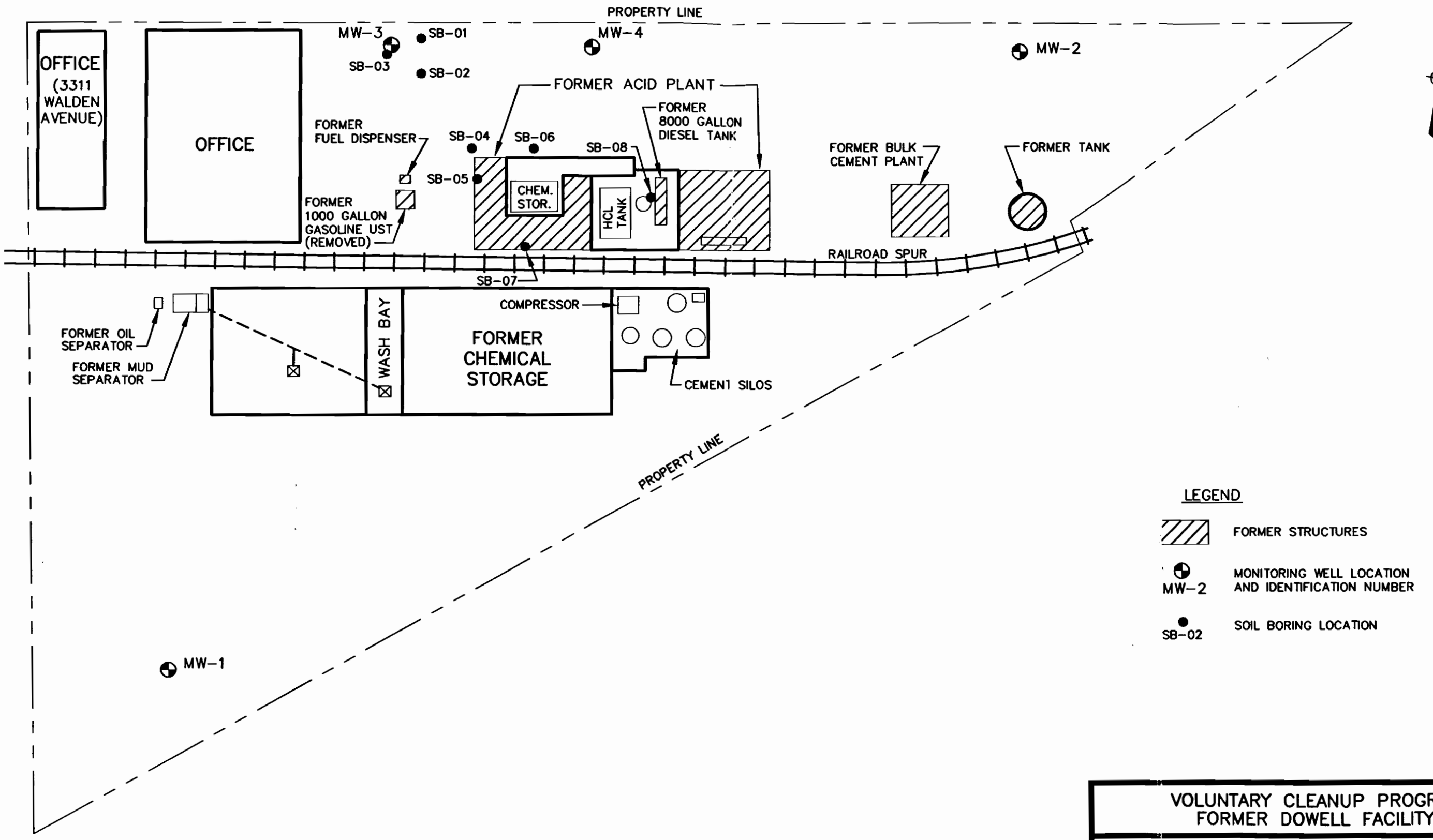

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VOLUNTARY CLEANUP PROGRAM FORMER DOWELL FACILITY	
PREVIOUS INVESTIGATION LOCATIONS	
URS	FIGURE A1-3

In July 1998, Radian performed several tasks including: removal of the former concrete Acid Plant revetment; excavation of previously-identified contaminated subsurface soil around the former Acid Plan; removal of the cement bulk plant; and other miscellaneous debris removal.

In July and December 1998, groundwater samples were collected from the four monitoring wells for VOC analysis. Analytical results for MW-1, MW-2 and MW-4 showed no VOCs at concentrations which exceeded the MCLs. DCA and TCA were detected at MW-3 at concentrations which exceeded their MCL's during both rounds.

In July 1999 and January 2000, groundwater samples were collected from the four monitoring wells for VOC analysis. Analytical results were similar to the 1998 results. Appendix A presents a summary of analytical results for soil and groundwater samples collected, and soil boring logs from the above-referenced previous investigations.

A1.4 Future Site Use

Following completion of the site investigation program, remedial activities, if any will be implemented. In addition, all the onsite buildings with the exception of the existing office building, will be demolished to grade and the floor slabs removed. The property will then be marketed for commercial and/or industrial re-use. Deed restrictions limiting the reuse to commercial/industrial purposes will be added, as applicable.

A2.0 SCOPE OF WORK

URS has been tasked by the Volunteers to conduct an SI at the Former Dowell Facility located in the Village of Depew, Erie County, New York. This SI includes the installation of four monitoring wells and sampling of eight monitoring wells (4 new wells and 4 existing wells) to further evaluate the nature and extent of groundwater contamination at the site. Soil borings will be advanced and samples will be collected around the perimeter of the former Acid Plant, around the perimeter of the former Chemical Storage Building and around floor sumps located in the former Chemical Storage Building and the former Maintenance Shop. Additionally, samples will be collected from the recently identified catch basins located east of the Maintenance Shop and west of the former fuel dispenser. A clay tile pipe running from the catch basin east of the Maintenance Shop northeast towards MW-3 also will be exposed and samples collected. This section describes the major tasks associated with the SI at the Former Dowell Facility.

A2.1 Task 1 – Scoping and SI Work Plan

A2.1.1 Scoping

In developing this work plan, URS reviewed previous investigation/sampling reports from 1992 to the present and conducted a site visit on September 22, 2000. Specific SI details and background information/site history were reviewed, including the project schedule.

A2.1.2 SI Work Plan

URS has prepared this SI Work Plan which includes:

- Part A – SI Work Plan
- Part B – Quality Assurance Project Plan (QAPP)
- Part C – Field Sampling Plan (FSP)
- Part D – Health and Safety Plan (HASP)

A Citizens Participation Plan (CPP) will also be prepared in accordance with NYSDEC requirements. This document will be submitted under a separate cover.

A2.2 Task 2 – Site Characterization

Initial SI efforts will include a general site reconnaissance to identify investigation locations. Thereafter, borings and wells will be installed and sampling of subsurface soil and groundwater will be conducted. As detailed below, samples also will be collected from interior portions of the former Chemical Storage building and former Maintenance Shop beneath the concrete slab, from catch basins east of the Maintenance Shop, around a clay tile pipe in the vicinity of MW-3, and adjacent to the Mud Separator/Oil Separator. Site characterization activities are described in the following sections, with environmental sampling/analysis summarized in Table A2-1. Investigation locations are shown in Figure A2-1. All analytical data will be evaluated for usability, summarized, and tabulated as described in Section A2.2.5.

A2.2.1 Buried Utility Identification

Prior to any intrusive activity (e.g., drilling, excavation), URS will request a utility clearance from the Underground Facilities Protective Organization, and underground utilities will be identified and clearly marked. While it appears electrical service was furnished predominantly by overhead lines, local utility companies will be contacted to assist in the location of underground utilities.

A2.2.2 Subsurface Soil Investigation

Twenty-three soil borings will be advanced using a Geoprobe direct push unit to evaluate the nature of contamination at specific areas of the site. The areas to be investigated during the subsurface investigation are listed below.

- Former Maintenance Shop – two borings will be advanced around each of the two floor sumps located in the Former Maintenance Shop. The borings will be advanced 3 feet beyond the invert of the floor sumps or 2 feet into the upper confining unit. It is estimated that the total depth of each boring will be 5 feet. These soils will be logged and screened with a photoionization detector (PID) to determine the presence of VOCs. Two samples, one from each floor drain, will be collected. The sample exhibiting the highest PID reading at each floor drain will be submitted to the

TABLE A2-1
SUMMARY OF ANALYTICAL PARAMETERS
FORMER DOWELL SITE

Parameter	Method Number / Reference[1]	Estimated Number of Samples	QA/QC Samples		
			MS/MSD/MD/MSB	Rinse Blanks	Trip Blanks
IA. Groundwater (MW-1, 3 & 5)					
Target Compound List (TCL)					
Volatiles + TICs	ASP 95-1	3	1/1/0/1	1	1
TCL Semivolatiles + TICs	ASP 95-2	3	1/1/0/1	1	0
TCL Pesticides/PCBs	ASP 95-3	3	1/1/0/1	1	0
Target Analyte List (TAL) Metals (total) plus Cyanide	200.7 CLP-M/335.2 CLP-M	3			0
Total Petroleum Hydrocarbons	418.1	3	1/0/1/0	0	
IB. Groundwater (MW-2, 4, 6, 7& 8)					
TCL Volatiles + TICs	ASP 95-1	5	1/1/0/1	1	0
IC. Groundwater (Geoprobe)					
TCL Volatiles + TICs	ASP 95-1	8	1/1/0/1	0	2
II. Subsurface Soil					0
TCL Volatiles + TICs	ASP 95-1	+7 18 16	1/1/0/1	1	
III. Sediment (Catch Basins & Sewerline)					
TCL Volatiles + TICs	ASP 95-1	4 - 6	0/0/0/0	0	0

NOTES:
[1]NYSDEC Analytical Services Protocol, 6/00 edition.

TIC – Tentatively Identified Compounds

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VAULT

PROPERTY LINE

MW-7

MW-6

MW-3

MW-4

MW-2

OFFICE (3311 WALDEN AVENUE)

MAINTENANCE SHOP

OFFICE

4"ø CLAY TILE PIPE

FORMER ACID PLANT

FORMER 8000 GALLON DIESEL TANK

FORMER FUEL DISPENSER

FORMER BULK CEMENT PLANT

FORMER TANK

CHEM. STOR.

HCL TANK

FORMER 1000 GALLON GASOLINE UST (REMOVED)

RAILROAD SPUR

MW-8

FORMER COMPRESSOR

FORMER OIL SEPARATOR (ABANDONED)

WASH BAY

FORMER CHEMICAL STORAGE

FORMER MUD SEPARATOR (ABANDONED)

FORMER CEMENT SILOS

MW-5

PROPERTY LINE

MW-1

LEGEND

FIGURES

MW-2 EXISTING WELL LOCATION

MW-6 MONITORING WELL LOCATION

P BORING LOCATION

CATCH BASIN LOCATION (APPROX

NOTE

1. MONITORING WELLS APPROXIMATELY LOCATED.

40' 0 40'

SCALE: 1"= 40'

ARY CLEANUP PROGR
MER DOWELL FACILITY

SED MONITORING WEL
OIL BORING LOCATIO

FIGURE

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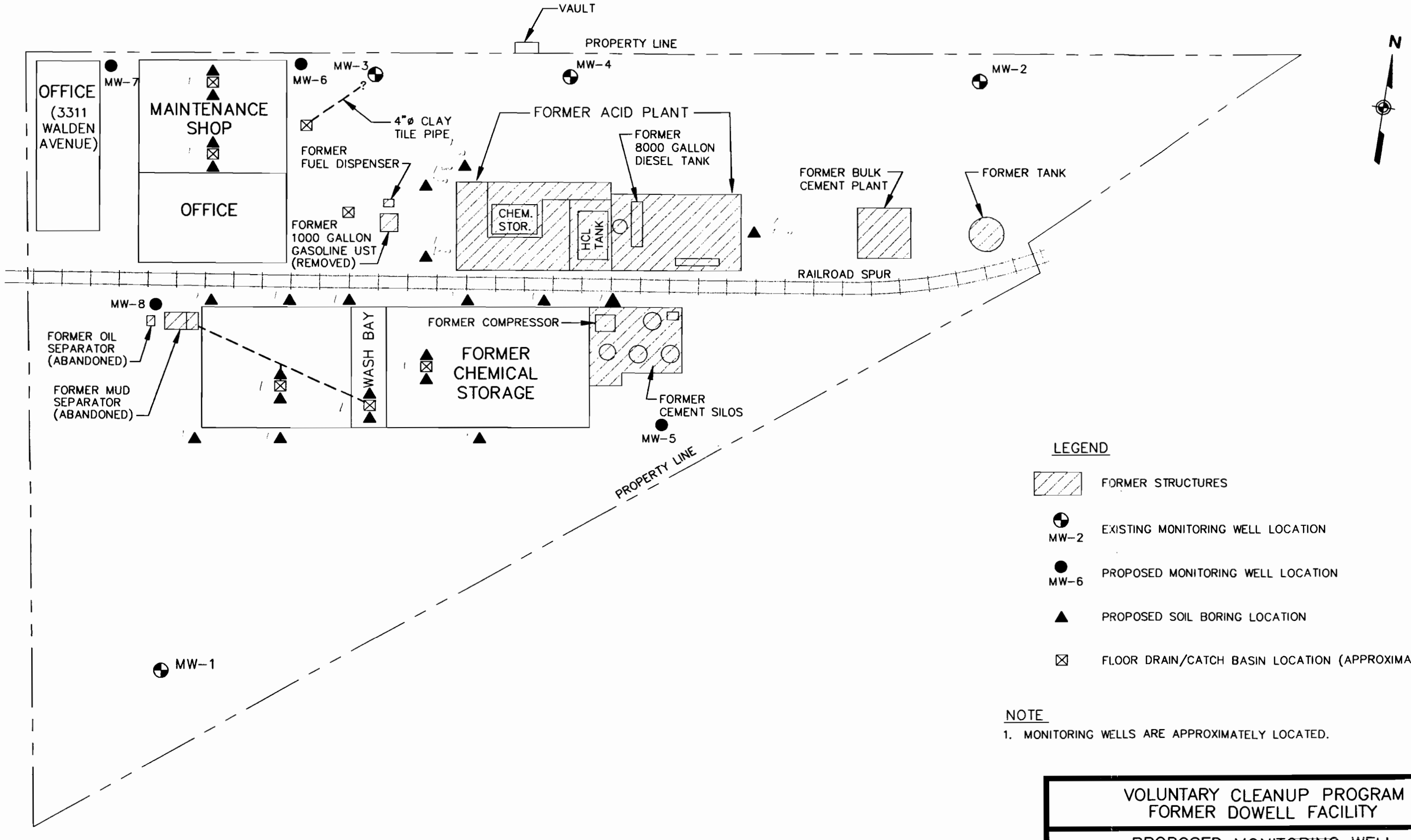

NOTE

1. MONITORING WELLS ARE APPROXIMATELY LOCATED.

VOLUNTARY CLEANUP PROGRAM
FORMER DOWELL FACILITY

PROPOSED MONITORING WELL AND SOIL BORING LOCATIONS

URS

FIGURE A2-1

CC-6446

laboratory for analysis of Target Compound List (TCL) VOC's. If no VOCs are detected, the soil from both borings at each floor drain will be composited to form one sample for analysis.

- Former Chemical Storage Building – two borings will be advanced around each of the three floor sumps located in the Former Chemical Storage Building. The borings will be advanced 3 feet beyond the invert of the floor sumps or 2 feet into the upper confining unit. It is estimated that the total depth of each boring will be 5 feet. These soils will be logged and screened with a photoionization detector (PID) to determine the presence of VOCs. Three soil samples, one from each floor drain, will be collected. The sample exhibiting the highest PID reading at each of the three floor drains will be submitted to the laboratory for analysis of Target Compound List (TCL) VOC's. If no VOCs are detected, the soil borings at each of the three floor drains will be composited to form one sample for analysis.

- Former Acid Plant – four borings will be advanced around the perimeter of the Former Acid Plant Building. Three of the borings will be advanced around the northern perimeter of the former building and one boring will be advanced east of the former building. These borings will be advanced to the top of clay, which is approximately 14-to-16 feet below ground surface as reported by Radian (Appendix A). One soil sample will be collected from each boring from the interval which exhibits evidence of staining or elevated PID readings. Soil samples will be analyzed for TCL VOCs. If groundwater is encountered during the soil boring program, samples will be collected for TCL VOC analysis and field pH measurement. Four groundwater samples have been estimated (one from each boring).

- Former Chemical Storage Building – nine borings will be advanced along the north and south side of the Former Chemical Storage Building. These borings will be advanced to the top of clay. One soil sample will be collected from each boring from the interval which exhibits evidence of staining or elevated PID readings. If no staining or elevated PID readings are encountered, four soil samples (two from each side of the building) will be collected. Soil samples will be analyzed for TCL VOCs. If groundwater is encountered during the soil boring program, up to four groundwater samples will be collected for TCL VOC analysis.

A2.2.3 Catch Basins and Sewer Lines

During the September 2000 site walkover, it was observed that a catch basin located east of the Former Maintenance Shop appears to connect floor drains located inside the Maintenance Shop to the storm/sanitary sewer system along Walden Avenue. A 4-inch diameter clay-tile pipe extending northeast from the catch basin appears to travel in the direction of MW-3. Historically, groundwater samples collected from this well and soil samples from nearby boring SB-03, have shown elevated levels of chlorinated organic compounds. The catch basin and clay-tile pipe may constitute a possible source of contamination and/or a route for contaminant migration at MW-3. A second catch basin located west of the former fuel dispenser also appears to be connected to the catch basin east of the Former Maintenance Shop.

In order to investigate the nature and extent of contamination, if any, present in these areas, the following investigation activities will be performed:

- Discrete sediment samples will be collected from the two floor drains inside the Maintenance Shop, the catch basin east of the Maintenance Shop and the catch basin west of the former fuel dispenser (total of four samples). The sediment samples will be analyzed for TCL VOCs.

- Excavation will be performed along side of the 4-inch diameter clay tile pipe from the catch basin to near MW-3. The soils surrounding the pipe and the bedding materials will be visually examined for signs of staining and screened with a PID to assess the presence of VOCs. Two discrete soil samples will be collected from areas exhibiting signs of staining and/or elevated PID readings. The soil samples will be analyzed for TCL VOCs. The clay tile pipe will not be removed during this SI and the excavated soils will be used to backfill the trench.

A2.2.4 Steel Vault

During the walkover, a steel vault was identified along the northern fence line, northwest of MW-4. The vault doors were locked, and could not be opened at that time. During the SI, the vault will be opened and inspected to determine its purpose.

Based on the results of the inspection, the need for collection and analysis of any samples will be determined.

A2.2.5 Groundwater Investigation

Four new monitoring wells (MW-5, MW-6, MW-7, and MW-8) will be installed during the SI. Proposed locations are illustrated in Figure A2-1. Monitoring wells will be drilled and installed using standard hollow stem augers methods or other NYSDEC-approved methods. Split-spoon samples will be collected continuously in 2-foot intervals in accordance with the American Society for Testing and Materials (ASTM) specifications. Soil samples will be visually classified and stored in sealed jars for future reference. One soil sample will be collected from the MW-8 boring for TCL VOC analysis to evaluate the potential impact from the Mud Separator/Oil Separator. All wells will be screened across the water table to obtain information about the upper portion of the aquifer. Screen length will be selected based on site conditions in consultation with the onsite geologist. The total depth of each monitoring well is not expected to exceed 25 feet.

Monitoring wells will be constructed of two-inch inner diameter (ID) threaded Schedule 40 polyvinyl chloride (PVC) flush-joint casing and properly-sized section of machine-slotted 0.010-inch well screen equipped with a threaded end cap. The annulus around the well screen will be backfilled with No. 1 Morie sand. The sand pack will extend a maximum of 2 feet above the well screen. A bentonite seal will be placed above the sand pack to form a maximum 3-foot seal. A cement/bentonite grout will be placed to within 3 feet of the surface. The wells will have a vented cap and an 8-inch diameter flush-mount protective casing with a locking cover. A cement pad will be installed around the flush-mount protective casing.

URS will develop the four new monitoring wells by pumping or bailing to remove sediment from the well screen and sand pack. Well evacuation will be accomplished using a disposable polyethylene bailer or a pump and dedicated polyethylene tubing. Efforts will be made to develop the wells until pH, conductivity, and temperature are stabilized and until the water has a turbidity of less than 50 Nephelomatic turbidity units (NTU). URS will collect groundwater samples from each of the 4 new and 4 existing monitoring wells. Groundwater samples collected from MW-1, MW-3 and MW-5 will be analyzed for TCL VOCs, TCL

semivolatile organic compounds (SVOCs), TCL pesticides, TCL polychlorinated biphenyls (PCBs), Target Analyte List (TAL) metals, cyanide and total petroleum hydrocarbons (TPH). Groundwater samples collected from MW-2, MW-4, MW-6, MW-7, and MW-8 will be analyzed for TCL VOCs only. Each monitoring well will undergo hydraulic conductivity testing (slug tests) upon completion of groundwater sampling.

A2.2.6 Site Survey

Upon completion of the SI, the eight monitoring wells will be surveyed for horizontal and vertical coordinates using Global Positioning Survey (GPS) techniques. The exterior soil borings will also be surveyed using GPS. The surveyed locations will be plotted on the existing base map in Auto CAD 14 format.

A2.2.7 Data Validation and Tabulation

The laboratory selected for analysis will be New York State Department of Health Environmental Laboratory Accreditation Program (ELAP) CLP-certified. URS will validate data received from the laboratory and prepare a Data Usability Summary Report (DUSR). The DUSR will be developed from a full NYSDEC ASP Category B package. Upon validation, all sample results will be grouped by media (e.g., soil, groundwater) and will be tabulated.

A2.2.8 Decontamination/Investigation-Derived Waste

Some of the field equipment will be disposable and not require decontamination. If decontamination is required, it will be carried out by washing with Alconox and rinsing with deionized water. Equipment will be kept in a clean environment prior to sampling. If a portable pump is necessary for well sampling, the pump will be properly decontaminated prior to sampling, and in between well sampling events. Heavy equipment (drill rig) will be decontaminated via high pressure steam-cleaning on the decontamination pad. The decontamination pad will be constructed of 2" x 6" wood framing lined with two layers of polyethylene sheeting. The polyethylene sheeting will be secured to the top of the wood frame with 1" x 6' furring strips. A sump pit will be located at the low point of the pad. All discarded equipment (latex gloves, trowels, paper towels, etc.) will be drummed in accordance with

applicable requirements. Decontamination water, soil cuttings, and purge water will be drummed and treated or disposed of. URS will coordinate the onsite handling and storage of investigation-derived waste (IDW), including transport and offsite disposal.

A2.2.9 Documentation

All field activities will be documented in a field logbook. This logbook will provide a record of activities conducted at the site. All entries will be signed and dated at the end of each day of field work. The field logbook will include the following: date and time of all entries, names of all personnel on site, weather conditions (temperature, precipitation, etc.), location of activity, and description of activity.

In addition, URS will complete the following standard field forms:

- Test Boring Log
- Monitoring Well Construction Details
- Well Purging/Development Logs
- Field Sampling Sheets
- Chain-of-Custody Records

A2.2.10 Potential Remedial Alternatives

The development of potential remedial objectives and alternatives for the Former Dowell Facility will begin during the initial stages of SI work plan preparation. Knowledge of potential alternatives for the final use and remediation during the early stages of the project will allow URS to focus the investigation on collecting data specifically required to evaluate the applicability and effectiveness of each of the potential alternatives.

Remedial alternatives, if necessary, will be developed separately for each of the media at the site (i.e., groundwater, soil). The future use of the site, the nature of contamination present, and the potential risk that the site contaminants pose to human health and the environment will be taken into consideration. Potentially applicable remedial alternatives will be identified for the site based on the data obtained from the SI.

A2.2.11 Standards, Criteria, and Guidance

Standards, criteria, and guidance (SCG's) for soil will be the NYSDEC Technical Administrative Guidance Memorandum (TAGM) 4046: *Determination of Soil Cleanup Objectives and Cleanup Levels* (dated January 1994, revised). SCG's for groundwater will be the NYSDEC Technical and Operation Guidance Series (TOGS) 1.1.1: *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations* (dated June 1998).

A2.3 Task 3 – Site Investigation Reporting

After completing the site investigation, a SI report will be prepared which summarizes the field activities, analytical testing/results, and findings of the SI program. A summary of the nature and extent of contamination in all media investigated will be included along with preliminary remedial alternatives which may be applicable for remediation of the site consistent with the intended future use. Copies of field data, analytical test results, and other relevant information will be included. An on site Qualitative Exposure Assessment will be performed if the data from the SI indicates that SCG's have been exceeded. The SI report will also include a discussion pertaining to additional investigations, including off site work.

A2.4 Task 4 - Development of Remedial Alternatives

Identifying remedial alternatives for the site is an iterative process that will be conducted concurrently with work plan preparation. A list of media-specific remedial action alternatives will be developed during the initial stages of work plan. As the SI progresses, the data will be used to develop and screen the alternatives.

Once the SI has been completed, remedial objectives will be developed based on comparisons of site contaminants and contaminant-specific cleanup criteria. Any risks to human health and the environment also will be used as a basis for determining the site remedial objectives.

A2.4.1 Potential General Response Actions

Once the objectives for each of the contaminated media at the site has been determined, general response actions capable of satisfying the objectives for each media will be developed. A wide range of general response actions will be considered including, No Action, Institutional Action, Containment, Treatment, Extraction, Excavation, and/or Disposal. These categories range from either limiting exposure to eliminating, destroying, or containing the contaminants.

A2.4.2 Evaluation of Potential General Response Actions

The general response actions identified for each of the contaminated media and consistent with the future intended site use will be evaluated on four initial criteria: effectiveness, reliability, implementability, and cost. Only those which are technically feasible, reliable, effective, implementable, and cost-effective will be considered further. Following the selection of general response actions, specific remedial technologies for each of the general response actions will be identified.

A2.4.3 Alternative Remedial Actions

Following completion of Task 4, potentially applicable remedial alternatives will be evaluated against the requirements of 6 NYCRR 375-1.10, "Remedy Selection," as well as the seven criteria as suggested in this work plan to select the most appropriate and cost-effective remedy for the site, consistent with the Voluntary Cleanup Program.

A3.0 PROJECT SCHEDULE

The table below presents the project schedule dates, and deliverables due dates for the Former Dowell Facility SI being conducted by the Volunteers.

Item	Action	Date
1	Issuance of Work Assignment	
2	Site Visit	9/22/00
3	Submittal of Work Plan	10/20/00
4	Notice to Proceed	Following NYSDEC Approval
5	Start of Field Work	7/9/01
6	Completion of Field Work	7/20/01
7	Draft SI Report	9/24/01
8	Development of Remedial Alternatives	12/28/01

A4.0 STAFFING PLAN/KEY PERSONNEL

The proposed management plan and key personnel for this project are shown below. The responsibilities of each project position is described below. The resumes of key personnel who will fill these positions are on file with the NYSDEC.

- Project Director (J. Gorton) is the URS corporate officer responsible for assuring the availability of resources, overall project performance, and representing URS in all contractual matters.

- Project Manager (R. Henschel) will be responsible for technical and financial management of the project, and for overall coordination and review of component work activities. The Project Manager will serve as the initial and primary contact throughout the project.

- Project Quality Assurance (QA) Officer (G. Robinson, CHMM), will ensure that all project deliverables undergo a thorough QA review by senior staff members who are qualified and experienced in appropriate disciplines.

- Project Work Plans and Scoping (D. Sheppard, CHMM), will be responsible for the development and implementation of the SI Work Plans. Other approved staff members will be utilized on an as-needed basis.

- Onsite Coordinator (T. Burmeier) will provide overall supervision and coordination of all field activities. The Onsite Field Coordinator will be responsible for implementing the SI Work Plan, the HASP and QAPP, and providing logistical support services as necessary.

APPENDIX A

PREVIOUS INVESTIGATION DETAILS

Table 3

Soil Sample Results

DS-Depew, New York Facility

November 1997

Detected Volatile Compound	Soil Boring ID and Sample Depth Interval (feet)													
	SB-01 (4 - 6)	SB-02 (6 - 8)	SB-03 (12 - 14)	SB-03 (16 - 18)	SB-04 (8 - 10)	SB-04 (14 - 16)	SB-05 (6 - 8)	SB-05 (10 - 12)	SB-05 (14 - 16)	SB-06 (4 - 6)	SB-07 (8 - 10)	SB-07 (18 - 20)	SB-08 (2 - 4)	SB-08 (6 - 8)
	Constituent concentrations (mg/Kg)													
Vinyl Chloride	0.022	0.029	ND	ND	0.11	ND	0.10	0.042	ND	ND	0.16	ND	ND	ND
1,2-DCA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.006	ND	ND	ND
TCE	0.11	0.86 (*)	ND	ND	33.0 (*)	0.033	3.3 (*)	29.0 (*)	0.012	ND	17.0 (*)	9.7 (*)	ND (*)	0.008
1,1,1-TCA	0.017	ND	1.6 (*)	ND	ND	ND	ND	ND	ND	ND	0.37J (*)	ND (*)	ND	ND
1,2-DCE (total)	0.21 (*)	0.63 (*)	ND	ND	2.0 (*)	ND	0.87 (*)	ND (*)	ND	ND	0.61J (*)	ND (*)	ND	ND
Methylene Chloride	ND	ND	0.008	0.01	ND	0.013	ND	ND	0.009	ND	ND	0.006	0.023	ND
Acetone	ND	ND	0.02	0.016	ND	ND	0.033	ND	0.02	0.028	ND	ND	0.30 (*)	0.022
1,1-DCA	ND	ND	7.9 (*)	0.34 (*)	ND	ND	0.025	ND	ND	ND	0.21	ND	0.008	ND
Toluene	ND	ND	ND	0.01	ND	0.019	ND	ND	ND	ND	ND	ND	0.016	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.008	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.14	ND	ND	ND	ND
Total Xylenes	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.067	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.016	ND	ND	ND
PCE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.38	ND	ND	ND
1,1-DCE	ND	ND	ND	ND	ND	ND	0.007	ND	ND	ND	0.38	ND	ND	ND
1,1,2-TCA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.013	ND	ND	ND
(*) - Dilute Analysis	1 : 2	1 : 5	1 : 125	1 : 2	1 : 250		1 : 125	1 : 250			1 : 125	1 : 125	1 : 2	

Notes:

Laboratory Analysis for Volatile Organic Compounds using EPA SW 846 Method 8260A
ND - Not Detected - Below Laboratory Quantification Limit
DCA - dichloroethane
TCE - trichloroethylene
TCA - trichloroethane
DCE - dichloroethene
PCE - tetrachloroethene
J - Present - Below the Quantification Limit in the Diluted Analysis

TABLE 4
MW-1
Groundwater Analytical Results
Former Dowell Schlumberger Facility, Depew, New York

Volatile Compounds	Sep-96 (Mg/L)	Mar-97 (Mg/L)	Nov-97 (Mg/L)	Jul-98 (Mg/L)	Dec-98 (Mg/L)	Jul-99 (Mg/L)	Jan-00 (Mg/L)
Chloroethane	<0.005	<0.005	NA	<0.005	<0.005	<0.005	<0.001
Vinyl Chloride	<0.005	<0.005	NA	<0.005	<0.005	<0.005	<0.001
Methylene Chloride	0.020	<0.005	NA	0.003[B]	<0.005	<0.005	0.001[B]
Acetone	<0.010	<0.010	NA	<0.025	<0.01	<0.010	0.006[B]
1,1-Dichloroethene	<0.005	<0.005	NA	<0.005	<0.005	<0.005	<0.001
1,1-Dichloroethane	<0.005	<0.005	NA	<0.005	<0.005	<0.005	<0.001
1,2-Dichloroethene (total)	<0.005	<0.005	NA	<0.005	<0.005	<0.005	<0.001
1,2-Dichloroethane	<0.005	<0.005	NA	<0.005	<0.005	<0.005	<0.001
1,1,1-Trichloroethane	<0.005	<0.005	NA	<0.005	<0.005	<0.005	<0.001
Total VOCs	0.020	ND	NA	ND	ND	ND	ND

Notes

Volatile Organic Analysis by EPA SW846 Method 8260A

NA= Not Analyzed

[B] Qualified as non-detect due to blank contamination

TABLE 5
MW-2
Groundwater Analytical Results
Former Dowell Schlumberger Facility, Depew, New York

Volatile Compounds	Sep-96 (Mg/L)	Mar-97 (Mg/L)	Nov-97 (Mg/L)	Jul-98 (Mg/L)	Dec-98 (Mg/L)	Jul-99 (Mg/L)	Jan-00 (Mg/L)
Chloroethane	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001
Vinyl Chloride	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001
Methylene Chloride	**0.012**	<0.005	**0.007**	0.005[B]	<0.005	<0.005	0.001[B]
Acetone	**0.013**	<0.010	**0.014**	<0.025	<0.005	<0.010	0.005[B]
1,1-Dichloroethene	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001
1,1-Dichloroethane	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001
1,2-Dichloroethene (total)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001
1,2-Dichloroethane	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001
1,1,1-Trichloroethane	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001
Total VOCs	**0.015**	**ND**	**0.021**	**ND**	**ND**	**ND**	**ND**

Notes

Volatile Organic Analysis by EPA SW846 Method 8260A

ND=Not Detected

[B] Qualified as non-detect due to blank contamination

TABLE 6
MW-3
Groundwater Analytical Results
Former Dowell Schlumberger Facility, Depew, New York

Volatile Compounds	Sep-96 (Mg/L)	Mar-97 (Mg/L)	Nov-97 (Mg/L)	Jul-98 (Mg/L)	Dec-98 (Mg/L)	Jul-99 (Mg/L)	Jan-00 (Mg/L)
Chloroethane	<0.005	<0.005	**<0.005/0.010**	**0.021/<1**	**<0.005/0.006**	**0.007**	<0.200/<0.200
Vinyl Chloride	<0.005	<0.005	**<0.005/0.005**	**0.12/<1**	<0.005/<0.005	<0.005	<0.200/<0.200
Methylene Chloride	**0.011**	<0.005	**0.010/0.012**	0.005[B]/0.930[B]	<0.005/<0.005	<0.005	0.27[B]/0.33[B]
Acetone	<0.010	<0.010	**<0.010/0.030**	0.007[B]/<5	<0.010/<0.010	<0.010	1.0*[B]/1.0*[B]
1,1-Dichloroethene	<0.005	**0.019**	**0.013/0.028**	**0.068/<1**	**0.010/0.028**	**0.007**	**0.22*/0.28***
1,1-Dichloroethane	**0.48**	**7.7**	**14.0*/18.0***	**19/33**	**16/30**	**19.0***	**18.0*/20.0***
1,2-Dichloroethene (total)	<0.005	<0.005	**0.005/0.010**	**0.005/<1**	<0.005/<0.005	<0.005	<0.200/<0.200
1,2-Dichloroethane	<0.005	**0.005**	**.006/0.011**	**0.009/<1**	**0.006/0.010**	**0.006**	<0.200/<0.200
1,1,1-Trichloroethane	**0.1**	**1.000**	**2.0*/2.6***	**3.7/5.5**	**3.3/5.4**	**2.4***	**2.5*/2.6***
Total VOCs	**0.591**	**8.724**	**20.696**	**38.723**	**35.450**	**21.42**	**22.88**

Notes

Volitile Organic Analysis by EPA SW846 Method 8260A

<0.005 / 0.010 = Sample Result / Duplicate Rasult

(*) = Dilute Analysis

ND=Not Detected

[B] Qualified as non-detect due to blank contamination

TABLE 7
MW-4
Groundwater Analytical Results
Former Dowell Schlumberger Facility, Depew, New York

Volatile Compounds	Sep-96 (Mg/L)	Mar-97 (Mg/L)	Nov-97 (Mg/L)	Jul-98 (Mg/L)	Dec-98 (Mg/L)	Jul-99 (Mg/L)	Jan-00 (Mg/L)
Chloroethane	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001
Vinyl Chloride	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001
Methylene Chloride	0.012	<0.005	<0.005	0.005[B]	<0.005	<0.005	0.002[B]
Acetone	0.020	<0.010	<0.010	0.005[B]	<0.010	<0.010	0.006[B]
1,1-Dichloroethene	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001
1,1-Dichloroethane	<0.005	<0.005	<0.005	0.004	0.021	<0.005	<0.001
1,2-Dichloroethene (total)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001
1,2-Dichloroethane	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001
1,1,1-Trichloroethane	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001
Total VOCs	**0.032**	**ND**	**ND**	**0.004**	**0.021**	**ND**	**ND**

Notes

Volitile Organic Analysis by EPA SW846 Method 8260A

ND= Not Detected

[B] Qualified as non-detect due to blank contamination

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TEST BORING SB01 PAGE 1 OF 2

PROJECT NAME DS- Depew NY PROJECT NO. DD7531

LOCATION East of MW-3 GEOLOGIST DNM

BY DNM DRILLING CONTRACTOR Maxim Tech. DRILLER Phil Shmin

DATE DRILLING METHOD HSA RIG TYPE CME-75

CHK BY DRILLING START DATE 11/2/97 DRILLING COMPLETION DATE 11/2/97

DATE SURFACE ELEVATION STICK-UP ELEVATION

DEPTH FEET	SOIL SAMPLE NO.	REC. (IN.)	BL/6"	VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	OVA READING	DEPTH (FEET)	REMARKS
0	SS1	12	5 6 8 8	Loose, Brown, Coarse GRAVEL, Little Silt, Moist to Wet	F				
				Medium Stiff, Brown-Gray CLAY, Some Silt, Orange-Brown Mottles, Moist H.S. - 0 ppm	CL				
2	SS2	21	8 15 23 24	Very Stiff, Brown, SILT, Some Clay, Orange-Brown and Black Mottles, Moist, HS- 0ppm	ML				
4	SS3	14	17 13 18 26	Very Stiff, Brown SILT, Some Clay, Trace Gray Mottles, Moist, HS- 0.9 ppm	ML				Laboratory Sample: DSD-SB01-SS0406
6	SS4	22	36 35 39 40	Hard, Brown SILT, Some Clay, Trace Gray Mottles, Moist, HS- 0.9 ppm	ML				
8	SS5	13	10 16 21 24	Very Stiff, Brown SILT, Some Clay, Orange-Brown Mottles, Moist HS- 0 ppm	ML				
10	SS6	20	5 11 14 19	Stiff, Brown-Gray, SILT and CLAY, Moist, HS- 0 ppm	ML-CL				
12	SS7	21	21 19 15 16	Very Stiff, Brown-Gray, CLAY, Some Silt, Moist to Wet, HS 0 ppm	CL				
14									

ADDITIONAL REMARKS

HS- Headspace Analysis (PID - 11.8 eV Lamp) (ppm)

TEST BORING SB01 PAGE 1 OF 2

RADIAN INTERNATIONAL LLC

PROJECT NAME DS-Depew, NY PROJECT NO. 207531

LOCATION East of MW-3 GEOLOGIST DNM

DEPTH FEET	SOIL SAMPLE NO.	REC. (IN.)	BL./6"	VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	OVA READING	DEPTH (FEET)	REMARKS
14	SS8	23	3 5 6 7	Medium Stiff, Gray, SILT and CLAY, Trace Fine Gravel, Moist to Wet HS 0 ppm	ML- CL				
16	SS9	24	11 8 12 16	Stiff, Gray, CLAY, Some Silt, Trace Fine Gravel, Wet to Saturated HS 0ppm	CL				
18	SS10	18	2 6 9 11	Stiff, Gray, CLAY, Some Silt, Trace Fine Gravel, 1/2" Gravel in Shoe, Saturated, HS 0 ppm	CL				
20				EOB = 20.0'					

ADDITIONAL REMARKS

Boring backfilled w/ grout

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TEST BORING SBØ2 PAGE 1 OF 2

PROJECT NAME DSI Depew NY PROJECT NO. D07531

LOCATION Southeast of MW3 GEOLOGIST DNM

BY DNM DRILLING CONTRACTOR Maxim Tech DRILLER Phil Shinn

DATE DRILLING METHOD HSA RIG TYPE CME-75

CHK BY DRILLING START DATE 11/2/97 DRILLING COMPLETION DATE 11/2/97

DATE SURFACE ELEVATION STICK-UP ELEVATION

DEPTH FEET	SOIL SAMPLE NO.	REC. (IN.)	BL/6"	VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	OVA READING	DEPTH (FEET)	REMARKS
0	SS1	13	8 15 9 9	Medium Dense, Brown GRAVEL and SILT, Moist Stiff, Gray and Red-Brown SILT, Little to Some Clay, Moist HS - 0 ppm	F ML				
2	SS2	18	10 11 22 25	Stiff to Very Stiff, Red-Brown, SILT, Little Gray in Fractures, Trace Fine Gravel, Moist, HS - 0 ppm	ML				
4	SS3	16	10 13 20 24	Stiff, Very Stiff, Red-Brown SILT, Little Clay, Gray in Some Fractures, Moist, HS - 0.8 ppm	ML				
6	SS4	20	36 36 35 35	Hard, Red-Brown, SILT, Little Clay, Trace Fine Gravel, Gray in Some Fractures, Moist, HS - 1.7 ppm	ML				Laboratory Sample: DSD-SBØ2-SS-0608
8	SS5	21	5 12 18 19	Very Stiff, Red-Brown SILT, Little Clay, Trace Gray in Fractures, Moist, HS - 0.4 ppm	ML				
10	SS6	20	8 15 18 22	Very Stiff, Gray-Brown SILT, Some Clay, Trace Fine Gravel, Trace Orange-Brown Mottles, Moist, HS - 0 ppm	ML				
12	SS7	23	20 18 12 14	Very Stiff to Stiff, Gray-Brown CLAY, Little Silt, Trace Fine Gravel, Trace Orange-Brown Mottles, Moist to Wet HS - 0 ppm	CL				
14									

ADDITIONAL REMARKS

HS - Headspace Analysis (11.8 eV Lamp) (ppm)

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TEST BORING SB#2 PAGE 2 OF 2

PROJECT NAME DS - DePew NY PROJECT NO. 207531

LOCATION Southeast of MW-3 GEOLOGIST DNM

DEPTH FEET	SOIL SAMPLE NO.	REC. (IN.)	BL/6"	VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	OVA READING	DEPTH (FEET)	REMARKS
14	SS8	23	3 3 5 6	Soft to Medium Stiff, Brown-Gray, CLAY, Little Silt, Trace to Little Fine Gravel, Moist to Wet, HS 0ppm	CL				
16	SS9	23	9 10 12 14	Stiff, Gray, CLAY, Some Silt, Trace to Little Fine Gravel, Wet to Saturated, HS-0ppm	CL				
18	SS10	22	2 6 9 10	Medium Stiff to Stiff, Gray, CLAY, Little Silt, Trace to Little Fine to Coarse Sand and Fine Gravel, Saturated HS-0ppm	CL				
20				EOB = 20.0'					

ADDITIONAL REMARKS

Boring backfilled w/ grout

RADIAN INTERNATIONAL LLC

TEST BORING SB#3 — PAGE 1 OF 2

PROJECT NAME DS- Depew NY — PROJECT NO. 007531

LOCATION South of MW-3 — GEOLOGIST DNM

BY DNM — DRILLING CONTRACTOR Maxim Tech — DRILLER Phil Shinn

DATE — DRILLING METHOD HSA — RIG TYPE CME-75

CHK BY — DRILLING START DATE 11/2/97 — DRILLING COMPLETION DATE 11/2/97

DATE — SURFACE ELEVATION — STICK-UP ELEVATION

DEPTH FEET	SOIL SAMPLE NO.	REC. (IN.)	BL/6"	VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	OVA READING	DEPTH (FEET)	REMARKS
0	SS1	16	29 10 8 6	Medium Dense, Black-Brown, Medium to Coarse SAND, and Fine GRAVEL, Some Silt, Moist Loose, Black-Brown SILT, Little Fine to Medium Sand, Orange-Brown Mottles, Damp to Moist, HS-0 ppm	(F)				
2	SS2	16	10 12 16 16	Stiff to Very Stiff, Red-Brown SILT, Little Clay, Little Gray in Fractures, Moist, HS- 0 ppm	ML				
4	SS3	20	13 15 21 24	Very Stiff, Red-Brown, SILT, Little to Some Clay, Gray in Some Fractures, Moist, HS- 0 ppm	ML				
6	SS4	22	25 42 45 41	Hard, Red-Brown, SILT, Little Clay, Moist, HS- 8 ppm	ML				
8	SS5	20	8 12 18 28	Stiff to Very Stiff, Red-Brown, SILT, Some Clay, Trace Fine Gravel, Moist., HS- 0 ppm	ML				
10	SS6	23	5 11 15 18	Stiff to Very Stiff, Red-Brown, SILT, Some Clay, Trace Coarse Gravel, Moist, HS- 0 ppm	ML				
12	SS7	23	19 14 12 11	Stiff, Gray-Brown CLAY and SILT, Trace Fine Gravel, Moist to Wet, HS- 14 ppm	CL-ML				Laboratory Sample: DSD-SB#3-SS-1214
14									

ADDITIONAL REMARKS

TEST BORING SBØ3 PAGE 2 OF 2

RADIAN INTERNATIONAL LLC

PROJECT NAME DS - Depew NY PROJECT NO. Dn7531

LOCATION South of MW-3 GEOLOGIST DNM

DEPTH FEET	SOIL SAMPLE NO.	REC. (IN.)	BL/6"	VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	OVA READING	DEPTH (FEET)	REMARKS
14	SSB	23	3 4 5 6	Medium Stiff, Gray-Brown CLAY, Some Silt, Minor Gray Sandy Silt Seams, Wet to Saturated, HS-4 ppm	CL				
16	SSA	22	4 5 6 9	Medium Stiff, Brown-Gray CLAY, Little Silt, Trace Fine Gravel, Wet to Saturated, Hs-0 ppm	CL				Laboratory Sample: DSD-SBØ3-SS-1618
18	SS10	23	6 8 11 10	Medium Stiff to Stiff, Gray-Brown CLAY, Some Silt, Little Fine to Coarse Gravel, Trace Fine Sand, Saturated, Hs-0 ppm	CL				
20				EOB = 20.0'					

ADDITIONAL REMARKS

RADIAN INTERNATIONAL LLC

TEST BORING SB04 PAGE 1 OF 2

PROJECT NAME DS- Depew NY PROJECT NO. 007531

LOCATION Former Acid Plant GEOLOGIST DNM

BY DNM DRILLING CONTRACTOR MAXIM Technologies DRILLER Phil Shinn

DATE ____ DRILLING METHOD HSA RIG TYPE CME-75

CHK BY ____ DRILLING START DATE 11/3/97 DRILLING COMPLETION DATE 11/3/97

DATE ____ SURFACE ELEVATION ____ STICK-UP ELEVATION ____

DEPTH FEET	SOIL SAMPLE NO.	REC. (IN.)	BL/6"	VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	OVA READING	DEPTH (FEET)	REMARKS
0				HSA	(F)				
2	SS1	3	9 5 7 19	Medium Stiff to Stiff, Brown CLAY, Little Silt, Trace Gravel, Moist	CL				
4	SS2	0	28 27 27 28	No Recovery					
6	SS3	0		No Recovery	ML				
8	SS4	18	20 21 24 35	Very Stiff to Hard, Red-Brown SILT, Little Clay, Moist HS- 17 ppm	ML				Laboratory Sample: DSD-SB04-SS-0810
10	SS5	12	16 25 27 38	Very Stiff to Hard, Red-Brown SILT, Little Clay, Moist HS- 12.6 ppm	ML				
12	SS6	12	16 17 21 24	Very Stiff, Gray-Brown, SILT, Little Clay, Gray in Partings, Moist, HS- 5.4 ppm	ML				
14									

ADDITIONAL REMARKS

HS- Headspace Analysis (PID-11.8 eV Lamp)

RADIAN INTERNATIONAL LLC

TEST BORING SB04 PAGE 2 OF 2

PROJECT NAME DS-Depew NY PROJECT NO. 207531

LOCATION Former Acid Plant GEOLOGIST DNM

DEPTH FEET	SOIL SAMPLE NO.	REC. (IN.)	BL/6"	VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	OVA READING	DEPTH (FEET)	REMARKS
14	SS7	24	8 7 5 5	Medium Stiff, Gray-Brown, CLAY, Some Silt, Moist to Wet HS- 0ppm	CL				Laboratory Sample: DSI-SB04-SS-1416
16	SS8	23	9 10 11 12	Stiff, Gray, CLAY, Some Silt, Trace to Little Fine Gravel, Wet HS- 0 ppm	CL				
18	SS9	22	10 8 10 20	Stiff to Very Stiff, Gray-Brown CLAY, Some Silt, Trace to Little Fine to Coarse Gravel and Coarse Sand, Wet, HS- 0ppm	CL				
20				EOB = 20.0'					

ADDITIONAL REMARKS

Borehole Backfilled w/ Grout

RADIAN INTERNATIONAL LLC

TEST BORING SBØ5 PAGE 1 OF 2

PROJECT NAME D.S.-Depew, NY PROJECT NO. 207531

LOCATION Former Acid Plant GEOLOGIST DNM

BY DNM DRILLING CONTRACTOR MAXIM Technologies DRILLER Phil Shinn

DATE ____ DRILLING METHOD HSA 4 1/4" ID RIG TYPE CME-75

CHK BY ____ DRILLING START DATE 11/4/97 DRILLING COMPLETION DATE 11/4/97

DATE ____ SURFACE ELEVATION ____ STICK-UP ELEVATION ____

DEPTH FEET	SOIL SAMPLE NO.	REC. (IN.)	BL/6"	VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	OVA READING	DEPTH (FEET)	REMARKS
0	SS1	14	12 17 7 8	Medium Dense, Fine GRAVEL, Some Silt and Fine to Medium Sand	F				
				Medium Stiff, Brown and Gray SILT, Little Clay, Moist, HS- 1.2 ppm	ML				
2	SS2	6	7 8 9 8	Medium Stiff to Stiff, Red-Brown and Black-Brown SILT, Some Clay Moist, HS- 7.3 ppm					
4	SS3	0	12 50/0	No Recovery	ML				
6	SS4	15	29 15 20 24	Very Stiff, Red-Brown SILT, Little Clay, Gray in Some Fractures, Moist, HS- 29.5 ppm	ML				Laboratory Sample: DSD-SBØ5-SS-0608
8	SS5	19	16 16 20 31	Very Stiff, As Above HS- 25 ppm	ML				
10	SS6	20	8 16 18 31	Very Stiff, Red-Brown SILT, Little to Some Clay, Trace Fine Gravel, Gray in Few Fractures, Moist, HS- 33.7 ppm	ML				Laboratory Sample: DSD-SBØ5-SS-1012
12	SS7	22	32 35 45 36	Hard, Red-Brown, SILT, Some Clay, Orange-Brown Mottles, Trace Fine Gravel, 1/2" Diameter Gravel @ 13.0', Moist to Wet, HS- 8.1 ppm	ML				
14									

ADDITIONAL REMARKS HS- Headspace Analysis (PID-11.8 eV Lamp)

TEST BORING SB-05 PAGE 2 OF 2

RADIAN INTERNATIONAL LLC

PROJECT NAME DS - Depew NY PROJECT NO. 007531

LOCATION Former Acid Plant GEOLOGIST DNM

DEPTH FEET	SOIL SAMPLE NO.	REC. (IN.)	BL/6"	VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	OVA READING	DEPTH (FEET)	REMARKS
14	SS8	21	6 6 7 10	Medium Stiff to Stiff, Gray-Brown, Orange-Brown Mottles, SILT, Little to Some Clay, Trace Fine Gravel, Wet, HS - 0 ppm	ML				Laboratory Sample: DSD-SB05-SS-1416
16	SS9	20	12 9 13 17	Stiff to Very Stiff, Gray-Brown, SILT, Some Clay, Trace to Little Fine Gravel and Fine to Medium Sand, Wet, HS - 0 ppm	ML				
18	SS10	23	3 7 10 21	Soft to Very Stiff, Gray-Brown, SILT, Little Clay, Trace to Little, Fine to Medium Sand and Fine Gravel, Saturated @ 19.5'. HS - 0 ppm	ML				
20				EOB = 20.0'					

ADDITIONAL REMARKS

Borehole backfilled w/ Grout

RADIAN INTERNATIONAL LLC

TEST BORING SB06 PAGE 1 OF 2

PROJECT NAME DS-Depew, NY PROJECT NO. 007531

LOCATION Former Acid Plant GEOLOGIST DNM

BY DNM DRILLING CONTRACTOR MAXIMUM TECH. DRILLER Phil Shinn

DATE DRILLING METHOD HSA 4 1/4" ID RIG TYPE CME-75

CHK BY DRILLING START DATE 11/4/97 DRILLING COMPLETION DATE 11/4/97

DATE SURFACE ELEVATION STICK-UP ELEVATION

DEPTH FEET	SOIL SAMPLE NO.	REC. (IN.)	BL/6"	VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	OVA READING	DEPTH (FEET)	REMARKS
0	SS1	10	9 15 12 8	Medium Dense, Gray and Black, Fine to Coarse SAND and Fine to Coarse GRAVEL, Little Silt, Wet					
2	SS2	4	12 2 9 6	Loose to Medium Dense, As Above, Little Red-Brown Silt, Saturated					
4	SS3	12	3 7 12 13	Soft to Stiff, Red-Brown SILT, Little Clay, Gray in Fractures, Moist	ML				Laboratory Sample: DSD-SB06-SS-0406
6	SS4	20	14 23 27 30	Stiff to Very Stiff, Red-Brown SILT, Little Clay, Gray in Some Fractures, Moist	ML				
8	SS5	24	10 13 24 30	Stiff to Very Stiff, Red-Brown SILT, Little Clay, Trace Gray in Fractures, Moist	ML				
10	SS6	15	9 15 24 32	Stiff to Hard, Red-Brown SILT, Little to Some Clay, Moist	ML				
12	SS7	23	37 40 40 40	Hard, Red-Brown SILT, Some Clay, Trace Fine Gravel, Moist to Wet	ML				
14									

ADDITIONAL REMARKS

Borehole backfilled with bentonite-cement grout.

RADIAN INTERNATIONAL LLC

TEST BORING SBØ7 PAGE 1 OF 2

PROJECT NAME DS- Depew NY PROJECT NO. ØØ7531

LOCATION Former Acid Plant GEOLOGIST DNM

BY DNM DRILLING CONTRACTOR MAXIM TECH. DRILLER Phil Shinn

DATE ____ DRILLING METHOD HSA 4 1/4" ID RIG TYPE CME-75

CHK BY ____ DRILLING START DATE 11/4/97 DRILLING COMPLETION DATE 11/4/97

DATE ____ SURFACE ELEVATION ____ STICK-UP ELEVATION ____

DEPTH FEET	SOIL SAMPLE NO.	REC. (IN.)	BL/6"	VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	OVA READING	DEPTH (FEET)	REMARKS
0	SS1	4	1 2 1 3	Very Loose, Brown, Fine GRAVEL, Some Fine to Coarse Sand and Silt, Moist	GM				
2	SS2	0	50/2"	No Recovery					
4	SS3	14	14 24 23 22	Stiff to Very Stiff, Gray-Brown CLAY, Little Silt, Trace Fine Gravel and Fine Sand, Wet, HS- 6.9 ppm	CL				
6	SS4	19	23 24 27 29	Very Stiff, Red-Brown SILT, Some Clay, Trace Fine Gravel, Gray in Some Fractures, Moist, HS- 202 ppm	ML				
8	SS5	21	17 13 17 9	Stiff to Very Stiff, Red-Brown SILT, Little to Some Clay, Trace Fine Gravel, Moist, HS- 298 ppm	ML				Laboratory Sample: DSD-SBØ7-SS-0810
10	SS6	22	10 17 22 24	Stiff to Very Stiff, Brown, Little Orange-Brown Mottles, CLAY, Some Silt, Moist, HS- 179 ppm	CL				
12	SS7	24	30 31 37 42	Hard, Brown CLAY, Some Silt, Trace Fine Gravel, Moist to Wet, HS- 279 ppm	CL				
14									

HS- Headspace Analysis (PID- 11.8 eV) ppm

ADDITIONAL REMARKS

TEST BORING SB #7 PAGE 2 OF 2

RADIAN INTERNATIONAL LLC

PROJECT NAME DS - Depew NY PROJECT NO. 203531

LOCATION Former Acid Plant GEOLOGIST DNM

DEPTH FEET	SOIL SAMPLE NO.	REC. (IN.)	BL/6"	VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	OVA READING	DEPTH (FEET)	REMARKS
14	SS8	23	8 8 12 17	Stiff to Very Stiff, Gray-Brown CLAY, Little Silt, Trace Fine to Coarse Sand and Fine Gravel, Wet HS - 14.9 ppm	CL				
16	SS9	21	8 16 17 19	Stiff to Very Stiff, Gray-Brown CLAY, Trace Fine to Coarse Sand and Fine Gravel, Wet, HS - 13.7 ppm	CL				
18	SS10	23	9 9 9 14	Stiff, Gray-Brown CLAY, Little Fine Gravel and Silt, Trace Fine to Coarse Sand, Wet, HS - 33.5 ppm	CL				Laboratory Sample: DSD - SB#7 - SS - 1820
20				EOB = 20.0'					

Borehole backfilled w/ Bentonite - Cement Grout

ADDITIONAL REMARKS

RADIAN INTERNATIONAL LLC

TEST BORING SB-08 PAGE 1 OF 2

PROJECT NAME DS- Depew, NY PROJECT NO. 007531

LOCATION Former Acid Plant GEOLOGIST DNM

BY DNM DRILLING CONTRACTOR Maxim Technologies DRILLER Phil Shinn

DATE DRILLING METHOD HSA 4 1/4" ID RIG TYPE CME-75

CHK BY DRILLING START DATE 11/4/97 DRILLING COMPLETION DATE 11/4/97

DATE SURFACE ELEVATION STICK-UP ELEVATION

DEPTH FEET	SOIL SAMPLE NO.	REC. (IN.)	BL/6"	VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	OVA READING	DEPTH (FEET)	REMARKS
0	SS1	12	13 11 4 3	Medium Dense to Loose, Black-Gray Fine to Coarse Gravel, Medium to Coarse Sand, and Silt, Moist, FILL HS- 0 ppm	F				
2	SS2	8	5 1 1 3	Very Loose to Loose, Black-Gray Cinders, Medium to Coarse Sand, Some Silt, Moist, FILL, HS-0ppm	F				Laboratory Sample: DSD-SB08-SS-0204
4	SS3	13	3 4 6 13	Soft to Stiff, Orange-Brown SILT, Some Clay, Trace Medium Sand, Gray in Fractures, Moist, HS-0ppm	ML				
6	SS4	19	16 16 21 20	Very Stiff, Orange-Brown SILT, Little Clay, Gray in Fractures, Moist, HS- 0 ppm	ML				Laboratory Sample: DSD-SB08-SS-0608
8	SS5	23	8 15 19 25	Stiff to Very Stiff, Orange-Brown SILT, Some Clay, Gray in Some Fractures, Moist, HS- 0 ppm	ML				
10	SS6	23	8 15 21 31	Stiff to Very Stiff, Orange-Brown SILT, Some Clay, Trace Gray in Fractures, Moist, HS- 0 ppm	ML				
12	SS7	8	48 50/2"	Hard, As Above, HS- 0 ppm	ML				
14									

ADDITIONAL REMARKS

HS- Headspace Analysis (PID 11.8 eV Lamp)(ppm)

RADIAN INTERNATIONAL LLC

TEST BORING SB-08 PAGE 2 OF 2

PROJECT NAME DS - Depew, NY PROJECT NO. 007531

LOCATION Former Acid Plant GEOLOGIST DNM

DEPTH FEET	SOIL SAMPLE NO.	REC. (IN.)	BL/6"	VISUAL CLASSIFICATION AND REMARKS	PROFILE	STATIC WATER LEVEL (FT)	OVA READING	DEPTH (FEET)	REMARKS
14			7	Medium Stiff to Very Stiff, Red-Brown					
	558	23	18	CLAY, Few Orange-Brown Sandy	CL				
			16	Silt Seams, Moist to Wet, HS-0ppm					
16			7						
	559	21	17	Stiff to Very Stiff, Gray-Brown SILT,					
			14	Some Clay, Trace Fine to Medium					
			14	Sand and Fine Gravel, Wet	ML				
18			16	HS- 0 ppm					
	5510	20	15	Stiff to Very Stiff, As Above, Wet					
			13	HS- 0ppm	ML				
			12						
20			20						
				EOB = 20.0'					

Borehole backfilled with Bentonite-Cement Grout

ADDITIONAL REMARKS

PART B

QUALITY ASSURANCE PROJECT PLAN

TABLE OF CONTENTS

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TABLES

B1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) is designed to provide an overview of QA/QC procedures and programs which will be adhered to during the SI activities as described in the SI Work Plan. It will give specific methods and QA/QC procedures for chemical testing of environmental samples obtained from the site. In addition, it will ensure the quality of the data produced during the SI/RAR. All samples will be analyzed at a New York State DOH approved laboratory.

The URS organizational structure for this project is described in Section A4.0 of the SI Work Plan. It identifies the names of key project personnel. The URS QA/QC Officer is responsible for verifying that corporate QA procedures are followed. The Onsite Coordinator is responsible for verifying that QA procedures are followed in the field. This will provide for the valid collection of representative samples. The Project Chemist will be in direct contact with the analytical laboratory to monitor laboratory activities so that holding times and other QA/QC requirements are met.

In addition to overall project coordination, the Project Manager will be responsible for overseeing both the analytical and field QA/QC activities. The ultimate responsibility for maintaining quality throughout the project rests with the Project Manager.

The analytical laboratory proposed to be used for the analysis of aqueous and soil samples is Friend Laboratory, Inc. (FLI), Akron and Waverly, New York. FLI currently is certified by NYSDOH ELAP for the appropriate categories (i.e., CLP). The QA Manager of FLI will be responsible for performing project-specific audits and for overseeing the quality control data generated. Also, the FLI QA Manager will be in daily communication with the Project Chemist.

B2.0 DATA QUALITY OBJECTIVES

B2.1 Background

Data quality objectives (DQOs) are qualitative and quantitative statements which specify the quality of data required to support the SI for the site. DQOs focus on the identification of the end use of the data to be collected. The project DQOs will be achieved utilizing the definitive data category, as outlined in *Guidance for the Data Quality Objectives Process,* EPA QA/G-4 (September 1994). All sample analyses will provide definitive data which are generated using rigorous analytical methods, such as reference methods approved by the U.S. Environmental Protection Agency (USEPA). A summary of the analytical methods to be used are presented in Table B2-1.

The project DQOs for data collected during this SI are:

- to further characterize the site and determine the nature and extent of contamination;
- to identify, evaluate, and select a long-term remedial action that is cost-effective and environmentally sound;
- to maintain the highest possible scientific/professional standards for each procedure be maintained; and,
- to assure the ultimate defensibility of the data produced during the SI.

Soil and groundwater analytical results will be compared to the applicable SCGs that are protective of human health and the environment. For the soil matrix, the SCG's will be the NYSDEC's Technical and Administrative Guidance Memorandum (TAGM) 4046: *Determination of Soil Cleanup Objectives and Cleanup Levels* (dated January 1994, revised). For the groundwater matrix, the SCG's will be the NYSDEC's Technical and Operational Guidance Series (TOGS) 1.1.1: *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations* (dated June 1998).

TABLE B2-1
SUMMARY OF ANALYTICAL PARAMETERS
FORMER DOWELL SITE

Parameter	Method Number / Reference[1]	Estimated Number of Samples	QA/QC Samples		
			MS/MSD/MD/MSB	Rinse Blanks	Trip Blanks
IA. Groundwater (MW-1, 3 & 5)					
Target Compound List (TCL)					
Volatiles + TICs	ASP 95-1	3	1/1/0/1	1	1
TCL Semivolatiles + TICs	ASP 95-2	3	1/1/0/1	1	0
TCL Pesticides/PCBs	ASP 95-3	3	1/1/0/1	1	0
Target Analyte List (TAL) Metals (total) plus Cyanide	200.7 CLP-M/335.2 CLP-M	3			0
Total Petroleum Hydrocarbons	418.1	3	1/0/1/0	0	
IB. Groundwater (MW-2, 4, 6, 7& 8)					
TCL Volatiles + TICs	ASP 95-1	5	1/1/0/1	1	0
IC. Groundwater (Geoprobe)					
TCL Volatiles + TICs	ASP 95-1	8	1/1/0/1	0	2
II. Subsurface Soil					0
TCL Volatiles + TICs	ASP 95-1	16	1/1/0/1	1	
III. Sediment (Catch Basins & Sewerline)					
TCL Volatiles + TICs	ASP 95-1	4	0/0/0/0	0	0

NOTES:
[1]NYSDEC Analytical Services Protocol, 6/00 edition.

TIC – Tentatively Identified Compounds

B2.2 QA Objectives for Chemical Data Measurement

In order to achieve the definitive data category described above, the data quality indicators of precision, accuracy, representativeness, comparability, and completeness will be measured during offsite chemical analysis.

B2.2.1 Precision

Precision examines the distribution of the reported values about their mean. The distribution of reported values refers to how different the individual reported values are from the average reported value. Precision may be affected by the natural variation of the matrix or contamination within that matrix, as well as by errors made in field and/or laboratory handling procedures. Precision is evaluated using analyses of a laboratory matrix spike/matrix spike duplicate (for organics) and matrix duplicates (for inorganics), which not only exhibit sampling and analytical precision, but indicate analytical precision through the reproducibility of the analytical results. Relative Percent Difference (RPD) is used to evaluate precision. RPD criteria must meet the method requirements identified in Table B2-1.

B2.2.2 Accuracy

Accuracy measures the analytical bias in a measurement system. Sources of error are the sampling process, field contamination, preservation, handling, sample matrix, sample preparation, and analysis techniques. Sampling accuracy may be assessed by evaluating the results of rinse and trip blanks. These data help to assess the potential concentration contribution from various outside sources. The laboratory objective for accuracy is to equal or exceeds the accuracy demonstrated for the applied analytical methods on samples of the same matrix. The percent recovery criterion is used to estimate accuracy based on recovery in the matrix spike/matrix spike duplicate and matrix spike blank samples. The spike and spike duplicate, which will give an indication of matrix effects that may be affecting target compounds, are also a good gauge of method efficiency. For VOC analysis surrogate recovery results will also be measured. Acceptable ranges of recovery are reported in the referenced methods identified in Table B2-1.

B2.2.3 Representativeness

Representativeness expresses the degree to which the sample data accurately and precisely represent the characteristics of a population of samples, parameter variations at a sampling point, or environmental conditions. Representativeness is a qualitative parameter which is most concerned with the proper design of the sampling program or subsampling of a given sample. Objectives for representativeness are defined for sampling and analysis tasks and are a function of the investigative objectives (i.e., determination of vertical and horizontal extent of contamination). The sampling procedures, as described in the FSP (Part C), have been selected with the goal of obtaining representative samples for the media of concern.

B2.2.4 Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another. A DQO for this program is to produce data with the greatest possible degree of comparability. This goal is achieved through using standard techniques to collect and analyze representative samples and reporting analytical results in appropriate units. Complete field documentation using standardized data collection forms will support the assessment of comparability. Comparability is limited by the other parameters (e.g., precision, accuracy, representativeness, completeness, comparability) because only when precision and accuracy are known can data sets be compared with confidence. In order for data sets may be comparable, it is imperative that contract-required methods and procedures be explicitly followed.

B2.2.5 Completeness

Completeness is defined as a measure of the amount of valid data obtainable from a measurement system compared to the amount that was expected to be obtained under normal conditions. It is important that appropriate QA procedures be maintained to verify that valid data are obtained in order to meet project needs. For the data generated, a goal of 90% is required for completeness (or usability) of the analytical data. If this goal is not met, URS project personnel will determine whether the deviations might cause the data to be rejected.

B3.0 SAMPLING LOCATIONS, CUSTODY, HOLDING TIMES, AND ANALYSIS

Sampling locations and procedures are discussed in Section A2.0 of the Work Plan. Procedures addressing field and laboratory sample chain-of-custody and holding times are presented in Section C6.0 of the FSP. Table B3-1 of the contains sample methods and container, preservation, and holding time requirements. All analyses will be performed in accordance with the NYSDEC Analytical Services Protocol, 10/95 Edition.

Table B2-1 identifies the specific methods to be performed on the individual matrices. All holding times begin with validated time of sample receipt (VTSR) at the laboratory. The laboratory must meet the method required detection limits which are referenced within the methods listed in these tables.

TABLE B3-1
ANALYTICAL METHODS, CONTAINER, PRESERVATION, AND HOLDING TIME REQUIREMENTS
FORMER DOWELL FACILITY

PARAMETER	ANALYTICAL METHOD	VOLUME REQUIREMENT	PRESERVATION	HOLDING TIME*
Water				
TCL Volatiles	ASP 95-1	2 x 40 ml VOA vials	HCl to pH<2, Cool 4° C	10 days preserved
TCL Semivolatiles	ASP 95-2	2 x 1 L amber glass	Cool 4° C	5 days until extraction/40 days for analysis
TCL Pesticides/PCBs	ASP 95-3	2 x 1 L amber glass	Cool 4° C	5 days until extraction/40 days for analysis
TAL Metals (total)	ASP CLP-M	1 x 1 L plastic	HNO_3 to pH<2, Cool 4° C	6 months; 26 days for mercury
Cyanide	ASP CLP-M	1 x 1 L plastic	NaOH to pH >12, 0.6g Ascorbic Acid, Cool 4°C	12 days for analysis
TPH	418.1	1 x 1 L amber glass	HCl to pH <2, Cool 4° C	14 days
Soil/Sediment				
TCL Volatiles	ASP 95-1	2 x 4 oz. wide mouth glass	Cool 4° C	10 days

NOTES:

* - All holding times begin with the Validated Time of Sample Receipt (VTSR) at the laboratory.

New York State Department of Environmental Conservation, Analytical Services Protocol (ASP), 6/00 Edition.

B4.0 CALIBRATION PROCEDURES AND FREQUENCY

In order to obtain a high level of precision and accuracy during sample processing procedures, laboratory instruments must be calibrated properly. Several analytical support areas must be considered so the integrity of standards and reagents is upheld prior to instrument calibration. The following sections describe the analytical support areas and laboratory instrument calibration procedures.

B4.1 Analytical Support Areas

Prior to generating quality data, several analytical support areas must be considered:

Standard/Reagent Preparation - Primary reference standards and secondary standard solutions shall be obtained from National Institute of Standards and Technology (NIST), or other reliable commercial sources to verify the highest purity possible. The preparation and maintenance of standards and reagents will be accomplished according to the methods referenced in Table B2-1. All standards and standard solutions are to be formally documented (i.e., in a bound logbook) and should identify the supplier, lot number, purity/concentration, receipt/ preparation date, preparer's name, method of preparation, expiration date, and any other pertinent information. All standard solutions shall be validated prior to use. Care shall be exercised in the proper storage and handling of standard solutions (e.g., separating volatile standards from nonvolatile standards). The laboratory shall continually monitor the quality of the standards and reagents through well documented procedures.

Balances - The analytical balances shall be calibrated and maintained in accordance with manufacturer specifications. Calibration is conducted with two Class "S" weights that bracket the expected balance use range. The laboratory shall check the accuracy of the balances daily and they must be properly documented in permanently bound logbooks.

Refrigerators/Freezers – The temperature of the refrigerators and freezers within the laboratory shall be monitored and recorded daily. This will verify that the quality of the standards and reagents is not compromised and the integrity of the analytical samples is upheld.

Appropriate acceptance ranges (2 to 6° C for refrigerators) shall be clearly posted on each unit in service.

Water Supply System - The laboratory must maintain a sufficient water supply for all project needs. The grade of the water must be of the highest quality (analyte-free) in order to eliminate false-positives from the analytical results. Ultraviolet cartridges or carbon absorption treatments are recommended for organic analyses and ion-exchange treatment is recommended for inorganic tests. Appropriate documentation of the quality of the water supply system(s) will be performed on a regular basis.

B4.2 Laboratory Instruments

Calibration of instruments is required to verify that the analytical system is operating properly and at the sensitivity necessary to meet established quantitation limits. Each instrument for organic and inorganic analyses shall be calibrated with standards appropriate to the type of instrument and linear range established within the analytical method(s). Calibration of laboratory instruments will be performed according to methods specified in Table B2-1. In addition to the requirements stated within the analytical methods, the contract laboratory will be required to analyze an additional low level standard at or near the detection limits. In general, standards will be used that bracket the expected concentration of the samples. This will require the use of different concentration levels, which are used to demonstrate the instrument's linear range of calibration.

Calibration of an instrument must be performed prior to the analysis of any samples and then at periodic intervals (continuing calibration) during the sample analysis to verify that the instrument is still calibrated. If the contract laboratory cannot meet the method required calibration requirements, corrective action shall be taken as discussed in Section B7.0. All corrective action procedures taken by the contract laboratory are to be documented, summarized within the case narrative, and submitted with the analytical results.

B5.0 INTERNAL QUALITY CONTROL CHECKS

Internal QC checks are used to determine if analytical operations at the laboratory are in control, as well as determining the effect sample matrix may have on data being generated. Two types of internal checks are performed and are described as batch QC and matrix-specific QC procedures. The type and frequency of specific QC samples performed by the contract laboratory will be according to the specified analytical method and project specific requirements. Acceptable criteria and/or target ranges for these QC samples are presented within the analytical methods referenced in Table B2-1.

QC results which vary from acceptable ranges shall result in the implementation of appropriate corrective measures, potential application of qualifiers, and/or an assessment of the impact these corrective measures have on the established data quality objectives. Quality control samples including any project-specific QC will be analyzed are discussed below.

B5.1 Batch QC

Method Blanks - A method blank is defined as laboratory-distilled or deionized water that is carried through the entire analytical procedure. The method blank is used to determine the level of laboratory background contamination. Method blanks are analyzed at a frequency of one per analytical batch.

Matrix Spike Blank Samples - A matrix spike blank (MSB) sample is an aliquot of water spiked (fortified) with all the elements being analyzed for calculation of precision and accuracy to verify that the analysis that is being performed is in control. A MSB will be performed for each matrix and organic parameter only.

B5.2 Matrix-Specific QC

Matrix Spike Samples - An aliquot of a matrix is spiked with known concentrations of specific compounds as stipulated by the methodology. The matrix spike (MS) and matrix spike duplicate (MSD) are subjected to the entire analytical procedure in order to assess both accuracy and precision of the method for the matrix by measuring the percent recovery and relative percent

difference of the two spiked samples. The samples are used to assess matrix interference effects on the method, as well as to evaluate instrument performance. MS/MSDs are analyzed at a frequency of one each per 20 samples per matrix. MS/MSDs (an MS for metals only) will be performed for all parameters listed in Table B2-1.

Matrix Duplicates - The matrix duplicate (MD) is two representative aliquots of the same sample which are prepared and analyzed identically. Collection of duplicate samples provides for the evaluation of precision both in the field and at the laboratory by comparing the analytical results of two samples taken from the same location. Obtaining duplicate samples from a soil matrix requires homogenization (except for volatile organic compounds) of the sample aliquot prior to filling sample containers, in order to best achieve representative samples. Every effort will be made to obtain replicate samples; however, due to interferences, lack of homogeneity, and the nature of the soil samples, the analytical results are not always reproducible. Duplicate samples are to be included at a frequency of one per 20 samples per matrix for metals only, as required by the analytical method references in Table B2-1.

B5.3 Additional QC

Rinsate (Equipment) Blanks - A rinsate blank is a sample of laboratory demonstrated analyte-free water passed through and over the cleaned sampling equipment. A rinsate blank is used to indicate potential contamination from ambient air and from sample instruments used to collect and transfer samples. This water must originate from one common source within the laboratory and must be the same water used by the laboratory performing the analysis. The rinsate blank should be collected, transported, and analyzed in the same manner as the samples acquired that day. Rinsate blanks for nonaqueous matrices should be performed at a rate of 10 percent of the total number of samples collected throughout the sampling event. Rinse blanks will not be performed on samples (i.e., groundwater) where dedicated disposable equipment is used.

Trip Blanks - Trip blanks are not required for nonaqueous matrices. Trip blanks are required for aqueous sampling events. They consist of a set of sample bottles filled at the laboratory with laboratory-demonstrated analyte free water. These samples then accompany the bottles that are prepared at the lab into the field and back to the laboratory, along with the

collected samples for analysis. These bottles are never opened in the field. Trip blanks must return to the lab with the same set of bottles they accompanied to the field, and will be analyzed for volatile organic parameters. Trip blanks must be included at a rate of one per volatile sample shipment.

B6.0 CALCULATION OF DATA QUALITY INDICATORS

B6.1 Precision

Precision is evaluated using analyses of a field duplicate and/or a laboratory MS/MSD which not only exhibit sampling and analytical precision, but indicate analytical precision through the reproducibility of the analytical results. RPD is used to evaluate precision by the following formula:

$$RPD = \frac{(X_1 - X_2)}{[(X_1 + X_2)/2]} \times 100\%$$

where:

X_1 = Measured value of sample or matrix spike

X_2 = Measured value of duplicate or matrix spike duplicate

Precision will be determined through the use of MS/MSD (for organics) and matrix duplicates (for inorganics) analyses. RPD criteria for this project must meet the method requirements listed in Table B2-1.

B6.2 Accuracy

Accuracy is defined as the degree of difference between the measured or calculated value and the true value. The closer the numerical value of the measurement comes to the true value or actual concentration, the more accurate the measurement is. Analytical accuracy is expressed as the percent recovery of a compound or element that has been added to the environmental sample at known concentrations before analysis. Analytical accuracy may be assessed through the use of known and unknown QC samples and spiked samples. It is presented as percent recovery. Accuracy will be determined from matrix spike, matrix spike duplicate, and matrix spike blank samples, as well as from surrogate compounds added to organic fractions (i.e., volatiles, semivolatiles, PCB), and is calculated as follows:

$$Accuracy\ (\%R) = \frac{(X_s - X_u)}{K} \times 100\%$$

where:

X_s = Measured value of the spike sample

X_u = Measured value of the unspiked sample

K = Known amount of spike in the sample

B6.3 Completeness

Completeness is calculated on a per matrix basis for the project and is calculated as follows:

$$Completeness\ (\%C) = \frac{(X_v - X_n)}{N} \times 100\%$$

where:

X_v = Number of valid measurements

X_n = Number of invalid measurements

N = Number of valid measurements expected to be obtained

B7.0 CORRECTIVE ACTIONS

Laboratory corrective actions shall be implemented to resolve problems and restore proper functioning to the analytical system when errors, deficiencies, or out-of-control situations exist at the laboratory. Full documentation of the corrective action procedure needed to resolve the problem shall be filed in the project records, and the information summarized in the case narrative. A discussion of the corrective actions to be taken is presented in the following sections.

B7.1 Incoming Samples

Problems noted during sample receipt shall be documented by the laboratory. The URS Project Chemist shall be contacted immediately for problem resolution. All corrective actions shall be documented thoroughly.

B7.2 Sample Holding Times

If any sample extraction and/or analyses exceed method holding time requirements, URS Project Chemist shall be notified immediately for problem resolution. All corrective actions shall be documented thoroughly.

B7.3 Instrument Calibration

Sample analysis shall not be allowed until all initial calibrations meet the appropriate requirements. All laboratory instrumentation must be calibrated in accordance with method requirements. If any initial/continuing calibration standards exceed method QC limits, recalibration must be performed and, if necessary, reanalysis of all samples affected back to the previous acceptable calibration check.

B7.4 Reporting Limits

The laboratory must meet the method required detection limits listed in Table B2-1. If difficulties arise in achieving these limits due to a particular sample matrix, the laboratory must notify URS project personnel for problem resolution. In order to achieve those detection limits, the laboratory must utilize all appropriate cleanup procedures in an attempt to retain the project required detection limits. When any sample requires a secondary dilution due to high levels of target analytes, the laboratory must document all initial analyses and secondary dilution results. Secondary dilution will be permitted only to bring target analytes within the linear range of calibration. If samples are analyzed at a secondary dilution with no target analytes detected, URS Project Chemist will be immediately notified so that appropriate corrective actions can be initiated.

B7.5 Method QC

All QC, including blanks, matrix duplicates, matrix spikes, matrix spike duplicates, surrogate recoveries, matrix spike blank samples, and other method-specified QC samples, shall meet the method requirements referenced in Table B2-1. Failure of method-required QC will result in the review and possible qualification of all affected data. If the laboratory cannot find any errors, the affected sample(s) shall be reanalyzed and/or re-extracted/redigested, then reanalyzed within method-required holding times to verify the presence or absence of matrix effects. If matrix effect is confirmed, the corresponding data shall be flagged accordingly using the flagging symbols and criteria. If matrix effect is not confirmed, then the entire batch of samples may have to be reanalyzed and/or re-extracted/redigested, then reanalyzed at no cost to the URS. URS shall be notified as soon as possible to discuss possible corrective actions should unusually difficult sample matrices be encountered.

B7.6 Calculation Errors

All analytical results must be reviewed systematically for accuracy prior to submittal. If upon data review calculation and/or reporting errors exist, the laboratory will be required to reissue the analytical data report with the corrective actions appropriately documented in the case narrative.

B8.0 DATA REDUCTION, VALIDATION, AND USABILITY

For all NYSDEC ASP analyses NYSDEC ASP Category B deliverable requirements will be employed for documentation and reporting of all data. The standard NYSDEC report forms (see Appendix) will be completed by the analytical laboratory and included in the deliverable data packages.

B8.1 Data Reduction

Laboratory analytical data are first generated in raw form at the instrument. These data may be either in a graphic or printed tabular format. Specific data generation procedures and calculations are found in each of the referenced methods. Analytical results must be reported consistently. Data for water samples will be reported in concentrations of micrograms per liter (µg/L). Data for soils will be reported in concentrations of micrograms per kilogram (µg/kg) for organics and milligrams per kilogram (mg/kg) for inorganics and reported on a dry weight basis.

Identification of all analytes must be accomplished with an authentic standard of the analyte traceable to NIST or USEPA sources. Data reduction will be performed by individuals experienced with a particular analysis and knowledgeable of requirements.

B8.2 Data Validation

Data validation is a systematic procedure of reviewing a body of data against a set of established criteria to provide a specified level of assurance of validity prior to its intended use. Data validation will be performed by environmental chemists under the supervision of the QA/QC Officer. All analytical samples collected will receive a limited data review. The data validation will be limited to a review of holding times, completeness of all required deliverables, review of QC results (surrogates, spikes, duplicates) and a 10% check of all samples analyzed to ensure they were analyzed properly. The methods referenced in Table B3-1 as well as the general guidelines presented in the following documents will be used to aide the chemist during the data review USEPA *Contract Laboratory Program (CLP) Organic Data Review, SOP Nos. HW-6, Revision #11* and USEPA *Evaluation of Metals Data for the Contract Laboratory Program* based on 3/90, SOW, Revision XI. These documents will be used with the following exceptions:

- Technical holding times will be in accordance with NYSDEC ASP, 10/95 edition;

- Tentatively identified compounds (TICs) will be qualified by the analytical laboratory only;

- Organic calibration and QC criteria will be in accordance with NYSDEC ASP, 10/95 edition. Data will be qualified if it does not meet NYSDEC ASP, 10/95 criteria.

Where possible, discrepancies will be resolved by URS chemists (i.e., no letters will be written to laboratories). A complete analytical data validation is not anticipated. However, if the initial limited data audit reveals significant deviations and problems with the analytical data. URS may recommend a complete variation of the data.

B8.3 Data Usability

Two sets of data usability tables will be submitted. One set of tables will be unqualified data, only detected values reported, which will be incorporated into the text of the SI report. The second set of tables will contain data qualified with validation qualifiers with cross-references made to the associated method, trip, and field samples. These validation summary tables will be included the Data Useability Summary Report (DUSR). The DUSR will obtain information regarding deviations, discrepancies and unusable data along with the validation summary tables.

B9.0 PREVENTIVE MAINTENANCE AND PERFORMANCE/SYSTEM AUDITS

B9.1 Preventative Maintenance

The laboratory is responsible for the maintenance of its analytical equipment. Preventive maintenance is provided on a regular basis to minimize down-time and the potential interruption of analytical work. Instruments are maintained in accordance with the manufacturer's recommendations. If instruments require maintenance, only trained laboratory personnel or manufacturer-authorized service specialists are permitted to do the work. Maintenance activities will be documented and kept in permanent logs. These logs will be available for inspection by auditing personnel.

B9.2 Performance/System Audits

Audits will include a careful evaluation of both field and laboratory quality control procedures and will be performed before or shortly after systems are operational. The audits will be conducted by an individual who is technically knowledgeable about the operation(s) under review. Performance audits are conducted by introducing control samples into the data production process. These control samples may include performance evaluation samples, field samples spiked with known amounts of analyte, and split field samples that are analyzed by two or more analysts within or outside the organization.

Systems audits are onsite qualitative inspections and reviews of the quality assurance system used by some part of or the entire measurement system. They provide a quantitative measure of the quality of the data produced by one section or the entire measurement process. The audits are performed against a set of requirements, which may be a quality assurance project plan or work plan, a standard method, or a project statement of work. The primary objective of the systems audits is to verify that the QA/QC procedures are being followed.

B9.2.1 Performance and External Audits

In addition to conducting internal reviews and audits, as part of its established quality assurance program, the laboratory is required to take part in regularly-scheduled performance evaluations and laboratory audits from state and federal agencies. They are conducted as part of the certification process and to monitor the laboratory performance. The audits also provide an external quality assurance check of the laboratory and provide reviews and information on the management systems, personnel, standard operating procedures, and analytical measurement systems. Acceptable performance on evaluation samples and audits is required for certification and accreditation. The laboratory shall use the information provided from these audits to monitor and assess the quality of its performance. Problems detected in these audits shall be reviewed by the QA Manager and Laboratory Management, and corrective action shall be instituted as necessary.

B9.2.2 Systems/Internal Audits

As part of its quality assurance program, the Laboratory QA Manager shall conduct periodic checks and audits of the analytical systems. The purpose of these is to verify that the analytical systems are working properly, and that personnel are adhering to established procedures and documenting the required information. These checks and audits also assist in determining or detecting where problems are occurring.

The QA Manager periodically will submit laboratory control samples. These samples will serve to check the entire analytical method, the efficiency of the preparation method, and the analytical instrument performance. The results of the control samples are reviewed by the QA Manager who reports the results to the analyst and the Laboratory Director. When a problem is indicated, the QA Manager will assist the analyst and laboratory management in determining the reason and in developing solutions. The QA Manager will also recheck the systems as required.

REFERENCES

Comprehensive Environmental Response Compensation and Liability Act (CERCLA) Quality Assurance Manual, Final Copy, Revision 1, October 1989.

National Enforcement Investigations Center of USEPA Office of Enforcement. *NEIC Policies and Procedures.* Washington: USEPA.

New York State Department of Environmental Conservation (NYSDEC). 1995. *Analytical Services Protocol* (ASP), 10/95 Edition. Albany: NYSDEC.

USEPA. 1987. *A Compendium of Superfund Field Operations Methods,* EPA/540/P-87-001, (OSWER Directive 9355.0-14). December. Cincinnati, OH: USEPA.

USEPA. 1994. *Guidance for the Data Quality Objective Process,* EPA QA/G-4. September. Washington: USEPA.

PART C

FIELD SAMPLING PLAN

TABLE OF CONTENTS

C1.0 INTRODUCTION

This Field Sampling Plan (FSP) is designed to provide detailed step-by-step procedures for the field activities outlined in the SI Work Plan for the Former Dowell Facility. It will serve as the field procedures manual to be strictly followed by all URS personnel. Adherence to these procedures will ensure the quality and defensibility of the field data collected. In addition to the field procedures outlined in this document, all personnel performing field activities must do so in compliance with: (1) the appropriate Health and Safety guidelines found in the Health and Safety Plan (Part D); (2) the Quality Assurance/Quality Control measures outlined in Part B; (3) the scope of work outlined in the SI Work Plan (Part A); and (4) the time schedule outlined in the SI Work Plan.

C2.0 MOBILIZATION

A centralized decontamination area with a decontamination pad will be constructed near the site entrance to decontaminate vehicles/heavy equipment/drill rigs entering and leaving the site. The decontamination area will be large enough to allow storage of cleaned equipment and materials prior to use, as well as to stage drums of contaminated material. Drums of decontamination fluids and investigation derived wastes will be stored on pallets covered with plastic sheeting in the decontamination area.

Proposed sampling locations will be staked, labeled and flagged prior to sampling. Utilities in areas designated for intrusive activities will be cleared through the Underground Facilities Protective Organization (UFPO). Vehicle access routes to drilling and boring locations shall be determined and cleared prior to any field activities.

C3.0 SUBSURFACE INVESTIGATION

C3.1 General Drilling Program

The subsurface investigation program will provide information which will assist in geologic, geotechnical, hydrogeological, and chemical site interpretation. Twenty-three Geoprobe borings and four monitoring wells are proposed as part of the subsurface program.

A list of applicable investigation and monitoring well installation procedures, and the appropriate section where they are discussed, follows:

- hollow-stem auger drilling procedures (Section C3.2);
- split-spoon sampling procedures (Section C3.3);
- Geoprobe procedures (Section C3.4)
- disposal of drill cuttings (Section C3.5);
- well construction procedures (Section C3.6);
- well development procedure (Section C3.7);
- slug testing (Section C3.8); and
- documentation (Section C3.9);

C3.2 Hollow-Stem Auger Drilling Procedures

Summary: A standard method of subsurface drilling which enables the recovery of representative subsurface samples for identification and laboratory testing.

Procedure:

1) Advance the boring by rotating and advancing the augers the desired distance into the subsurface. The borings will be advanced incrementally to permit continuous or intermittent sampling as required.
2) Remove center plug from augers and sample subsurface per method stipulated by the project geologist or hydrogeologist. Sampling methods are presented in Section C3.3.

Reference: American Society of Testing Materials (ASTM) Standard Practice for Soil Investigation and Sampling by Auger Borings D1452-80, and Standard Method for Penetration Test and Split Barrel Sampling of Soils D1586-84.

C3.3 Split-Spoon Sampling Procedures

Summary: Split-spoon sampling is a standard method of soil sampling to obtain representative samples for identification and laboratory testing as well as to serve as a measure of resistance of soil to sampler penetration.

Procedure:

1) Measure the sampling equipment lengths to ensure that they conform to specifications. Confirm the weight of the hammer (140 pounds.).
2) Clean out the auger flight to the bottom depth prior to sampling. Select additional components as required (i.e., leaf spring core retainer for clays or a sand trap for non-cohesive sands).
3) Lower the sampler to the bottom of the auger column and check the depth against length of the rods and the sampler.
4) Attach the drive head and hammer to the drill rods without the weight resting on the rods.
5) Lower the weight and allow the sampler to settle up to 6 inches. If it settles more, consider use of another sampler.
6) Mark four 6-inch intervals on the drill rods relative to a drive reference point on the rig. With the sampler resting on the bottom of the hole, drive the sampler with the 140 pound hammer falling freely over its 30-inch fall until 24 inches have been penetrated or 100 blows applied.
7) Record the number of blows per 6 inches. Determine the "N" value by adding the blows for the 6-to 12-inch and 12-to 18-inch interval of each sample attempt.
8) After penetration is complete, remove the sampler.
9) Open sampler and describe the soil.
10) Document all properties and sample locations in the field notebook and later on the Boring Log form (Appendix A).

11) Place sample in suitable container, label (Section C10.0), and store on site until onsite work has been completed, at which time the samples will be properly disposed.

Reference: American Society of Testing Materials (ASTM) Standard Method for Penetration Test and Split Barrel Sampling of Soils D1586-84.

C3.3.1 Unified Soil Classification System

Soils are classified for engineering purposes according to the Unified Soil Classification System (USCS) adopted by the U.S. Army Corps of Engineers and U.S. Department of the Interior Bureau of Reclamation. Soil properties which form the basis for the USCS are:

- Percentage of gravel, sand, and fines;
- Shape of the grain-size distribution curve; and
- Plasticity and compressibility characteristics.

According to this system, all soils are divided into three major groups: coarse-grained, fine-grained, and highly-organic (peaty). The boundary between coarse-grained and fine-grained soils is taken to be the 200-mesh sieve (0.074 mm). In the field the distinction is based on whether the individual particles can be seen with the unaided eye. If more than 50% of the soil by weight is judged to consist of grains that can be distinguished separately, the soil is considered to be coarse-grained.

The coarse-grained soils are divided into gravelly (G) or sandy (S) soils, depending on whether more or less than 50% of the visible grains are larger than the No. 4 sieve (3/16 inch). They are each divided further into four groups:

W: Well graded; fairly clean (<5% finer than 0.074 mm)

P: Poorly graded (gap-graded); fairly clean (<5% finer than 0.074mm)

C: Clayey (>12% finer than 0.074mm); plastic (clayey) fines. Fine fraction above the A- line with plasticity index above 7.

M: Silty (>12% finer than 0.074 mm); nonplastic or silty fines. Fine fraction below the A- line and plasticity index below 4.

The soils are represented by symbols such as GW or SP. Borderline materials are represented by a double symbol, as GW-GC.

The fine-grained soils are divided into three groups: inorganic silts (M), inorganic clays (C), and organic silts and clays (O). The soils are further divided into those having liquid limits lower than 50% (L), or higher than 50% (H).

The distinction between the inorganic clays (C), the inorganic silts (M), and organic soils (O) is made on the basis of a modified plasticity chart. Soils CH and CL are represented by points above the A-line, whereas soils OH, OL, and MH correspond to positions below the A-line. Soils ML, except for a few clayey fine sands, are also represented by points below the A-line. The organic soils O are distinguished from the inorganic soils M and C by their characteristic odor and dark color.

C3.3.2 Visual Identification

Soil properties required to define the USCS classification of a soil are the primary features to be considered in field identification. These properties and other observed characteristics normally identified in describing a soil are defined below:

a. Color
b. Moisture conditions
c. Grain size
    (1) Estimated maximum grain size
    (2) Estimated percent by weight of fines (material passing No. 200 sieve)
d. Gradation
e. Grain shape
f. Plasticity
g. Predominant soil type

h. Secondary components of soil

i. Classification symbol

j. Other features such as:

- organic, chemical, or metallic content;
- compactness;
- consistency;
- cohesiveness near plastic limit;
- dry strength; and source - residual, or transported (aeolian, water borne, glacial deposit, etc.)

C3.4 Geoprobe Procedures

A Geoprobe direct push sampling system will be used to complete the twenty-three soil borings and collect soil and groundwater samples. The Geoprobe does not bring subsurface soil to the surface as does conventional hollow stem augering.

Procedure:

1) Inspect the sampling equipment (macrocore) to ensure proper working condition.
2) Select additional components for the sampler as required (i.e., leaf spring core retainer for clays, or a sand trap for non-cohesive sands).
3) Lower the sampler to the ground surface, or bottom of hole previously made by the sampler, and check the depth against length of the rods and the sampler.
4) Attach the drive head assembly to the sample rods.
5) Push sampler into the subsurface with a hydraulic press.
6) After penetration is complete, rotate the sampling rods clockwise and remove the sampler.
7) Extrude the sample, describe the soil, and collect any necessary samples into appropriate containers and label the containers. The sample fraction with obvious soil staining or highest organic vapor concentration will be collected for analysis.

8) Groundwater samples will be collected by inserting 3/16 ID tubing through the hollow Geoprobe rods. Groundwater will be brought to the surface using a vacuum pump and will be placed into appropriate sample vials.

9) Document all soil descriptions and sample information in the sampling log book.

C3.5 Disposal of Drill Cuttings

Summary: Disposal of drill cuttings will be performed in accordance with New York State Department of Environmental Conservation Technical and Administrative Guidance Memorandum (TAGM) HWR-89-4032, November 21, 1989.

Procedure:

1) Cuttings will be stored/disposed on site in bulk and monitored for volatile emissions and fugitive dust with on site instruments. If any action level specified in the HASP is exceeded, corrective action such as an interim cover or placement in containers will be implemented.

2) If wastes are present in the cuttings, cuttings will be placed in a segregated storage or disposal area.

3) Drill cuttings generated near or adjacent to the site will be collected and transported to the site for disposal.

4) If materials are found to be hazardous, cuttings will be disposed of off site at a properly permitted treatment, storage or disposal facility.

C3.6 Well Construction Procedures

Summary: A method for construction of groundwater monitoring wells within unconsolidated material which enables monitoring of groundwater elevation and acquisition of groundwater samples for laboratory testing. Four monitoring wells will be installed during this SI using the procedures described below.

Procedure:

1) Advance subsurface boring to the desired depth by means of hollow-stem auger drilling.

2) Remove center plug from augers and verify borehole depth using weighted measuring tape.

3) Add washed and graded medium sand as needed to base of borehole.

4) Insert the well screen and riser pipe into borehole through the hollow stem augers. Cap the riser to prevent well construction materials from entering the well.

5) Add sand to screen section of well while slowly removing augers. Sand pack should extend at least two feet above the top of the screen section. Measure with a tape.

6) Slowly add bentonite pellet seal to borehole as augers are slowly removed. The bentonite seal should extend at least two feet above the top of the sand pack section. Measure with tape.

Note: The rate of removal of the auger from the borehole should closely follow the rate that the sand pack and bentonite pellets fill the borehole.

7) If bentonite seal is placed above the groundwater level within the borehole, add water to the borehole to hydrate the bentonite pellets. Allow pellets to hydrate for at least 30 minutes.

8) Mix cement/bentonite grout per Manufacturer's specifications.

9) Add grout to borehole through tremie pipe or hose from the top of the bentonite seal to the ground surface.

10) Remove remaining augers from the borehole.

11) Top off grout in borehole. Grout should extend to approximately two feet below ground surface.

12) Cut well riser pipe to about three feet above the ground surface for stickup type wells. Flush-mount well risers should be cut off just below surface grade.

13) Backfill the remaining two feet of the borehole with concrete.

14) Install a protective casing over the well riser pipe and set it into the concrete backfill.

15) Lock the protective casing cover.

16) Document well construction in the field notebook and later on a Monitoring Well Construction Detail diagram (Appendix A).

C3.7 Well Development Procedures

Summary: Following completion of drilling and well installation, each monitoring well will be developed by pumping until the discharged water is relatively sediment free and the indicator parameters (pH, temperature, and specific conductivity) have reached steady state. Developing the well not only removes any sediment but also may improve the hydraulic properties of the formation. The effectiveness of the development measures will be closely monitored in order to keep the volume of discharged water to the minimum necessary to obtain sediment-free samples. A portable turbidimeter will be used to monitor effectiveness of development. A turbidity reading of < 50 Nepheliomatic Turbidity Units (NTU) and steady state pH, temperature, and specific conductivity readings will be used as a guide for discontinuing well development.

Procedure:

1) An appropriate well development method should be selected, depending on water level depth, well productivity, and sediment content of water. Well development options include: (a) manual pumping; and (b) powered suction-lift or hydrolift pumping.
2) Equipment should be assembled, decontaminated (if necessary), and installed in the well. Care should be taken not to introduce contaminants to the equipment during installation.
3) Well development should proceed by repeated removal of water from the well until the discharged water is relatively sediment-free. All development waters will be containerized. Effectiveness of development should be monitored at regular intervals using a portable turbidimeter. Volume of water removed and turbidity, pH, temperature, and conductivity measurements will be recorded on a Well Development/Purging Log form (Appendix A).
4) Well development will be discontinued when the turbidity of the discharged water is below 50 NTU and the other indicator parameters have stabilized.

C3.8 Slug Testing Procedures

Summary: Slug testing is a rapid and inexpensive procedure for estimating the horizontal hydraulic conductivity of an aquifer material screened by a monitoring well. Equipment consists of dedicated/disposable nylon rope, a decontaminated stainless steel slug and pressure transducer, a Hermit Data logger, and a water level indicator.

Procedure (rising-head test):

1) Record the initial water level in the well (static water level).
2) Lower the pressure transducer into the well to the well bottom. Pull the transducer up one foot. Connect the transducer to the Hermit Data Logger.
3) Insert a stainless steel slug into the well, below the water table, with nylon rope. Allow the water level in the well to return to static condition.
4) Monitor water level recovery in the well with the Hermit Data Logger until the static water level has recovered.
6) Download data from the Hermit Data Logger and record the data in the field notebook. Review the data to verify that the slug test was successful.
7) Remove equipment from the well and decontaminate.
8) Analyze the data in office using a computer.

C3.9 Documentation

Each subsurface boring will be logged in a bound field notebook during drilling by the supervising geologist. Field notes will include descriptions of subsurface materials encountered during drilling, sample numbers, and types of samples recovered from the borehole. Additionally, the geologist will note time and material expenditures for later verification of contractor invoices.

Upon completion of daily drilling activities, the geologist will complete the daily drilling record form and initiate chain-of-custody on any samples recovered for chemical laboratory testing. Following completion of the drilling program, the geologist will transfer field notes onto standard forms for the SI report.

On a weekly basis the project geologist will submit a summary report to the project manager containing at a minimum the following: (1) a summary of the daily drilling records; (2) progress report on field activities; and (3) a record of site visitors.

The proper completion of the following forms/logs will be considered correct procedure for documentation during the drilling program:

1) Field Log Book - weather-proof hand-bound field book
2) Daily Drilling Records (Appendix A)
3) Test Pit and Boring Logs (Appendix A)
4) Monitoring Well Construction Details and Piezometer Installation Diagrams (Appendix A)

C4.0 GROUNDWATER WELL PURGING/SAMPLING

Summary: To collect representative groundwater samples, groundwater wells must be adequately purged prior to sampling. Purging will require the removal of three to five volumes of standing water in rapidly recharging wells and at least one volume from wells with slow recharge rates. Shallow wells in which the screen intersects the water table should require a minimum amount of purging since the groundwater would flow through the screen and not be entrapped in the casing. Deeper wells should be purged more thoroughly since they may be located in confined aquifers and water may rise up into the casing. A thorough purging would require the removal of several volumes of this trapped water to ensure that representative groundwater is brought into the casing for sampling. Sampling should commence immediately after purging as soon as adequate recharge has occurred.

Groundwater sampling locations and frequency of sampling are defined in Section A 2.2.3 of the SI Work Plan. The wells will be sampled following procedures found in Section C4.2. The samples will be labeled and shipped following procedures outlined in Sections C7.0 and C8.0 and analyzed according to the program outlined in the SI Work Plan.

C4.1 Well Purging Procedures

1) The well cover will be unlocked and carefully removed to avoid having any foreign material enter the well. The interior of the riser pipe will be monitored for organic vapors using a photoionization detector (PID). If a reading of greater than 5 ppm is recorded, the well will be vented until levels are below 5 ppm before purging begins.
2) Using an electronic water level detector, the water level below top of casing will be measured. Knowing the total depth of the well, it will be possible to determine the volume of water in the well. The end of the probe will be soap-and-water-washed and deionized-water-rinsed between wells.
3) On wells with water levels that remain 25 feet or less below the top of casing, a suction-lift pump will be used to remove three to five times the well volume, measured into a calibrated pail. (A well volume will be defined as the volume of water standing inside the casing measured prior to evacuation.) Dedicated new

polyethylene discharge and intake tubing (½" I.D. high-density polyethylene [HDPE]) will be used for each well.

During this evacuation of the well, the intake opening of the pump tubing will be positioned just below the surface of the well water. If the water level drops, then the tubing will be lowered as needed to maintain flow. Pumping from the top of the water column will ensure proper flushing of the well. Pumping will continue until the required volumes are removed. All water removed from the well will be containerized.

If the well purges to dryness and recharges rapidly (within 15 minutes), water will continue to be removed as it recharges until the required volumes are removed. If the well purges to dryness and is slow to recharge (greater than 15 minutes), evacuation will be terminated.

A dedicated HDPE bailer could also be used to evacuate the well. The line for the bailer will be dedicated new ¼-inch nylon. The bailers and rope would be discarded after use.

An optional method to purge deeper wells will be the use of the Waterra Hydrolift pump with dedicated HDPE tubing and check valve.

4) Purging will continue until three to five well volumes of water have been removed. The discharge volume will be established on a well-by-well basis. Measurements for pH, temperature, turbidity, and specific conductivity will be recorded during purging. The stability of these measurements with time will also be used to guide the decision to discontinue purging.

5) Well purging data are to be recorded in the field notebook and on the Well Development/Purging Log (Appendix A).

C4.2 Groundwater Sampling Procedures

1) Well sampling may be performed on the same date as purging at any time after the well has recovered sufficiently to sample, or within 24 hours after evacuation, if the well recharges slowly. If a well does not contain or yield sufficient volume

for all required laboratory analytical testing (including quality control), then a decision will be made to prioritize analyses. If a well takes longer than 24 hours to recharge, then a decision will be made whether or not the sample will be considered valid.

2) After well purging is completed and the well has recharged sufficiently per the previous item, a sample will be collected into appropriate containers using a dedicated teflon bailer. The bailer will have a 5-foot teflon-coated stainless steel "leader" which will be attached to a clean, dedicated ¼-inch nylon line. The bailer will be lowered below the surface of the water so as to allow the water to touch only the "leader" and not the nylon rope.

3) All sample bottles will be labeled in the field using a waterproof permanent marker. Procedures outlined in Sections C7.0 will be followed. Labels will include:

- Site name
- Sample identification code
- Project number
- Date/time
- Sampler's initials
- Preservation added (if any)
- Analysis to be performed

4) Samples will be collected into verifiably clean sample bottles (containing required preservatives) and placed on ice in coolers for processing (preservation and packing) prior to shipment to the analytical laboratory. Chain-of-custody will be initiated. The analytical laboratory will certify that the sample bottles are analyte-free.

5) A separate sample of approximately 200 mls will be collected into a 16-ounce plastic bottle to measure pH, conductivity, turbidity, and temperature of the groundwater sample in the field.

6) Well sampling data are to be recorded in the field notebook and on the Well Development/Purging Log (Appendix A).

C4.3 Water Level Monitoring Procedures

Summary: Determination of groundwater surface elevations throughout a monitoring well network makes possible the construction of a potentiometric surface contour map and determination of groundwater flow patterns.

Water levels in all monitoring wells will be measured using an electronic water level indicator or weighted tape. Initially, measurements will be taken following well development until the well has recovered to anticipated static conditions. Water levels will also be measured prior to groundwater sampling. Water level measurement procedures are presented below.

Procedure:

1) Clean the water level probe and the lower portion of cable following standard decontamination procedures (Section C6.0) and test water level meter to ensure that the batteries are charged.
2) Lower the probe slowly into the monitoring well until the audible alarm indicates water.
3) Read the depth to the nearest hundredth of a foot from the graduated cable using the V-notch on the riser pipe as a reference.
4) Repeat the measurement for confirmation and record the water level.
5) Remove the probe from the well slowly, drying the cable and probe with a clean "Chem Wipe" or paper towel.
6) Replace monitoring well cap and lock protective cap in place.
7) Decontaminate the water level meter (Section C6.0) if additional measurements are to be taken.

C5.0 SURVEYING AND MAPPING

Project control surveying will provide for location of sampling points. All surveying will be performed under the supervision of a New York State licensed Land surveyor, following the requirements of the Work Plan, (Section A2.2.6) and the HASP.

5.1 Establishing Horizontal Primary Project Control

Summary: In order to determine the horizontal locations of site features, horizontal control will be established by surveying to/from established survey monuments in the New York State Plane Coordinate System, Transverse Mercator Projection, East Zone, North American Datum of 1983. This information will be used on all site maps.

Procedure:

1) Research for monuments.
2) Recover monuments in field.
3) Set and reference points on primary traverse.
4) Turn angles and measure distances.
5) Compute closures and adjust traverse.

C5.2 Establishing Vertical Primary Project Control

Summary: In order to determine site elevations, vertical control must be established by surveying to/from established survey monuments in the North American Vertical Datum of 1988 network.

Procedure:

1) Research for monuments.
2) Recover monuments in field.
3) Set project benchmarks.
4) Run level line from monuments to set project benchmarks and back.

5) Reduce notes and adjust benchmark elevations.

6) Prepare recovery sketches.

C5.3 Global Positioning System (GPS) Surveying

Most of the surveying will be performed using GPS systems methodologies. This data will be converted into the horizontal and vertical coordinate systems noted in Sections C5.1 and C5.2.

C6.0 SAMPLING EQUIPMENT CLEANING PROCEDURES

Summary: To assure that no outside contamination will be introduced into the samples/data, thereby invalidating the samples/data, the following cleaning protocols will apply for all equipment used to collect samples/ data during the field investigations. Drilling equipment and heavy machinery will be steam cleaned on the decontamination pad.

Procedures:

1) Thoroughly clean equipment with laboratory-grade soap and water, until all visible contamination is gone.
2) Rinse with tap water, until all visible evidence of soap is removed.
3) Rinse several times with deionized water.
4) Air dry before using. If equipment will not be used immediately, wrap in aluminum foil.

C7.0 SAMPLE LABELING

Summary: In order to prevent misidentification and to aid in the handling of environmental samples collected during the field investigation, the following procedures will be used:

Procedure:

1) Affixed to each sample container will be a non-removable (when wet) label. Apply label and wrap with 2-inch cellophane tape to cover label. The following information will be written on each label with permanent marker:

- Site name
- Sample identification
- Project number
- Date/time
- Sampler's initials
- Sample preservation
- Analysis required

2) Each sample of each matrix will be assigned a unique identification alpha-numeric code. An example of this code and a description of its components is presented below:

Examples

1. MW1-GW
   MW1 = Monitoring Well 1
   GW = Groundwater

2. SB1 - 2'-4'
   SB1 = Soil Boring 1
   2' - 4' = Two-foot to four-foot soil sample

List of Abbreviations

Monitor Type

MW = Monitoring Well

Sample Type

GW	=	Groundwater
SB	=	Soil Boring
MSB	=	Matrix Spike Blank
EB	=	Equipment Rinse Blank
TB	=	Trip Blank
RB	=	Rinse Blank
MS	=	Matrix Spike
MSD	=	Matrix Spike Duplicate

C8.0 SAMPLE SHIPPING

Summary: Proper documentation of sample collection and the methods used to control these documents are referred to as chain-of-custody procedures. Chain-of-custody procedures are essential for presentation of sample analytical chemistry results as evidence in litigation or at administrative hearings held by regulatory agencies. Chain-of-custody procedures also serve to minimize loss or misidentification of samples and to ensure that unauthorized persons do not tamper with collected samples.

The procedures used in this SI follow the chain-of-custody guidelines outlined in NEIC Policies and Procedures, prepared by the National Enforcement Investigations Center (NEIC) of the U.S. Environmental Protection Agency Office of Enforcement.

Procedure:

1) The chain-of-custody (COC) record (Appendix A) should be completely filled out, with all relevant information.
2) The original COC goes with the samples. It should be placed in a ziplock bag and taped inside the sample cooler. Sampler should retain a copy of the COC.
3) Place inert cushioning material such as vermiculite or bubble-wrap in bottom of cooler.
4) Place bottles in cooler in such a way that they do not touch (use cardboard dividers or bubble-wrap).
5) Wrap VOA vials securely in bubble-wrap and tape. Place them in the center of the cooler.
6) Pack cooler with ice in doubled ziplock plastic bags.
7) Pack cooler with cushioning material.
8) Tape the drain shut.
9) Wrap cooler completely with strapping tape at two locations securing the lid. Do not cover any labels.

10) Place lab address on top of cooler. For out-of-town laboratory, add the following: Put "This side up" labels on all four sides and "Fragile" labels on at least two sides. Affix numbered custody seals on front right and left of cooler. Cover seals with wide, clear tape.

11) Ship samples via overnight carrier the same day that they are collected.

APPENDIX A

FIELD ACTIVITY FORMS

DAILY DRILLING RECORD

URS Greiner Woodward Clyde

PROJECT: _____ DATE: _____

CLIENT: _____ CONTRACTOR: _____

FROM	TO	PRODUCTIVE HOURS	ACTIVITY / COMMENTS
TOTAL PRODUCTIVE HRS.			LEVEL B / LEVEL C / LEVEL D (circle selection)

LABOR:

UNITS	ACTIVITY

MATERIALS / SUPPLIES:

UNITS	ITEM

WEATHER:

_____ _____

URS ON-SITE COORDINATOR *CONTRACTOR REPRESENTATIVE*

URS

BORING LOG

BORING NO.:

PROJECT:	SHEET: OF
CLIENT:	JOB NO.:
BORING CONTRACTOR:	BORING LOCATION:
GROUNDWATER:	GROUND ELEVATION:
ENVIRONMENTAL SAMPLE	DATE STARTED:
Sample Type:	DATE FINISHED:
Sample Analyses:	DRILLER:
	GEOLOGIST:
	REVIEWED BY:

DATE	TIME	LEVEL	REFERENCE

DEPTH Meters	STRATA	SAMPLE				DESCRIPTION			REMARKS
		Number	Recovery	PID Readings (ppm)	Env. Sample Depth(m)	COLOR	MATERIAL DESCRIPTION	CLASS USCS	
1									
2									
3									
4									
5									
6									
7									
8									

COMMENTS: _____

PROJECT NO.: _____

BORING NO.: _____

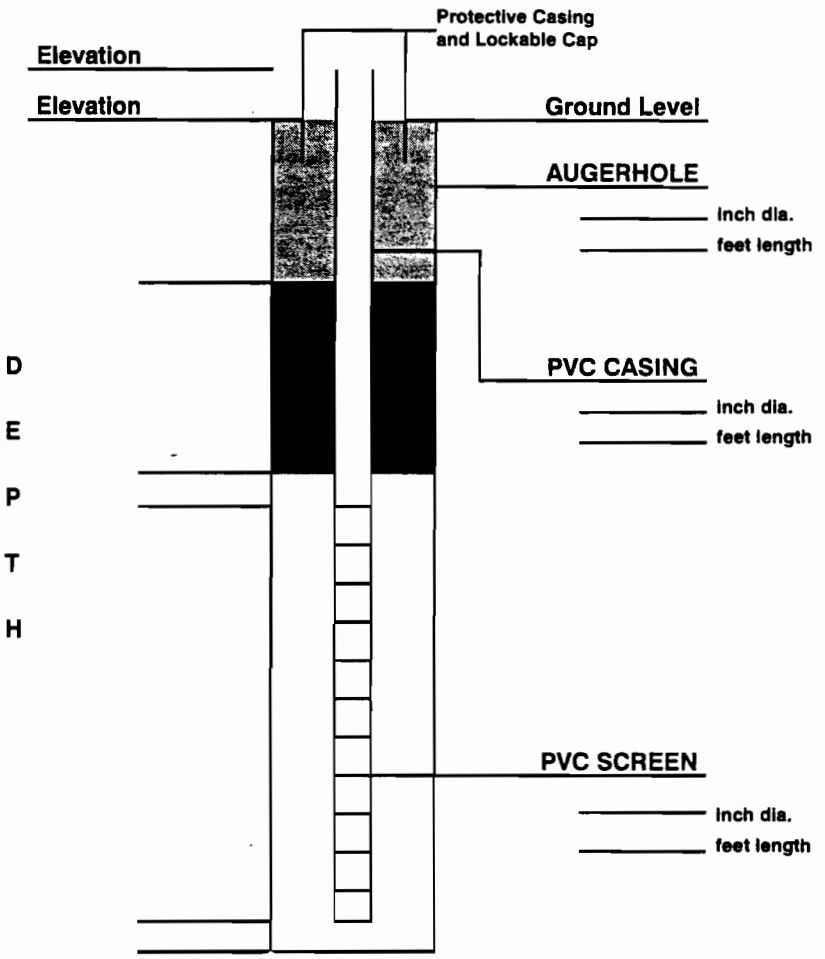
OVERBURDEN WELL CONSTRUCTION DETAILS

URS

DRILLING SUMMARY
Geologist:
Drilling Company:
Driller:
Rig Make/Model:
Date:

GEOLOGIC LOG

Depth(ft.)	Description



WELL DESIGN

CASING MATERIAL	SCREEN MATERIAL	FILTER MATERIAL
Surface:	Type:	Type: Setting:
Monitor:	Slot Size:	SEAL MATERIAL
		Type: Setting:

COMMENTS	LEGEND
	Cement/Bentonite Grout
	Bentonite Seal
	Silica Sandpack
	Well No.

Client:	**Location:**	**Project No.**

WELL DEVELOPMENT LOG

URS
CONSULTANTS, INC.

PROJECT TITLE: _____

PROJECT NO.: _____

STAFF: _____

DATE(S): _____

WELL NO.: _____

1. TOTAL CASING AND SCREEN LENGTH (FT.): _____

2. CASING INTERNAL DIAMETER (IN.): _____

3. WATER LEVEL BELOW TOP OF CASING (FT.): _____

4. VOLUME OF WATER IN CASING (GAL.): _____

#1-#3 x #2 (Gal./Ft.)

WELL ID.	VOL. (GAL./FT.)
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	0										
pH											
SPEC. COND. (µmhos)											
TURBIDITY (NTU)											
TEMPERATURE (°C)											
DISSOLVED OXYGEN (mg/L)											

COMMENTS:

WELL PURGING LOG

URS Greiner

PROJECT TITLE:_____ WELL NO.: _____

PROJECT NO.:_____

STAFF:_____

DATE(S):_____

			WELL ID.	VOL. (GAL./FT.)
1. TOTAL CASING AND SCREEN LENGTH (FT.)	=	_____	1"	0.04
2. WATER LEVEL BELOW TOP OF CASING (FT.)	=	_____	2"	0.17
3. NUMBER OF FEET STANDING WATER (#1 - #2)	=	_____	3"	0.38
4. VOLUME OF WATER/FOOT OF CASING (GAL.)	=	_____	4"	0.66
5. VOLUME OF WATER IN CASING (GAL.)(#3 x #4)	=	_____	5"	1.04
6. VOLUME OF WATER TO REMOVE (GAL.)(#5 x _____)	=	_____	6"	1.50
7. VOLUME OF WATER ACTUALLY REMOVED (GAL.)	=	_____	8"	2.60

OR

$V = 0.0408 \times (\text{CASING DIAMETER})^2$

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	0										
pH											
SPEC. COND. (µmhos)											
TURBIDITY (NTU)											
TEMPERATURE (° C)											

COMMENTS:

FIELD SAMPLING REPORT

URS Greiner
282 Delaware Avenue
Buffalo, New York 14202
(716) 856-5636

LOCATION: _____ PROJECT NO.: _____

SITE: _____

SAMPLE INFORMATION

MATRIX: _____ SAMPLE ID: _____

SAMPLING METHOD: _____ DUP.REP. OF: _____

BEGINNING DEPTH: _____ MATRIX SPIKE/MATRIX SPIKE DUPLICATE

END DEPTH: _____ YES ( ) NO ( )

GRAB ( ) COMPOSITE ( ) DATE: _____ TIME: _____

CONTAINER SIZE/TYPE	#	PRESERVATIVE/ PREPARATION	EXTRACTION METHOD	ANALYTICAL	ANALYSIS

NOTABLE OBSERVATIONS

PID READINGS	SAMPLE CHARACTERISTICS	MISCELLANEOUS
1st	COLOR:	
2nd	ODOR:	
	OTHER:	

GENERAL INFORMATION

WEATHER: SUN/CLEAR ____ OVERCAST/RAIN ____ WIND DIRECTION _____ AMBIENT TEMP. _____

SHIPMENT VIA: FED-X ____ HAND DELIVER ____ COURIER ____ OTHER _____

SHIPPED TO: _____

COMMENTS: _____

SAMPLER: _____ OBSERVER: _____

MATRIX TYPE CODES

DC = DRILL CUTTINGS
SL = SLUDGE
WG = GROUND WATER
SO = SOIL
LH = HAZARDOUS LIQUID WASTE
GS = SOIL GAS
SH = HAZARDOUS SOLID WASTE
WS = SURFACE WATER
SE = SEDIMENT
SW = SWAP/WIPE

SAMPLING METHOD CODES

B = BAILER
G = GRAB
BR = BRASS RING
HA = HAND AUGER
CS = COMPOSITE SAMPLE
H = HOLLOW STEM AUGER
C = CONTINUOUS FLIGHT AUGER
HP = HYDRO PUNCH
DT = DRIVEN TUBE
SS = SPLIT SPOON
W = SWAB/WIPE
SP = SUBMERSIBLE PUMP

WATER LEVEL ELEVATIONS

URS Greiner Woodward Clyde

PROJECT NO. _____

DATE				___/___/___		___/___/___		___/___/___		___/___/___		___/___/___	
TIME				AM PM		AM PM		AM PM		AM PM		AM PM	
Borehole No. ____ Ground Elevation	MONITOR No.	Type	Top of Monitor Elev.	DEPTH FROM TOP OF MONITOR	WATER ELEVATION	DEPTH FROM TOP OF MONITOR	WATER ELEVATION	DEPTH FROM TOP OF MONITOR	WATER ELEVATION	DEPTH FROM TOP OF MONITOR	WATER ELEVATION	DEPTH FROM TOP OF MONITOR	WATER ELEVATION

○ PIEZOMETER ● MONITORING WELL

TABLE _____ SHEET _____ of _____

URSF-138/1 OF 1/WLE/NPV

HYDRAULIC CONDUCTIVITY LOG

URS
CONSULTANTS, INC.

PROJECT TITLE: _____

PROJECT NO.: _____

STAFF: _____

DATE: _____ START TIME: _____ STOP TIME: _____

WELL NO.: _____ RISER PIPE ID: _____

SLUG TYPE: _____ SLUG VOLUME: _____

V = (0.0408)(DIAMETER[IN])(LENGTH[FT.]}

SLUG IN/OUT (CIRCLE ONE)

TIME	SPV	TIME	SPV	TIME	SPV	COMMENTS
		1.91		O.25		
		1.83		0.23		
20.00		1.75		0.21		
18.00		1.66		0.20		
16.00		1.58		0.18		
14.00		1.50		0.16		
12.00		1.41		0.15		
10.00		1.33		0.13		
9.50		1.25		0.11		
9.00		1.16		0.10		
8.50		1.08		0.08		
8.00		1.00		0.06		
7.50		0.91		0.05		
7.00		0.83		0.03		
6.50		0.75		0.03		
6.00		0.66		0.02		
5.50		0.58		0.02		
5.00		0.50		0.02		
4.50		0.41		0.01		
4.00		0.33		0.01		
3.50		0.31		0.00		
3.00		0.30		0.00		
2.50		0.28		0.00		
2.00		0.26		0.00		

PART D

HEALTH AND SAFETY PLAN

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PART D – HEALTH AND SAFETY PLAN

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FIGURES

TABLES

APPENDICES

D1.0 INTRODUCTION

This Health and Safety Plan (HASP) includes appropriate health and safety procedures to be followed by all URS Corporation (URS) personnel during site investigation (SI) activities at and in the vicinity of the Former Dowell Facility in the Village of Depew, Erie County, New York. Anticipated field activities at the site will include:

- setting up of support facilities/mobilization
- drilling
- subsurface soil sampling
- groundwater monitoring well installation, development, and sampling
- land surveying
- real-time air monitoring

The procedures presented in this plan comply with the following regulatory or guidance documents:

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH)

ACGIH-0028	1999 TLVs and BEIs - Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices.
ACGIH-0376	Guide to Occupational Exposure Values - 1999.
ACGIH-0460	Guidelines for the Selection of Chemical Protective Clothing, 3rd Edition.

CODE OF FEDERAL REGULATIONS (CFR)

29 CFR Part 1904	Recording and Reporting Occupational Injuries and Illnesses.
29 CFR Part 1910	Occupational Safety and Health Standards, especially Part 1910.120-Hazardous Waste Site Operations and Emergency Response.

29 CFR Part 1926	Safety and Health Regulations for Construction, especially Part 1926.65-Hazardous Waste Site Operations and Emergency Response.
49 CFR Part 171	General Information, Regulations, and Definitions.
49 CFR Part 172	Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (USEPA)

No Publication No.	(1984) Standard Operating Safety Guides, Office of Emergency and Remedial Response.
USEPA Order 1440.2	(1981) Health and Safety Requirements for Employees Engaged in Field Activities.

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)

NIOSH Pub. No. 85 115	(October 1985) NIOSH/OSHA/USCG/USEPA, Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities.
NIOSH Pub. No. 97-140	(June 1997) NIOSH Pocket Guide to Chemical Hazards.

URS personnel who will be involved in intrusive activities on site have completed the appropriate waste site worker training as required by OSHA 1910.120(e)(2), 1910.120(e)(3), and 1910.120(e)(8), as applicable, and the required medical surveillance as required by OSHA 1910.120(f). Copies of training certificates and medical surveillance certification for all URS field personnel will be maintained on site.

D2.0 RESPONSIBILITIES

The following is a summary of the health and safety responsibilities of various project personnel.

D2.1 Project Health and Safety Officer

The responsibilities of the Project Health and Safety Officer (HSO) are to develop and coordinate the Site Health and Safety Program, and to provide necessary direction and supervision to the Site HSO. The Project HSO will conduct the initial site-specific training session (Onsite Health and Safety Briefing), and will review and confirm changes in personal protection requirements when site conditions are found to be different from those originally anticipated.

D2.2 Site Health and Safety Officer

The responsibilities of the Site HSO are as follows:

- Implement this HASP
- Enforce day-to-day health and safety protocols in effect on the site
- Require that all URS workers who will be involved in intrusive activities on the site have had appropriate waste site worker training and medical examinations, and review and maintain training and medical certifications on site
- Require that all personnel entering the site understand the provisions of this HASP
- Conduct periodic training sessions in proper use and maintenance of personal protective equipment and safety practices
- Conduct periodic emergency response drills
- Conduct daily health and safety meetings each morning
- Direct and advise onsite URS personnel, visitors, and subcontractor HSO on all aspects, especially changes, related to health and safety requirements at the site
- Conduct necessary health and safety monitoring
- Administer the air monitoring program

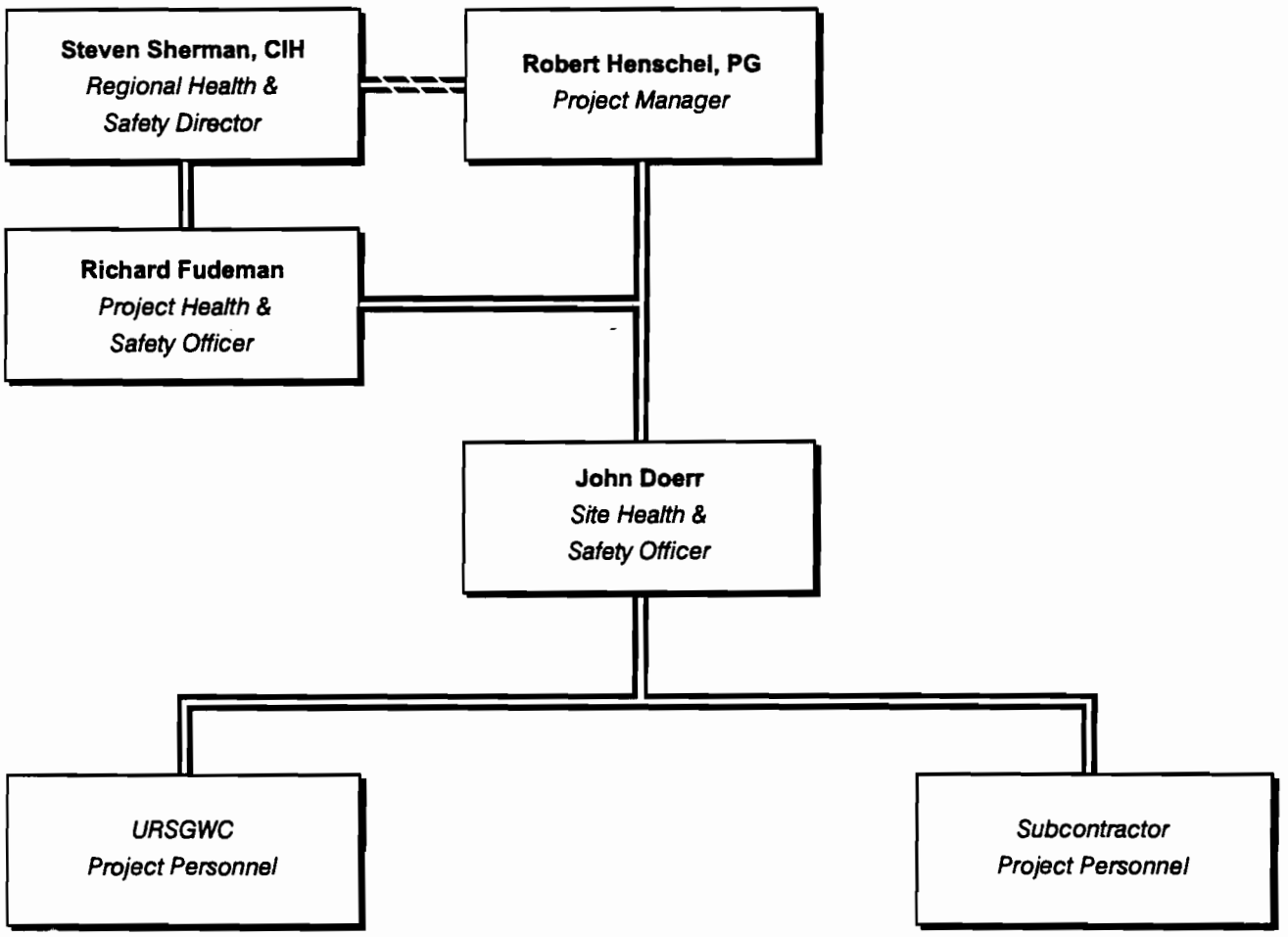
- Monitor site conditions and determine all necessary changes in levels of personal protection and, if warranted, execute work stoppages
- Report changes in site conditions and changes in personal protection requirements to the Project HSO
- Prepare accident/incident reports

The Site HSO reports directly to the Project HSO. URS will designate a qualified backup for the Site HSO prior to the initiation of onsite activities.

D2.3 Field Team Personnel

Field team personnel will be responsible for understanding and complying with site health and safety requirements. Field team personnel on site will be trained in first aid and CPR, and will be certified by the American Red Cross. Field team personnel will have completed the required waste site worker training to comply with 29 CFR, Part 1910.120.

A chain-of-command chart for implementation of this Health and Safety Plan is presented in Figure D2-1.



URS

DOWELL SITE INVESTIGATION
HEALTH & SAFETY CHAIN-OF-COMMAND

FIGURE D2-1

AG15632.35824.00-092000-GCM

D3.0 SITE DESCRIPTION AND HISTORY

Site description and history is presented in Section A1.1 of the SI Work plan (Part A) for the Former Dowell Facility.

D4.0 TRAINING REQUIREMENTS

All personnel conducting field activities on site are required to be certified in health and safety practices for hazardous waste operations as specified in the Federal OSHA Regulations (29 CFR 1910.120) (revised March 6, 1990). Paragraph (e) (2) of the above-referenced regulations requires that each employee, at the time of job assignment, receive a minimum of 40 hours of initial instruction off the site, and a minimum of three days of supervised field experience.

Paragraph (e) (3) of the above-referenced regulations requires that all onsite management and supervisory personnel directly responsible for, or who supervise employees engaged in hazardous waste operations, must initially receive eight hours of additional specialized training. Management and supervisory training must emphasize health and safety practices related to managing hazardous waste work.

Paragraph (e)(8) of the above-referenced regulations requires that workers and supervisors receive eight hours of refresher training annually on the items specified in Paragraph (e)(1) and/or (e)(3).

Additionally, all personnel must receive adequate site-specific training, in the form of an Onsite Health and Safety Briefing given by the Project HSO prior to participating in onsite field work. This will involve a review of this Health and Safety Plan with emphasis on the following:

- Protection of the adjacent community from hazardous substances which may be released during intrusive activities
- Attention to health effects and hazards of substances known to be present on site
- Attention to physical hazards on site, and the importance of knowing proper means of avoiding these hazards

- Health hazards, protective measures, emergency and first aid measures, fire and explosion information, reactivity, incompatible materials, and emergency procedures for spills of hazardous chemicals brought onto the site for use during normal field operations

- Hazards and protection against heat/cold

- The need for vigilance in personal protection, and the importance of attention to proper use, fit, and care of personal protective equipment

- The effectiveness and limitations of personal protective equipment

- Prescribed decontamination procedures

- Site control, including work zones, access, and security

- The proper observance of daily health and safety practices, such as the entry and exit of work zones and site, proper hygiene during lunch, break, etc.

- Recognition in oneself or in others of physical conditions requiring immediate medical attention, and application of simple first aid measures

- Emergency procedures to be followed (with rehearsals) in cases of fire, explosion, or sudden release of hazardous gases

Health and Safety Meetings will be conducted daily by the Site HSO and will cover protective clothing and other equipment to be used that day, potential chemical and physical hazards, emergency procedures, and conditions and activities from the previous day.

All visitors entering the Exclusion Zone or Contamination Reduction Zone will be required to receive the necessary site-specific training from the Site HSO and must be equipped with the proper personal protective equipment.

D5.0 MEDICAL SURVEILLANCE REQUIREMENTS

All URS personnel who engage in onsite activities for 30 days or more per year participate in the Medical Surveillance Program which involves undergoing a medical examination once every year. The examination must be conducted by a physician who is board-certified in occupational medicine. The physician will have been made familiar with the job-related duties of each worker examined. All URS project personnel involved in onsite activities in the Exclusion Zone at the site participate in the Medical Surveillance Program.

Components of the Medical Surveillance Program are shown in Table D5-1. The physician must state whether the individual is fit to conduct work on hazardous waste sites using personal protection, or whether he or she must work within certain restrictions. Personnel may be excluded from this site for medical reasons. Copies of medical examination reports are given to each employee who are encouraged to forward copies to their personal physician.

Any person exposed to high levels of hazardous substances will be required to undergo a repeat medical exam at or before the conclusion of the project to determine possible health impacts. Any person suffering a lost-time injury or illness must have medical approval prior to returning to work on site. When employment is terminated for any reason, the employee must receive an exit medical examination.

All medical records will be held by the employer for the period of employment plus at least 30 years, in accordance with OSHA regulations on confidentiality and any other applicable regulations and will be made available to OSHA upon request.

TABLE D5-1

COMPONENTS OF MEDICAL SURVEILLANCE PROGRAM

- Medical and occupational history
- Physical examination, with particular attention to the cardiopulmonary system, general physical fitness, skin, blood-forming, hepatic, renal, and nervous systems
- Urinalysis, to include:
  - color
  - appearance
  - specific gravity
  - pH
  - ketones
  - protein
  - glucose
  - blood
  - bilirubin
  - leukocyte esterase
  - nitrite
  - WBC
  - RBC
  - casts
  - bacteria
  - epithelial cells
  - crystals
  - yeasts
- Blood analysis, to include:
  - complete blood count
  - hemoglobin
  - albumin, globulin, total protein
  - bilirubin - direct and total
  - g-glutamyl transpeptidase
  - serum glutamic oxalacetic transaminase
  - lactic dehydrogenase
  - alkaline phosphatase
  - sodium
  - potassium
  - chloride
  - magnesium
  - calcium
  - phosphorus
  - uric acid
  - BUN (blood urea nitrogen)

TABLE D5-1 (Continued)

- creatinine
- cholesterol
- triglycerides
- glucose
- iron
- heavy metals - arsenic, lead, mercury, and zinc protoporphyrin

- Pulmonary function test

- Additional tests as appropriate, including:
  - chest X-ray
  - electrocardiogram
  - stress test

D6.0 SITE HAZARD EVALUATION

D6.1 Chemical Hazards

The primary chemicals of concern on site are organic solvents (i.e., 1,1 dichloroethane, 1,1 dichloroethene, 1,1,1 trichloroethane) based on detections of these compounds in soil and water samples from previous investigations. The health and safety characteristics and occupational exposure values of these compounds are summarized in Table D6-1. The risk of exposure to these contaminants can be by the dermal or respiratory route, depending on the type of contaminant and activity being conducted.

D6.2 Physical Hazards

Physical hazards range from the dangers of tripping and falling on uneven ground to those associated with the operation of heavy equipment such as drill rigs. Physical hazards also include scattered debris, scrap metal, exposed rusted drums, water hazards (i.e., ponds, wetlands).

During site activities, workers may have to work on drilling equipment by climbing the mast. The drilling subcontractor will conform with any applicable OSHA and NIOSH recommendations for climbing activities. These activities will be overseen by the subcontractor drilling supervisor and URS field geologist.

Field activities that involve drilling usually involve contact with various types of machinery. At least two people on site must be currently American Red Cross-certified in first aid and CPR. Personnel trained and certified in first aid should be prepared to take care of cuts and bruises as well as other minor injuries. A first aid kit approved by the American Red Cross will be present and available during all field activities.

Animals and some insects may bite and thereby pose a health hazard in the form of irritation, illness, or poisoning. Anyone bitten should be given immediate first aid as necessary, and shall be transported to the nearest medical facility (if necessary). Members of the field investigation team will be properly briefed regarding the potential for encountering insects and animals. The potential threat

TABLE D6-1

HAZARD CHARACTERISTICS OF CONTAMINANTS OF CONCERN POTENTIALLY PRESENT AT THE FORMER DOWELL SITE

SUBSTANCE	TOXICITY/CARCINOGENICITY	OCCUPATIONAL EXPOSURE VALUES*
1,1 Dichloroethane	Irritant to skin and eyes via inhalation.	405 mg/m^3 (TLV-TWA) 400 mg/m^3 (PEL)
1,1 Dichloroethene	Irritant to skin and eyes via inhalation.	20 mg/m^3 (TLV-TWA)
1,1,1 Trichloroethane	Irritant to eyes, nose, and central nervous system via inhalation.	1910 mg/m^3 (TLV-TWA) 1900 mg/m^3 (PEL) 1910 mg/m^3 (STEL) (CEILING) (1)

*Occupational Exposure Values (TLVs and PELs) are 8-hour Time-Weighted Averages (TWAs) unless otherwise noted.

NOTES:

(1) Ceiling - The concentration that should not be exceeded during any part of the working exposure.

Definitions

Threshold Limit Values (TLVs) - Refers to airborne concentrations of substances as issued by the ACGIH and represents conditions under which it is believed that nearly all workers may be repeatedly exposed, day after day, without adverse effect.
Threshold Limit Value - Time-Weighted Average (TLV-TWA) - The Time-Weighted Average concentration as issued by ACGIH for a normal 8-hour work day and a 40-hour workweek, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect.
Permissible Exposure Limits (PELs) - Exposure limits that are enforceable by OSHA as legal standards and cannot be exceeded over an 8-hour exposure.

References

- American Conference of Governmental Industrial Hygienists. *Guide to Occupational Exposure Values-2000*. Cincinnati, Ohio.
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- 29 CFR, Part 1910.1000, Tables Z-1 and Z-2, Limits for Air Contaminants, July 1, 1995.
- National Institute for Occupational Safety and Health. *NIOSH Pocket Guide to Chemical Hazards.* Publication No. 97-140, June 1997. Cincinnati, Ohio.
- Hawley, Gessner G. *The Condensed Chemical Dictionary*, Tenth Edition, New York: Van Nostrand Reinhold, 1981.
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of the deer tick and the possibility of contracting Lyme disease is a serious matter. The likelihood of contracting Lyme disease will be greatly decreased by field personnel wearing long pants, long sleeved shirts, and hard hats. All field personnel will be instructed to take a shower daily upon returning to the hotel or place of residence to further decrease the likelihood of contracting Lyme disease.

Improper lifting by workers is one of the leading causes of industrial injuries. Field workers in the drilling program will often be required to lift heavy objects (drill casings, auger flights, etc.). Therefore, all members of the field crew should be trained in the proper methods of lifting heavy objects. All workers should be cautioned against lifting objects too heavy for one person.

D6.3 Temperature Stress

A Heat/Cold Stress Log will be kept and maintained on a daily basis for all personnel wearing protective ensembles on site.

D6.3.1 Heat Stress

The combination of high ambient temperature, high humidity, physical exertion, and personal protective apparel which limits the dissipation of body heat and moisture can cause heat stress. The Site HSO is responsible for monitoring heat stress in the field team personnel.

The following prevention, recognition, and treatment strategies will be implemented to protect personnel from heat stress. Personnel will be trained to recognize the symptoms of heat stress, and to apply the appropriate treatment.

A. Prevention

1. Provide plenty of liquids. Available in the Support Zone will be a 50% solution of fruit punch in water, or the like, or plain water.

2. Provide cooling devices. A portable, pump-activated sprayer and containers of tap water will be available in the Contamination Reduction Zone to reduce body temperature, cool protective clothing, and/or act as a quick-drench shower in case of an exposure incident.

3. Adjustment of the work schedule. During the hot summer days, labor intensive tasks which pose a high potential risk of heat stress can be performed during the coolest part of the day.

B. Recognition and Treatment

Any person who observes any of the following forms of heat stress, either in themselves or in another worker, will report this information to the Site HSO immediately after implementing treatment, if possible.

1. Heat Rash (prickly heat):

Cause:	Continuous exposure to hot and humid air, aggravated by chafing clothing.
Symptoms:	Eruption of red pimples around sweat ducts, accompanied by intense itching and tingling.
Treatment:	Remove source of irritation and cool the skin with water or wet cloths.

2. Heat Syncope (fainting):

Cause:	Sun rays beating down on victim's head and prolonged upright position can lead to mild dehydration and contraction of the blood vessels resulting in a temporary deficiency of blood to the brain.
Symptoms:	Brief loss of consciousness.

Treatment: Worker should assume a horizontal position and drink ½ liter to one liter of fluid (not alcohol). Elevate the legs and cover the head.

3. Heat Cramps (heat prostration):

Cause: Profuse perspiration accompanied by inadequate replenishment of body water and electrolytes.

Symptoms: Sudden development of pain and/or muscle spasms in the abdominal region.

Treatment: Move the worker to the Contamination Reduction Zone. Remove protective clothing. Provide fluids orally. Decrease body temperature and allow a period of rest in a cool location.

4. Heat Exhaustion (heat toxemia, sunstroke):

Cause: Overexertion in a hot environment and profuse perspiration accompanied by inadequate replenishment of body water and electrolytes. A serious condition.

Symptoms: Muscular weakness, tiredness, staggering gait, nausea, dizziness, shallow breathing, pale and clammy skin, approximately normal body temperature.

Treatment: Perform the following while simultaneously making arrangements for transport to a medical facility: Move the worker to the Contamination Reduction Zone. Remove protective clothing. Lie the worker down on his or her back, in a cool place, and raise the feet 6 to 12 inches. Keep warm, but loosen all clothing. If conscious, provide sips of a salt water solution using one teaspoon of salt in 12 ounces of water. Transport the worker to a medical facility.

5. Heat Stroke:

Cause: Same as heat exhaustion. An extremely serious condition.

Symptoms: Dry, red, hot skin, dry mouth, dizziness, nausea, headache, rapid pulse. Temperature continues to rise unless treatment is implemented.

Treatment: The basic principle is to lower the body temperature rapidly.

1. Move the victim out of the sun.
2. Remove clothes.
3. Soak victim completely with water, wet hair as well.
4. Place victim in front of a fan or in a breeze, if possible.
5. If ice is available, apply directly to the victim, especially under the arms and on the head.
6. Monitor body temperature with available thermometers. Temperature should start to decrease within minutes.
7. As temperature approaches 101°F, stop cooling measures and initiate transport to a hospital or declare an emergency response. The temperature should continue to fall, often to subnormal, during this period.

Other considerations in treating heat stroke are:

1. Rub skin briskly during cooling process.
2. If cardiac arrest occurs, perform CPR (ONLY IF CERTIFIED) and continue cooling.
3. If a seizure occurs, continue cooling; the seizure will stop.

4. No drugs of any kind are to be given to the victim.

D. Heat Stress - Predisposing Factors

Preventing heat stress is clearly preferred to treatment. The following factors increase the individual's risk of heat stress:

- Physically unfit
- Age
- Not accustomed to heat
- Sunburn
- Alcohol and drugs
- Dehydration
- Heavy or non-breathable clothing
- Not covering one's head

D6.3.2 Cold Stress

Personnel can be susceptible to cold stress while conducting field work during cold weather months. To guard against cold stress and to prevent cold injuries, appropriate warm clothing should be worn, warm shelter must be previously identified and readily available, rest periods should be adjusted as needed, and the physical conditions of onsite field personnel should be closely monitored. All personnel working onsite must be able to recognize the signs and symptoms of cold stress and apply first aid as needed. The Site HSO is responsible for monitoring the signs and symptoms of cold stress among field personnel.

The development of cold stress and cold injuries is influenced by three factors: the ambient temperature, the velocity of the wind, and the amount of sunshine. Fingers, toes, and ears are the most susceptible parts of the body affected by cold.

A. Frost Nip: Frost nip is the first sign of frost bite and is the only form of local cold injury that can be definitively treated in the field.

Symptoms: A whitened area of the skin which is slightly burning or painful.

Treatment: Rewarming the affected part.

B. Frost Bite: Local damage is caused by exposure to low temperature environmental conditions. It results at temperatures when ice crystals form, either superficially or deeply, in the fluids and underlying soft tissues of the skin. The nose, cheeks, ears, fingers, and toes are most commonly affected.

Symptoms: Skin is cold, hard, white, and numb. There may also be blisters. The affected parts will feel intensely cold; however, there may not be any pain. The victim may not know that he or she is frost-bitten. As time goes on, the victim may experience mental confusion and impairment of judgment. The victim may stagger and eyesight may fail. The victim may fall and become unconscious. Shock is evident and breathing may cease. If death occurs, it is usually due to heart failure.

Treatment: Generally, definitive thawing should not be performed in the field, because if re-freezing occurs, it could result in severe damage. The victim should be transported to a medical facility after the following measures are instituted:

<u>Do Not</u>:

- Do not walk on a thawed foot or toes or use thawed hands.
- Do not allow victim to smoke or drink alcohol.
- Do not rub affected area with anything.
- Do not break any blisters.
- Do not apply heat of any kind.

Do:

- Do place victim in protected environment.
- Do prevent further heat loss (warmer clothes).
- Do protect from further damage (warm covering).

C. Mild Hypothermia

Symptoms: The single most important sign of mild hypothermia is a change in behavior. Some signs that can be observed are:

- Decrease in work efficiency
- Decreased level of communication
- Forgetfulness
- Poor judgment
- Poor motor skills (difficulty in handling objects, dropping tools)

The target organ of mild hypothermia is the brain. During mild hypothermia, most of the body's protective mechanisms for temperature control are intact. Shivering is usually present and "goose flesh" and pale skin persist. When asked directly, the victim will usually say that he feels cold. A worker impaired by mild hypothermia can be a danger to himself and co-workers.

Treatment:

- The victim should be moved indoors or into a heated vehicle.
- Remove all wet or damp clothing, dry skin, and apply dry clothing.
- The head should be covered with a hat or blanket.
- Blankets should be put on the victim.
- The victim should be given hot fluids (no alcohol).
- If possible, monitor the victim's temperature at 15 minute intervals.

D. Moderate Hypothermia: For field purposes, this may be defined as the stage at which the patient is clearly incapable of functioning effectively, but is conscious.

Symptoms: The victim's body temperature is well below normal and some mental changes may occur which include:

- Disorientation to people, place, and time
- Hallucinations
- Inappropriate laughing or crying
- Bizarre behavior for that individual

During moderate hypothermia, shivering is absent, "goose flesh" disappears, and the heart rate may slow down. The victim does not "feel" cold.

Treatment:

- First, treat the patient for mild hypothermia.
- Provide warming with hot blowers or heaters.
- Use human body heat.
- Watch for signs of returning to normal (e.g., shivering, goose flesh, teeth chattering).
- Monitor mental status.

After these steps are initiated, the victim should be taken to a medical facility. The patient should not return to work for at least 48 hours.

E. Severe Hypothermia:

Symptoms: Characterized by a decrease in the body temperature which results in a deep coma in which even vital signs become very weak and finally undetectable. Most occupational cases occur when the victim is alone or lost. These victims, for all practical purpose, appear to be dead, but the saying "not dead until warm and dead" applies to severe hypothermia. Many of these victims can survive.

Treatment:

1. The patient is not to be considered dead.
2. Remove wet clothes, dry skin, and apply dry clothes.
3. Activate rewarming.
4. Prepare to transfer the victim to a medical facility.
5. If the patient is pulse-less and is not breathing, perform CPR (ONLY IF CERTIFIED), while enroute to the medical facility.
6. Very cold victims often tolerate long periods of arrest, even without CPR. The victim must be handled very carefully because of extreme susceptibility to even minor trauma.

D7.0 SITE CONTROL

In order to keep unauthorized personnel from entering the work area during drilling or environmental sampling activities, and for good control of overall site safety, three work zones will be established. The three work zones are the Support Zone, the Contamination Reduction Zone, and the Exclusion Zone. Actual Exclusion Zone size will be determined by optimal size of work area and by local obstructions.

D7.1 Support Zone

The Support Zone for the Former Dowell Facility will be established inside of the maintenance building. The support facilities will contain personal protective equipment (disposable suits, gloves, boots, etc.), a first aid kit, a fire extinguisher, a stretcher, an eyewash station, sampling equipment, sample containers, and 50% solution of fruit punch or the like in water (or plain drinking water).

D7.2 Contamination Reduction Zones

A Mobile Contamination Reduction Zone will lie adjacent to each active drilling Exclusion Zone. During drilling operations, materials brought to the surface may come in contact with workers' boots or protective clothing and equipment. A mobile decontamination area will be set up adjacent to the active drilling area. All personnel in the active drilling area will be required to decontaminate themselves and light equipment prior to leaving the active drilling Exclusion Zone.

D7.3 Exclusion Zone

The Exclusion Zone is the area around each active drilling or sampling location. The exact size of this active Exclusion Zone will be determined by optimal size of work area and by local obstructions. All personnel leaving the active or Exclusion Zone will be required to do so via the Mobile Contamination Reduction Zone, and to carry out proper decontamination procedures.

D7.4 Site Visitation

It is expected that officials from NYSDEC and other regulating bodies and jurisdictions will visit the site during operations. It is also possible that an OSHA representative will wish to inspect the operations. All such officials must meet the requirements of OSHA-approved training and site-specific training before going into any Exclusion Zone. All visitors must read this HASP prior to entering an Exclusion Zone. Visitors other than NYSDEC, OSHA, New York State Department of Health (NYSDOH), or Town or County government representatives will be subject to the additional requirement of having to receive written permission from Dow/Schlumberger to enter an Exclusion Zone. A Daily Site Visitors Log will be kept and all visitors to the site will sign in and provide their affiliation, the date of visit, affirmation that they have read and understood the HASP, arrival time, departure time, and purpose of visit.

D8.0 PERSONAL PROTECTION

Since personnel working on site may be exposed to chemical contaminants released during intrusive activities, or may come in contact with contaminants in wastes, drill cuttings, or soils, various levels of protection must be available. Components of all levels of personal protection that will be available are listed in Table D8-1. The anticipated levels of protection for various field activities are given in Table D8-2.

In the event that unexpected levels of organic vapors are encountered, any personnel working at Level D or D+ protection will don their respirators (change to Level C). The Site HSO will consult with the Project HSO to decide if and when Level D or D+ protection may be resumed, or if a higher level of personal protection is required.

Some modification in safety equipment (e.g., switching from poly-coated disposable coveralls to standard disposable coveralls) may be implemented in order to balance concerns for full contaminant protection against concerns for the possibility of heat stress resulting from the need to wear more restrictive protective equipment. Such modifications may be implemented only if approved in advance by the Site HSO, following consultation with the Project HSO. Protective equipment which fully complies with the requirements of all required levels of protection will be immediately available at all times on the site.

Level C respiratory protection will normally be provided using NIOSH-approved full-face respirators, with high efficiency particulate air P-100 (HEPA) combination filter cartridges approved for removal of organic vapors, particulates, gases, and fumes. The filter cartridges will be changed at the end of each work day or when breakthrough occurs, whichever comes first. All URS field team members will have been fit-tested for respirators using irritant smoke prior to project assignment. Due to difficulties in achieving a proper seal between face and mask, persons with facial hair will not be allowed to work in areas requiring respiratory protection.

TABLE D8-1

COMPONENTS OF PERSONAL PROTECTION LEVELS

Level D Protection	Level D+ Protection	Level C Protection
ANSI-Approved Safety glasses with side shields (or goggles)	ANSI-Approved Safety glasses with side shields (or goggles)	Level D+ items, adding:
ANSI-Approved Hard hat	ANSI-Approved Hard hat	Full-face air-purifying respirator (to be worn)
Ordinary coveralls	Face shield (optional)	Duct-taping of gloves and boots to disposable coveralls
Ordinary work gloves	Disposable poly-coated coveralls (Tyvek or equivalent)	
ANSI-Approved Steel-toe, steel-shank work shoes or boots (chemical resistant)	Inner gloves of snug-fitting latex or vinyl	
Outer boots of neoprene or butyl rubber (optional)	Outer gloves of neoprene or nitrile	
	Outer boots of neoprene or butyl rubber	
	ANSI-Approved Steel-toe, steel-shank work shoes or boots (chemical resistant)	
	Full-face air-purifying respirator (immediately available)	

1. The use of optional equipment is dependent upon site conditions.

2. Respirator to be fitted with NIOSH-approved high-efficiency filter (P-100) combination respirator cartridges approved for organic vapors, particulates, gases, and fumes.

TABLE D8-2

PLANNED LEVELS OF PERSONAL PROTECTION FOR EACH MAJOR ACTIVITY

Field Activity	Level of Protection*
A. Non-Intrusive Activities	
1. Setting up Support Facilities/Mobilization	D
2. Land Surveying	D
3. Staging of Drummed IDW	D
4. Support Zone Activities	D
B. Intrusive Activities	
1. Drilling/Monitoring Well Installation	D+/C
2. Environmental Sampling	D+/C
3. Equipment Decontamination	D+/C

* These are the levels of protection at which work will commence during the various activities on the site. Due to onsite conditions, and as directed by the Site Health and Safety Officer, it may become necessary to upgrade, or it may be possible to downgrade, the level of personal protection.

D9.0 AIR MONITORING

Real-time air monitoring will be performed during all intrusive activities (e.g., drilling and monitoring well installation) by trained URS personnel. While sampling activities are in progress, monitoring frequencies will be as summarized in Table D9-1. Air monitoring equipment will be calibrated daily and all data will be recorded in the field notebook and transferred to Instrument Reading Logs (Appendix B). Each day, intrusive work will not begin until the instruments are calibrated and background levels are taken and recorded. Air will be monitored for total volatiles with a photoionization detector (PID) (HNu Model PI 101, or equivalent). Explosive atmosphere, oxygen content, and hydrogen sulfide will be monitored with an explosimeter (Bacharach Sentinel 44, or equivalent). Particulates will be monitored only during test pit excavation using a MIE PDM-2 Miniram dust/aerosol monitor, or equivalent. All real-time air monitoring results and meteorological data (e.g., temperature range, wind speed, wind direction, etc. obtained from onsite measurements and/or national weather service, radio, or airport) will be recorded in the field notebook and will be transferred to Instrument Reading Logs.

D9.1 Total Volatiles

Air monitoring for total volatiles (organic vapors) will be performed using a PID (HNu Model PI 101, or equivalent) equipped with the standard probe which contains a 10.2 eV lamp. When readings less than 1 part per million (ppm) above background in the breathing zone are observed consistently, monitoring will take place at least every 10 minutes or for every sample retrieved and Level D protection will be utilized. When readings between 1 ppm and 5 ppm above background in the breathing zone are observed consistently, monitoring will be continuous and Level D+ protection will be utilized. If readings from 5 to 10 ppm above background in the breathing zone are observed, and all other action levels indicate that intrusive activities can proceed, monitoring will be continuous and Level C protection will be utilized. If organic vapor readings exceed 10 ppm above background in the breathing zone, or other instrument readings necessitate work suspension, intrusive activities will be halted and the level of protection used by onsite personnel will be reassessed. Monitoring frequencies during intrusive activities will be as summarized in Table 9-1.

TABLE D9-1

ACTION LEVELS DURING INTRUSIVE ACTIVITIES

Organic Vapors (PID)	Combustibles	Oxygen	Hydrogen Sulfide	Particulates	Responses
0-1 ppm Above Background, Sustained Reading	0-10% LEL	19.5-23.5%	0-5 ppm	<0.10 mg/m^3	• Continue intrusive activities. • Level D protection. • Continue monitoring every 10 minutes/every sample retrieved in work area.
1-5 ppm Above Background, Sustained Reading	0-10% LEL	19.5-23.5%	5-10 ppm	0.10- 0.15 mg/m^3	• Continue intrusive activities. • Level D+ protection. • Continuous monitoring for organic vapors in the work area and at the Exclusion Zone perimeter. • Continuous monitoring for LEL, O_2, and H_2S in the work area.
5-10 ppm Above Background, Sustained Reading	0-10% LEL	19.5-23.5%	5-10 ppm	>0.15 mg/m^3	• Continue intrusive activities. • Level C protection. • Continuous monitoring for organic vapors in the work area and at the Exclusion Zone perimeter. • Continuous monitoring for LEL, 0_2, and H_2S in the work area. • Employ dust suppression measures if particulate readings > 0.15 mg/m^3 above background are sustained over 15 minute period.
>10 ppm Above Background, Sustained Reading	>10% LEL	<19.5% or >23.5%	>10 ppm	>0.15 mg/m^3	• Temporarily suspend intrusive activities. • Withdraw from area; shut off all engine ignition sources. • Continuous monitoring for organic vapors at Exclusion Zone perimeter if organic vapor readings >10 ppm. • Continuous LEL monitoring in breathing zone if LEL reading >10%. • Employ dust suppression measures if particulate readings > 0.15 mg/m^3 above background are sustained over 15 minute period. • Consult with Project HSO.

Notes:

Air monitoring for action levels will occur in the breathing zone.

If action levels for any one of the monitoring parameters is exceeded , the appropriate responses listed in the right hand column should be taken.

D9.2 Explosive Atmosphere/Oxygen Content/Hydrogen Sulfide Gas

A Bacharach Sentinel 44 combustible gas indicator (CGI), or equivalent, will be used to monitor for explosive atmosphere, percent oxygen, and hydrogen sulfide content. Readings greater than 10% LEL, less than 19.5% oxygen, greater than 23.5% oxygen, or greater than 10 ppm hydrogen sulfide will require temporary suspension of intrusive activities until the Project SHO determines a safe re-entry level.

D9.3 Particulates

Particulate monitoring will be conducted during drilling. Particulates will be monitored in the active work area upwind and downwind from the drilling location. If particulate levels, integrated over a period not to exceed two minutes under windy conditions or 10 minutes under calm conditions, at the downwind location are in excess of 0.15 mg/m^3, the upwind station will be monitored immediately using the same monitor. If the downwind measurement exceeds the background measurement by more than 0.15 mg/m^3, operations will be temporarily suspended and water may be used to suppress the dust. Operations will be continued once ambient conditions improve, as determined by the Site HSO.

D9.4 Work Stoppage Responses

The following responses will be initiated whenever one or more of the action levels necessitating a work stoppage is exceeded:

- The Site HSO will be consulted immediately.
- All personnel (except as necessary for continued monitoring and contaminant mitigation, if applicable) will be cleared from the work area (e.g., from within the Exclusion Zone).

Any chemical release to air, water, or soil must be reported to the Site HSO at once. Any exposure resulting from protective equipment failure must be immediately reported to the Site HSO and to the Project HSO in writing within 24 hours.

D9.5 Calibration of Air Monitoring Instruments

Photoionization Detector: The photoionization detector will be calibrated to a benzene surrogate daily (prior to field activities) and the results will be recorded in the field notebook and transferred to Instrument Reading Logs.

Explosimeter: Once a day, the explosimeter will be calibrated to a methane gas and hydrogen sulfide gas standard. Prior to each use, the oxygen sensor will be air-calibrated at an upwind location. This calibration involves adjusting the meter to read 20.9%, the concentration of oxygen in ambient air.

Particulate Monitor: All instrument operation checks will be performed prior to use each day according to manufacturer specifications.

D9.6 Community Air Monitoring Plan

Real-time air monitoring for volatile organic compounds will be conducted at the perimeter of the Exclusion Zone during the drilling and test pit excavation programs as follows:

- Volatile organic compounds and dust particulates will be monitored at the downwind perimeter of the exclusion zone on a periodic basis. If total organic vapor levels exceed 5 ppm above background, work activities will be halted and monitoring continued under the provisions of a Vapor Emission Response Plan (Section 9.7.1). All readings will be recorded and be available for NYSDEC and NYSDOH personnel to review if requested.

- If particulate levels at the downwind station exceed particulate levels at the upwind station by more than 0.15 mg/m^3, work activities will be halted and appropriate dust suppression measures will be employed.

D9.6.1 Vapor Emission Response Plan

If the ambient air concentration of organic vapors exceeds 5 ppm above background at the perimeter of the Exclusion Zone, activities will be halted and monitoring continued. If the organic vapor level decreases below 5 ppm above background, work activities can resume. If the organic vapor levels are greater than 5 ppm over background but less than 25 ppm over background at the perimeter of the Exclusion Zone, activities can resume provided the organic vapor level 200 feet downwind of the Exclusion Zone or half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm over background.

If the organic vapor level is above 10 ppm at the perimeter of the Exclusion Zone, activities must be shut down. When work shutdown occurs, downwind air monitoring as directed by the Site HSO will be implemented to ensure that vapor emission does not impact the nearest residential or commercial structure at levels exceeding those specified in the Major Vapor Emission Response Plan (Section D9.7.2).

D9.6.2 Major Vapor Emission Response Plan

If any organic vapor levels greater than 5 ppm over background are identified 200 feet downwind from the Exclusion Zone or half the distance to the nearest residential or commercial property, whichever is less, all work activities will be halted.

If, following the cessation of work activities, or as the result of an emergency, organic vapor levels persist above 5 ppm above background 200 feet downwind from the Exclusion Zone or half the distance to the nearest residential or commercial property, then the air quality will be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20-foot zone).

If efforts to abate the emission source are unsuccessful and organic vapor levels approaching 5 ppm persist for more than 30 minutes in the 20-foot zone, then the Major Vapor Emission Response Plan shall automatically be placed into effect. Also, the Major Vapor Emission Response Plan shall be immediately placed into effect if 20-foot zone organic vapor levels are greater than 10 ppm above background.

Upon activation of the Major Vapor Emission Response Plan, the following activities will be undertaken:

- All Emergency Response authorities will immediately be contacted by the Site HSO and advised of the situation.

- Air monitoring will be conducted at 30 minute intervals within the 20-foot zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the Site HSO.

D10.0 HANDLING OF SAMPLES

The collection and analysis of environmental samples will require caution, not only to ensure safety of site sampling and support personnel, but also to ensure accuracy of results. To minimize hazards to lab personnel, sample volumes will be no larger than necessary, and the outside of all sample containers will be wiped clean prior to shipment.

D11.0 DECONTAMINATION PROCEDURES

D11.1 Decontamination of Personnel

Non-disposable protective clothing, boots, and gloves, will be decontaminated before entering the Support Zone by a thorough soap-and-water wash prior to leaving the Exclusion Zone. Personnel performing intrusive tasks in potentially contaminated areas (e.g., drilling or environmental sampling) will be advised that all clothing worn under protective clothing (i.e., underwear, shirts, socks, trousers) should be laundered separately from street clothing before re-wearing. If protective clothing is breached and personal clothing becomes contaminated, the personal clothing will be disposed.

D11.2 Decontamination of Equipment

Decontamination of sampling equipment is described in the Field Sampling Plan (Part C). Other light equipment (such as tools, containers, monitoring instruments, radios, clipboards, etc.) will be segregated and deposited on plastic drop cloths or in plastic-lined containers placed in the Contamination Reduction Zone and will be wiped off with damp cloths.

Decontamination of drilling equipment, such as auger flights, heavy equipment, and vehicles, will be carried out at the decontamination pad by high-pressure water in the Contamination Reduction Zone. Appropriate PPE must be used during all decontamination activities.

D12.0 EMERGENCY PROCEDURES

The most likely incidents for which emergency measures might be required are:

- an exposure-related worker illness
- a sudden release of hazardous gases/vapors during drilling
- an explosion or fire occurring during drilling
- a heavy equipment-related accident, or other accident resulting in personal injury
- slipping, tripping, or falling resulting in personal injury
- spill of contaminated liquid or solid

Emergency procedures established to respond to these incidents are covered under the sections that follow.

D12.1 Communications

Communications will be centered in the field vehicle, one of which will contain a cellular telephone for direct outside communications with emergency response organizations. The support facilities will also contain two-way radios for contact with personnel working on site. If the site HSO or his designee leaves the immediate area, a radio will be carried by him at all times. A radio will be maintained at the drill rig and with any groups of personnel who are performing tasks on site (e.g., environmental sampling).

D12.2 Escape Routes

Flags will be positioned near drill rigs to indicate wind direction. In the event of a sudden release of hazardous gases, or a fire, all personnel will be required to move upwind or at 90 degrees away from the location of the release or fire, toward the site exit point. This may require personnel to move from the Exclusion Zone directly into an offsite area without proper decontamination. At the conclusion of the emergency, they should perform proper decontamination.

D12.3 Evacuation Signal

In the event of a sudden release or fire requiring immediate evacuation of the site, three quick blasts will be sounded on an air horn. Sounding the air horn will be the responsibility of the drill rig operator or the supervising personnel. The horns will be kept in a conspicuous place for quick access by personnel. The person will also contact the Site HSO via the two-way radio to report the incident and request aid if necessary. An air horn will also be kept in the Contamination Reduction Zone. Dowell and the Project HSO will be notified by telephone, and a written report, prepared whenever a site evacuation is executed.

D12.4 Other Signals

Emergency hand signals for use by personnel wearing air-purifying respirators are summarized in Table D12-1.

D12.5 Fire

In the event of a fire that cannot be controlled with available equipment, the local fire department will be summoned immediately by the Site HSO or his designee, who shall apprise them of the situation upon their arrival. Dowell will also be notified. (See Table D12-2 for telephone numbers of emergency response agencies).

D12.6 First Aid

At the startup of field activities, the Project HSO will contact hospital personnel regarding the potential hazards at the site. First aid for personal injuries will be administered, if possible, at the site by the Site HSO or his designee. If a site worker should require further treatment, he or she will be transported to the hospital in the URS vehicle located on site or an ambulance will be summoned. The onsite vehicle will carry written directions to the hospital as well as a copy of Figure D12-1 showing the route.

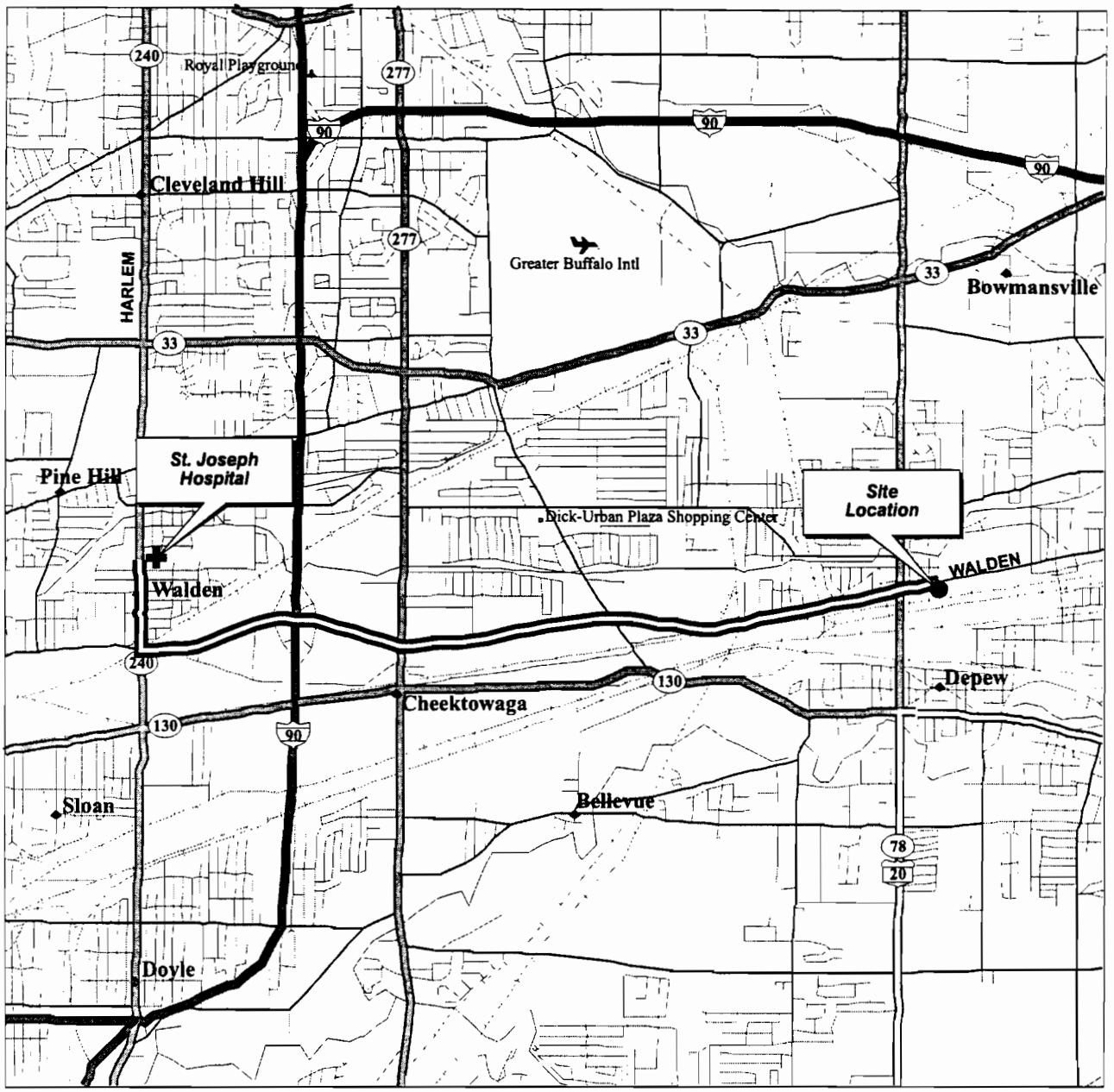
TABLE D12-1
EMERGENCY HAND SIGNALS

• Hand gripping throat	- Can't breathe.
• Grip partner's wrist, or place both hands around wrist	- Leave area immediately, no debate!
• Hands on top of head	- Need assistance.
• Thumbs up	- I am all right, OK, I understand.
• Thumbs down	- No, negative.

TABLE D12-2

EMERGENCY TELEPHONE NUMBERS

Emergency Response Agencies	
Fire	911
Police	911
Ambulance	911
Medical Facilities	
St. Joseph Hospital 2605 Harlem Road Cheektowaga, New York 14225	(716) 891-2450
Environmental and Health Agencies	
New York State Department of Environmental Conservation (Marty Doster)	(716) 851-7220
New York State Department of Health (Matt Forcucci)	(716) 851-4385
USEPA National Response Center (Chemical spills, oil spills, pollutant discharges)	1-800-424-8802
URS Corporation	
Robert Henschel	(716) 856-5636
Richard Fudeman	(716) 856-5636



APPROXIMATE SCALE IN FEET

1000 0 1000

From site location head west (left out of site) on Walden Avenue for approximately 5 miles. Turn right and head north on Harlem Road (Route 240) for approximately one mile. The hospital will be on your right.

St. Joseph Hospital
2605 Harlem Road
Cheektowaga, New York 14225

General - (716) 891-2400
Emergency - (716) 891-2450

URS

ROUTE TO THE HOSPITAL

FIGURE D12-1

AG15631-35824.00-0920000.NPV

All accidents, however insignificant, will be reported to the Site HSO, who will report the accident to the Project HSO. All personnel designated to administer first aid will have received a minimum of eight hours training in first aid and CPR, and be certified by the American Red Cross.

In the event of a serious personal injury requiring offsite medical attention, the injured person will first be moved to the Contamination Reduction Zone, where an attempt will be made to go through the decontamination procedures, including removal of protective clothing. If the injury is life-threatening, decontamination will be of secondary importance, and the injured party will be taken directly to the hospital. If a head, neck, back, or spinal injury is suspected, the injured person will not be moved and an ambulance will be summoned to the site.

D12.7 Emergency Assistance

The name, telephone number, and location of police, fire, hospital, and other agencies whose services might be required, or from whom information might be needed, will be kept in the support zone. The list is presented in Table D12-2.

If an ambulance should have to be called to the site, the injured person should meet the ambulance outside the Exclusion Zone if possible. If a head or spinal injury is suspected or the person is unconscious for any reason, medical personnel may have to come into the Exclusion Zone.

D12.8 Spills

The potential for spills to occur during onsite work at the site is minimal, since the direct handling of hazardous waste containers (drums, tanks, etc.) is not expected to be part of the scope of work. In the event that residual materials are spilled on site, the following procedures will be implemented:

D12.8.1 Liquid Spills

If a liquid (decontamination water, well development water, etc.) is spilled on a permeable surface, 2 inches of surface soil will be removed where the spill occurred and drummed. The area will later be either backfilled with clean soil or regraded. If liquid is spilled on an impermeable surface, a sorbent material will be applied to the spill area. The sorbent material will be swept up and drummed, and the spill area washed down with clean water.

D12.8.2 Soil Spills

Contaminated soil spilled on a permeable surface will be shoveled into a drum, and the top 2 inches of soil where the spill occurred will also be removed and drummed. The area will then be either backfilled with clean topsoil or regraded. If soil is spilled on an impermeable surface, the material will be shoveled (or swept) back into a drum, and the area washed with clean water.

All spills will be reported to the Project HSO within 24 hours. The Project HSO in turn will inform Dowell of the incident.

D12.9 Reports

Any emergencies, spills, or releases that occur on the site will be reported to the Project HSO and Dowell within one hour and will be followed by written notification to NYSDEC within 24 hours.

D12.10 Accident Investigation and Reporting

D12.10.1 Accident Investigations

All accidents requiring first aid which occur incidental to activities on site will be investigated. Standard OSHA formats will be used for reporting any accidents/injuries/illness that occur on the site. The investigation format will be as follows:

- interviews with witnesses,
- pictures, if applicable, and
- necessary actions to alleviate the problem.

D12.10.2 Accident Reports

In the event that an accident or some other incident such as an explosion or exposure to toxic chemicals occurs during the course of the project, the Project HSO will be telephoned within one hour and receive a written notification within 24 hours. The report shall include the following items:

- Name, telephone number, and location of the contractor, if not URS personnel.
- Name and title of person(s) reporting.
- Date and time of accident/incident.
- Location of accident/incident, (i.e., building number, facility name).
- Brief summary of accident/incident giving pertinent details including type of operation ongoing at the time of the accident/incident.
- Cause of accident/incident.
- Casualties (fatalities, disabling injuries).
- Details of any existing chemical hazard or contamination.
- Estimated property damage, if applicable.
- Nature of damage; effect on contract schedule.
- Action taken by contractor/URS to ensure safety and security.
- Other damage or injuries sustained (public or private).

D13.0 SAFETY CONCERNS AND CONTINGENCY MEASURES DURING DRILLING OPERATIONS

Drilling at this site will be conducted under the OSHA Safety and Health Standards (29 CFR 1926/1910) relative to heavy equipment operation. The following sections describe site-specific safety measures to be implemented during various phases of drilling activities.

General precautionary measures that should be taken to prevent accidents and injuries during drilling activities are:

- All underground utilities should be clearly marked.
- The driller or the driller's helper are the only people who should operate the drill rig.
- Keep hands away from moving parts.
- Do not wear loosely-fitting clothing when working near the drill rig to avoid entanglement in cables, ropes, etc.
- Personnel working near the drill rig should look upward from time to time and generally be aware of what is overhead.
- Personnel should not stand directly behind the drill rig to avoid falling or projected objects.
- No work within 25' of overhead utilities
- All personnel will be shown operation and location of "kill-switches" daily

An active drilling Exclusion Zone is established by the opening of a borehole. A photoionization detector calibrated to a benzene surrogate, an explosimeter calibrated to methane, and a particulate meter will be used in this zone. As described in Table D9-1, readings will be made at the borehole at timed intervals or every time a sample is retrieved from the borehole. Monitoring with real-time instrumentation will be performed at the borehole and around the drill rig. Action levels will be considered to have been reached when a continuous, steady reading at or above an action level has been observed.

If at any time during the drilling program, buried drums, cylinders, metal, or concrete are encountered, drilling activities will cease immediately. After obtaining instrument readings, the project geologist and the Site HSO will decide whether to continue or discontinue drilling.

D14.0 CONFINED SPACE ENTRY

Because it is not presently part of the scope of work, confined space entry requirements will not be necessary. If it does become necessary, the URS project manager will be notified prior to any confined space entry and all confined space entry will be performed in accordance with 29 CFR 1910.146.

APPENDICES

APPENDIX A

WASTE SITE WORKER TRAINING PROGRAMS

APPENDIX A

TABLE 1

WASTE SITE WORKER TRAINING PROGRAM (40 HOURS)

Introduction to Program
Sources of Reference
Hazardous Waste Operations and Emergency Response (29 CFR 1910.120)
Heat Stress/Cold Exposure
Chemical & Physical Hazards
Chemical Protective Clothing (CPC)

Toxicology
Respiratory Protection Principles
Air-Purifying Respirators (APR)
APR Inspection, Donning, and Doffing
Self Contained Breathing Apparatus (SCBA)
SCBA Checkout
SCBA Field Exercise
Review of SCBA Lab and Field Exercise
Air-Line Respirators (ALR)

Site Safety
Site Control
Decontamination
Air Monitoring Equipment
Permit Required Confined Spaces (29 CFR 1910.146)
Entry Permit Development
Confined Space Entry
Review of Confined Space Lab and Field Exercise
Material Handling and Spill Containment

Health and Safety Plans (HASP)
Emergency Response Plans (ERP)
HASP & ERP Development

Level A/B Field Exercise
Level B/C Field Exercise
Air Monitoring Equipment Lab
SCBA Proficiency Checkout

Review of Lab & Field Exercises
Review of Air Monitoring Equipment Lab
Medical Monitoring
Hazard Communication (29 CFR 1910.120)
Risk Assessment
APR Fit Test Demonstration and Certification
Written Test

APPENDIX A

TABLE 2

WASTE SITE WORKER SUPERVISORY TRAINING PROGRAM (8 HOURS)

Record keeping Requirements Under Standard 29 CFR 1910.120
OSHA Inspections
Establishing Community Relations
Employee Training and Motivation
Management Traits
Dermal Protection Program
Respiratory Protection Program
Preventative Heat Stress and Cold Exposure Management
Medical Monitoring Requirements
Reporting and Recording Occupational Injuries, Illnesses, and Exposures
Accident Prevention
Spill Containment Program
Permit Required Confined Spaces (29 CFR 1910.146)
Determining the Effectiveness of Decontamination Procedures
Implementation of Site Health and Safety Plans
Implementation of Emergency Response Plans
Implementation of the Hazard Communication Standard (29 CFR 1910.120)
Responsibilities of the Site Safety and Health Supervisor and Project Manager
Personnel Sampling
Interpretation of Air Monitoring Data

APPENDIX A

TABLE 3

WASTE SITE WORKER ANNUAL REFRESHER TRAINING PROGRAM (8 HOURS)

OSHA Requirements
Hazardous Wastes
Toxicology
Exposure Limits
Chemical Hazards
Temperature Stress
Other Physical Hazards
Radiation
Site Control at Hazardous Waste Sites
Decontamination Procedures
Personal Protective Equipment
Confined Spaces
Air Monitoring Equipment
Field Exercises

APPENDIX B

FIELD ACTIVITY FORMS

URS Greiner Woodward Clyde
282 Delaware Avenue
Buffalo, New York 14202
(716) 856-5636

HAZARDOUS WASTE ACTIVITIES HEALTH & SAFETY CHECKLIST

Project: _____

Project Manager: _____

Onsite Health & Safety Officer: _____

The Project manager, or onsite health and safety officer will signify the completion of the following items by initialing and dating each item.

	Initial	Date
Site health and safety plan prepared and approved by health and safety manager	_____	_____
All employees who will be onsite:		
. Have received initial (24 or 40 hr.) Training	_____	_____
. Have received annual 8 hr. refresher training	_____	_____
. Have reviewed the site health & safety plan and received pre-job briefing	_____	_____
. Have received respiratory protective equipment training including SCBA if required	_____	_____
. Have received negative pressure respirator fit test	_____	_____
. Have had a medical exam within the past 12 months	_____	_____

This form is to be submitted to the health and safety director prior to onsite work which may involve exposure to hazardous materials.

URS Greiner Woodward Clyde
282 DELAWARE AVE.
BUFFALO, NEW YORK 14202-1805
PHONE: (716) 856-5636
E-MAIL: URSCONS@URS-BUFFALO.COM

RESPIRATOR FIT TEST

TODAY'S DATE _____

TESTED BY: _____

EMPLOYEE NAME _____ SEX _____

DATE OF BIRTH _____ MEDICAL APPROVAL DATE _____

RESTRICTIONS _____

_____

TYPE OF RESPIRATOR(S) SELECTED

MODEL _____

SIZE _____

COMPLETE ONE FORM FOR EACH TYPE OF RESPIRATOR USED

ENTER A CHECK (✓) FOR "ACCEPTABLE" OR "U" FOR "UNACCEPTABLE" FOR EACH OF THE FOLLOWING:

_____ CHIN PROPERLY PLACED

_____ STRAP TENSION

_____ ROOM TO TALK

_____ RESPIRATOR SLIPPAGE

_____ ROOM FOR SAFETY GLASSES

_____ FIT ACROSS NOSE BRIDGE

ENTER "T" (TRUE) OR "F" (FALSE) FOR EACH OF THE FOLLOWING. (IF "F" TO ANY ONE, SUBJECT FAILS FIT TEST.)

_____ EMPLOYEE HAS COMPLETED REQUIRED TRAINING PROGRAM

_____ EMPLOYEE IS CLEAN SHAVEN IN AREA WHERE RESPIRATOR CONTACTS SKIN

_____ GLASSES AND/OR TEMPLE BARS DO NOT INTERFERE WITH SEAL

_____ FACIAL SCARS DO NOT INTERFERE WITH SEAL

_____ OTHER FACIAL FEATURES DO NOT INTERFERE WITH SEAL

_____ EMPLOYEE DOES NOT COMPLAIN OF DISCOMFORT DUE TO RESPIRATOR

_____ EMPLOYEE IS ABLE TO "SEAT" RESPIRATOR PROPERLY

_____ EMPLOYEE IS ABLE TO DEMONSTRATE ADEQUATE POSITIVE PRESSURE TEST

_____ EMPLOYEE IS ABLE TO DEMONSTRATE ADEQUATE NEGATIVE PRESSURE FIT TEST

_____ EMPLOYEE HAS WORN RESPIRATOR FOR THE TEN MINUTES PRIOR TO INITIATING THE "TEST ATMOSPHERE FIT TEST".

URS Greiner Woodward Clyde
282 Delaware Avenue
Buffalo, New York 14202
(716) 856-5636

DAILY SAFETY MEETING

DATE: _____ CUSTOMER: _____

SPECIFIC: _____

_____

SAFETY TOPICS PRESENTED:

PROTECTIVE CLOTHING/EQUIPMENT: _____

_____

CHEMICAL HAZARDS: _____

_____

PHYSICAL HAZARDS: _____

_____

EMERGENCY PROCEDURES: _____

_____

HOSPITAL/CLINIC: _____ PHONE: _____

PARAMEDIC PHONE: _____

HOSPITAL ADDRESS: _____

SPECIAL EQUIPMENT: _____

_____

OTHER: _____

_____

ATTENDEES:

NAME PRINTED: _____ SIGNATURE: _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

MEETING CONDUCTED BY:

_____ _____

Name Printed *Signature*

URS Greiner Woodward Clyde
282 Delaware Avenue
Buffalo, New York 14202
(716) 856-5636

METEOROLOGICAL DATA LOG

DATE ___/___/___ ________ TIME ________

B.P. _______._____ mm Hg

TEMP. _____.___ °C

WIND ________ AT _____ MPH

DESCRIPTION ________________

Precip. since last reading __________ in.

DATE ___/___/___ ________ TIME ________

B.P. _______._____ mm Hg

TEMP. _____.___ °C

WIND ________ AT _____ MPH

DESCRIPTION ________________

Precip. since last reading __________ in.

DATE ___/___/___ ________ TIME ________

B.P. _______._____ mm Hg

TEMP. _____.___ °C

WIND ________ AT _____ MPH

DESCRIPTION ________________

Precip. since last reading __________ in.

DATE ___/___/___ ________ TIME ________

B.P. _______._____ mm Hg

TEMP. _____.___ °C

WIND ________ AT _____ MPH

DESCRIPTION ________________

Precip. since last reading __________ in.

DATE ___/___/___ ________ TIME ________

B.P. _______._____ mm Hg

TEMP. _____.___ °C

WIND ________ AT _____ MPH

DESCRIPTION ________________

Precip. since last reading __________ in.

DATE ___/___/___ ________ TIME ________

B.P. _______._____ mm Hg

TEMP. _____.___ °C

WIND ________ AT _____ MPH

DESCRIPTION ________________

Precip. since last reading __________ in.

DATE ___/___/___ ________ TIME ________

B.P. _______._____ mm Hg

TEMP. _____.___ °C

WIND ________ AT _____ MPH

DESCRIPTION ________________

Precip. since last reading __________ in.

DATE ___/___/___ ________ TIME ________

B.P. _______._____ mm Hg

TEMP. _____.___ °C

WIND ________ AT _____ MPH

DESCRIPTION ________________

Precip. since last reading __________ in.

URS Greiner Woodward Clyde
282 Delaware Avenue
Buffalo, New York 14202
(716) 856-5636

REPORT OF ACCIDENT/INJURY

PROJECT: _____ DATE OF OCCURRENCE: _____

LOCATION: (be specific) _____

_____

TYPE OF OCCURRENCE: (check all that apply)

- ☐ DISABLING INJURY
- ☐ OTHER INJURY
- ☐ PROPERTY DAMAGE
- ☐ EQUIPMENT FAILURE
- ☐ CHEMICAL EXPOSURE
- ☐ FIRE
- ☐ EXPLOSION
- ☐ VEHICLE ACCIDENT
- ☐ OTHER (explain) _____

_____

WITNESSES TO ACCIDENT / INJURY: (and office)

_____ _____

_____ _____

_____ _____

_____ _____

INJURIES:

NAME OF INJURED: _____ OFFICE: _____

WHAT WAS BEING DONE AT THE TIME OF THE ACCIDENT/INJURY? _____

_____

_____

_____

_____

_____

_____

_____

U.S. Department of Labor

Bureau of Labor Statistics
Supplementary Record of Occupational Injuries and Illnesses

This form is required by Public Law 91-596 and must be kept in the establishment for 5 years. Failure to maintain can result in the issuance of citations and assessment of penalties.

Case or File No.

Form ADD
O.M.B. No. 1220

Employer

1. Name

2. Mail address *(No. and street, city or town, State, and zip code)*

3. Location, if different from mail address

Injured or Ill Employee

4. Name *(First, middle, and last)*

Social Security No.

5. Home address *(No. and street, city or town, State, and zip code)*

6. Age

7. Sex: *(Check one)* Male ☐ Female ☐

8. Occupation *(Enter regular job title, not the specific activity he was performing at time of injury.)*

9. Department *(Enter name of department or division in which the injured person is regularly employed, even though he may have been temporarily working in another department at the time of injury.)*

The Accident or Exposure to Occupational Illness

If accident or exposure occurred on employer's premises, give address of plant or establishment in which it occurred. Do not indicate department or division within the plant or establishment. If accident occurred outside employer's premises at an identifiable address, give that address. If it occurred o a public highway or at any other place which cannot be identified by number and street, please provide place references locating the place of injury as accurately as possible.

10. Place of accident or exposure *(No. and street, city or town, State, and zip code)*

11. Was place of accident or exposure on employer's premises? Yes ☐ No ☐

12. What was the employee doing when injured? *(Be specific. If he was using tools or equipment or handling material, name them and tell what he was doing with them.)*

13. How did the accident occur? *(Describe fully the events which resulted in the injury or occupational illness. Tell what happened and how it happened. Name any objects or substances involved and tell how they were involved. Give full details on all factors which led or contributed to the accident. Use separate sheet for additional space.)*

Occupational Injury or Occupational Illness

14. Describe the injury or illness in detail and indicate the part of body affected. *(E.g., amputation of right index finger at second joint; fracture of ribs; lead poisoning; dermatitis of left hand, etc.)*

15. Name the object or substance which directly injured the employee. *(For example, the machine or thing he struck against or which struck him; the vapor or poison he inhaled or swallowed; the chemical or radiation which irritated his skin; or in cases of strains, hernias, etc., the thing he was lifting, pulling, etc.)*

16. Date of injury or initial diagnosis of occupational illness

17. Did employee die? *(Check one)* Yes ☐ No ☐

Other

18. Name and address of physician

19. If hospitalized, name and address of hospital

Date of report | Prepared by | Official position

OSHA No. 101 (Rev. 1981)

APPENDIX C

STANDARD OPERATING SAFETY PROCEDURES

APPENDIX C STANDARD OPERATING SAFETY PROCEDURES

Rules for onsite personal safety are shown in Appendix C, Table 1; rules for operational safety appear in Appendix C, Table 2.

APPENDIX C

TABLE 1

PERSONAL SAFETY RULES

- Visual contact must be maintained between crew members on site.

- Any practice that increases the probability of hand-to-mouth transfer and ingestion of materials is prohibited in any area designated as contaminated. These practices include as a minimum, eating, drinking, chewing gum or tobacco, and smoking.

- Hands and face must be thoroughly washed upon leaving the work area, and before engaging in any other activities, especially eating or drinking.

- Due to interference of facial hair with the mask-to-face seal on air-purifying respirators, personnel working on site will not be permitted to wear facial hair that interferes with the seal.

- Contact with contaminated surfaces or surfaces suspected of contamination should be avoided. Site personnel should avoid walking through puddles, mud, or other discolored areas, and should not kneel or sit on the ground.

- Field personnel shall be familiar with the physical characteristics of the site, including:

  - wind direction in relation to the working area
  - accessibility to associates, equipment, and vehicles
  - communications
  - work zones
  - site access

- Medicine and alcohol can exacerbate the effect from exposure to toxic chemicals. Prescribed drugs should not be taken by field personnel where the potential for absorption, inhalation, or ingestion of toxic substances exists unless specifically approved by a qualified physician. Alcoholic beverage and controlled substance intake is strictly forbidden during onsite operations.

APPENDIX C

TABLE 2

OPERATIONAL SAFETY RULES

- No visitors shall be allowed into any Exclusion Zone without the permission of the NYSDEC.
- Onsite personnel must use the buddy system when wearing respiratory protective equipment. A third person, suitably equipped, is required as a safety backup during initial site entries.
- During day-to-day operations, onsite workers will act as a safety backup to each other. Offsite personnel will provide emergency assistance.
- Wind indicators will be set up so as to be visible from the Exclusion Zone.
- Daily briefings will be held to review site hazards, changes in level of personal protection required, special safety precautions for assigned work activities, and emergency response.
- All personnel going on site must be thoroughly briefed on anticipated hazards, and trained on equipment to be worn, safety procedures, emergency procedures, and communications.